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Heading for New Frontiers in Purchasing and Supply Management

5th International Annual IPSERA Conference
Organised by the Eindhoven University of Technology (TUE)
Eindhoven, The Netherlands
April 1-3, 1996

IPSERA
International Purchasing & Supply Education & Research Association

Sponsored by the Dutch Association of Purchasing Management (NEVI)
Introduction

This year IPSERA will celebrate its first jubilee! Five years ago our colleagues in the UK decided to form a scientific body of academics and practitioners, who were specifically interested in both education and research in the developing area of Purchasing and Supply Management. What has started as a UK initiative has turned into a rapidly growing international community with already strong and still developing ties in many countries in Europe. As an illustration for this may serve that this year, the annual IPSERA Conference takes place outside the UK. We, at Eindhoven University of Technology, are proud and very pleased that we may host this important event. It is a pleasure to welcome you, and we hope that your stay here will be both fertile and enjoyable.

IPSERA suffers, as we actually have experienced, from a growing interest from both practitioners and researchers. Due to the large interest for presenting papers at this Conference, we had to apply a review-procedure — for the first time — in order to select the most promising papers. Every abstract, which has been submitted, has been refereed by at least two independent international reviewers. This job has been conducted with great care by all reviewers. Given the timeschedule of the Conference, we were aware that we could only allow about half of the abstracts that had been submitted.

The papers included in these proceedings therefore, only present just a small part of the ideas and subjects on which researchers and practitioners throughout Europe are currently working. From this point of view, the proceedings are far from complete, but we hope that it will serve as a guide to any researcher and practitioner during this Conference. It will provide guidance in ideas and developments that are or will be 'hot' in purchasing and supply management in the near future. It will also facilitate the exchange of views, thoughts, and ideas among colleagues, and may enable the strengthening of existing relationships or the development of new ones.

In this respect, these preprints serve as a vehicle for the theme of this year's Conference; we hope it will enable you to head for, and touch upon new frontiers in purchasing and supply management. We wish a fine Conference!

On behalf of the Organising Committee,

Prof. dr Arjan J. van Weele
Chairman, 1996 IPSERA Conference
Conference Sponsors

IPSERA and the Eindhoven University of Technology would like to thank the:

- NEVI (the Dutch Association of Purchasing Management)
- ASPA Kantoorartikelen BV
- British Airways
- Factor BV
- Heineken Nederland BV; and
- Philips Electronics NV

for their kind donations of sponsorship to the 5th International Annual IPSERA Conference.
Conference Organisation

The 1996 IPSERA conference is organised by the following people:

- **prof.dr. Arjan J. van Weele**
  Professor of Purchasing Management, Graduate School of Industrial Engineering and Management Science, Section of Business Economics and Marketing, Eindhoven University of Technology, The Netherlands.

- **ing. Piet Jurg**
  Employee at the Graduate School of Industrial Engineering and Management Science, Section of Business Economics and Marketing, Eindhoven University of Technology, The Netherlands.

- **drs. J.Y. Finn Wijnstra**
  Ph.D. Candidate on the Role of Purchasing in New Product Development, Graduate School of Industrial Engineering and Management Science, Section of Business Economics and Marketing, Eindhoven University of Technology, The Netherlands.

- **ir. Rob H.A. van Stekelenborg**
  Ph.D. Candidate on Information Systems for Purchasing, Graduate School of Industrial Engineering and Management Science, Section of Information & Technology, Eindhoven University of Technology, The Netherlands.

- **Drs. Carla L.A. Schreurs**

- **Joris de Lint**
  Student at the Graduate School of Industrial Engineering and Management Science, Eindhoven University of Technology, The Netherlands.

The international referee committee of the 1996 IPSERA conference consisted of:

- **prof. B. Axelsson**, Uppsala University, Sweden
- **Mr. J.W. Ederveen**, NEVI, The Netherlands
- **prof. R.C. Lamming**, University of Bath, United Kingdom
- **prof. J. Telgen**, University of Twente, The Netherlands; and
- **prof. A.J. van Weele**, Eindhoven University of Technology, The Netherlands
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Maps

The map on the left is a schematic map of Eindhoven.

The Eindhoven University of Technology can be reached easily by car as well as by public transport.

All university buildings are on walking distance (5 min.) of Eindhoven's central railway station.

The map below is a detail map of the University Campus. The conference halls are situated in the University's Auditorium (AUD). All sessions as well as luncheons will take place in the Auditorium.

Conference Halls and Plan

Below you can find a schematic plan of the Auditorium.

Please note that the plenary sessions will take place in the Blue Hall on the 1st level of the Auditorium, and that all parallel tracks will take place in the Conference Halls on the 2nd level of the Auditorium. The parallel tracks numbered 1 through 4 will take place in the corresponding Conference Halls on the 2nd level.

During the conference there is the possibility to visit an exhibition with stands of publishers, software vendors and the Eindhoven University of Technology. This exhibition will take place between the Blue Hall and the Senator's Hall.

Poster presentations will take place opposite of the Senator's Hall and the Conference Halls and can be visited throughout the conference.

All breaks, luncheons as well as the buffet on Monday evening will take place in the Senator's Hall on the 1st level.
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1. Introduction

"After the recession... many authors began to tout the fact that the purchasing department had emerged from corporate obscurity and, at long last, had taken its rightful place in corporate hierarchy. Yet, there remains some question as to whether these gains were enduring or short lived. In fact, Farmer suggests that purchasing's ability to impact corporate strategic decisions has gained little ground since the economic chaos of ....".

These words of Spekman and Hill (1980) and the original Farmer (1978) citation have an ominously familiar ring (Ellram and Carr 1994). Certainly since the late 1970's, there have been dramatic changes in the supply management field to suggest that the current environment might prove Farmer's conclusions wrong. The growing recognition of supply management as an area for achieving competitive advantage would suggest that finally, perhaps, purchasing is achieving its long overdue position, along with marketing and operations, as a key element in corporate strategy. It seems appropriate, therefore, to revisit the role of purchasing in corporate strategy to see what has really changed in the past 15 years. This paper reviews several fundamental environmental changes, identifies the anticipated impact these changes should have had on the role of purchasing in corporate strategy and uses an existing data base to test several suggested propositions. We interpret and provide several reasons for the contradictory results. In addition, we provide some advice for future research into the purchasing strategy-firm performance arena.

Purchasing's Role in Corporate Strategy

Do strategic supplier alliances make a difference?

Ian Stuart

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Abstract

The role of purchasing and supply in corporate strategy has been discussed in prior research, mostly from a broad conceptual level with relatively little empirical validation. This paper uses the results from a longitudinal study of buyer-supplier relationships to evaluate the impact from firms' recent initiatives in developing strategic supplier alliances on purchasing's role in the corporate hierarchy. Contrary to anticipated results, the use of an alliance approach of managing suppliers did not lead to any appreciable improvement in status and respect for purchasing's role within the organisation in developing corporate strategy. Several propositions are offered to explain these results including a need for reassessing the major conceptual models of purchasing strategy. Further research is called for to empirically verify the link between strategic consideration for supply issues and firm success.

1. Purchasing's strategic role

2. The changing face of supply management

The past fifteen years has witnessed dramatic changes in many firms' approach to supply chain management. A more focused approach by firms consistent with emphasis on "core competencies" (Quinn 1992; Prahalad and Hamel 1990) has reduced many firms' degree of vertical integration and raised the relative cost component of externally sourced goods and services, as Gunn (1987) predicted. The influence of Deming, from a quality perspective, Porter (1985), from a conceptual perspective and the Japanese, from a management perspective, have led to an apparent paradigm shift in supplier relations. At the very least, firm's are actively developing vendor certification programs, tiering their suppliers according to some assessment of supplier performance, initiating true supplier development programs (Leenders 1966) and attempting to reduce their supply base to more manageable levels. In some cases, firms have established supplier partnerships or strategic supplier alliances with a select few suppliers to exploit the synergistic effects of a more collaborative approach to supply arrangements. These alliances are particularly effective in improving the new product development process and assisting with technology exchanges (Kamath and Liker 1994; Dodgson 1991; Doz 1988).

While there have been numerous studies of late on the implementation problems and benefits from these new forms of relationships (Stuart and McCutcheon 1995; Ellram 1995), little is known about what these changes imply with respect to the role and organisational structure of purchasing within the firm. Has this modern supply management approach led to an increase in the strategic positioning of purchasing within the firm, as Ellram and Carr (1994) would suggest? If so, what is the impact of these changes on the current reporting relationships and reward systems for purchasing? Will these changes be entrenched or are they another example of heightened awareness subject to easy reversal? This paper explores some of these questions.

3. Purchasing's strategic role

Recently, the purchasing strategy research has been reviewed and evaluated (Ellram and Carr 1994) and classified into a number of different perspectives. Much like the argument for consistency between operations strategy and corporate strategy (Richardson, Taylor and Gordon 1985; Stobaugh and Telesio 1983), some authors have suggested that there should be consistency or goal congruency between operations strategy and purchasing (e.g. Watts, Kim and Hahn 1992; Landeros and Moncza 1989; St. John and Young 1991). Purchasing performance could then be evaluated by whether or not such consistency was found (St. John and Young 1991; Carlson 1990; Caddock and Dale 1987). Purchasing strategy in this context is then reduced to a more tactical level to ensure that all efforts of purchasing are consistent with operational approaches. The approach's premise is that purchasing can be little more than a supportive function whose strategy is determined by another functional group.

There are potential problems with this concept. For one, consistency does not guarantee appropriate choice since the operations strategy may be flawed. More importantly, other researchers have identified the firm's environmental context as playing a large part in purchasing importance. For example, Van Weele (1984) indicated high level strategic involvement for purchasing was found in situations of supply availability problems. Extraction type industries of commodity or near commodity products would be particularly good examples where supply related issues drive the corporate strategy. Econometric studies of long term supply and demand projections may provide the impetus for strategic initiatives and major capital investment projects (e.g. expensive oil sands extraction or offshore oil development in
hostile climates). In this case, the operations strategy would follow from the supply strategy.

Others have defined purchasing strategy as a selection of important supply related issues (Culliton 1956; Burt and Soukup 1985; Van Weele 1984; Freeman and Cavinato 1980) and then examined how effective purchasing was in addressing these strategic issues (Farmer 1978; Spekman and Hill 1988). This approach suggests the existence of some "world class" areas of purchasing importance areas and then audits the organisation on these dimensions. One major drawback of this approach is the potential validity of the findings due to respondent bias. Browning, Zabriskie and Huettman (1983) suggest that it would be naive to think that the firm is not evaluating and discussing key supply strategy issues. However, these discussions may be taking place outside purchasing departments. To be valid, this research stream must assume that administrative areas (purchasing departments) and responsibilities (purchasing function) are aligned with strategic topic areas, an assumption that can be challenged.

A third purchasing strategy research stream focuses on the corporate strategy decision making approach and the role that purchasing plays in shaping and developing the overall corporate strategy. These authors use variations of the Mack and Wheelwright (1984) staged or evolutionary model for manufacturing strategy, based on the notion that operations strategy defines the corporate distinctive competencies and technical core (Hayes 1985; Kim and Arnold 1991). The model is reinterpreted for a supply context and the consistency between the firm's development and the evolution of supply management within that firm is evaluated (Reck and Long 1988; Freeman and Cavinato 1980). These authors argue that the purchasing function evolves over time through four distinctive phases, suggesting that purchasing can be one of passive, independent, supportive or integrative. The supportive approach, according to the Reck and Long (1988), is associated with certain behavioural or value characteristics including "considering suppliers as a resource which is carefully selected, motivated, monitored and developed". At the integrative extreme, "purchasing's strategy is fully integrated into the firm's competitive strategy and constitutes part of an integrated effort among functional peers to formulate and implement a strategic plan". Reck and Long (1988) suggested typical characteristics or indicators that such an integrative role has been competitive strategy requirements and performance measured in terms of "considering suppliers as a resource which is carefully selected, motivated, monitored and developed". At the integrative extreme, "purchasing's strategy is fully integrated into the firm's competitive strategy and constitutes part of an integrated effort among functional peers to formulate and implement a strategic plan". Reck and Long (1988) suggested typical characteristics or indicators that such an integrative role has been competitive strategy requirements and performance measured in terms of "considering suppliers as a resource which is carefully selected, motivated, monitored and developed". At the integrative extreme, "purchasing's strategy is fully integrated into the firm's competitive strategy and constitutes part of an integrated effort among functional peers to formulate and implement a strategic plan".

Hypothesis 1: Alliance practising firms will display an increase in purchasing's image and involvement in the corporate strategic making process.

Because the alliance decision involves a more intensive approach to supplier selection and supplier management incorporating multiple attributes and multiple customer assessments, a team-based buying approach is generally viewed as imperative (Monczka and Trent 1993). Such a cross-functional team, despite any initial process related problems, will increase the purchasing representatives' visibility within the organisation. Eventually, this should be reflected in increased informal recognition of purchasing's role in strategy formulation (hereafter referred to as "purchasing's strategic involvement"). Consistent with prior research (Mohr and Spekman 1994; Lamming 1995; Mowery 1988), the activities associated with alliances are synonymous with and can be measured using scales evaluating the degree of "joint problem solving".

Hypothesis 2: The growing dependency on outside sourcing will increase the role of purchasing in the corporate strategy.

Gunn (1987) suggested that financial reasons alone can raise the profile of purchasing within an organisation. Both Quinn's (1992) and Prahalad et al. (1990) arguments concerning core competencies suggest a continued trend towards outsourcing all but the most vital of a firm's expertise and skills. These two factors should combine, from a risk perspective (technological, business and financial), to increase the impact of purchasing related issues within the firm. As such, we should witness an increased reliance on outside sources as causing increased reliance on both supplier alliances (a counterbalancing risk reduction strategy involving high governance costs) and increased role in corporate strategy for purchasing.

Hypothesis 3: Alliance practising firms should experience increased benefits (productivity, quality and ultimately competitive advantage) which serve to reinforce and improve purchasing's strategic posture.

The use of the alliance approach has been reported to yield firm specific success in terms of productivity and competitive advantages (Lamming 1993; Mohr and Spekman 1994; Monczka et al. 1990; Stuart 1993). These performance results not only tend to reinforce the desire to maintain such relationships but should also serve to make visible the impact that purchasing can have on the firm's bottom line. Convincing top management that purchasing can indeed make a difference represents an "internal marketing" effort required to strategically position the purchasing function. Successful internal marketing should improve top management's respect for purchasing as a place where advantages can be achieved. In summary, the successes
from alliance activities, initiated and managed by purchasing, will serve to provide the basis for convincing top management of purchasing's increased financial impact as well as providing the basis for purchasing involvement in determining competitive strategy. We can think of this concept as a time dependent feedback loop whereby the performance results become the engine that supports continued alliance activities, raises the impact/importance of purchasing and increases purchasing's strategic involvement. The total impact includes direct and indirect effects.

In summary, if Reck and Long's (1988) model has validity, firms that practice alliance activities and measure their purchasing performance based on contribution to corporate success should be clearly distinguishable from their transaction based peers in terms of respect, image, and involvement in corporate strategy.

5. Research design

Testing such a model requires some consideration for the implied temporal elements. For example, we have hypothesised that performance results would have an influence, over time, on the role that purchasing plays in the competitive strategy formulation procedure. Cross sectional data can be used to test some of the model's elements but this temporal relationship would require a different approach. Fortunately, we had access to a data base that measured purchasing managers' degrees of commitments to problem solving efforts, results, and role & status within the organisation at two separate time intervals; 1991 and 1994.

The 1991 data base consisted of 88 purchasing executive responses to a mailed questionnaire related to ongoing research into strategic supplier alliances. Some of these executives reported active involvement in strategic supplier alliances. Others reported more traditional transactional approaches to supply chain management. The groups were segmented into three sets; those that are operating, according to Reck and Long (1988), in a passive mode, those operating in an integrative mode and a neutral group covering the Independent/Supportive category.

These same purchasing executives were resurveyed in the summer of 1994 as part of a separate research initiative on supplier alliance trends. In the end, 41 purchasing executives provided responses for both the 1991 and 1994 time frames. The 41 purchasing responses that were available in both 1991 and 1994 were tested and found to be a reasonably representative sample of the original and larger data base. Clearly, a larger longitudinal data base, albeit expensive to develop and track over time, would be advisable for future research. Scales were developed to measure the various constructs. Scale reliabilities, as indicated by cronbach alpha values, exceeded 0.65 in all cases, sufficient for the exploratory nature of the research (Nunnally 1978). It should be noted that the Performance Results scale measures objectives along three domains (faster, cheaper, better) and a high cronbach alpha value for this scale should not be anticipated.

We then tested our hypotheses that the groups would differ on levels of potential impact, strategic profile and performance. Because of the relatively small sample sizes available at both time periods, we limited our analysis to test of group mean differences with grouping based on the degree of joint problem solving underway. Those scoring low on this scale (less than 3.60 on a 5 point scale) were considered as Passive purchasing firms (n=20), those scoring high on this scale (greater than 4.25) were considered as Integrative (n=26) while the balance (n=43) were considered as Independent/Supportive, a neutral category. We show the results in Table 1.

<table>
<thead>
<tr>
<th>Table 1. Comparison of Group Means Based On Strategy Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALLIANCE ACTIVITIES</strong></td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>PASSIVE</td>
</tr>
<tr>
<td>(n=20)</td>
</tr>
<tr>
<td>POTENTIAL IMPACT</td>
</tr>
<tr>
<td>STRATEGIC PROFILE</td>
</tr>
<tr>
<td>PERFORMANCE RESULTS</td>
</tr>
</tbody>
</table>

As shown in Table 1, the three groups differed significantly (statistically and managerially) in only one common dimension; Performance Results. Directionally, all the group means do trend in a consistent direction. Only in the extreme case of comparing Passive groups with Integrative groups does the difference in Impact and Strategic Profile become significant. In sum, therefore, there is some support for Reck and Long's (1988) conceptual model, although it is not overwhelming. The more that firms practised alliance type activities, the more these same firms claimed competitive advantage gains through their purchasing efforts, enjoyed a stronger strategic profile in the company, and had successfully convinced top management of purchasing's importance to corporate success. However, the differences in the Strategic profile and impact are only evident in comparing the most extreme forms of purchasing classifications. We also include the correlation matrix at the bottom of the table. It indicates that the direction and strength of association is consistent with these conclusions.

In an attempt to explore the time dependent propositions, we made use of the 41 purchasing executive responses who responded in 1994 to the resurvey. Because of the limited number of 1994 responses, we only present the statistics for the two extreme groups in Table 2 and limit our discussion to Passive versus Independent groups.
Table 2. Strategy Classifications For Successive Respondents (Mean Rank Sum)

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>PASSIVE 1991 (n=9)</th>
<th>INTEGRATIVE 1994 (n=17)</th>
<th>PASSIVE 1994 (n=6)</th>
<th>INTEGRATIVE 1991 (n=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>POTENTIAL</td>
<td>8.17</td>
<td>15.10*</td>
<td>8.42</td>
<td>12.26</td>
</tr>
<tr>
<td>IMPACT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRATEGIC</td>
<td>10.56</td>
<td>13.67</td>
<td>12.50</td>
<td>11.82</td>
</tr>
<tr>
<td>PROFILE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERFORMANCE</td>
<td>5.89</td>
<td>16.47*</td>
<td>5.50</td>
<td>14.29*</td>
</tr>
<tr>
<td>RESULTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Statistically different from Passive group at 0.05 level
- Note: Comparison of absolute mean rank values between groups of differing sizes is inadvisable.

Because of the small sample sizes, tests were based on non parametric statistics (Mann Whitney Wilcoxon rank sum). Briefly, the comparison of groups in 1991 revealed significant differences in the Performance results and Potential impact. However, by 1994, only the Performance Results were statistically different. In fact, purchasing’s involvement in the corporate strategy was virtually identical in low alliance activity companies as it was in high alliance activity companies! Despite 2 1/2 years of continued effort at forging new forms of supplier relationships and a strong perception that such efforts yielded performance benefits, the purchasing executives, relative to the Passive companies, felt no better off in terms of their role in corporate strategy. These results are confirmed by examining the correlation matrix for all 41 purchasing managers for both 1991 and 1994 shown in Table 3. The 1991 results are consistent with our previous analysis of the larger data set in 1991 that we presented in Table 1. However, because of the smaller sample sizes, some associations lose statistical significance (e.g. alliance activities with strategic profile). Our examination of the correlation matrix does reveal some interesting points. While alliance activities tended to be positively associated with performance results, regardless of the time period, such activities appeared to have little association with Strategic Profile. There is some indication that the more consistent indicator of purchasing’s strategic role in corporate strategy rests with the extent to which purchased inputs represent a considerable expense for the firm, supporting Van Weede’s (1984) environmental context model and Gurun’s (1987) proposition.

Table 3. Correlation coefficients (n=41, 1991, 1994)

<table>
<thead>
<tr>
<th></th>
<th>ALLIANCE ACTIVITIES</th>
<th>POTENTIAL IMPACT</th>
<th>STRATEGIC PROFILE</th>
<th>PERFORMANCE RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1.0000</td>
<td>0.3559</td>
<td>0.1997</td>
<td>0.0615</td>
</tr>
<tr>
<td></td>
<td>p=0.002</td>
<td>p=0.511</td>
<td>p=0.045</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>0.1879</td>
<td>0.0264</td>
<td>0.0513</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p=0.239</td>
<td>p=0.870</td>
<td>p=0.000</td>
<td></td>
</tr>
<tr>
<td>POTENTIAL IMPACT</td>
<td>1.0000</td>
<td>0.2589</td>
<td>0.1823</td>
<td>0.4023</td>
</tr>
<tr>
<td></td>
<td>p=0.103</td>
<td>p=0.002</td>
<td>p=0.0186</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>0.3790</td>
<td>0.0264</td>
<td>0.1823</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p=0.042</td>
<td>p=0.315</td>
<td>p=0.0186</td>
<td></td>
</tr>
<tr>
<td>STRATEGIC PROFILE</td>
<td></td>
<td>1.0000</td>
<td>0.1833</td>
<td>0.226</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=0.026</td>
<td>p=0.0186</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>0.1253</td>
<td>0.043</td>
<td>0.043</td>
<td></td>
</tr>
</tbody>
</table>

In general, our results do not provide much support for Beck and Long’s (1988) strategy model. Alliance activities appear to be largely unrelated to the strategic role that purchasing plays in corporate strategy. Despite the effort expended by some companies on building and maintaining supplier alliances, our data suggests that the strategic role of purchasing has remained virtually unchanged and not statistically different than those firms practicing traditional transaction approaches. Farmer’s (1978) comments appear to be as relevant today as ever. In the words of Rodney Dangerfield, “purchasing gets no respect”.

6. Rethinking the concept of purchasing strategy

There are a number of possible explanations for the results seen beyond the traditional criticism of questionnaire survey results. For one, we may be witnessing the effect of diminishing returns. One might argue that supplier relations were extremely poor prior to 1991 and that the improvements registered since that time have been sufficient that other priorities have replaced purchasing as the squeaky wheel that gets the oil. Perhaps the focus has switched to internal operations, labour costs or technological improvements as the key focus of management attention. Certainly, there has been a more recent emphasis placed on revenue enhancement compared to a cost reduction focus during the early 1990’s. In addition, one could argue that the lean supply strategy received its initial support based on an emphasis on Total Quality Management, an area of declining enthusiasm in business practice. Similarly, the supplier partnership approach may have been oversold as a panacea for supply related problems. These arguments might help in explaining the contrary data results for ‘potential impact’.

A second possible explanation might lie in the activities associated with alliances and modern supply management. These activities rely more heavily on cross functional teams and end customer evaluations & assessments of supplier performance. Some might argue that such a cross disciplinary approach to supplier evaluation and monitoring has created confusion in the roles and responsibilities of...
purchasing departments. What exactly does purchasing "bring to the table" in terms of meaningful contribution to supply management (Leenders 1995)? Does an effective and efficient modern supply management approach displace the natural power and authority of purchasing as the key buying agency? And how can we explain the relative degree of success of Passive/Independent firms in becoming recognised as an important facet in corporate strategy despite the apparent traditional approach to supply management adopted? It may be possible that implementing a successful strategic supplier alliance, while it may be initiated and vehemently supported by purchasing, is only successful in the longer term through the direct collaboration between the supply firm and the internal buying firm customers, predominately operations. Thus, we may witness an increase in purchasing importance but it may not be related to importance of the administrative department.

This raises an interesting aspect of measurement error with which purchasing research must contend. Regardless of the prior research orientate, be it consistency, strategic activities or evolutionary, there has been general confusion created by referencing strategic elements (e.g. make or buy, form of supplier relationship, extent of value analysis/value engineering) at the same time as discussing those individuals within the purchasing department who arguably represent the most appropriate home for making and contributing to those decisions. The confusion stems from the difference in terminology between purchasing function and purchasing department, a difference that is not merely one of semantics (Dobler, Burt and Lee 1990). A departmental view focuses on the activities that occur within an administrative group called 'purchasing' in an organisation. The functional view is more aligned with activities associated with supply, regardless of where such decisions are made. The major difference is that on such activities, there has been dominated by a frame of reference consistent with a departmental view of purchasing or have combined the functional view for defining activities with a departmental view for empirically examining whether the firm is fulfilling the requirements in these areas. To avoid such confusion, future researchers would be well advised to focus on the role of externally sourced goods and services. As the trend to outsourcing continues, we may see an increase in purchasing importance but it may not necessarily translate into an elevated role for purchasing departments. Despite many firms' efforts at instituting strategic supplier alliances, the purchasing department has not advanced significantly in the corporate strategy involvement. In fact, one could conclude that the more traditional transactional and adversarial approach to supplier management offered as much opportunity to improve purchasing reputation as did the alliance approach.

While there were several explanations offered for the confusing results, at least part of the answer lies in confusion between purchasing as a function and purchasing as a department and the conceptualisation of purchasing strategy to date. Our efforts in the purchasing strategy field may be wasted unless we begin to tap the internal customers' perspectives (operations, quality engineers) as well as the most senior levels of the corporation. When out sourced goods' and services' expenses can typically represent 50-70% of total costs, our knowledge of how supply chain management supports and contributes to corporate strategy remains primitive. Clearly, additional research is required.

References


7. Conclusion

We have examined, in this paper, several conceptual models or themes that were apparent in the literature on purchasing strategy. Using the Rock and Long framework, we used an existing data set to examine if purchasing had "finally emerged from corporate obscurity to take its rightful place in corporate hierarchy". The answer, based on the analysis, was apparently a brief fling with notoriety but an effort lacking in endurance. We have yet to see the marathon runner emerge despite progress made in training our sprinters. We did see support for those authors who contended that the strategic profile for supply issues is related to how much is spent on externally sourced goods and services. As the trend to outsourcing continues, we would anticipate a continuation of this trend. However, this increased supply related importance does not necessarily translate into an elevated role for purchasing departments. Despite many firms' efforts at instituting strategic supplier alliances, the purchasing department has not advanced significantly in the corporate strategy involvement. In fact, one could conclude that the more traditional transactional and adversarial approach to supplier management offered as much opportunity to improve purchasing reputation as did the alliance approach.

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Why Purchasing Strategies Must Become Supply Strategies

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Abstract
This paper seeks to reconcile the ways in which organisations endeavour to derive competitive advantage, with the continued advancement of a 'strategic' role for the Purchasing function. The research was conducted in the UK in 1995 using in-depth interviews with eight leading UK based companies. The study sought to provide an insight into the ways the Purchasing functions within these organisations organised themselves to make an effective contribution to the business strategy. What can be seen from the research are two distinct approaches to this task. The first, emphasises functional development, whilst the second seeks to promote an organisational-wide view of supply issues. The report concludes that the belief that Purchasing will achieve 'strategic' status through the development of functional excellence can be considered parochial at best. The function would be better served promoting its skills within a cross-functional environment to ensure that organisations develop robust and effective supply strategies that are consistent with the business strategy.

1. Introduction
During the 1980's the strategy literature was dominated by the concepts of industrial organisation economics (Porter, 1980, 1985) which emphasised the effects of industry structure and product/market positioning on the profit earning potential of organisations. More recently, efforts to counter this view have led to a renewed interest in the resource based view of the organisation (Rumelt, 1984; Hamel and Prahalad, 1993). Whereby, proponents argue that competitive advantages are derived through processes of resource accumulation and deployment, leading to the development of idiosyncratic higher order capabilities.

Implicit in such a view is that the fortunes of an organisation are not determined by its choice of industry or by the relative position it holds within that industry. What cannot be ignored is that under similar conditions, some organisations are successful whilst others are not. Organisations that are able to accumulate, develop and integrate several different process skills into a complex strategy-making 'capability' might thus be expected to outperform less process capable organisations. Such organisations will possess difficult to copy assets and capabilities of suppliers and customers in a way that improves the performance of all three. Whereas an organisation's hierarchical structure is typically a slice-in-time view of responsibility and reporting relationships, its process structure is a dynamic view of how it adds value (Davenport, 1993: p6).

This attempt to integrate the organisation is founded on the belief that organisations are more innovative and generally more effective when the various parts are integrated into a single, consistent and uniform whole, where a strong corporate culture prevails over weaker 'local' subcultures (Bate, 1994: p55). The result of such a transformation is the blurring of the organisation's boundaries internally and externally creating an extended network that includes suppliers and customers.

Drawing upon original empirical research this paper seeks to reconcile these developments with the ongoing efforts of the Purchasing function to achieve 'strategic status'. Using in-depth face-to-face interviews, the following questions were pursued:

- What is the current role of Purchasing in the company's strategy making process?
- What do you think the role should be?
- What do you think are the challenges facing the organisation?

The issues of concern within this subject area included: 'How does Purchasing ensure that its actions are consistent with the goals of the organisation? and 'What are the current barriers to this course of action? To provide context to the study issues such as the nature of the organisation's chosen industry, its culture, and the skill profile within the Purchasing function were explored.

Much of the literature advocating the elevation of the Purchasing function to a 'strategic status' has been based on rational, economic argument. (Adamson, 1980; Spekman, 1989; Hadnan, 1980). Such a rational logical approach may not most accurately reflect the way in which the organisational decision-making process functions. Recognition must be given to the political and behavioural factors (Azzi, 1979) which are present as individuals and functions throughout the organisation endeavour to influence decision outcomes.

2. The Research
Eight companies were chosen to be included in the research study (see Table 1). These were chosen on a non-random basis. They were considered appropriate on the basis that they were all material intensive high profile companies who held prominent positions in their respective industries and, as such, their philosophies and current working practices would be of interest to all. The research was not intended to determine the existence or frequency of any particular phenomena that would be generally applicable in a wider context, but rather to provide a rich insight into the current thinking and approaches to supply related issues of some of the UK's leading companies.
Face to face interviews were conducted with senior members of the Purchasing function. These interviews were designed to identify the way in which the Purchasing function was organised (see Table 2, next page) and the ways in which it sought to add value to the business.

3. Findings From Cases

3.1 Organising the function

All the companies involved in the research perceived a re-organisation of the Purchasing function to be a prerequisite to improving performance. Companies B, C, E and G have all developed centre-led structures in response to the need to adopt a strategic approach to supply related issues. Their role encompasses all aspects of the Purchasing and supply chain management process. This includes:

- Providing guidance and direction to supply strategies
- Co-ordinating purchasing activities across the organisation to optimise leverage
- Driving cost and inefficiencies out of the supply chain
- Creating networks with academics and practitioners alike to develop best practice

These teams are comprised of high calibre, multi-skilled personnel who are capable of providing holistic solutions to business problems.

Table 1. The Case Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>A division of a UK aerospace manufacturer. Group sales £10bn.</td>
</tr>
<tr>
<td>Company B</td>
<td>UK based manufacturer and supplier of pharmaceuticals and equipment. Sales £2.5bn.</td>
</tr>
<tr>
<td>Company C</td>
<td>A Japanese subsidiary providing Information systems, solutions and services. Sales £1.9bn.</td>
</tr>
<tr>
<td>Company D</td>
<td>A division of a manufacturer of components and systems for the aerospace and automotive industries. Group sales £2.5bn.</td>
</tr>
<tr>
<td>Company E</td>
<td>A Japanese vehicle manufacturer for the UK market. Sales £1bn.</td>
</tr>
<tr>
<td>Company F</td>
<td>Subsidiary of an international supplier of data processing systems and software solutions. Group sales £2bn.</td>
</tr>
<tr>
<td>Company G</td>
<td>An international healthcare organisation. Sales £6.5bn.</td>
</tr>
<tr>
<td>Company H</td>
<td>A major food retailer. Sales £7.5bn.</td>
</tr>
</tbody>
</table>

Table 2. How Purchasing is organised within case companies.

<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Purchasing function split between equipment (high value) and raw materials (low value). Recognition of under-performing. Representation at executive level. Low perceived need for change.</td>
</tr>
<tr>
<td>Company B</td>
<td>Strategic supply centre created. Selective recruitment, strong multi-functional skill base, team focused. Culture change, power base altered. Turnaround situation, high driver for change. Tactical purchasing diffused throughout organisation to local level.</td>
</tr>
<tr>
<td>Company C</td>
<td>Strategic supply centre co-ordinating across individual businesses to optimise leverage. Strong empowerment culture leading to business level focus.</td>
</tr>
<tr>
<td>Company D</td>
<td>Purchasing split between new and mature (stable) products. Clear co-ordination between the two sections. Supply expertise residing within project teams and responsible to project leaders.</td>
</tr>
<tr>
<td>Company E</td>
<td>Strategic supply centre. Strong focus on supplier relationships. Emphasis on measurement/benchmarking. Company-wide vision driving improvement. Supply management one of the three cornerstones of this initiative.</td>
</tr>
<tr>
<td>Company F</td>
<td>Purchasing historically decentralised. Move to centralise function. Initiative in place to re-position Purchasing function from clerical/administrative function to a focal point of the business strategy. No direct representation at board level.</td>
</tr>
<tr>
<td>Company G</td>
<td>Strategic supply centre co-ordinating across businesses. Ability to influence varies from business to business. Collaboration needs to be driven.</td>
</tr>
<tr>
<td>Company H</td>
<td>Support functions (Technical, Design, Marketing) consolidated into Commercial function. Commercial function responsible for all product issues up to point of receipt at stores/depot.</td>
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Company B is in a turnaround situation and has recently appointed a new executive team. Superior performance in the area of supply was considered to be key to the overall recovery of the company. A member of the new executive team is the Director of Supply, who contended that if the company was to achieve the improvement in performance it desired, the purchasing function needed to be re-organised and the skill levels upgraded.

As a result a 'strategic' supply team was formed. There was a perceived need that this team should consist of personnel who could demonstrate high academic achievement and were dynamic and results orientated. Their diverse skill base being more suited to the role of change agents rather than that of functional specialists. Such people it was considered, did not currently exist within the organisation's Purchasing function, so recruitment was considered to be the only option. In addition to a high skill profile it was considered that the ability to work as part of a team would be critical. The ability of the team to bond together would enable them to create the critical mass that would be vital in overcoming resistance as the power bases changed within the organisation. This team orientation would also allow them to successfully 'infiltrate' other teams.
Within the 'strategic' supply chain, responsibilities are organised by discriminating between key supply chains where the 'strategic' Purchasing Managers operate as business managers supported by a small number of multi-skilled supply people operating within the relevant manufacturing centre.

The centre-led structure within Company C has evolved over the last 4/5 years. As the organisation has developed a federal business structure, the Purchasing function has devolved to the business level where each business has its own Purchasing function which is responsible for the spend of that business. The Purchasing function therefore is an integral part of the business with a dotted line responsibility into the centre. The centre team considers that within its role it has two objectives. One is to promote best practice within the Purchasing fraternity, operating at the business level within the group. These guidelines provide the framework for Purchasing strategies, allowing the individual businesses to add the detail. A key activity which enables the centre to perform this task is its development of networks with external agencies (academics, practitioners, institutions) throughout the world. This network enables it to accumulate knowledge, exchange views and remain informed of the latest developments in Purchasing and Supply Chain thinking, whilst at the same time comparing the groups' performance in related areas with 'best in class' organisations around the world.

The second objective is to co-ordinate Purchasing activity across the group in an attempt to optimise leverage where individual businesses use common suppliers and products. This co-ordinating role operates within an organisation that has developed a strong empowerment culture. Given the autonomy of the individual businesses, the centre team must be seen to support the business in pursuit of their individual goals whilst, at the same time, encourage behaviour that benefits the group as a whole. The centre team recognises that it will only continue to exist whilst it is considered by businesses to add value.

Formal mechanisms are in place to facilitate this co-ordinating task. One such mechanism is the quarterly business review, whereby senior members of the purchasing community meet to discuss relevant supply issues and to find out who is doing what with whom and identify areas of commonality. At a more junior level, the Purchasing function comes together on a monthly basis in an attempt to learn from each other and to create awareness throughout the businesses of latest developments. Within Company E there exists a 'supply sub-group', which consists of personnel from all the disciplines that have a supplier interface (Logistics, Quality, Purchasing and Finance). This is an action-led group concerned with defining the organisations' Supply strategy (not Purchasing strategy), determining objectives, whilst implementing improvements and change on a continuous basis. The Supply strategy is seen by the organisation as one of the three cornerstones of the business and Supply considerations are integrated into the business by means of a company-wide improvement initiative.

The centre team within Company G has evolved out of recognition that the Purchasing function was under-performing. The role of the strategic centre is to organise Purchasing on a category basis at a global or local level depending on the characteristics of the supply markets concerned, to drive best practice throughout the organisation and to promote collaboration in order to optimise leverage. There is acute awareness of the need to recruit high calibre personnel if these objectives are to be achieved.

The centre-led structure can be seen as a conscious attempt by the Purchasing function to divorce 'strategic' Purchasing activities from the transactional, administrative tasks traditionally perceived by the rest of the organisation as central to the role of Purchasing. These tasks have been pushed further down the organisation, either to tactical level Purchasing personnel or even end users by means of such mechanisms as corporate procurement cards.

One of the discernible features of the centre-led development has been the drive to attract highly skilled personnel to the function. This in part has been due to the recognition of the diverse skill base that a strategic perspective of the function demands. Just as important however, has been the need to endow the function with the credibility and stature it must have if it is to exist on equal terms with other peer functions.

4. Other Structural Forms

Not all the companies studied have adopted the centre-led structure. Within Company A, the Purchasing function is centralised and responsibilities are divided between equipment, which accounts for 80% of spend, and raw materials which make up the remainder. The importance of the equipment side is reflected in the relative competence levels of the personnel, where the buyers responsible for this sector are likely to have higher skill profiles (e.g. graduates). The re-organisation of the Purchasing function has seen it achieve direct representation on the Divisional Management Committee (DMC), with the appointment of a Procurement Director who reports to the Managing Director.

Purchasing within Company D is divided between mature, stable products (electromechanical and electronics) and new products. The personnel involved in new products are directly responsible to the project leader, whilst co-ordinating with Purchasing management. The mature side of the function is responsible for supplier selection and contract management and report directly to Purchasing management. In this way, Purchasing ensures that through its new products arm, supply concerns are represented at the very earliest stages of new product development whilst, at the same time, through the mature side of the function it is able to ensure that decisions complement and are consistent with, longer term Supply policies.

Historically within Company F Purchasing has been organised on a de-centralised basis, split down into 5 groups and reporting to a variety of executives. It has traditionally been perceived as a clerically orientated support function, 'rubber stamping' deals made by sales people. Under a re-organisation programme, the Purchasing function has been given a 'pivotal' role in an organisation-wide improvement initiative. The new structure is a centralised, organised into 3 business streams with responsibilities being allocated on a commodity basis. Purchasing has no direct representation at board level and the Purchasing Manager reports to the Company Secretary.

Company H differentiates between purchasing goods and services in the course of the business and purchasing for resale to the public. The latter activity which is afforded significant strategic importance is consolidated into the Commercial function along with such disciplines as Marketing, Technical and Merchandising. The Commercial function is then divided into 10 trading areas, with each area headed by a Trading Director who reports to the Commercial Director. As such, the Trading Director is responsible for all aspects of product management up to the point of receipt at the depot or stores.

5. Top Level Representation

In 6 of the 8 companies studied, Purchasing has direct representation at executive level. It would appear that this development is significant in several respects; first, it ensures that supply issues are considered at the highest level within the organisation;
Company C's Director of Procurement and Property considers that his presence on the company's board ensures that Purchasing is a key element in the overall decision-making process and therefore, suppliers are part of the team that helps the business to satisfy its customers and to achieve its objectives.

Second, that sufficient resources are made available to support supply strategies:

The Supply Chain Director of Company B was able to use his position to persuade the rest of the executive team that if Purchasing was to deliver the required level of performance, he would need to recruit the best people available and offer salaries to match.

Third, it provides a means of linking the functional strategy to the business strategy, and facilitates the feedback of information to the executive on supply issues and activities:

Within Company G the Head of Purchasing meets quarterly with the Chief Executive and twice quarterly with the heads of each business sector. In this way Purchasing is able to get its agenda across and to reconcile that with the current and ongoing needs of the business.

In much the same way, Company C holds quarterly business reviews that are chaired by the Chairman, and at which all the businesses are reviewed together with the Managing Directors of each of the businesses and the board members. In this way the company regularly reviews its business plans and performance by means of a constant process of iteration.

Fourth, it is important in overcoming resistance within the organisation as Purchasing attempts to involve itself in areas of the business not traditionally recognised as its field of operation.

The redefining of the role of Purchasing within Company B represented a significant culture change characterised by political conflict and resistance to change. The senior status afforded the Supply chain Director was critical in enabling Purchasing to overcome those barriers.

The process within Company D of resolving disputes over technical and commercial issues is one of arbitration between the respective functional heads. That Purchasing has executive level status means that it can add equal weight to the debate. Should further arbitration be required it is referred to the Managing Director. For all parties concerned however, this would be considered as a last resort.

6. Purchasing's Role in The Business Strategy

Without exception, all the companies studied have recognised a need to improve the performance of its Purchasing function. What differentiates the organisations is their perception of the scope of Purchasing's contribution to the business strategy (see Table 3).

The primary contribution of the Purchasing function to the business is still perceived to be to secure cost reductions from its suppliers. All the companies were consistent in attaching significant importance to this aspect of their role. In all instances this task could be linked directly to the competitive posture of the organisation within its chosen environment.

Throughout the case companies, there appeared to be a general consensus that with respect to this task, a joint co-operative approach towards the suppliers would be likely to yield the best results. In some cases the supplier enjoyed superior commercial leverage and, as such, a unilateral, adversarial approach would not have been appropriate in any case. Several methods of enlisting the support of the suppliers were evident from the research:

The free flow of information between the companies and their suppliers was considered to be a powerful facilitator. By providing information about current trading conditions and business objectives, and in turn taking time to understand the needs and aspirations of the suppliers, the companies were more likely to develop solutions with their suppliers that were mutually agreeable. The majority of the companies interviewed stated that they supported such an approach.

Companies C and E had formalised this approach through its yearly supplier conferences. These conferences brought together the organisations' key

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<th>Table 3. Purchasing's Role in the business strategy</th>
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<td>Company A</td>
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suppliers for the purpose of reflecting on past achievements, providing an insight into what the future may hold and the task ahead, and to reward meritorious behaviour. These conferences were seen as a powerful means of blurring organisational boundaries, facilitating the integration of the suppliers into the company culture. In addition, they were instrumental as a means of motivating suppliers and creating self-esteem whilst, at the same time, encouraging a cross-fertilisation of ideas within the supply base.

Company E has sought to emphasise its own level of performance as a consequence of its suppliers' performance. In an attempt to raise the level of responsibility of its suppliers, it has on an ongoing basis, a large contingent of guest engineers from its suppliers who are resident at the plant. Their task is to develop an intimate understanding of the interaction between their product and the company's finished product to drive improvements.

Another method designed to cultivate co-operative relationships with suppliers is to involve them much earlier in the supply chain. This has involved a shift where the supplier is expected to play a much greater part in the design and development of the end product. Company E is increasingly tasking its suppliers on a 'design by function' basis rather than the traditional 'design by specification' method.

Whilst these methods support the primary objective of reducing cost, their benefits are not intended to be confined to this area alone. In addition to obtaining cost reductions, Purchasing was seen to contribute in other ways. The importance of dealing with capable and committed suppliers was widely recognised by the case companies. In this respect Purchasing is seen to have an influential role in maintaining high levels of quality and delivery performance. Companies C and E have evolved very sophisticated vendor 'rating' systems which ensure that the suppliers occupy high profile positions within their organisations thinking and emphasises the link between the suppliers performance and the company's ability to satisfy its customers. This process is considered to be ongoing and interactive. Whilst Company H did not report a vendor 'rating' system as such, it was nevertheless able to articulate the criteria upon which the health of a supply relationship was assessed.

Companies C and H clearly consider their suppliers to be a legitimate source of innovation and make conscious attempts to exploit this. Company C recognised that some of its suppliers spent more on R & D than it did and were reliant on them for technological contributions. Company H saw supplier innovation as a means of offsetting the superior R & D spend of some of its competitors. Company E is able to utilise its suppliers' expertise by employing concurrent design techniques, whereby the suppliers are expected to develop an intimate understanding of the interaction of their product with the customer's finished product. In this way the supplier's own expertise is exploited to provide holistic business solutions.

Company D maintained that its ability to manage semi-conductor suppliers was seen by its automotive customers as a critical differentiator between tier one suppliers. The ability to manage materials through the supply chain and into the customer was considered to be an order winning criterion.

The commercial function within Company H is responsible for all decisions relating to the product which includes pricing, marketing, product ranging and quality. Whilst, the 'strategic supply team' within company B is considered to be the main influencer in the make or buy decision where the company has its own internal manufacturing capability.

7. Developing Cross Functional Links

Companies A, C, E and F all reported that the business strategy of the company was clearly articulated to all members of the organisation. This included a review of business performance and identification of objectives and targets for all areas of the business. In the case of Companies C and F this was done by means of a formal presentation termed 'kick offs' and 'roadshows' respectively. Such articulation was considered to be vital in developing a single culture within the organisation and a common understanding of the factors of success. It also provided a means for the organisation's employees to get their thoughts and concerns across to the executive team.

The Purchasing activity within companies A, B, C, F and G operates within clear functional boundaries, no formal mechanisms exist to create linkages with other functions. In the case of companies C and G, the emphasis is on creating intra-functional linkages within the Purchasing community to take advantage of common suppliers and areas of spend and to create a uniform level of performance.

In the absence of such formal linkages, tasks are performed in a linear manner with the consequence that a high proportion of design issues become immutable prior to the consideration of commercial issues.

Company E implemented a company-wide improvement initiative which was seen as an opportunity to breakout of the traditional functional approach to doing work. This initiative emphasised a strategic, collective approach to solving problems and the organisation's approach to supply issues is consistent with that objective. The supply 'sub-group' has a multi-skilled composition and includes personnel trained in the concepts of productivity improvements, quality, inventory reduction and cost reductions. All functions that have a supply side interface are represented (Logistics, Quality, Purchasing, Finance) within the sub-group. Company E does not see the cross-functional approach as a replacement for the traditional functional structure but rather as an alternative approach to problem solving.

Company D has sought to combine the virtues of both approaches to ensure that the Purchasing function has a 'cradle to grave' involvement with all products. Through its New Products arm it ensures involvement in new product design whilst retaining responsibility for the management of the supply base through the commodity sector of the function.

Company H has consolidated a number of support functions (Technical, Design, Merchandising, stock control) into the commercial function. The organisation considers the change has resulted in a leaner more coordinated business structure.

8. Culture and Status

7 of the eight companies involved in the research possessed some form of proprietary knowledge, patent or regulatory protection and in those cases Purchasing has traditionally been perceived as a 'second tier' function. In some cases this was viewed that was held within the function itself. Consequently for Purchasing, this has meant that it has encountered considerable resistance as it has tried to redefine its field of operation. Company A reported that any attempt to drive change would inevitably be slow and protracted as it was not possible to create a sense of crisis within the organisation. In contrast the Purchasing function within Company B has been instrumental in driving change due in part to the turnaround situation of the organisation. The Supply Chain Director did acknowledge however, the importance of networking with sympathetic peers in any attempt to create a critical mass for change.

Company C has found it difficult to drive leverage across the group due to the strong culture of empowerment that prevails within the businesses. Each of the
businesses enjoys autonomy within the group with P & L responsibility which in turn has created a business level focus. As such, there is some reticence between the businesses to share information and commercial arrangements.

Company G has operational world-wide and as such, needs to drive collaboration against a background of different cultures, nationalities and business circumstances. It is felt unlikely under such conditions that collaboration will occur purely as a matter of goodwill.

9. Skills Profile

Companies A, B, F and G all felt that the requisite skills required to further the Purchasing's case as a significant contributor to the success of the business were not currently present within the function. Consequently Company G had formed a strategic supply team comprised entirely of new recruits. Whilst Companies A, F and G were all actively trying to recruit personnel from various disciplines to address the skills imbalance.

Company C has operated a policy of recruiting graduates for many years. This policy touches all areas including Purchasing and Purchasing has a reasonable record for retaining some of these graduates. It was felt however, that the function had taken its "eye off the ball" recently and career development amongst Purchasing personnel was not being pushed as enthusiastically as it had been in the past.

10. Future Challenges

All the companies interviewed related their interpretation of the future challenges at both an organisational level and a functional level.

Company A had traditionally operated in markets that were to some degree regulated with relatively low 'cost' sensitivity. Now as it looks beyond those markets, competition has become more intense, and with a product that it is unable to differentiate from the competition, cost has become a paramount concern. The company sees its suppliers as a key resource in driving costs down and increasing competitiveness as it looks to the supply markets for more and more of its inputs. For the Purchasing function, the focus will be on further rationalisation, upgrading of skills and developing the necessary internal and external relationships to improve supply base performance.

For Company B the initial concern is to secure its longer term future. As it goes through a period of change seeking to delay and rationalise its operations, the Purchasing function will continue to play an ever increasing role in that transformation process. As the company becomes more dependent on the supply markets, Purchasing will continue to re-engineer the supply chain to maximise contribution to the bottom line.

Companies C and H both regard profitable growth as the primary challenge, with the supply base continuing to be an important factor in driving competitiveness and innovation.

Company D considers its biggest challenge to be its ability to grow its market share in emerging markets that are characterised by low margins and high labour content. Improving supplier performance is considered to be a prerequisite within this objective. At the functional level, Purchasing is striving to slim down the group, develop functional excellence and gain recognition as a value-added contributor within the organisation.

Company G is under increasing pressures to provide further innovation within its product portfolio and to reduce time to market. The Purchasing function sees its major challenges in terms of these objectives. This will involve the continued development of the Purchasing community to ensure it has the necessary resources to optimise supplier performance.

11. Conclusions and Recommendations

What appears to be emerging from the study are two distinctive approaches to the development of the Purchasing function. One approach takes a functional perspective of supply issues, concerning itself with the organisation of the function and the development of competencies designed to achieve functional excellence. The second approach takes an organisation-wide perspective of supply issues, through the creation of multi-disciplined teams, of which Purchasing is a part, that seek to ensure that the organisation develops the competencies that are critical to its success.

Where the functional approach has been employed, Purchasing has been relatively unsuccessful in influencing areas of the business not traditionally considered to be its field of operation. One reason for this is the absence of any formal mechanisms for facilitating its integration into the business decision-making process. In functionally organised companies it is unrealistic to expect such linkages to occur as a matter of goodwill. Consideration must be given to the cognitive, cultural and political contexts and constraints that reside within the organisation and are exhibited in managerial behaviour (Johnson, 1990).

A further reason is that regardless of its level of sophistication, no-one would accept Purchasing in its traditional sense as being sufficiently impartial to cater for the interests of all. Any attempt to redefine the role of Purchasing will inevitably involve changes to the existing power base, and as such, it is likely to be resisted. At such an early stage of its development, Purchasing may not be politically adept enough to overcome such resistance.

Where the integrated approach has been adopted however, supply considerations are seen to be an integral part of the business decision-making process. The existence of cross-functional teams ensures a holistic approach to business problems, and objectives are set that are broad enough to demand that both technical and commercial issues are given the fullest consideration. Purchasing is part of this team and as it has direct responsibility to the team it is seen to be a legitimate part of the process.

Cross-functional teams are not simply means by which the skills within the organisation are combined together to develop the capabilities that are essential to the success of the organisation. As such the outputs from these teams are considered by the organisation to be strategically significant. If Purchasing is to be considered in a strategic context it must be seen to actively contribute to these outputs. This 'strategic alignment' will not be achieved merely by the pursuit of functional excellence. The Purchasing function will be capable of making a more effective contribution to the organisational goals, if it recognises that the best way to proceed, is through its integration across the organisation.

This diffusion of Purchasing personnel throughout the organisation will ensure that the key teams are self-sufficient in terms of commercial expertise and that the consideration of supply issues is part of the decision process. At the centre of the
organisation, a small team of supply experts which through its links with the key teams will perform a co-ordinating role seeking to exploit areas of commonality and to facilitate the cross-fertilisation of knowledge. Through this structure, it will be possible to ensure that supply related information is disseminated to a much wider audience within the organisation and is available on a 'need to know basis'.

The incentive for organisations to develop their integrative capacity is derived from the proposition that an effective organisation is a unitary system bound together by a common task and common values (Bate, 1994, p.55). As such, the belief that Purchasing will achieve 'strategic' status through the development of functional excellence can be considered parochial at best. This assertion is based on the simple notion that, the organisation is system of activities, rather than a portfolio of products and services. Some of these activities are performed so much better than the competition and are so critical to the end products and services, that they can be described as core competencies. When the organisation is successful in integrating these competencies into a higher order capability, then this business process can create competitive advantage, even if the component activities by themselves do not.

As organisations increasingly look towards their own skills and resources as the source of sustainable advantage, the emphasis for Purchasing will be the consideration of its own activities in relation to the activities that are seen to be critical by the organisation as a whole. That strong functional competence is desirable is not in question. what is questionable however, is whether functional excellence should be developed at the expense of organisational excellence.

This paper contends that organisations need Supply strategies, not Purchasing strategies. That is to say priority must be given to the management of the relationships between the various intra-organisational functions that interface with the supply markets. In this way the supply base as a critical resource, can be levered to support the activities that are key to the competitive posture of the organisation, rather than being used to support a variety of dislocated initiatives, which reflect the operational needs of the individual functions.

References


Revolution in Purchasing: Building Competitive Power Through Pro-Active Purchasing

Results of the 'Purchasing's Future Research Project'

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Abstract
New concepts in the field of purchasing, like outsourcing, supply-base management and value-chain management have become more and more common practice. Because of the cross-functional character of these concepts, the call for a strategic reorientation of the purchasing function becomes louder and louder. However, a clear future vision to guide the purchasing process has not matured yet. Through the Purchasing Future Research Project at Eindhoven University of Technology we investigated the most prominent developments and the expected trends in the profession, as well as the role and position which purchasing probably is going to have in major companies ten years from now. This paper will start with a description of the changing business context companies are confronted with these days. Followed by an overview of the purchasing and supply practices of leading edge companies. It concludes with a possible model for future purchasing organizations to make simultaneous improvements in both increasing functional expertise and economies of scale.

Topics: business context, changing strategies and structures, virtual purchasing

1. Introduction
It is no secret that over the years differences in the area of purchasing and supply strategy have emerged between so-called "leading edge" companies and the companies in the rear. Within the manufacturing industry the gap between both groups of companies has grown bigger and bigger (Weele and Rozemeijer, 1996). Through the Purchasing Future Research Project, conducted by the Purchasing Education and Research Unit at Eindhoven University of Technology, we systematically want to describe and analyse best-practices in purchasing and supply management. With this article we would like to give an insight into what is going on in Purchasing strategy and organization in leading manufacturing companies nowadays. We will describe how some leading edge companies in industry shape their purchasing strategies and how they organize for competitive purchasing in the global market place. Compared with traditional purchasing, these modern purchasing practices are just revolutionary! We hope they may serve as a warning to those who are lagging behind.

2. Changes in the business context
The context in which manufacturing companies operate is undergoing radical changes (Hammer, 1993; Peters, 1994). We all sense that the changes surrounding us are not mere trends but the result of large, unruly forces. The next decade will show three revolutions in business, which will dramatically change the nature of competition. Revolution number one is the Globalization of Trade. Over the past few years competition has intensified all over the globe, mainly due to deregulation, the emergence of new trade zones (GATT, NAFTA), the volatility of currency exchange rates, improved transportation and sophisticated information technology. Thanks to the new information and logistics linkages, businesses are relocating and reconfiguring their activities into global value-added chains, based on least cost and greatest expertise (see Box 1 and Box 2). This will, beyond doubt, shift the traditional trend patterns between nations (Ohmae, 1995).

Box 1: Nortel's Internationalization
Canadian telecommunications giant Northern Telecom (Nortel) is reorganizing its headquarters and manufacturing operations. In recent years, the company has been recognizing its manufacturing operations worldwide in order to increase sales to overseas markets, which have increased from $784 million in 1990 to $2.6 billion in 1994. Customer sales in Canada now represent just 13% of worldwide revenues a 45% decline since 1980. The signing of the Canada-US Free Trade Agreement put pressure on Northern Telecom's margins on its switching products, traditionally its core business. Unions for Nortel's Canadian employees have long complained that the company has transferred jobs from high-wage, union plants in Canada, to low-wage, non-union facilities outside the country. The company now operates a non-union, switch-manufacturing facility in North Carolina and has set up manufacturing operations in China (Mississauga Business Times, 1995).

Box 2 Global Company
Some Japanese companies have already become 'global' in that their R&D is networked, involving American and Asian scientists; their design concepts are detailed by low-cost Indian engineers in Bangelore or Bombay and then switched over to Singapore; their components are produced in Taiwan and shipped to Tianjin for final assembly and inspection; and then final products are sold in Europe and North America (Ohmae, 1995).
More demanding consumers and continuously changing consumer preferences are responsible for revolution number three. In the past customers judged the value of a product or service on the basis of some combination of quality and price. The customer of tomorrow acts from an expanded concept of value that encompasses convenience of purchase, after sales service, uniqueness, and reliability (Treacy and Wiersema, 1993). In essence, people will no longer settle for whatever companies are offering. Instead, in relationship with suppliers, customers will take charge; they now tell manufacturers what they want, when they want it, how they want it and what they are willing to pay (Hammer, 1993). Levi Strauss anticipates on this new customer environment, by letting the customer design their own jeans (see Box 3).

Box 3 Levi Strauss

The California-based apparel company Levi Strauss has begun marketing a made-to-order service for customizing women's jeans in selected US locations. Sales clerks measure customers and feed the data into a computer-aided-design information system. They let a customer try on sample jeans in the store - to perfect the fit - and they feed the additional data into the system. The system forwards the information to a computerized fabric-cutting machine at the factory, and the jeans are made to order. The custom-jeans cost only $10 more than Levi Strauss's mass produced products. In this real time system, the transaction (selling the jeans) is also a service experience for the customer. The shopper will still expect high quality jeans at a reasonable price, but she will also help Levi Strauss design her product, and she will define elements of the product - measurements, colour, and texture - that satisfy her.

In the future Levi Strauss could use this system to broaden its dialogue with the customer. Customers could order new jeans over the phone; Levi Strauss could make them using the customer's measurements, stored in a database, and ship them out quickly. The company could also send information on new products to repeat customers. And, as the company database grows, it will have useful information about sizes and styles of jeans that its customers are ordering (McKenna, 1995).

Apart from these revolutionary changes, we see technologies mature in many end-user markets. As a result companies have to cope with ever increasing materials and processing costs, in order to make the next generation of technologically advanced products. Customers are not willing to pay for marginal technological improvements. To survive, the manufacturing industry has two options: continuous and drastic cost reduction or constant innovation. Most companies will have to pursue both strategies at the same time, however. Besides this, it is becoming more common for large manufacturing companies to operate sophisticated services businesses. Manufacturers like IBM and Digital Equipment bring in more revenues from consulting and processing services than 'real' services companies like EDS. US automakers today make almost no parts themselves. It is an exaggeration, but not an outrageous one, to say that the Big Three (Ford, GM, and Chrysler) are chiefly design studios and marketers. Nowadays, almost 75% of Chrysler's employees are in non-manufacturing services like engineering, design, sales, purchasing, or distribution (Spiers, 1995).

3. Changing insights on organizational behaviour

What will be the impact of changes in the business environment on strategy and structure of large companies? Today's global economy is genuinely borderless. Information, capital, and innovations flow all over the world at top-speed, enabled by technology and fueled by consumers' desires for access to the best and least expensive products (Ohmae, 1995). This global competition has issued a wake-up call to companies everywhere to change their assumptions about the design of efficient organizations and workplaces. Companies that want to stay competitive in the late 1990s and beyond are being forced to narrow their business focus, not broaden it by focusing, companies can gain such a lead that competitors find it hard to catch up. This is largely because the leaders have aligned their entire business model - that is, the company's culture, business processes, management and computer platforms - on delivering a superior customer value. For example, Nike aligned their entire organization to deliver leading-edge sport shoes (Treacy and Wiersema, 1993). Less focused companies must do far more than simply reengineer existing processes to gain this advantage.

Value chain management: The desire for fat organizations that relied on redundancy, encouraged over-staffing, and could afford to waste talents of people on non-essential tasks, has been replaced by a preference for lean organizations with focused efforts. Many companies are reorganizing their value chains and focusing on a few core activities, where they can achieve and maintain a long term competitive advantage, outsourcing all other activities in which they don't have world class status (Quinn, 1993). This explains the rising purchasing-to-sales ratio of many manufacturing companies including IBM, Xerox, Philips Electronics, and Alcatel (Weele, 1994). The point is that outsourcing more and more becomes a strategic issue, with great importance for the survival of the company. Because if a company is not best in the world (including all transaction costs) at a certain activity, it gives up competitive edge by performing that activity internally (Quinn, 1993). As a result companies, especially the ones in very volatile, highly customized, or advanced technology fields, find extensive outsourcing more attractive than before. Contracting out non-core activities to specialized suppliers can save cost reduction, quality improvement, lead time reduction and innovation.

Competency-based strategies: It appears that the way forward requires fundamentally different approaches to inter-firm relationships. Companies become smaller, downsized through outsourcing, but reinforced by strong collaboration with other firms that were once called 'suppliers', now 'network partners'. Applying this approach to core competencies, companies can develop a much higher level of focus, and keep a tougher level of focus, and keep a tougher level of focus, for their strategies than through traditional product-focused strategies. This extensive outsourcing increases the dependency of suppliers, making supply management, or management of Best-in-class supplier networks, a key success factor. Com-
companies who are not capable of developing this kind of network, will fail in the highly competitive environment of the future.

Process-orientation: In order to meet the contemporary demands of quality, service, flexibility and low cost, organizational processes must be kept simple, transparent, and focused on the customer. Companies must look at entire processes that cut across organizational boundaries. Work should be performed where it makes most sense. In the future managers, in most cases, will delegate responsibility to teams that might include people from many departments, who report to various bosses. The horizontal dimension (looking across territories to focus the effort of the organization on common goals to serve customers) is getting more important than the vertical dimension (what bosses in a single department tell people to do). At every level more work is being done in cross-functional or cross-departmental project teams or even joint customer-supplier development teams. Narrow specialist jobs are being replaced by broader and more demanding jobs. Work is even shifted across organizational boundaries to improve overall process performance (Hammer, 1993).

4. Global purchasing and supply strategies

What are the implications for the Purchasing profession? How do leading-edge companies cope with the increasing need to professionalize, rationalize, and globalize their purchasing operations? In this new business environment Purchasing must bring increased skill and value to their companies. Purchasing must find a way to add value, or disappear. This has led to significant changes in the role and position of Purchasing in many leading-edge companies like GM, IBM, and Chrysler (Weele and Rozemeijer, 1996). In particular, redefinition of primary purchasing tasks, responsibilities and competencies in the relationship with other departments. Over the last few years many international companies have slashed their centralized corporate staffs, whilst adopting a business unit structure. In doing so it seems that companies traded bureaucracy and lack of customer focus for ill-defined communication and lack of synergy. Today many companies have abandoned the pure business unit structure, and have moved to a center-led organizational structure. This structure is characterized by a clear direction, i.e. vision, from the top in combination with bottom-up entrepreneurship and decentral execution. A clear example of this can be found at IBM (see Box 4).

Box 4 Commodity Buying at IBM

IBM’s new Procurement organization provides suppliers with consolidated, enterprise-wide requirements and a ‘virtual’ organization with a single contact point (the commodity council) for ‘contracting’. However, in all cases the actual purchasing operations are decentralized. Production buying is organized around Divisional Global Procurement executives. These managers report to the Chief Purchasing Officer (CPO), but also to the one line manager. The Business Unit Managers meet with the CPO on the corporate business councils, so there is direct contact between the CPO and them. Here common agreements are decided upon. The CPO works with each of these managers individually to make sure that the corporate wide procurement strategy is consistent with what the division needs to have. In this way IBM is able to benefit from its massive purchasing power, whilst at the same time pursuing maximum operational flexibility for its manufacturing plants (Weele and Rozemeijer, 1996).

In discussing appropriate purchasing and supply strategies we encountered during our research project, we differentiate between production and non-production buying.

4.1 Production area

When we look at the production-related Purchasing & Supply strategies, we see global process uniformity. Leading-edge companies have a global competitive sourcing process which searches more and more for main suppliers with worldclass capabilities and global presence. Some of the advantages of this global sourcing are price advantage, improved quality, supplier commitment, a reduced supplier base, and reduction in total inventory. It also saves time and resources, hence more attention can be given to the relationship with suppliers in the value chain to improve their performance. Using all the resources in the value chain, and improving them continuously is key in today’s competitive environment. The issues leading-edge companies pursue to improve the global sourcing process are strong leadership, active involvement of line management, aggressive supplier management, corporate commodity plans, cross functional teams and supply standardization.

The corporate commodity plans are mostly drawn up by so called cross functional commodity teams. Such teams consist of professionals in functions such as product design, research and development, marketing, product distribution, and finance, together with purchasing professionals. The leader of the team will often be a person identified as a commodity manager, not necessarily a purchasing professional, who will report to the Vice President of Purchasing and to a Functional Line manager. The structure is usually virtual. These teams have the power to select suppliers and to contract worldwide agreements, for their particular commodity.

Another issue is the implementation of supply standardization. Many companies are starting to realize that there are a lot of commonalities between their businesses, and that they need to share that information. They can’t afford not to do it in this competitive environment. In order to generate leverage in the company’s total requirements companies must look for opportunities to reduce cost and share suppliers, and possibilities to pursue product and supplier standardization. This has been recognized clearly at Chrysler, where standardization is successfully implemented to rationalize faster purchasing (see Box 5).

Box 5 Standardization at Chrysler

Chrysler restricts the number of fasteners (screws, bolts, parks, etc) that engineers of the product development platforms can use. They used to have a situation where engineers could use any fastener they want. Now they are restricted to a small list, which is very restrictive and brings an approved source with it. This list is also integrated in the CAD/CAM systems. In this way Chrysler rationalized their fastener purchases from at a high point of 500 suppliers down to 42 suppliers for whole company. Today, Chrysler also intends to take that recommended list to their first tier suppliers (Weele & Rozemeijer, 1996).

Some of the benefits of standardization are lower materials costs, and lower overhead costs (Guigley, 1995). It looks simple, but when you have multiple plants and/or divisions across a country or continents, it gets very difficult.

To enable the above strategies, companies are establishing worldwide information systems. Single worldwide databases with complete and current technical and
commercial data of all available components, of preferred parts and approved suppliers, alternative suppliers, and specifications (with probably over 100,000 part numbers and hundreds of suppliers). Ford, IBM, Alcatel, Xerox, and Chrysler are some of the companies that are working to establish these systems. It is the task of the commodity teams to define the preferred parts and suppliers. This provides an important vehicle to design and engineering: they only have to tap into the system to search for components and select them. These kind of systems will drastically reduce the number of different components and part numbers, new product introduction cycle-time by using common parts and off-the-shelf parts. Purchasing can add savings directly to the bottom-line.

4.2 Non Production area
Let's now talk about the non-production buying area. Traditionally Purchasing is very much production oriented, but now we definitely see a trend towards more attention for center-led non-production buying. Reengineering the buying process and application of modern purchasing practices can significantly reduce costs and improve productivity in this area. However, getting results from this area requires a thorough analysis and a careful orchestration of the purchasing resources all over the company. Most critical is the lack of information on this kind of expenditure: what do we buy, who are the suppliers? Some leading companies have found out that the amount of money spent on suppliers in the non-production areas far outweighs the amounts of money spent on production buying, and that the percentage covered by corporate contracts is very low. AT&T, for example, found out that they spent a billion dollar on non-production items such as car rental, maintenance, insurance, travel, etc. Xerox purchases 6 billion dollar in total, of which 4 billion in the non production area (Weele & Rozemeijer, 1996).

Companies today are packing once fragmented purchases of services and supplies into one or two company wide contracts for each. High-volume purchasing can trim bills for services and MRO by 10% to 25% (Tully, 1995). The corporate contracts are to be followed by all divisions and business units concerned, who should order from the relevant suppliers directly.

In general we have found two center-led approaches: the systems-supported approach and the Purchasing card. The first approach resembles center-led production buying, with the commodity teams, supported by information systems. These systems will contain enterprise wide Purchasing information, enabling users to buy themselves, and to find information about corporate contracts, approved suppliers, supply history, performance, etc. The system is fed by regional or global commodity teams. Corporate purchasing is responsible for managing and facilitating the whole process. The actual buying is done decentral.

In addition to the systems-supported approach, many US companies, among which Gillette, IBM, Xerox, have distributed the Purchasing Card to their employees. The cards incorporate codes that set credit limits and restrict where they can be used and for what commodities. At the time of transaction the electronic checking process validates that the type of commodity is allowed. The creditcard company pays the suppliers, eliminating thousands of purchase orders and checks. At the end of the month the company receives one bill, hard copy and/or tape, with all transactions sorted by purchaser, store, and/or job code. These systems greatly reduce cash use and provide cost control over the many small purchases often needed in non-production areas. At Gillette Company the purchasing card enabled the Purchasing department to add real value in the non-production area, because they have more time to negotiate better contracts, and find better suppliers (see Box 6). Despite all these features the biggest roadblock to implementing the card, remains the control of abuse.

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Box 6 Gillette and the Purchasing Card

Bob Edwards, VP Purchasing at Gillette sees a bright future for the credit card, because purchasing in his view adds hardly any value to the buying of MRO items. "We just take a requisition and convert it to a purchase order and pass in on to a supplier. We are high priced clerks. The cost is often more then the spend. My goal is to cut back 15 to 20% of the people from Purchasing and Account payable", Edwards says.

"First, I have to pull the people in. I don't want them restricted at first on the card, because then they are not going to use it. I let them buy anything that's bought with MRO. I want them to get used to use that card, that they can't live without it. Secondly, in a year's time I do an analysis of what expense have been done, and what companies they bought supplies from. After that analysis Purchasing will go out and negotiate a national or international company-wide contract for them. And then, Purchasing is going to add real value, because we are able to negotiate better contracts, find better suppliers, and we have the leverage of the total dollars (Weele and Rozemeijer, 1996).

5. Towards virtual structures in Purchasing and Supply

An ever more demanding competitive environment requires ever higher levels of corporate purchasing performance. The trouble is that performance improvements which are needed often remain out of reach for purchasing organizations organized in the traditional vertical fashion: hierarchically structured, functionally oriented. The crucial advantage of vertical organizations is functional excellence, but their central dilemma is coordination across tasks, across departments, across functions. By contrast, there is real performance leverage in moving towards a flatter, more horizontal mode of organization, in which cross-functional, end-to-end work flows link internal processes with the needs and capabilities of both suppliers and customers.

5.1 The virtual Purchasing Organization

A possible model for future purchasing organizations to make simultaneous improvements in both increasing functional expertise and economies of scale, and improving focus and flexibility at the business unit level, could be the hard core/soft core organization. We will explain this in more detail below.

In this organization a small centralized hard core of corporate Purchasing professionals is surrounded by a soft core of business specialists. The hard core is responsible for the Purchasing process, the strategy, professional development, and the recruitment, training and development of the people involved in the purchasing process. This hard core resides mainly at headquarters, and will be very small (about 20 to 30 people for companies as large as Alcatel Alsthom and IBM). These hard core professionals move from setting up a particular purchasing process, and all of the support that is needed there, to whatever the next major project is.

This hard core farms out all business-specific purchasing responsibilities to a soft core group aligned with each business unit. These soft core specialists are the real on-the-spot commodity managers, who have the authority to make decisions how one can best meet local needs. They reside in their own business units and are part of virtual purchasing teams. They will make extensive use of video-conferencing, telephone, and Internet, all to ensure that everybody is aware at all times of the group wide picture, and to share information. The soft core people come and go (to the purchasing functi-
The practical question, of course, is how to build such a hard core/soft core organi-

This organization ensures high involvement of the line, due to a two line reporting
relationship. The soft core commodity managers report to their divisional manager,
and to the vice president Purchasing, who will control their working methods. This
means that Purchasing has to consider these people by formulating their policy,
providing them with tools for this, and training them, but most importantly by letting
them do the job, because they know what is best. Box 7 illustrates that, according to
the Bank of Boston, buying of law services is best done by somebody of the law
department.

Box 7 The bank of Boston

Says Ron Payne from Purchasing services Inc: "At the Bank of Boston the law
department spends approx. 18 million dollars a year on services of lawyers, as a
supplement to their own law department. They now have a commodity manager,
who is not a purchasing person at all, sitting in the law department managing that
complete 18 million dollar budget for them. This is my view an ideal situation. You
don't need a person with a purchasing title sitting in the law department doing
that work, when in fact this person was recognized as an outstanding staff person
from the law department. This staff person said: I know what the requirements are,
I know the business, I understand the business plan, and I understand what we are
going to need from the outside law firms in this department, so I am in the best
position to manage this "commodity". He reduced the number of suppliers signifi-
cantly, contracted best deals, and introduced free shopping (Weele and Rozemeijer,
1996).

This structure is especially appropriate in the non-production area where buying has
an ad hoc character and where specific expertise is needed temporarily. In this
situation it does not pay to build up specific expertise within the Purchasing function.

5.2 Staffing hiring and training future Purchasing professionals

The practical question, of course, is how to build such a hard core/soft core organi-
ization. In order to make this model reality companies first need to upgrade their
purchasing staff. The future purchasing professional needs different behavioural skills
and capabilities, and he is going to be a business person. In general leading edge
companies look for: young highly educated people, communication skills and team-
work orientation, strong personality, and a general business view.

He or she will have a greater willingness to take risks, whether that means linking
up with other purchasers to pursue more effective and efficient buying, partnering
with a major supplier in a new business approach, or working with manufacturing to
explore more efficient value chain operations.

Furthermore tomorrow's purchaser must be both a team member and a team leader;
a facilitator and a consensus builder. We see two different generic buyer roles: the
production buyer, a product/market specialist with an engineering background
working in cross-functional teams, and the non-production buyer or facilities buyer, a
generalist with an all-round business background working as a process consultant and
facilitator.

6. Revolution required

As we have seen, most Western leading-edge companies in the field of Purchasing and
Supply management (IBM, Compaq, Digital, and Chrysler) share a similar
background. Most of these companies have gone through difficult times, in which the
continuity of the company was in jeopardy. Stringent cost reduction was required for
survival. Looking at their cost position and value chain, these companies decided to
change their purchasing policies and strategies in a drastic way. New managers and
staff were sent in, cross-functional teams introduced, local sourcing replaced by global
sourcing, etc. All in all these companies took an aggressive, business-like approach to
their purchasing decision making. We feel that the functional orientation towards
purchasing is the biggest barrier. Maintenance of the status quo and a more gradual,
evolutionary pattern of change in this function might seem more attractive to some,
and many managers may be comfortable with it. However, those managers should
realize that the changes we are confronted with now are of a discontinuous nature.
When considering a reorientation of Purchasing and Supply operations we feel that a
revolution is required (Weele and Rozemeijer, 1996).

References

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Bye, Bye, Purchasing Department

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Abstract

We believe that the current changes in the business world will force all managers, regardless of which function they belong to, to meet greater demands for integration, both internally and externally. This is a challenge that must be met also by the research community interested in purchasing and the purchasing function. The starting point for such a restructuring can be found in the network approach, where relationships are given a central place and the context of relationships is discussed. A change in the organization of a firm towards a more relation-oriented teams who can handle central external relationships, product or process lines in a more holistic fashion is the opinion of the authors an important response to the current changes in the business world. A necessary prerequisite is also that managers will stop thinking along the lines of traditional functional areas and instead think towards management of internal and external relationships.

Keywords: Purchasing, Industrial Networks, External integration, Organisation

1. Introduction

It is argued by many academics that purchasing is a function which is currently undergoing great changes (Cammish & Keough, 1991; Kraljic, 1992). From the point of view of a single firm, these changes are directed both internally (operationally and strategically) and externally (in relation to suppliers and sub-suppliers). The first task of this article will be to explore the most important ones of these changes (as perceived by the authors).

We will then examine the response to these changes in the academic community, and argue for the position that although these responses are adequate when it comes to forming a new theory of the function and how it should be handled; only a few of them tries to go on from this to discuss the role of functions in a firm. We believe that it is also necessary to open up such a discussion, because the changes observed push firms towards a higher degree of integration, both internally and between firms.

In the main part of the article, we try to look at which lines such a discussion can follow. It is necessary to take into account both the need for greater internal integration and the need for involving external counterparts. Externally, we believe that the industrial networks approach with its focus on interdependencies between firms can be a reasonable starting point for such a discussion. For the internal part, we suggest that activities and functions should be realigned to support the external relationships.

2. Current changes in the role of purchasing

Purchasing management has in the recent years changed dramatically. Most of these changes are a result of changes in the business environment; changes which in turn has


Mississauga Business Times (1995), July/August, p. 1


Spiers, J. (1995) 'The most important economic event of the decade', Fortune, April 3


affected the way that the purchasing department must operate (see for example Cannish & Keesough, 1991; Kralic, 1992).

One of the most important changes in the business environment is the gradual shift towards a work specialization between companies (Gadde & Häkansson, 1993). This specialization is obvious in many ways. First off, we can look at the part of total costs accounted for by purchasing costs. Different empirical findings cite different numbers for this. For example, van Weele (1983) reports a figure of 58% for Dutch industry, Häkansson (1989) reports 40% as an average for Swedish industry while Scheuing (1989) claims that on average 58% of every sales dollar in the US is used on purchases from outside sources. Our own study of 15 Norwegian and 29 Swedish industrial firms (Games et al., 1995) gives a figure of 50%. However, all these empirical findings from different countries agree that purchasing is THE major cost factor for an industrial company of today.

What is more important, is to observe that this figure is on the rise. Grant (1990) and Häkansson (1993) both concludes that purchasing costs are a growing portion of total costs. Cooper (1994) agrees with this, and specifies that this can be attributed to two processes of change; an increase in the outsourcing of components and even whole systems of components, and the purchase of several services that used to be provided by in-house expertise. An example from our own research (Games et al., 1995) can illustrate this as well. In one of the industrial firms we investigated, they produced three "generations" of the main product. The cost of purchased materials in this product amounted to about 60% in the 1st generation, 70% in the 2nd generation and almost 80% in the 3rd generation. In other words, purchasing costs as a percentage of total costs is both high and on the increase in industrial firms. This has served to raise the profile of purchasing work, as, and top managers are much more conscious about the costs spent purchasing items than they were earlier on.

Another very important effect on the purchasing function stems from the current changes in production philosophies. The main change here is a shift in focus from standardisation of production processes to low-cost operations and towards a focus on flexible production to achieve time-based advantages and tailor-made solutions for specific customers (Hayes & Wheelwright, 1984; Womack, Jones & Roos, 1990). This change in production processes has given rise to a stronger integration of activities both inside the firm (the separate functions must work better together) and between firms (particularly along the value chain, where customer input and cooperation with suppliers regarding quality and product/process development has been more focused, see for example Christopher, 1992).

To face these two challenges, the purchasing manager of today is expected to rise from his or her earlier clerk-type role to a more professional role. Becoming more professional means to improve along three dimensions of purchasing work, internally for specific customers (Hayes & Wheelwright, 1984; Womack, Jones & Roos, 1990). This change in production processes has given rise to a stronger integration of activities both inside the firm (the separate functions must work better together) and between firms (particularly along the value chain, where customer input and cooperation with suppliers regarding quality and product/process development has been more focused, see for example Christopher, 1992).

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3. Researchers response to the changes in purchasing

Many researchers have contended themselves with pointing out, and describing these changes in the situation of the purchasing function. Those who have gone farther, have usually suggested (and this is a very broad generalization) one or both out of two solutions; to make the purchasing manager more professional and/or to make the techniques for handling purchasing work more sophisticated. Most often, these two solutions have been applied along one or more of the central dimensions of purchasing work mentioned above.

First, the purchasing manager is expected to get a better grip on the internal operations of the firm. Operating the purchasing department in itself has become more complex. In addition, the purchasing manager is expected to stay in touch with several other important departments. The production department is important since the purchasing manager need to know more about the production process (in order to buy the needed materials). Product and process development is equally important to ensure that useful materials and components are a part of new designs (Burt & Soukup, 1985). The handling of new IT-systems is also a part of the modern purchasing managers job, as is communication with sales/marketing (information exchange and cross-training programs) for the finance department (for the financing of working capital), the accountants (for the creation of reporting systems that are helpful to purchasing) and personnel (to ensure the quality and motivation of purchasing employees).

Although many scholars disapprove of the low-key strategic role that purchasing plays, and clamor to show (both empirically and theoretically) that purchasing is an underrated department in today's business firms, few will argue that there is no change in the strategic importance of purchasing. Rather to the contrary, purchasing is rapidly becoming very important for industrial firms (Gadde & Häkansson, 1993). The introduction of "Just-In-Time", lean supply and other new production methods have introduced strategic management of the supply chain into the industry as well (Lamming, 1993). Industrial purchasing is now increasingly thought of as an area with importance for the overall strategy. Thus, purchasing planning is integrated into the larger business plans and special care is given to the area when possibilities for gaining competitive advantages are being contemplated. This has lead to closer integration between purchasing plans and strategic plans, and to possibilities for differential treatment of suppliers depending on their "strategic value" to the organization (Sysyn, 1992; Kralic, 1992).

Also in relation to the external organizations have there been readily apparent changes. A strong tendency to approach the environment as an entity is now being replaced with a strong sense of the environment as manageable. Organizations in the environment take on strong contours and are being treated as specific counterparts, rather than as faceless "suppliers" (Ford, 1984). Most organizations want more out of their suppliers than just the goods needed, and they enter into informal and/or formal relationships to achieve better coordination between production processes and logistic chains, cooperation on technical and technological development, extension of market participation and simplification of administrative procedures. To achieve this increased intensity in individual relationships, most industrial organizations cut down on their supplier base, and single-suppliers have become a much more common occurrence than it was ten years ago (Gadde & Häkansson, 1993).

We acknowledge the thought that good descriptions as those above can form patterns for how to structure thinking along a problem. As such, we believe that accurate descriptions of the changes going on can help managers becoming aware of the changes and thus help them to handle their purchasing tasks better. We also think that it is important to make purchasers more professional and to improve techniques for handling industrial purchasing.

4. An extended role of purchasing

Above, we have looked at the changes occurring in business over the later ten years, and seen some of the effects that these changes have had on the way we think and act in industrial purchasing. We have also mentioned briefly how different researchers have seen this development in relation to theory development of both internal, external and strategic purchasing theory. In the opinion of the authors, new and
"better" theory is absolutely necessary for the development of purchasing as an independent, academic discipline. At the same time, the theoretical development has contributed normative principles and techniques usable by practitioners (and the other way around).

In our own research, we intend to contribute to this body of research by focusing on the external dimension of the purchasing work. Our approach to this area has a basis in interorganisational theory directed towards development and handling of interfirm relationships. More specifically, the starting point is in the industrial network theory as presented by the IMP-group (Håkansson, 1982; Ford et al., 1992; Gadde & Håkansson, 1993 and Håkansson & Snehota, 1995).

During our thesis work, we have become aware of the importance of a closer integration between firms operating in large industrial structures. In this context, integration means to interact and discuss with suppliers, and to adapt and align products and production processes in both the supplying and the buying company to each other. This integration is necessary because of the increased complexity of work specialisation between firms mentioned above. For us, it seems natural for the purchasing function to play a key role in bringing about this integration on the upstream side (towards suppliers), thus extending the role of purchasing. It should be realised that this key role is relevant for the purchasing FUNCTION, but that the given organisational choices made by a company may or may not reflect this relevance (depending on the tasks given to the purchasing DEPARTMENT). We will in most of the article discuss impact on the purchasing function, regardless of organisational solutions chosen, but will return briefly to the organisational problem at the end of the paper. As our angle into the discussion of a closer integration, we have chosen to focus on external relations to suppliers, and it is through this discussion, that we have discovered that there is also a need for a change in the internal organisation of the firm.

4.1 Achieving a higher degree of integration between firms

It is natural for us to open the discussion on external integration by drawing the attention to the context of a supplier relationship. It is here that we believe the purchasing professionals and researchers have acquired a sense for the importance of external integration. Researchers have here pointed to several modes of cooperation on the macro-level, ranging from supplier development (see for example Hahn et al., 1990) through co-development projects and strategic alliances to industrial networks theory (Gadde & Håkansson, 1993; Håkansson & Snehota, 1995). Among these approaches, the latter focuses strongly on the observation that relationships DO exist between firms. And, what more is, industrial networks theory does not only point out that relationships are important, but it also takes care to underline that it is the total impact of all other relationships in the network that determines the strength and focus of each individual relationship. Thus, it also point out the importance of interdependencies between individual relationships.

To discuss this, we will first turn to the thesis work of Pedersen (1996). She concentrates on a focal buyer-supplier relationship, and attempts to describe how other relationships entertained by either the buyer or the supplier can affect this focal relationship.

Starting with the impact on the focal relationship of the BUYING firms other relationships, we can argue that one such important group of relationships are those entertained with complementary suppliers. A common occurrence in industrial firms is that the buying firm must co-ordinate assembly and adaptation of several sub-components into the firm's final product (argued for example by Dubois (1994)). When this is the case, the focal relationship must often be involved in the relationships to complementary suppliers in order to effectuate such adaptations. Alternative suppliers (meaning situations where dual-sourcing or multiple-sourcing is applied, or situations where a clear alternative supplier exist but is not currently used) is another important group for the buying firm. Following the supplier market through alternative suppliers will give the buyer an insight into the possibilities offered by other technological solutions. By comparing these possibilities, the buyer can improve the existing focal relationship, or, in some cases, even change to these alternative suppliers.

Furthermore, the buying firm's customers can have a great impact on the focal relationship. An example of such impact is to focus on the demands a customer places on the buying firm, both regarding internal processes, supplier evaluation and management and on quality and lead-time improvements in the supply chain. The last group of actors we will discuss is the buying firm's competitors (firms selling similar products to the same market as the focal firm). This type of relationships are important to the focal relationship because of the possibility of co-ordinated purchasing. For example, the buying firm may cooperate with a competitor on purchasing activities to increase volumes, thus obtaining better prices, better transportation etc.

In the above sections we have discussed how the buyer's different relationships can have a significant impact on the focal relationship. All these relationships have been seen from the buying firm's point of view, but it is obvious that an analysis from the selling firm's point of view could contain other important relationships which will also affect the focal relationship. Both Lammeng (1993) and Gadde & Håkansson (1993) have shown that the suppliers to the selling firm have an important impact on the focal relationship.

They argue that these suppliers play a significant role in matters such as specialization, standardization of components, quality improvements etc. They also argue that to focus on the total supply chain (buying firm, selling firm, selling firm's suppliers) is of great value to the buying firm.

Further, we will argue that other customers to the selling firm can also influence the focal relationship. These customers can be competitors to the focal firm, or they can be firms selling other types of products in other market segments. For example, adaptations made by the selling firm towards one or more other customers may be problematic and/or helpful to adaptations deemed necessary in the focal relationship. The last category of important relationships enjoyed by the selling firm, is the selling firm's competitors. Similarly to the case of the two buying firms collaborating in the purchasing process, two selling firms can do the same regarding marketing. This is for example possible when a single supplier is to small to get in contact with a customer, but through co-operation with one of its competitors can be an interesting partner to the same customer. This type of relationships can have a great impact on the focal relationship.

To sum up, we have shown that there are different groups of relationships, both related to the selling and to the buying firm, which can play a significant role in the development of a focal relationship. This is illustrated in Figure 1 on the next page.
The figure above shows how industrial networks theory can be used to describe the change in managers' perception about the degree of integration necessary with other firms' content of these supplier relationships in turn are dependent upon other relationships.

This description is important if we want to see from the firm level, from the relationship level or from the network level. This allows for crucial business functions such as purchasing. In other words, to improve the purchasing function and the way it works internally, we must also look at how the firm is linked to its suppliers (local relationships), and how the focus and content of these supplier relationships in turn are dependent upon other relationships.

4.2 Achieving higher productivity in supplier relationships

Another thesis work presented by Torvatn (1996) links up to this analysis and description by treating the issue of productivity in relationships, and how different levels of analysis change our perception of what is productive and how we can achieve it. Improvement of performance measurement in the purchasing function is one of the classic challenges of purchasing research. Empirical surveys of the current status of purchasing performance have been done by example Stevens, 1978 (for the UK), Monczka & Carter, 1979 (in the US); van Weele, 1983 (in the Netherlands) and Axelsson & Lage-Hellman, 1993 (in Sweden). The latter authors (van Weele, 1983 and Axelsson & Lage-Hellman, 1993) also introduce reasonable discussions related to the problems of measuring purchasing performance. Again, however, these approaches have stayed within the function, trying to evaluate the function and/or other constituents as seen from the function.

The research done by Torvatn (1996) shows that the methods for performance measurement should be closely linked to the level we want to examine performance on. Thus, what is productive from the functional level, may not look as productive when seen from the firm level, from the relationship level or from the network level. This means that care must be taken to avoid sub-optimization of functional productivity to the detriment of the productive of the larger structures. Torvatn (1996) then introduces industrial networks theory to explain why this is so, and tries to develop ways of describing productivity on the relationship and network levels.

For example, he illustrates in his thesis work how price (which is usually seen as a major indicator of purchasing performance) works mainly on a firm level. Achieving real productivity gains on the relationship level means to adapt and adjust the production processes and the products exchanged within the relationship to achieve a better fit between the firms involved in the relationship. This involves changing both activity structures (such as administrative, logistic and production processes) and adapting resources (products, machinery and work force) as necessary.

This is not to say that price as an indicator is wasted or wrong. Rather, to the contrary, each level of analysis will have its own "logic" and its own indicators. The main point, however, is that none of these levels can be safely ignored. Instead of choosing one level of analysis, and overlooking other, Torvatn (1996) proposes that a multi-level analysis should be used and that sufficient balance must be found between evaluating performance on the firm level and performance inside the larger structures (relationship level and network level). This in turn means that firms must approach their environment in a holistic fashion, where equal care is taken to the needs of the firm and to the firm's place in the larger structure. Such an approach emphasizes integration with close partners and indicates a more complicated way of handling supplier relationships (thus reinforcing the picture given by Pedersen (1996) above).

Another major point of this thesis work is the importance of the impact that suppliers (and other external partners) have on a given firm's total productivity. We can again refer to the economic importance of the purchased materials of a company. Nevertheless, it is difficult to find measures which can reflect this importance. Firms still deal with each other in an indirect way through measures on the firm level (using price and quality to evaluate the end result from a suppliers production). Managing all the complex overlaps and dependencies in the interface between suppliers and buyers is a far too important and complex task to be left to indirect control. Instead, purchasing personnel (and possibly also other managers of the firm) must go into direct discussions about resources are used in other companies, and how activities and activity chains are formed for a larger structure, negotiating solutions and suggesting development processes which may increase the output of the larger structure. Only then can the large importance of suppliers in the economy of a modern firm be met with corresponding dealt with in a sufficient way.

This process may seem like a lot of work, and especially when a practitioner thinks about all those suppliers that his or her firm has. Fortunately, it seems to be so in most industrial firms that the number of important suppliers (both when it comes to volumes and technical content) is very low. Empirical research (for example Cadek & Håkansson, 1993 and Garnes et al., 1995) indicate that the five largest suppliers (in volumes usually account for almost 50% of the total purchasing costs. Thus, a task that may at first seem to be large, is in fact a very manageable task. It is the way of thinking about a firm and the purchasing function that need to be developed further in order to emphasize integration.

For this article, we can draw the following conclusions: Firms still have a large, unrealized potential for productivity increases in better contact with the firms main suppliers. This potential can be released through a closer integration between buyer and supplier, and it is natural for the purchasing officials of the buying firm to be one of the leading factors in this integration process. Furthermore, sufficient care must be taken in this work not to destroy the network productivity stemming from interdependencies between several relationships (as indicated by Pedersen, 1996).
4.3 Managing supplier relationships in a network context
To develop the knowledge and insights acquired through our thesis work, we will concentrate on the concept of integration. The external integration process can be described as a "co-action" strategy (Jansson & Pedersen, 1994). In such an inter-organisational process, it becomes crucial to know your partners, as well as the relationship to other central parts (the network context). The reason for this is that in a co-action-strategy, knowledge is important both to be able to suggest your own improvements to the relations, but also to be able to react to other partners in the network and to their suggestions. Only earlier experience with these relationships can serve as a basis for making such suggestions. Håkansson & Snehota (1989) formulates this point for relationships in general in the following way: "Within a relationship interaction takes place between actors who are pursuing their own goals and acting purposely. In a setting, reacting to other actors' actions can be more important than acting itself".

It is with this kind of thinking that we will argue that the development of supplier relationships towards a more integrative approach is not only dependent upon the initiation of change processes in one organization, but that a number of firms and organizations linked to each other need to develop a common approach. Such firms and organizations may include suppliers, customers and competitors to both the buying firm and the selling firm (Pedersen, 1996). If this is to be possible, the involved actors need to define the changes being attempted as positive to themselves (or at least not negative). In many ways, we can compare the situation with the one described excellently by Lakof (1987) as a process of "enactment". Actors need to be involved at different stages in the development process, and in order for them to stay in the process, they need to feel that the process is moving in a direction that they have chosen themselves.

Transcending this paradigm of slow-moving adaptation processes is in this situation only possible when many actors together wish (or are forced) to change the direction of their work.

In the start of the article we described empirical arguments for the strategic importance of the purchasing function. In light of the discussions taken from our thesis work, we believe that this strategic function cannot be run by the firm in isolation. It is not a matter of developing an internal integration and "play it out". In our opinion, the most important strategic task of a firm (when it comes to purchasing) is to identify the relationships affecting the firm's crucial supplier relationships. This information is the basis for co-action with the identified important actors to develop and adapt to the relationships, and it is the effectiveness of this co-action process which determines whether the organization can achieve productivity improvements or not. The above does not, however, mean that this task is a simple one. Rather to the contrary, this view indicates that purchasing strategy becomes even more complicated and difficult to handle, since it involves integration of a number of strategies stemming from a number of different actors. We do believe though, that this external integration process should be one of the most important strategic tasks of the purchasing department.

4.4 Working with Internal Integration
Above, we have discussed the need for external integration between buyers and suppliers as one concern being important to purchasing. The title of this article indicates that internal integration is in the view of the authors very important. Working with suppliers in the way indicated above presents the purchasing officials with a need for information not currently possessed by them. For example, since it is important to assess the effect of a customer relationship on the local supplier relationship, it is necessary also for the purchasing function to know something about the markets and the market situation of the firm. This knowledge can be achieved in two different ways: by educating the purchasing manager, or by having purchasing people working together with marketing people. It is the latter of these two solutions which will have implications for the internal organisation of the firm.

To some extent, actual firms do use a system such as the one described above. In one company that we came across, the purchasing manager claimed that he would often bring production people and/or designers with him when meeting a supplier, and particularly so when the theme of the discussion was technical adaptations and/or changes to the product (Torvatn, 1996). The thought of using cross-functional teams has also been described in theory. However, we believe that employing such a system on an occasional basis (or even on a project basis) is not sufficient, given that the need for external integration is growing. Permanent solutions must be reached, and engravings into the organisational structure of a firm.

Since the relationships entertained by a firm with suppliers is directly affecting the economic performance of the firm, NOT ONLY through the prices we pay for raw materials, but also in the way that we organise our internal affairs to handle them. In other words, the relationships do not stop at the firms doorstep. Instead, they stretch into, and affect, the firms and their inner life to such an extent that it is sometimes prudent to ask whether we can truly establish a difference between internal and external activities in a firm. This critical question of borders is discussed thoroughly by Dohuis (1994) and by Torvatn (1996).

With our relationship focus on companies, it seems natural to suggest that the same relationships could be used as a basis for internal organisation as well, thus leading to a relationship-oriented approach to internal organisation. In such a firm, people occupied with tasks related to a specific department will also work together on a common basis. For example, the firm organised in this way will leave handling of key supplier relationships to a group of managers and employees drawn from all earlier functional specialisations of the firm. In this group, there will be marketing, purchasing and production people, in addition to people whose specialisation is in quality management. The size of such a group will vary depending on the importance of the relationship. The main principle of such an organisation is to group together people who have specific knowledge about the counterparty, and it is this knowledge that the member of the groups have in common.

Envisioning such a company may be difficult at the present time, and we do not suggest that this is the only possible solution. We are, however, concerned about the problem in general, and regard the suggestion made above as a contribution to a debate about the future internal organisation of a firm, as well as a way to further develop the purchasing function.

5. Conclusions
Since much of the research on business functions DO frequently stumble upon the problem of achieving a greater integration, it is in our opinion long overdue that we ask ourselves a critical question: Is it the role of functional specialisation itself that must be changed? If we as researchers really believe that the trend is towards a more holistic and integrative approach, and if we really believe that a lot can be achieved through a closer integration of the functions of a firm as well as between firms and even in larger networks, we should offer opinions on how such integration could be achieved, and that is what we have intended to do in this article. Fortunately, we should not be alone in such work, as this should be an equally interesting area of research for all business researchers, whether their specialisation is in marketing, strategic management, personnel management or purchasing. The point is to develop the organization to handle products, processes and/or relationships in a more holistic fashion.
The changes towards a more wholistic view suggested in the preceding paragraph are not merely cosmetic, but will have severe consequences for managers and the way that they think about firms. Internally, managers must abandon central dogmas in organisational theory like "unity of command" and "chains of command". Externally, concepts such as "arms-lengths transactions" and the ever nebulous concept of "environment" must give way to relationships and exchange with identifiable partners in the network. Although it is unlikely to go as far as our title suggests (that separate departments for the business functions will disappear totally), the role of functional departments should be downplayed as more wholistic approaches become the focus of managerial activity. The paradox then becomes that in order to develop the purchasing function, we must abandon the thought of a strong purchasing department and lend our efforts to the development of a relationship-oriented organization.

References

Is it Interesting for a Company to Outsource Purchasing and Under What Conditions?

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Abstract
In today's business environment, companies are faced with a dilemma when analysing their Purchasing organisation. On the one hand, they recognise that Purchasing must play an essential role in their company to become more efficient, productive and profitable. On the other hand, the high cost of maintaining a full in-house purchasing covering the complete purchasing process, is a difficult expense to justify. This is particularly true where companies are re-focussing their efforts to concentrate on their 'core-competencies'. This paper describes a perfect solution to this dilemma: Outsourcing the non-critical part of Purchasing. Question is: how to identify non-criticals? This paper explains a method and approach to help on this purpose.

1. Introduction

"The winning companies will create semi-permanent alliances of all kinds to subcontract anything from anywhere."  

Tom Peters

The prime objective of a company is to make profits. Profits that are maximised to offer the highest possible return on investment for the shareholders. Profit maximisation can be realised through different ways:

- increasing the sales keeping the same cost structures
- cut fixed and variable costs keeping sales at the same level
- shift fixed cost to variable cost (buy flexibility!)  
- combination of mentioned points

Important is that profit maximisation is an objective that has to be realised taking several constraints into account, such as markets, political situation, availability of capital, people, ...

In the 1980s, the sharply decreasing growth rate of the market and the increasing costs confronted the companies with reduced profit margins. Attention was then consequently shifted to cost control and the equation also changed:

\[
\text{from: } \text{cost price} + \text{profit} = \text{sales price}
\]

\[
\text{to: } \text{sales price} - \text{profit} = \text{cost price}
\]

Today for many companies the cost of goods sold is already under good control. That is why today new areas will be considered where there is a high potential for decreasing fixed costs by shifting them to variable costs.

2. Environment — Market Trends

A. The market conditions are changing very quickly today. In many businesses there is considerable overcapacity of workforce. Where circumstances allow, market will push towards downsizing and reduction of head-count.

B. Companies are looking for continuity of their complete logistic chain. We can talk about synchronisation of the complete supply chain.

C. The total cost of ownership is not only determined by the supplier's performance such as quality, reliability, innovation, price, ... but also by the number of manufacturers and suppliers needed to run the business.

D. Make or buy decisions determine if the inter-company operations have more added value than the external competition. This is certainly the case of facilities management that can be run internally by using external resources. Another option is to isolate the desired internal competence and make it entirely external to the company.

E. Outsourcing is used as a stabiliser of output/input (capacity). Outsourcing can be infinitely adjustable. It can be used for regular services or temporary peaks.

F. As the life cycle of products becomes shorter and because of increased competition, the market pushes towards flexibility; not only in terms of logistics but certainly also in terms of innovation. Today it is a matter of concentrating on core business, of identifying needs and services that are core to the true nature of the business.

![Figure 1. The strategic tetrahedron](Image)

Source: F. Clauwaert (Alcatel Bell)
3. Cost of Ownership — Cost Drivers

The past years, the concept of cost of ownership (COO) has been used throughout the whole world in many industrial, trading or service oriented environment. Mostly it has been used from theoretical point of view. And for sure one sensitive aspect is the price. However everybody is becoming aware that not only the price but many other elements have to be considered in evaluating competitiveness.

The COO can be defined as the total of all costs created by purchasing goods and services to meet the business targets of the company. This definition can be explained by an example: What is the cost when a new article is purchased, e.g., an advanced electronic component, which is a new technology, coming from a new unknown supplier, and which will be delivered by air freight from the Far East and to be used in the production within 6 weeks? The price is indicated on the invoice but the COO will be completely different and much higher!

The COO can be defined in two categories of elements. The first category comprises the 'easy-to-quantify' elements and concerns rather conventional parameters:

- price
- transport
- inventory
- duties
- insurance
- exchange rate
- etc.

The second category, comprising the 'difficult-to-quantify' elements, becomes a major part of the COO. It comprises elements such as:

- technological capability of the supplier
- quality level
- reliability of deliveries
- flexibility to deliver more or less on short time (turbulent market)
- number of suppliers to manage
- number of articles designed-in
- level of standardization and commonality between products
- sole source-articles
- etc.

These difficult to quantify elements are generally never used by traditional buyers in their negotiation meetings with the supplier. Indeed, the main problem is how to collect facts and figures to compare the different vendors, with the final aim of increasing the competitive position of the company. It is crucial to determine exactly these 'difficult- and easy to quantify' parameters to decide if outsourcing will be part of the strategy.

4. Managed Outsourcing

To be effective in outsourcing it is a necessity to consider the outsourcing process as a project. This means clearly that some criteria will be necessary to define in advance:

- Define clearly the frame, e.g., to what extent do you want to outsource?
  - What departments are involved?
  - Is it necessary to contact HRM or the unions?
- What is the objective?
  - Obviously a better result than has been obtained internally, but is it a matter of cost reduction only in purchasing or another division, or is the objective a reduction of the supplier base?
  - Do you want to concentrate more on your core activities so to realises better and higher cost improvements?
- What is your milestone plan?
  - Duration of the investigation, required resources, action plan, ...
- How will the advancements of the process be measured?
  - This is of course directly linked to the objectives.

It is the intention of management to guide the project and exclude the risks as much as possible. The project will end in a procedure that is a management tool. The different phases of the project will be formally identified and planned in time (see Figure 2).

Figure 2. Project planning

5. Materials to Consider

The materials and article mix which come in consideration can be related to two main categories:

1. Coded Materials
   Generally material that can be found directly in the end-product. Often the term 'inventory' material will be used. In MRP terminology this material is identified with a Bill of Material and further we will use the term BOM materials.

2. Non-coded Materials
   These materials are mostly auxiliary material, capital investments, indirect material, etc., necessary to support the output of company. In analogy of the coded material we will use the term NON-BOM materials.
The second category, NON-BOM, is particularly difficult to detect because of the nature of these articles. This material has generally a very low stock rotation (small moving items) and will be purchased without forecast. The requirements are triggered on urgency base which is mostly not always the best economical solution. For these categories it is hard to define or recognise some values or cost aspects. Questions about (a) year estimation, (b) used warehousing space, (c) actual stock rotation, and (d) number of suppliers cannot be exactly answered.

For this reason and to analyse on an objective way we will have two complete different approaches. The following Table summarises some essential differences.

Table 1. Differences between BOM and NON-BOM materials.

<table>
<thead>
<tr>
<th>BOM Materials</th>
<th>NON-BOM materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defined with a specification or product</td>
<td>Defined with description:</td>
</tr>
<tr>
<td>Can be a product, application or service</td>
<td>Focus on flexibility:</td>
</tr>
<tr>
<td>• MRP (system) driven</td>
<td>• Speed of delivery</td>
</tr>
<tr>
<td>• JIT deliveries</td>
<td>• Co-operation</td>
</tr>
<tr>
<td>• Forecast</td>
<td>• Communication</td>
</tr>
<tr>
<td>• EDI</td>
<td>• Proximity</td>
</tr>
<tr>
<td>Agreed price and incoterm</td>
<td>Negotiated price and incoterm</td>
</tr>
</tbody>
</table>

6. Methodology

BOM → Portfolio-analysis with Kraljic model
NON-BOM → Pareto-analysis related to cost-drivers

6.1 Portfolio Analysis

This model is a survey of the supply risk in relation to the business package of the supplier. We have to make a clear distinction here between a supplier and a manufacturer. A manufacturer is defined as the company that produces the articles while a supplier is the partner with whom we place our purchase orders. Mostly suppliers and manufacturer are the same. However in a number of cases, the manufacturer works with local agents or representations.

This model allows us to manage the variety of articles with the corresponding suppliers. The advantage of this system is the objectivity based on facts and figures.

In a two dimensional space, supply risk and added value result in a distinction of 4 categories: Strategic — Bottleneck — Non-critical — Leverage (see Figure 3).

![Figure 3. The purchasing portfolio](image)

The supply risk is of course determined by the company’s strategy and is a function of different elements. Anyway, an objective evaluation can be made. The supply risk can take following elements into account and can be graduated on a scale of 10 or 100 points. A low value on the scale means low risk (see Figure 4).

<table>
<thead>
<tr>
<th>Supply</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>no</td>
<td>sole</td>
<td>single</td>
<td>dual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Lead</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Time</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logistic</td>
<td>70</td>
<td></td>
<td>80</td>
<td></td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock</td>
<td>high</td>
<td></td>
<td></td>
<td>low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Quality</td>
<td>80</td>
<td></td>
<td>85</td>
<td>90</td>
<td>95</td>
<td>100</td>
<td></td>
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<tr>
<td>Performance</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>no</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>bad</td>
<td></td>
<td></td>
<td>good</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life</td>
<td>in phase</td>
<td>proto</td>
<td>out</td>
<td>satur</td>
<td>grow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>low</td>
<td></td>
<td>mid</td>
<td></td>
<td>high</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
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</table>

![Figure 4. Supply risk elements](image)
Clearly only the elements that are completely system supported will be investigated in this model. As an example, communication can be determined as a function of the number of PO lines launched or in function of the receiving of the goods. Flexibility can be related to vendor lead-time, e.g., shorter lead-time results mostly in a higher flexibility. Also experience with the supplier can be quantified in function of time (date of the last PO, number of POs, ...)

The value is calculated on unit price of the article multiplied with the quantity needed on an average of one year.

The potential outsourcing category will be of course this one with low supply risk. That means the non-critical and bottleneck zones.

6.2 Pareto Analysis Related to Cost Drivers

The next figures are used as an example on a medium sized Belgian company named Company X (500 employees and a yearly turnover of 37,500 ECU).

Over a period of one year per purchasing head:

- Average manpower cost in purchasing division: 39,538 ECU
- Number of POs: 2,500
- Number of PO lines: 10,500
- Number of active suppliers: 600
- Average headcount — strictly purchasing: 14
- Average headcount — involved in purchasing: 20
- Total purchasing volume (BEF): 20,000 ECU

Related to the CEGOS figures the following assumptions can be made (CEGOS figures: Cost drivers as percentage of procurement cost):

<table>
<thead>
<tr>
<th>Cost Driver</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFQ, negotiation and contracting</td>
<td>22%</td>
</tr>
<tr>
<td>Prospection, evaluation of suppliers</td>
<td>17%</td>
</tr>
<tr>
<td>Stock management</td>
<td>8%</td>
</tr>
<tr>
<td>Ordering and call-off</td>
<td>21%</td>
</tr>
<tr>
<td>Fire-fighting</td>
<td>13%</td>
</tr>
<tr>
<td>Invoices</td>
<td>12%</td>
</tr>
<tr>
<td>Others</td>
<td>7% +</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The total cost per head of purchasing for Company X is:

<table>
<thead>
<tr>
<th>Cost Driver</th>
<th>Cost per Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFQ, negotiation and contracting</td>
<td>39,538 ECU</td>
</tr>
<tr>
<td>Prospection, evaluation of suppliers</td>
<td>6,786 ECU</td>
</tr>
<tr>
<td>Stock management</td>
<td>3,242 ECU</td>
</tr>
<tr>
<td>Ordering and call-off</td>
<td>8,303 ECU</td>
</tr>
<tr>
<td>Fire-fighting</td>
<td>4,982 ECU</td>
</tr>
<tr>
<td>Invoices</td>
<td>4,586 ECU</td>
</tr>
<tr>
<td>Others</td>
<td>2,926 ECU</td>
</tr>
</tbody>
</table>

Ventilation of the average purchasing cost means:

- Cost of PO/headcount: 316.3 ECU
- Cost of PO line per headcount: 75.3 ECU

Detailed as:

- RFQ, negotiation, contracting: 16.65 ECU
- Prospection, evaluation: 12.87 ECU
- Stock management: 6.17 ECU
- Ordering and call-off: 15.8 ECU
- Fire-fighting: 9.50 ECU
- Invoices: 8.72 ECU
- Others: 5.57 ECU
For the examples in this model we use following assumptions:

- the cost of external purchasing (trading house) varies from 10 to 20% to take the decision to outsource part of own purchasing, only a part of the purchasing division (PO lines) is taken into consideration:
  - 1/6 of the cost of 3,012 BEF (= 12.5 ECU)
  - 1/3 or equivalent of 25 ECU
  - 1/2 or equivalent of 37.5 ECU

If the cost of own division is higher than the external solution, obviously this will be treated by the own division.

Table 2. First analysis of PO lines of Company X

<table>
<thead>
<tr>
<th>PO line</th>
<th>VALUE ECU</th>
<th>Avg. Cost A (10%)</th>
<th>Cost C (20%)</th>
<th>Fix A (37.5 ECU)</th>
<th>Fix B (25 ECU)</th>
<th>Fix C (12.5 ECU)</th>
<th>Cum</th>
<th>TURN TRADER</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)1</td>
<td>72.042</td>
<td>72.042</td>
<td>72.042</td>
<td>14.408</td>
<td>72.042</td>
<td>2203012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B)1</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>25</td>
<td>12.5</td>
<td>2203012</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C)1</td>
<td>124.042</td>
<td>124.042</td>
<td>124.042</td>
<td>25</td>
<td>12.5</td>
<td>2203012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Decision table 1 (NO = no outsourcing)

<table>
<thead>
<tr>
<th>D, AA</th>
<th>D, CC</th>
<th>D, AC</th>
<th>D, CA</th>
<th>D, AB</th>
<th>D, BA</th>
<th>D, BB</th>
<th>D, BC</th>
<th>D, CB</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>NO</td>
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<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>NO</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

8. Advantages of Outsourcing

1. Financial
   - COO
   - high-lighting real cost
   - variabilisation

2. Organisation
   - shift up stream
   - EDI
   - change capacity

3. Strategic
   - concentration on strategic partnerships

9. Criteria for the External Purchasing Office
   - expertise in logistics and administration
   - manage many low value articles and many suppliers
   - frequent deliveries

10. Elements of the Contract

- pricing policy
- delivery of goods
- planning information: tools, system, ...
- payment conditions
- delivery frequency
- stock strategy
- frequency of ordering
- ACO - EDI
- conditions on quality follow-up
- documentation
- supplier rating system
- contact persons
- NON disclosure agreement

11. Conclusions

Outsourcing of purchasing is an important element in today's competitive position of the companies. It permits to improve their performances by cost improvements and by giving their procurement the essential power for a strategic role on the market.

This strategy is the result of the 'lean supply' philosophy. But it is important not to inverse the roles: outsourcing of purchasing without re-engineering the position and function of procurement, makes no sense.

References

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The Death of Purchasing?
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2 Flymo Ltd, Preston Road, Aycliffe Industrial Estate, Newton Aycliffe, County Durham, United Kingdom, DL5 6UP

Abstract
This paper has been written to explore shifts in the conceptualisation of the purchasing function. It also explores the degree to which this conceptual shift impacts upon the nature of the purchasing function both for the profession as a whole, and the individuals who make up that profession. It considers the effects of the shift upon the management and practice of purchasing in a number of important functions. Consideration is offered to suggest that this shift is so fundamental as to call for a redefinition of the profession.

Keywords: The Purchasing Function, Performance Centred Purchasing

"He had decided to live forever - or die in the attempt" Joseph Heller, Catch 22

1. Introduction

Within the literature we can identify a number of themes with regard to the profession of purchasing. One of these includes the fact that purchasing is developing as a more 'strategic' function (Gaddie and Hakansson 1993) with a range of new skills and sourcing which perhaps, reflects the growth of so called 'relationship' selling. All of these terms are difficult to define and lend themselves to more than one interpretation. Nonetheless it seems possible to say that this shift is having a direct effect on the way in which the profession is changing. These have been dealt with at some length elsewhere (Stannack and Scheuing 1996) but it may be useful to reconsider them briefly here.

Perhaps the first of these is the domination of Darwinian thought and practice in organisational theory (Degler 1993). Increasingly we can see the growth of organisational demands for flexibility to meet rapidly changing environmental demands, and an extension of the way in which flexibility is managed. Traditionally human resources have been perceived as the most flexible element in the management of organisational change with the possible exception of money.

Interestingly, it is possible to identify an evolution in attitude towards human resources as components of flexibility. In the early days of so called scientific management (Taylor 1927) employers were, as noted, seen as 'components' within an organisational machine (Hayyol 1937; Morgan 1985). Each component was selected for 'fit' and could be easily replaced by other components in the warehouse of the labour market. Flexibility was managed by reducing the number of 'components' through lay offs, short time working etc. To some degree this is still true today. A recent article by Berry (1995) has indicated that the number of applications to Industrial Tribunals for cases of unfair dismissal has risen by 50% in the year beginning 1995. This may, of course be a result of other intervening variables.

Nonetheless, we can see shifts in practice in managing flexibility. As work becomes more complex and 'entry barriers' to the world of work become higher, we can see a reluctance to shed certain components which have become essential to organisational operation. Here managers learned to differentiate between core and peripheral workers and become reluctant to lose core workers. This core and peripheral model of managing aggregate labour flexibility was adopted and heavily structured by Japanese companies (Dore 1994).

We can suggest that this need for flexibility in the management of human resources has extended, and is extending naturally to suppliers. The rationalisation of supply bases, the tiering of the supplier function, the supplier development function all find resonance in the world of human resource management. We will argue, however that the management of suppliers is a more complex function than the management of human resources.

A further result of this search for flexibility is the need to move decision making closer to the customer or service user. This improves organisational response times and moves out middle managers whose classic role was to act as mediator between operational staff and senior managers. The effect of this shortening of the "chains" of command has been exacerbated by the employment of information technology where operational information can be transmitted much more quickly to senior managers, operational staff and senior managers. The effect of this shortening of the way in which competitiveness is perceived. Increasing speed of information transfer and processing means that competition is larger in scale as more companies enter the global market place and smaller companies find market entry barriers relatively high. One consequence of this may be market polarisation with the multi-national "big-players" operating in one market and smaller companies operating in marginal markets.

As well as increases in the perceived need for flexibility we can also identify a shift in the way in which competitiveness is perceived. Increasing speed of information transfer and processing means that competition is larger in scale as more companies enter the global market place and smaller companies find market entry barriers relatively high. One consequence of this may be market polarisation with the multi-national "big-players" operating in one market and smaller companies operating in marginal markets.

As well as increases in the scale of competition we can also identify increases in complexity. This is reflected in social terms by what Koller (1987) terms the "move towards a mosaic society". Here rising levels of education, increased social and cultural diversity, more single person households lead to a demand for customised products and a movement in manufacturing and marketing towards what Pine (1993) labels "mass customisation".
One response here is to place an emphasis on waste reduction and minimisation such as that seen in ‘Toyotism’ and the Total Quality Management philosophy which underpins this approach to organisational design. Here we can see a move towards ‘lean’ production with reduced stockholding. Just in Time inventory management systems and ‘poka yoke’ production line techniques (Monden 1987 Shingo 1982). 

Cusamano (1994) has warned of the limits of improvement of the purchasing job is significant. We can see from these two examples that the nature of the purchasing job is changing, with increased emphasis on the environment and the need for greater control over quality and cost. Such a response might be measured through ‘poka yoke’ production with reduced stockholding. Just in Time inventory management systems and ‘poka yoke’ production line techniques (Monden 1987 Shingo 1982). 

3. Measuring Changes

Each of these changes may be said to have an effect - or a range of effects - on the nature of purchasing. These include, activity, variety, temporal structure, social contacts, status and identity and money. Although, we use the term ‘job’ freely in a range of situations and with a range of meanings (Bridges 1995) we would suggest that in order to be able to develop hypotheses with regard to the nature of ‘jobs’ it is necessary to consider a number of elements.

The first of these is the definition of what we mean by a ‘job’. Clearly, the idea of a job is a social construct or social ‘fact’ (Searle 1994, Berger and Luckmann 1967). In considering social and psychological facts it is often too easy to be drawn into a debate with regard to the nature of a phenomenon without a proper exploration of the mechanisms necessary to carry out such a debate. In such cases, managerial discourse can often deceive the social scientist and, indeed, the practitioner into thinking that they have an adequate understanding of the subject under discussion. In such cases, discourse - vocabulary - can blind us to the reality of practice.

Before beginning any such debate, it is useful to consider the ‘grammar’ as well as the vocabulary of managerial practice. This involves establishing a context in order to create meaning. There are a number of ways in which context can be defined.

We can see that the two themes identified above will have effects upon particular dimensions of the purchasing function. The shift to a strategic role will have an effect upon the way in which the purchasing professional interacts with colleagues in other disciplines within the organisation or group. The shift to an entity or a partner of partnership sourcing will have an effect upon the way in which professionals interact with suppliers. We can see from these two examples that the nature of the purchasing job is more complex than might at first be recognised. The shift from ‘product centred’ through ‘process centred’ and ‘relational’ to ‘performance centred’ purchasing has already been noted at a functional level (see Table 1 on the next page, Stannack and Scheuing 1996). The next section of this paper considers the implications of this shift from an individual level.

### Table 1. The Evolution of Purchasing

<table>
<thead>
<tr>
<th>Stage One Product Centred Purchasing</th>
<th>Stage Two Process Centred Purchasing</th>
<th>Stage Three Relational Purchasing</th>
<th>Stage Four Performance Centred Purchasing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor assessment methods</td>
<td>Improved assessment methods, process and outcome measures, process focused</td>
<td>Improved assessment methods Process and outcome measures, process and relationally focused</td>
<td>Best Practice assessment Outcome measures closely linked to processes, Best Practice management methods, Employs an integrated methodology to manage relationships, processes and outcomes, Jointly resources this methodology with suppliers Best Practice monitoring methods</td>
</tr>
</tbody>
</table>

4. The ‘Job’ of Purchasing

In considering the function of purchasing, it may be useful to consider the nature of ‘jobs’ as a whole. Traditionally, the job is portrayed as only a set of tasks. We will argue that the job, and particularly the job of purchasing is somewhat more than this. The idea of the job, or at least work, as being central to an individual’s life has been noted by writers and researchers since Webers formulation of the idea of the Protestant work ethic and its relationship to the spirit of capitalism (Weber 1947). 

Warr (1982) has noted the functions that work fulfill for individuals. These include, activity, variety, temporal structure, social contacts, status and identity and money. Although, we use the term ‘job’ freely in a range of situations and with a range of meanings (Bridges 1995) we would suggest that in order to be able to develop hypotheses with regard to the nature of ‘jobs’ it is necessary to consider a number of elements.

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Before beginning any such debate, it is useful to consider the ‘grammar’ as well as the vocabulary of managerial practice. This involves establishing a context in order to create meaning. There are a number of ways in which context can be defined.

One of these is through the consideration of functional analysis. Robert Merton (1949) has identified thirteen steps necessary to carry out the functional analysis of a phenomenon ranging from identification and description of the phenomena to be observed through to a consideration of the ideological implications of the analysis process. Although Merton himself had doubts as to whether a complete functional analysis was practicable, but we can suggest that in order to understand a
phenomenon we need to describe it, and place it in a context which will lend it meaning.

It is therefore necessary to define terms before we can successfully consider whether those terms are changing effectively or subjectively. Once terms have defined it is possible to take consideration of the factors which might lead to any shift i.e. the context in which this shift takes place. Once context has been adequately identified it may be useful to consider how a shift in the nature of a job might be identified, the motivations behind both the identification and the study. Finally it may be helpful to consider the impact of such a shift on issues with regard to the purchasing function. Definitions are grounded in "common sense" approaches to the world of work. Others are more tenuous. We define jobs as having three primary functions. The first of these is to offer a set of categories through which the employee can ascribe meaning to the world of work and organisations. Here jobs perform a locating function in that they offer individuals a way of locating themselves to organisations. The second of the primary functions is to represent the contract between the individual and the organisation in its broadest 'psychological' or 'symbolic' sense. It also represents the relationship between individuals within organisations. In this sense the job also performs a relational function (Rousseau 1995). The third function is task based in that it defines tasks and duties to be carried out, performance standards to be set and skills to be developed. It allows or seems to allow work to be measured, structured and rewarded. It is possible to argue, however, that any jobshift is defined in terms of its individual and aggregate psychological effects.

Within these primary functions we can identify a number of components or categories. Pettigrew (1975) has noted the way in which categorisation is perhaps the basic building block of human cognitive processing. He notes the difference between 'broad' and 'narrow' categorisers and the impact this has upon human information processing and, by extension, behaviour. It is possible to suggest that the job is both about a self-categorisation and a categorisation by others with regard to an individuals way of behaving in organisational (not merely work) situations. This idea of job as a categorising mechanism, has a number of implications for this research. When we consider purchasing as a number of categories, we can identify a range as follows:

1. Purchasing as a role i.e. behavioural categories
2. Purchasing as a set of tasks
3. Purchasing as a set of relationships i.e. status
4. Purchasing as social categories
5. Purchasing as a set of attitudes or capabilies of capacity.
6. Purchasing as a set of skills

To these we could probably add others, and it would, of course, be folly to suggest that these individual definitions do not overlap. The conceptualisation of purchasing as a role and purchasing as a set of tasks will often blur, as will that of purchasing as a status category and purchasing as a wage category. Before considering each of these definitions in more detail, we will consider the framework of the study.

5. The Study Framework

In identifying cognitive, affective and cognitive shifts in each of the above areas, we relied on a range of qualitative research methods with a range of purchasing managers. At the time of writing, further research is underway employing a range of techniques including a variant of the twenty statements test to explore the shift in the 'job' of purchasing in more depth.

The research was carried out with twenty three purchasing professionals working in eleven organisations involved in high volume manufacturing environments (4), utilities (1), process industries (2), capital goods manufacturing (1) and public sector purchasing in health or social care (2). The organisations ranged in turnover from 7.5 million sterling to £4.44 billion sterling. Spend within each purchasing department varied from 2.5 million sterling to 185 million sterling. In five of the organisations, purchasing was seen as a support or internal consultancy function.

The respondents ranged in age from seven years through to thirty years in the profession and had been in post from three to eleven years. This sample was selected from a range of companies with whom the authors had been in contact and took place over eight months from April 1995 to January 1996. In addition to the purchasing specialists we were also able to interview a number of managers in other functions who acted as assessors and managers of the purchasing function.

The qualitative methods chosen were structured open response interviews, and in some cases card sort tests such as those outlined by Johnson et al (1995). King (1994) offers a four stage approach to the use of qualitative interviews. These are

1. Defining the research question
2. Creating the interview guide
3. Recruiting participants
4. Carrying out the interview

To the above we can add a fifth stage of data interpretation and presentation

Defining the Research Questions

The research questions were defined on the basis of the hypotheses identified above. These questions were then checked with a number of individuals within the field of purchasing. This led to the formulation of the following research questions and sub-questions.

1. What is the function of the "job" in purchasing?
2. Has this function shifted and how?
3. How does the purchasing "job" differ from the supply chain management "job" and in what respect?
4. What are the effects of the shift from "purchasing" to "supply chain management"?
5. How has this shift affected your working relationships with other departments?
6. How has your performance been assessed within your organisation?
7. Has there been a shift in the types of skills which you use in your job?
8. Has there been a shift in the way in which your performance is assessed within your organisation?

The above questions and sub-questions represented the research questions and also reflected the categories of "job" which we had previously identified above. The research questions led to the development of a structured interview guide as follows:

1. What do you see as being the role of a purchasing manager within your organisation?
2. How has your role changed over the last two years?
3. Which other departments do you work with most often? Do you work with these departments more or less often since the shift?
4. Please describe your most common type of interaction with these individuals? Has this changed?
5. How do you feel that the role of the purchasing department is perceived by other professionals? How has this changed?
6. What do you see as being the core tasks of a purchasing manager?
7. How have these tasks shifted over the last two years?
8. Do you feel that these tasks require new skills?
9. Could you identify these skills?
10. How do you feel that any shift has impacted upon the way in which your performance is assessed?

Prompts were added to the questions identified above i.e.:

2. How has your role changed over the last two years?
   Prompt — such as a shift from direct purchasing input to more ‘co-ordinative’ or ‘consultancy’ tasks
   If yes — could you explain a little more about this shift?
   If no — why do you think that is?
   Follow up — How do you feel about this shift?
   2nd follow up — What do you think brought this about?
   Prompt — e.g. the shift in role, uncertainty about your new role?

The respondents were selected as stated above and the data was interpreted employing a variant of discourse analysis (Stubbis 1983) to determine a number of ‘interpretive repertoires’ which were then matched to the original research questions. This has affected the presentation of the results where statements ‘typical’ of these interpretive repertoires were selected to support hypotheses with regard to the shift in the nature of purchasing. The next section of the paper will consider how each of the categories identified above have shifted.

6. The Role of the Purchasing Professional

The first category which we considered was that of purchasing activities as a ‘role’. Within the literature, we can see that the term role is employed in two distinct ways. The first of these is to define an entity’s identity for itself. The second is to define an entity’s identity for other entities. The second component is the structurally given demands or expectations in the organisation (or other social system). This component may be internalised rules. The third component is the experience of a role and offer a basis for the development of further commitment to that role.

Strong identities and clear roles are therefore necessary for effective performance in social situations and we can suggest that the use of ‘rules’ and job descriptions to define clear roles is a feature of industrial bureaucracy as noted by Gouldner (1954). We have also seen, however, that identity, whether defined as experience, educational background etc., and role involves expectations and ‘permissions’ about the way in which individuals can orient themselves in interaction.

Given this we would suggest that there has been a shift in both the expectations and permissions available to individuals working in the field of purchasing. This shift can be identified by a number of areas. Perhaps one of these is in the increased uncertainty which purchasing professionals feel with regard to their role. Increasingly we can see purchasing professionals who express concerns with regard to the lack of clarity or direction which they feel. In the interviews we could see purchasing staff typically make statements such as:

“I’m sure that there is a better way of arranging these (purchasing) issues but I’m not sure what it is.” (Purchasing Manager - Construction)

“I can see where we need to be (in our relationship with suppliers) but I’m not sure how to get there - or if I can” (Director of Purchasing)

When asked why they felt this uncertainty, typical responses were:

“We can see that there is considerable competitive advantage in working in a different way, but there does not seem to be any effective guidance about working in that way” (Buyer, 30 years experience in consumables)

“We’ve had to scrap all the old rules, and we’re busy trying to make up new ones, but it’s very hard work” (Purchasing Team Leader)

Another salient issue was that of professional division. The development of professions involves hierarchies within the professions as well as between professions. To some degree this involved the ‘apprenticeship’ system, but to a far greater extent it involved the division of purchasers into what a number of supply chain managers, borrowing from Jones (1993), called ‘upstream’ and ‘downstream’ purchasing. Where we might expect such a division to rest upon an administrative/management functional split, we were surprised to find that this split rested upon the way in which
relationships were managed - the definition of purchasing as a network of relationships.

7. Purchasing as a Set of Relationship Categories or 'Status'

Whilst Bridges (1995) and others (Senge 1992, Stahl et al 1992, Hammer and Champy 1993) have noted the transformation of hierarchies towards 'leaner, flatter' organisational structures. This involves a shift in the way in which power is distributed within an organisation. Strauss (1972) and his colleagues from the Chicago school developed the idea of the 'arena complex' to explain this distribution with different professional groups vying for a greater share of decision making. The suggestion of a move towards a 'more strategic' role for the profession of purchasing involves shifts in the way in which purchasing professionals interact with other professional and interest groups in the organisation.

Stannack and Scheuing (1996a) have already noted the need for purchasing to develop a professional language in the same way as do professional groups within the medical profession (Torstendahl 1995), but the effect of the shift in relationships will include both quantitative dimensions i.e. the frequency with which purchasing professionals interact with other groups and qualitative dimensions i.e. the way in which the interaction takes place.

The frequency and nature of the interactive process will rest upon a number of issues, some of which extend beyond the boundary of the organisation. For Merton (1968 p434) status is "the complex of distinct positions assigned to individuals both within and among social systems." Purchasing as 'status' is about a category of relationships which will depend upon the way in which the profession is perceived both within and outside the organisation. Indeed Kolchin and Guimperro (1993) have noted that the team approach to sourcing will become more prevalent in the same way that the team approach to product development has become more prevalent. Here, concurrent engineering attempts to remedy some of the co-ordinate shortfalls faced by professionals working in complex environments.

During the course of the research, we identified the fact that purchasing was frequently defined through association rather than through the work carried out. Examples of such status definition would include the use of associative job titles i.e. 'Supply chain managers are the M.D.s blue eyed boys at the moment' where relationships with the Managing Director are more salient than the job itself.

In response to questions with regard to the way in which 'upstream' purchasing differed from 'downstream' purchasing, the majority of responses rested upon the degree to which the functions interacted within and between organisations. Typical of these responses were;

"Supply chain management means that we are constantly meeting with other departments, some of whom, like HRM, we've never worked with before." (Purchasing Team Leader)

"It's a much more co-ordinating role. We have to help organise the activities of other departments. This is sometimes frustrating because we don't have the time for working in traditional ways and we are attacked by colleagues because of this failure" (Purchasing Manager - Automotive Components)

The tenor of meetings has changed. It used to be that production or quality would be hitting us over the head with process failure. Now we are showing them why failure takes place - and it's often due to poor compatibility between supplier systems and our systems" (Director of Systems and Supply)

"We seem to be working more and more frequently as mediators between suppliers and departments within our organisation" (Purchasing Manager)

"Work with suppliers has become much more intense. We are shifting from the 'product' centred approach ...to more of a systems focus. This means that we have to develop a completely different style of working, and overcome the traditional suspicion that traditional ways of working has create. Mind you, we're not always successful." (Strategic Supply Manager)

8. Purchasing as a Set of Tasks

If purchasing as a set of relationships has shifted, we would suggest that relationships are a result of role, but also a result of activity. MacGregor, working in the 1960s has noted the difference between 'task based and maintenance based activities for groups. Ancona and Caldwell (1992) have demonstrated the use of groups as a boundary spanning mechanism. We believe that the difference between task based and maintenance based activities is spurious, and that the third essential component of the purchasing function are those tasks which both achieve the objectives of the purchasing function and manage the relationship between that function and suppliers or other functions within the organisation.

According to Bridges (1995), the nature of work is changing so quickly that traditional approaches to recruitment and selection, as well as those relating to job design are changing. The idea of 'fit' has given way to a process in which the individual has to sell him or herself and the company in turn demands increasing flexibility and commitment. Jobs are, in Bridges lexicon 'inhibitors'.

Such a view depends, however, upon the view of purchasing as a contract between the individual and the organisation to obtain the 'right goods, at the right price, in the right quantity, at the right time and to the right quality' (Bailly and Farmer 1987). It has been argued elsewhere (Stannack and Scheuing 1996a) that this classic view of the purchasing process is indeed inhibiting or choice limiting. In this view, one element of the shift in purchasing is that of conceptualisation. This involves a focal shift from a 'product' centred approach to a 'performance management' approach where supplier performance is the most important commodity.

Here the 'core' function for the purchasing process is 'to manage the performance of suppliers' (Stannack and Scheuing, 1996a, p. 3) and a set of core tasks can be derived from this function. These include the 'recruitment' and assessment of suppliers, the 'motivation' of suppliers, particularly in single sourcing arrangements, the development of clear performance measures and methods to communicate performance targets and the creation of a common vision with regard to the way in which the relationship will move forward and the targets which will be jointly achieved. They also include the task of "relational governance (Kram 1994) in which the damage caused to operational plans and activities by unexpected environmental shifts can be minimised through effective 'relationships' with external entities (see also Kay, 1993).

The respondents in this area were clear that the tasks involved had shifted significantly.

"Of course outcomes are still important to us, but they don't give us sufficient control over the supplier. We're looking much more closely at the way in which processes
Contribute to the outcomes that we need. We do seem to need a new way of getting our objectives agreed. Traditional "clout" is less useful, particularly in strategic supply. (Strategic Supply Chain Manager)

"Outcome measures are less and less flexible, as we need more from suppliers than we can specify through outcomes, but it's difficult both communicating our requirements and even more difficult ensuring that they are met" (Director of Purchasing)

"It used to be that we were concerned about the outcomes of purchasing. We've shifted now to be much more concerned with processes, and that means that we need to be able to carry out assessments much more accurately and comprehensively." (Purchasing Manager, Automotive Components)

"We spend much more time in meetings analysing what's gone wrong with suppliers, rather than chasing our own tails, expediting, and finding that the blockage has moved, just when we thought that it had been identified." (Purchasing Manager, Construction)

"It used to be that I went into a company and managed it for them. I managed their planning and scheduling, their quality assurance, their production layouts. The trouble is, that once you've done that you can never get out. The new challenge is trying to get them to do it for themselves." (Strategic Supply Manager, Process Industries)

"We were the experts. Thousands of man-hours were spent writing specs that were five hundred pages long. And then we couldn't get it right. One of my main jobs now is trying to ensure that we get the best out of suppliers - because, after all we trust them to do it for themselves." (Strategic Supply Manager, Process Industries)

9. Purchasing as a Set of Skills

In the previous section we saw the purchasing defined as a set of tasks. It is also possible to identify purchasing as a set of skills. It is possible identify a shift in this area too. Schott (1995) suggests that the traditional buyers day has been spent in what he describes as 'expediting, doing paperwork and attending meetings leaving little time to spend money well' (p. 8). Under an MRPII/JIT/TCQ umbrella this shifts to negotiations, value analysis, vendor selection.

Whilst such a shift is not empirically supported, and, indeed, might be attributed to the improved information flow which arises in such manufacturing environments, we can accept that there may be a shift in process or skills in carrying out tasks.

Cady writing in 1945 notes that "the purchasing agent spends important parts of his time (some times as much as 75%) at interviews and conferencing" and lists interviewing prospective suppliers as being amongst the most important skills.

Within the current literature we can identify two types of skills studies. The first of these is a descriptive exercise in functional mapping. The very process of functional mapping is one which is fraught with problems. The method necessitates choosing a large sample from which to derive the functional map. As a consequence the skills picture which develops is one which describes the present state of purchasing skills. The second type of study is a prescriptive exercise which asks a group of experts, what they believe will be the skills necessary for the purchasing professional in five, ten, or twenty years. Such forecasting exercises are difficult because they can work from normative components which are not subject to critical reflection.

Amongst the more influential studies in the United Kingdom, the Chartered Institute of Purchasing and Supply has identified five "minimum" activities including strategic decision making, determination of optimum contractual strategies, identification and management of supply sources, inventory management, and the management of total supply. Logistics. The United Kingdom Purchasing and Supply Lead Body has also identified a range of units, which include contracting for supply, contributing to the maintenance of organizational relationships, vendor evaluation and optimising the supply base.

Sauders (1994) has identified a list of "general" skills which include communication, working in groups, numeracy, information processing, information gathering, and problem solving. Erriode et al (1995) in a comparative study of standards in purchasing and supply within the United States identifies eight common components ranging from "formulating courses of purchasing plans and strategies through strategic sourcing to maintaining" effective relationships with customers and suppliers.

In the United States, Muller (1991) offers an overview of the Certified Purchasing Managers examination in four modules Purchasing which include supplier analysis and negotiations, Administration: Supply which includes materials flow and inventories, management, and Current Issues which includes forecasting and strategies, computerisation and external/internal relationships.

All of these curricula suffer to a greater or lesser degree from the curse of job analysis. They either confuse activities with skills or they offer a standards based approach which breaks down because of the contextual nature of higher level skills. In considering the shift in skills we were able to identify that a shift had taken place but the nature of the new skills was still unclear to the majority of respondents. Typical responses to the questions here were:

"There is an issue about the way in which we work now. Supply chain management is a generalists game and calls for a much more process based approach." (Supply Chain Manager, Automotive)

"I remember reading somewhere that a manager needs the sort of skills used in riding a bicycle rather than the skills used in building a fortress. We've moved away from the fortress approach where suppliers tried to break in. Whether we've moved far enough remains to be seen." (Strategic Purchasing Manager)

"We rely much less on traditional contracting skills in managing supply chains. It used to be about making rules that the supplier will obey. Now it's much more about helping the supplier to help us. This has led to a qualitative difference in the way in which we approach problem solving and the way in which we communicate." (Purchasing Team Leader)

"The complexity of the contracting and specification process means that we used to rely heavily on our 'expert' skills in engineering or logistics design. We found out that this didn't work because we were overspecifying and losing supplier input. We've been forced to try to develop a whole new way of communicating with suppliers." (Director - Group Purchasing)

10. Purchasing as a Wage Category

Bruns (1992) has suggested that jobs might be defined as wage categories.
Just as task categories might be seen as a subset of role categories, so might wage categories be seen as a partial subset of status or relationship categories although not a complete one. Individuals - technical experts for instance, may be paid at levels of that to senior managers within an organisation, but may not have the same status because of their limited interaction with key powerholders.

At the time of writing research into the correlation between pay rates in the 'new' and the 'old' purchasing is currently underway. We may find that there is a difference between the way in which 'supply chain' managers and 'purchasing' managers are paid, although we expect this research to take some time as job titles may not accurately reflect responsibilities, roles, tasks, and relationships.

11. Purchasing as Performance Measurement

Perhaps the last way in which individuals might categorise purchasing is in the way in which purchasing carries out its tasks. In this sense individuals might define purchasing as performance. The way in which individuals assess performance in purchasing will clearly lend us a perspective upon the way in which they consider the function of purchasing. Although 'performance' is difficult to define we can identify a number of useful points:

For Nichols (1977) performance is "the outcomes of behaviour". Performance in the global sense is measured by changes in the individuals environment. This relates to Gillett's idea of performance being accomplishments "which we value" (Gillett 1974) and even further to Ryle's (1949) idea of performance as "achievements".

Given the above, we can suggest that the way in which achievements are assessed and valued (see purchasing as a wage category) will offer an insight into the way in which purchasing is conceived by both purchasers and non-purchasers.

The shift here could be noted in the way in which performance was assessed. Classically, purchasing performance has been assessed on the basis of its ability to meet a range of gatekeeping criteria such as cost, delivery times, defects in parts per million. Such traditional purchasing performance measures relied upon outcomes, although the research seems to suggest a shift is taking place in this area also. Responses here included the following:

"Up until a few years ago, we were looking at the traditional measures which were really about managing risk and product failure. Now we can see that general management is seeking a much more 'active' set of measures which include the way in which purchasing contributes to innovation within the company or the way in which we can shorten lead times." (Purchasing Manager - Construction)

"I know what I'm looking for. If purchasing is going to act as an administrative function, I'm going to get rid of it. I expect that my project managers can manage that function. We need to see purchasing making a contribution not only in terms of production efficiency, but also in terms of internal expertise. I would expect project managers to express delight with what the purchasing function has done for them." (SBU Director - Process Industries)

"The contracting function has to have a monitoring function within provider units. Unless it can monitor through assessment and control through effective working relationships, we will devolve budgets to operational managers" (Divisional Director - Social Care)

"I think that the way in which performance is measured has changed quite a lot in some areas. Perhaps the most significant change is that purchasing has had to make it's performance much more visible to other units, although I'm not sure that they have the methods to assess it yet." (Supply Chain Manager)

12. Conclusion

In concluding this paper, we can say that there is clear evidence to support the view that purchasing is shifting as a function at an individual level. This supports the view that the perceptions of purchasing managers are also shifting and that such a local shift impacts upon their roles, responsibilities, tasks, and performance measurement.

The four stages of this functional evolution have been noted elsewhere (Stannack and Scheuing 1996). Process Centred Purchasing is concerned with the 'five rights' of Bailey and Farmer (1987) which concentrate exclusively upon the purchasing of tangible products and the outcome dimensions through which this product can be described and managed. The next stage in the development of the purchasing function is that of Process Centred Purchasing. Process centred purchasing moves beyond a concern with outcomes and begins to measure the process through which the outcome is delivered. The third stage in the development of the purchasing function is a relatively recent one. We will label this Relational Purchasing. It involves a further broadening of focus to include the way in which the relationship between the purchaser and supplier might be used to manage the relationship and nature of the supply. Here we can see the beginnings of the 'partnership sourcing' movement. It includes the concept of 'relational governance' (Ramaswamy et al 1994) in which purchasing is managed through relationships and reflects, in part, the work of John Kay (1993) on 'relationships' as a foundation of corporate success. The last stage in the 'evolutionary' process is that of Problem or Performance Centred Purchasing in which the local shift is completed and the purchasing professional becomes concerned with the way in which the 'supply chain' purchaser interact to produce 'performance' measures.

The significant changes in the way in which purchasing professionals carried out their roles and tasks seem to indicate that there has been a clear move from 'product' centred purchasing through to process centred purchasing. There is less evidence that any of the respondent companies were as yet employing relational purchasing although many of them claimed to run 'partnership' sourcing programmes. Such partnerships tended to rely on a heavy investment of resources by the purchaser and a commitment to a lengthy or a sole relationship. There was little evidence within respondents that improved two way communication or joint development strategies were turning such dependency based relationships into effectively governed partnerships. Within respondents there was a clear recognition of the fact that working relationships needed to change but a much less clear idea of what they were changing to, and only a dim perception of the skills needed to bring change about. Over the course of the study, there came to be an acknowledgement that purchasing needed to make a major contribution to the performance of the organisation.

Within the organisations we also saw a marked shift in the way in which purchasers regarded themselves and were regarded by other groups. An increased emphasis upon 'proactivity' in approach reflects Burr's work in this area (1984). This was coupled with an increased in the visibility of the function. We also saw an increased emphasis on multidisciplinary as a mechanism for dealing with complexity. Coupled with this, we were also able to perceive new demands being placed upon purchasers in terms of co-ordinative or consultancy functions which would bring their leadership roles to the fore.
We are still however left to answer the somewhat dramatic question implied at the beginning of this paper. Is what we are seeing, in the field, the death of purchasing? In one sense we can say ‘yes!’ where the old function of purchasing is ‘the systematic process of deciding what, when, and how much to purchase. The art of purchasing it; and the process of ensuring that what is required is received in the quality specified on time’ (Burt 1984). Increasingly we can see the function of purchasing as the assessment, management and monitoring of supplier behaviour to optimise organisational inputs. Here the act of purchasing is only one strategy, albeit perhaps the most powerful one, in a whole range of strategies to ensure these inputs. Nonetheless, until purchasers and academics broaden their approach to roles, relationships, tasks and skills to take these new challenges into account, then the unsavoury zombie of purchasing may well be around for quite some time. Dead - but too stupid to lie down.

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Successful Product Development by Integrating Purchasing
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Abstract
The product development process is one of the central processes for the companies' success. Whereas participation of production and marketing in the product development process is common, it is not a matter of course that purchasing is integrated. Analysing the strategies of successful firms, we identified the integration of purchasing as an early stage of the product development process as one key success factor. In these companies purchasing plays an active role. The paper describes a new understanding of purchasing and in this context the contribution of purchasing in the development process. Further the resulting benefits of an early integration of purchasing regarding the success factors time, quality and costs will be revealed.

Key words: Internal Strategy - The role of purchasing in new product development

1. Introduction - The Chrysler case
For some time a change in international publications with regard to the position and importance of the corporate function of purchasing can be noticed. Headlines and statements like "Purchasing as one guarantor of a successful value creation" (Zenger, 1995, p.40); "At last purchasing is becoming strategic" (Speman/Kamauff/Salmond, 1994, p.76) or "Our heritage is the management of materials our future lies in design" (Burt/Doyle, 1994, p.150) verify this trend. Simultaneously research and development (R&D) as another corporate function and reply to reduced product life cycles and intensified international competition gains in importance. The Chrysler case:

In the beginning 80ies Chrysler, one of the biggest automobile manufacturers worldwide, was faced with a difficult situation. Chrysler lost the connection to its competitors. One measure in this critical situation was the redesign of the relations to the supply market managed by the purchasing department. A closer cooperation with suppliers in form of JIT-supply was realized in the mid 80ies. In the last ten years purchasing at Chrysler changed. In an increasing degree it detached from pure purchasing tasks within production and took over tasks within product development. Today purchasing is responsible for the use of its suppliers potential already within product planning and development. In the traditional product development process of the car industry suppliers are involved in the planning not earlier than 70 or 80 weeks before production. At Chrysler the procurement starts 180 weeks before production. The purchasing department reduced the number of suppliers from 700 to 200 best qualified suppliers.

2. Tendencies in purchasing
The tendencies in purchasing result from changes in production (Wildemann, 1992, p.180). The last years were characterized by the reduction of production depth and an increase of material costs. For example in 1988 the material costs in Germany's mechanical engineering industry amounted 37 %, in 1998 it will be about 48 % (VDMA, 1993, p.4). The reduction in the production depth means a shift of value creation towards suppliers. An increasing share of supply components within the own product leads to increasing importance of the external relations to the supply market. The exploitation of the possibilities the supply market offers is of decisive importance for quality, lead time and the company's cost structures, i.e. for the market success. The sales department has to develop the potential the sales markets offer, while it is in the responsibility of the purchasing department to do so with the supply markets.

A redesign of the purchasing function in order to achieve a kind of entrepreneurial purchasing is demanded since the beginning of the 80ies (Winand/Welters, 1982, pp.6-8; Hamman/Lohberg, 1986, p.V). But even at the end of that decade purchasing was regarded as a handmaid of production in German enterprises (Koppelmann, 1993, p.1). Today the redesign takes shape. Table 1 summarizes the tendencies of the actual redesign and describes them with some particular features.

The tendencies given in Table 1 follow the priority of a value chain orientation. In practise the most important potential for reduction are expected by the internationalisation of the supply sources and the intensified cooperation with suppliers (VDMA, 1993, p.4). Building up intensive partnerships with preferred, qualified suppliers will be in the centre of these new cooperations. In the scope of the orientation on the customers' benefit purchasing can make use of its possibilities to develop and design more competitive products. The consequent selection of suppliers is just a single possibility to participate on their high reputation ("brand sourcing").

Lowering the production depth means increasing the complexity of the items purchased. Selecting the items is done in a team. In this coherence the team of representatives of purchasing, of development as well as of suppliers proved their worth (Stapf, 1994).

They established long term relations to them based on partnership. The results (Rose, 1994, pp.109-110):
• reduction of product development time about 50 % to 39 months
• more innovative and customer oriented products
• product development costs below the budget planning

Changing the buyer-supplier-relationships Chrysler was able to save USD 3 Billion just in 1993 (Burt/Doyle, 1994, p.30).

In this article the development from traditional to modern purchasing is described. Based on this description the chances arising from the higher importance of purchasing within the product development process are worked out. The basis of this paper are interviews with supply managers especially in the German mechanical engineering industry and with consultants.
technology. The new tasks and the use of information technology like standard software or EDIFACT (Electronic Data Interchange for Administration, Commerce, and Transport) are followed by a qualification of the purchasing employees.

Table 1. Tendencies in purchasing

<table>
<thead>
<tr>
<th>Tendency</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>Value chain orientation</td>
<td>Internationalisation of procurement (Global sourcing)</td>
</tr>
<tr>
<td></td>
<td>Advising the management of the supplier by purchasing</td>
</tr>
<tr>
<td></td>
<td>Conducting procurement marketing</td>
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<td></td>
<td>Conducting value analysis studies with the suppliers</td>
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<tr>
<td>Supplier orientation</td>
<td>Reducing the number of suppliers (Single sourcing)</td>
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<td></td>
<td>Involving the supplier in the design phase</td>
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<td>Developments done by supplier</td>
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<td>Long term contracts</td>
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<td></td>
<td>Selecting suppliers by development potentials and competences</td>
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<tr>
<td></td>
<td>Just-in-time-delivery (JIT)</td>
</tr>
<tr>
<td>Customer value orientation</td>
<td>&quot;Brand-sourcing&quot;, i.e. purchasing from the marketing point of view</td>
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<td></td>
<td>Quality as the main criterion in purchasing (VDMA, 1993, p.4)</td>
</tr>
<tr>
<td></td>
<td>Enlargement of supplier selection criteria, e.g. considering environmental aspects</td>
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<td>Team orientation</td>
<td>Crossfunctional teams</td>
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<tr>
<td></td>
<td>Interorganisational collaboration with suppliers</td>
</tr>
<tr>
<td>Reduction of administrative tasks</td>
<td>Conducting of conceptional tasks</td>
</tr>
<tr>
<td></td>
<td>Displacing and automating of administrative tasks</td>
</tr>
<tr>
<td></td>
<td>Conducting procurement marketing</td>
</tr>
<tr>
<td></td>
<td>Employment of methods, like value analysis</td>
</tr>
<tr>
<td>Reinforced use of information technology</td>
<td>Realization of integrated company solutions, like SAP R/3</td>
</tr>
<tr>
<td></td>
<td>Electronic relationship to suppliers by EDIFACT</td>
</tr>
<tr>
<td></td>
<td>Creation of purchasing information and controlling systems</td>
</tr>
<tr>
<td>Qualification of purchasing staff</td>
<td>Increasing offer of language and law courses</td>
</tr>
<tr>
<td></td>
<td>Job Rotation</td>
</tr>
<tr>
<td></td>
<td>Increasing educational degree of the purchasing employees</td>
</tr>
</tbody>
</table>

The potential of modern purchasing lies in the cooperation with other departments as the development, the production and the distribution where it enables the possibilities offered by the supply market. Its tasks are more conceptional. Being aware of its responsibility to the final product, it emphasizes the competition between an internal and external production which is an advantage for the company (Fieten, 1994, p.67).

An interview partner described the new purchasing as follows: "Purchasing needs not to find a solution but moderate the way to the solution. Purchasing is a communicator and moderator concerning the external producers.

3. Purchasing in the new product process

On a large scale the main factors of corporate success costs, time and quality are already fixed during the planning and development of a new product. Experts assume a determination of about 75 % of costs during this stage (Fieten, 1994, p.56, Feldte/Diekhinver 1989, p.125). The "time to market" also is fixed by the length of the product development process. Today the strategic importance of lead time is undisputable (Geschka, 1989, pp.161-163). In the next chapters a brief description follows concerning a product development process and the discussion of the question if and how modern purchasing influences the development of new products in an industrial corporation.

3.1 The product development process

The product development process is one of the central processes in an industrial corporation (Brandt/Weller, 1995, p.38). The idea for a new product is the starting point of this process. In spite of well known industry- and firm-specific characteristics this paper is based on an ideal type of a new products process (Fay, 1995, p.25). It is adapted to the requirements of the mechanical engineering industry. Table 2 shows a product development process separated into five phases. There are innovation tasks assigned to each phase. The involvement of purchasing into the management of each single task is marked with a asterisk (*).

Table 2: Cooperation of purchasing in the product development process

<table>
<thead>
<tr>
<th>Phases of product development process</th>
<th>Tasks within the scope of product development Traditional role of purchasing</th>
<th>Modern role of purchasing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Planning</td>
<td>Analysing the companies potentials in R&amp;D, production, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Systematic idea generation and evaluation from a strategic point of view</td>
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<td></td>
<td>Top management decision and R&amp;D release</td>
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<tr>
<td>Basic Engineering</td>
<td>Drawing up requirements specification</td>
<td></td>
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<tr>
<td></td>
<td>Designing new marketing concepts</td>
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<td></td>
<td>Working out fundamental technical solutions, including make-or-buy-considerations</td>
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<td></td>
<td>Starting up with costs-, time, and personnel planning</td>
<td></td>
</tr>
<tr>
<td>Detail Engineering and Construction</td>
<td>General development of new or improved main product components</td>
<td></td>
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<tr>
<td></td>
<td>Evaluating and selecting product components</td>
<td></td>
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<tr>
<td></td>
<td>Developing or fixing of materials, resp. production methods</td>
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<tr>
<td></td>
<td>Selecting suppliers</td>
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<tr>
<td></td>
<td>Building and testing prototypes</td>
<td></td>
</tr>
<tr>
<td>Production Planning and</td>
<td>Working out product documents</td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>Preparing preproduction</td>
<td></td>
</tr>
<tr>
<td>Introduction on the Market</td>
<td>Realizing preproduction series</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General introduction on the market</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assembling and putting into commission</td>
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</tbody>
</table>

The phase of product planning includes all activities that take place before the actual product R&D. Successful enterprises attach very high importance to this phase (Geschka, 1989, pp.161-163). While in the past R&D started with a low structured pre-phase today the potential for time and cost savings in this early phase are recognized. Therefore a division's strengths and weaknesses concerning personnel, know-how etc. are analysed in a preliminary stage of the ideation phases. Through the establishment of the corporate strategy the management is involved into the product development. Starting from strategy and ideation product proposals are worked out. An increasing number of firms uses cross-functional teams for this task (Fage, 1993, pp.273-276). The proposals are presented to the management, that has to decide about the release for the next phases (basic and detail engineering as shown in Table 2), necessary alterations or the cancellation of the project.
3.2 The traditional role of purchasing in the product development process

Assembling and commissioning of the supply market.

For the product's concept is broken down to single development components (e.g., drive, bodywork, steering mechanism etc.) it is possible to start with a detailed cost and time planning as well as to design the production means.

The concrete development activities for these components and the fixing and development of materials and production methods start in the detail engineering phase. After the selection of component proposals and their drawing up to a general concept of the new product it is possible to definitely decide about the selection of suppliers and the procurement of standard and purchased components. New or improved marketing concepts must either be worked out at this time. The development and construction phase ends with the building and testing of a prototype, a CAD-simulation, respectively, and a detailed value analysis in order to check the technical and economical capacities.

The results of R&D and testing have to be presented to the management in order to catch up the release for the final phases of the innovation process: production planning, production and market launch. Results of trial runs of the prototype, probably together with a small number of customers that have a special relationship of mutual trust with the manufacturer, should also be available in this very moment. If there are no serious alterations necessary the process can be continued with the production planning, the manufacturing and assembling of a first series as well as the realization of an improved sales and marketing strategy.

The market launch, here looked upon as the final point of the widespread product development process, ends with the training of the customer's machine crew and the assembling and commissioning of the appliance or machine at the customer's site.

3.3 The modern role of purchasing in the product development process

In the described product development process above purchasing in its traditional role is involved rather late. Neither during the product planning nor in the basic engineering stage the purchasing department plays an active part. Even with the first make-or-buy considerations are selected and tested, i.e., when most of the product specifications and almost all of the technical options are fixed and a substantial part of the development and construction tasks are done (Table 2, column 3). Then detailed specifications of the necessary components are given to the purchasing department and it is not unusual that also the supply sources are named explicitly (Winand/Welters, 1982, p.9).

Purchasing tasks are purely clerical duties now. In this case purchasing know-how is not unusual. Often a team of engineers or even the development engineer responsible on his own decides from a strictly technical point of view about make or buy of R&D tasks as well as components. They usually do not have detailed knowledge about the supply market.

Into the decisions about materials and manufacturing methods, that take place in the beginning of the development and construction stage, the purchasing department is also not involved (Burt/Soukup, 1984, p.90). Very often those responsible for purchasing join the R&D process not before the proposals for the product components are selected and tested, i.e., when most of the product specifications and almost all of the technical options are fixed and a substantial part of the development and construction tasks are done (Table 2, column 3). Then detailed specifications of the necessary components are given to the purchasing department and it is not unusual that also the supply sources are named explicitly (Winand/Welters, 1982, p.9).

If the manufacture is not unusual. In this case purchasing know-how is not unusual. Often a team of engineers or even the development engineer responsible on his own decides from a strictly technical point of view about make or buy of R&D tasks as well as components. They usually do not have detailed knowledge about the supply market.

To introduce its very specific know-how about the supply market, indicated by the specific selection of components to be procured as well as the forced competition between make or buy (Fieten, 1994, p.67).

This may reduce those risks, that probably cause a failure of the product development process (see chapter 3.4). The orientation on the supply market becomes important especially for the medium-sized firms in the mechanical engineering industry (Murrmann, 1994, pp.217-226).

3.4 The modern role of purchasing in the product development process

Because of its improved qualification (see Table 1) the modern purchasing is involved earlier and more intensive into the product development process (Table 2, column 4). Purchasing is acting in a more planning and consulting manner than purely clerical.

The fundamental difference between modern and traditional interpretation of purchasing is the understanding of development, procurement and selling as one common challenge (Mendez/Pearson, 1994, p.6; Hendrick, 1994, pp.13-18; Morgan/Monczka, 1995, p.103). The modern purchasing is one member of a product planning team, i.e., it is involved into the analysis of the firm's strengths and weaknesses, into the reception of innovation impulses and into the systematic ideation and selection (Stapf, 1994). It can introduce its very specific know-how about the supply market during the early stages of the product development process, something that today has become self-evident for the sales department and is practiced successfully for a long time (Hauschild, 1993, p.66). Then the broad potentials of the supply market are included already in the product proposals. At this moment for the management their decision basis is expanded by an important aspect.

The modern purchasing is also able to support the actual development tasks, working out the technical solutions and their realization in construction, the next step in our innovation process. The possibility is offered to the engineers to use the purchasing department as an information broker to improve own make-or-buy considerations. This offers the chance to put together cross-functional know-how in order to optimize the new product in technical and economical respects. If the purchasing department is involved as a know-how provider also into the conceptualization of materials and production means, then the company will be able to transfer know-how from supply market into its own products. Furthermore, quality as well as cost - time and personal planning can receive further improvement (Hendrick, 1994, pp.13-18). To a large extent the traditional tasks described above remain in the responsibility of purchasing departments.

Therefore modern purchasing allows the interdisciplinary cooperation not only between production and sales department but also the inclusion of the supply market within the product development process. This starting-point leads to:

- an enlargement of the information basis
- an intensified orientation of the product development process in the direction of the supply market, indicated by the specific selection of components to be procured as well as the forced competition between make or buy (Fieten, 1994, p.67).

This may reduce those risks, that probably cause a failure of the product development process (see chapter 3.4). The orientation on the supply market becomes important especially for the medium-sized firms in the mechanical engineering industry (Murrmann, 1994, pp.217-226).

In Figure 1 the traditional and the modern purchasing and their role in the product development process are compared with each other. The hatched squares mark those phases purchasing is involved in as well as their tasks and objectives.
3.4 Potentials of modern purchasing within the product development process

The potential of purchasing results from the comparison of the traditional with the modern role of purchasing within the product development process. They can be described by the risks of a late implementation of purchasing.

Arranged by the success factors costs, time and quality, Table 3 at first demonstrates the possible risks of the product development (column 2) in connection with the traditional purchasing to deduce the potential of modern purchasing (column 3).

Table 3. Benefits of integration of purchasing in the product development process

<table>
<thead>
<tr>
<th>Success Factors</th>
<th>9 risks for the product development through neglecting of purchasing</th>
<th>Benefit of integration of purchasing in the product development process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>• Overengineering</td>
<td>• Showing substitutes</td>
</tr>
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<td></td>
<td>• Unnecessary commitment of own development capacities</td>
<td>• Increasing competition between internal R&amp;D and suppliers</td>
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<td>• Renunciation of marketing possibilities</td>
<td>• Analysing and assessing make-or-buy-decisions</td>
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<td>• Renunciation of influencing potential suppliers</td>
<td>• Relating to the availability of components</td>
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<td>• Unnecessary long development lead time</td>
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<td>• Integrating suppliers</td>
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<td>Quality</td>
<td>• Renunciation of product ideas</td>
<td>• Information procurement of concurrent production methods, products, etc.</td>
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<td>• Renunciation of specialist's knowledge</td>
<td>• Developing supplier-know-how</td>
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Coming up different approaches to solve the problem of reducing single risks within modern purchasing will be described.

Figure 1. Traditional versus modern purchasing

Overengineering

Overengineering, i.e. formulating exaggerated functional and/or technical demand on the new product or on single components, is a danger not to be underestimated. Unnecessary costs are the result. This is still the fact in the technology marked investment good industry despite an increasing market orientation (Murmann, 1994, pp.127-134). Involving purchasing already in the basic engineering phase can exclude unrealistic demands on supply parts. Purchasing offers links to available alternatives and supports a market- and functionconforming creation of the specifications. Above all there are the recognition of material substitutions and the references to unneeded tolerances to be mentioned.

Unnecessary commitment of own development capacities

The risk to unnecessarily tie own development capacities is reflected in two different shapes: On the one hand there is the danger to neglect the realization of other competitive innovations and on the other hand to create development capacities which the company doesn't need. Integrating purchasing into the development and construction phase prevents that the purchased items which are already available on the supply market are newly developed or that development capacities are enlarged.

The supplier-oriented purchasing knows the supply of purchased items and finds the potential of purchasing: On the one hand there is the danger to neglect the realization of other competitive innovations and on the other hand to create development capacities which the company doesn't need. Integrating purchasing into the development and construction phase prevents that the purchased items which are already available on the supply market are newly developed or that development capacities are enlarged.

Renunciation of marketing possibilities

Looking for a supplier considering features like price or quality of the item purchased always implies the risk to complicate later marketing activities. For instance a company can't take advantage of advertising for an environment-friendly product if the item purchased wasn't chosen after ecological points of view. This risk can be reduced if the marketing concept considers purchasing. The customer-oriented purchasing deliberately selects suppliers using a wider range of selection criteria, e.g. environment or image criteria. Successful examples where suppliers were integrated into the marketing concept of the buyer come from the computer industry. Computer producers advertise with the name of the manufacturer ("Intel inside").

Establishing an uneconomic production depth

In the coherence of the danger of unreasonable usage of own development capacities the risk to misuse own production capacities shall also be mentioned. It should always be verified the necessity to pursue the product development process until the market introduction, i.e. to build a prototype with the company-owned production personnel and to realize a first production set. Modern purchasing can support such a verification of development related make-or-buy-decision in two ways. Above the possibility was mentioned to assess the tasks of development from the point of view of the supply market. Then a buy-decision of the development can bring about an equivalent procedure referring to the production of this component. But modern purchasing can also give precious references for the company-owned development, whether its production should be planned and realized internally or externally, i.e. whether an outside production is acceptable.

Renunciation of influencing potential suppliers

The traditional purchasing influences the supplier only within the scope of price negotiations. It is done without taking influence more extensively. As a consequence the supplier's potential concerning the value creation are not used. The value-creational and supplier-oriented purchasing is conscious that supplier and buyer can
The risk to abandon potential product ideas may occur in different ways. So there either is no new impulse to a new product idea or costs. This risk can also be reduced by adding purchasing to the product planning e.g. from the production planning backwards to the construction. Such a setback will only be unavoidable if the company recognized too late that the supply market can’t or can only realize the new product idea or to a realization via extremely high imprecise development times due to:

- the procurement which can be realized earlier and parallel to the product development process
- the utilisation of development capacities of the supplier
- the use of purchased items instead of company-owned products

Prerequisite is a cooperation of purchasing in the production planning. Implementing purchasing into the product planning team and its cooperation at the given specifications, this will lead to expensive delays of the total project. Those misunderstandings may occur by both irreal expectations of the supply market and by specifications of the item purchased which are either too late or incomplete. If it turns out that an item purchased is basically available in the course of the product development process but potential suppliers see themselves not to be able to keep the time proposal at given specifications, this will lead to expensive delays of the total project. Those misunderstandings may occur by both irreal expectations of the supply market and by specifications of the item purchased which are either too late or imprecise.

At the same time within the product development process the necessity can arise to reconsider an already done task or even to step back to a previous development stage, e.g. from the production planning backwards to the construction. Such a setback will always be unavoidable if the company recognized too late that the supply market can’t make the required item available. Consequences may reach from the change of company-owned development plans to the surrender of the whole project. Implementing purchasing into the product planning team and its cooperation at the determination of the purchased items avoids surprises in respect to the availability of purchased items.

Renunciation of product ideas

The risk to abandon potential product ideas may occur in different ways. So there either is no new impulse to a new product idea or it is refused since a lack of knowledge about new materials or the production method leads to a seeming impossibility to realize the new product idea or to a realization via extremely high costs. This risk can also be reduced by adding purchasing to the product planning phase. The modern conceptional purchasing procures some information about activities of competitors (Haberland, 1992, pp.79-84) as well as new materials or methods. These pieces of information are used within the phase of the product planning. In the scope of the analysis of the company’s potentials purchasing helps to suggest developments of new products based on the knowledge of the competition situation. Concerning the development and assessment of the new product idea it demonstrates alternative materials and methods e.g. considering the examination of feasibility studies. Both activities guarantee that the product idea isn’t already extinguished at the stage of the product planning.

Renunciation of specialist’s knowledge

This risk consists of the renunciation of know-how of the later supplier at the product development process. A common reason is the distrust on both sides. Supplier-oriented purchasing creates an atmosphere of a cooperation based on a partnership. Adding the supplier to the product planning phase seems to be advantageous. A further task of modern purchasing is to integrate the supplier into the product planning team. Advantages for the buyer result from the already described case of the company-owned development capacities, but also by the participation in specialist’s know-how of the supplier which enables significant improvements of the quality (Graham/Daugherty/Dudley, 1994, p.17).

4. Summary

Purchasing is at a state of change. The meaning of purchasing was recognized by many companies in the coherence of a reduced production depth. Tendencies of the change show that purchasing is developing towards a manager of outside relationships in order to use the potential of the supply market. The potential of modern purchasing results from its implementation into processes decisive for company success. An early and lasting implementation of purchasing into the product development process reduces the risks which exist in the product development. Modern purchasing is able to show cost, time and quality potential by adding its specific market knowledge. This significantly contributes to the success of a new product on the market.

References

Market Orientation and Pilot-User Co-operation in New Product Development Projects

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Abstract

This paper deals with co-operation between organisations that are operating under different principles and objectives. The framework for co-operation between the agencies and companies is established by the so-called OFU-contracts administrated by the Norwegian Industrial and Regional Development Fund (SNF). This involves agreements between Norwegian public agencies and Norwegian industrial companies where the public agency purchase an advanced product developed by the private company. Two research questions are discussed: #1. Does a connection exist between the degree of market orientation and project success? #2. How does co-operation in dyads and the solution of the pilot-user dilemma effect the project success? The first research question (#1) is basic to the company and to its effort to ensure a spill-over effect to a broader set of users beyond the pilot user. In connection with #1 a survey study of about 100 product development projects was executed. This study shows that a high level of market orientation beyond co-operating with a pilot-user during product development projects, is significant associated with sales beyond the pilot user. The second research question (#2) emerged as a result of the work with research question #1. The results from studying six in-depth case studies indicates that balanced strength (symmetry), interdependence, high degree of trust, active techniques for solving conflicts contribute to project success for both partners. Common to three of the projects in the case study, is the solution of the pilot user dilemma to the satisfaction of both partners. The win-win solution that is obtained can probably be attributed to the dyadic co-operation itself.

1. New product development (NPD)

NPD is a business function that has major influence on a technology based company's competitiveness and survival in the long run. However, there is hardly any area in which technological and commercial uncertainty is higher than in the development and commercialisation of product innovations (Teece, 1992). This explains the explosion in use of co-operative agreements with actors outside the firm the last ten years (Hergert and Morris (1988). One aspect of R&D co-operation with users (pilot-
users) is that the co-operation may turn out to be a dilemma for the producer. In order to survive in the long run sales to a broader set of customers is necessary, especially when the R&D collaboration is a one of a kind episode and the pilot user only asks for one single product. If the needs and requirements of the customer location during the development phase, we're tied to project success. In the development phase contains stages like initial product development, (2) product development according to the needs and demands of the pilot user, (3) competitive products and prices are being strongly associated with success in the front end of the product development process. The product design was not necessarily representative of the market segment in question. In order to solve this paradox Biemans (1991) suggests that avoiding failing co-operative arrangements implies among other things incentives to motivate the parties to perform and avoid shrinking, an authority system to govern the joint activities and to strangle opportunism, a system for conflict resolution to handle conflicting interests fast enough, and control to measure the participants use of resources and their performances. Ownership is usually assumed to be a prime source of conflict with control. However, different theoretical perspectives use different terms to picture cooperation between different organizations or actors; cooperative arrangement (Baarsdon and Graenbaus, 1990), collaborative agreement (Hargreave and Morris, 1980) and strategic alliances (Ree, 1990). The terms "cooperation" and "collaboration" are in this paper used interchangeably, hence a clear distinction is not made. Ree (1989) refers to cooperation as relations developed between two or more formally isolated units as a result of mutual agreements (oral or written) about change of resources, common activities or decisions in the future. Brown (1983) refers to conflict as the result of both conflicting interests and incompatible behaviour. By interest he means "negotiable and unambiguous" states of disparate environment (1985). Incompatible behavior refers to "actions by one partly intended to oppose or frustrate the other party" (1985).
when ownership is inappropriate as basis for sufficient control, other sources of control must be sought, e.g., mutual trust as reflected in Ouchi's (1980) "clan" mode of governance. Mohr and Spekman (1994) developed a model where the aim was to address the characteristics of partnerships that were associated with its success. Here vertical partnerships between manufacturers and dealers in the computer industry were studied. The basic assumption was that these kind of partnerships exhibit behaviour characteristics that distinguished these more intimate relationships from more traditional business relationships. The behavioural characteristics included attributes of the partnership (e.g., commitment, co-ordination, interdependence, trust), communication behaviour (e.g., quality, information sharing, participation) and conflict resolution techniques (joint problem solving, persuasion, smoothing, domination, arbitration, harsh words). Two indicators of partnerships success were used, an objective indicator (sales volume flowing between dyadic partners) and a affective measure (satisfaction of one party with the other).

The results indicates that partnership attributes were predictors for partnership success. Commitment and co-ordination were associated with satisfaction with support from manufacturer and dyadic sales, while trust were associated with satisfaction with profit. Further, communication problems were found to be associated with a lack of success. Both communication quality and participation were significantly associated with satisfaction with manufacturer support. The study further emphasise that the manner in which conflict is resolved has an impact on relationship success. Joint problem solving, fosters a win-win solution between partners and was significantly related to satisfaction of support from the manufacturer. However, there was no association between persuasion and partnership success. Arbitration were beneficial to success in extreme situations, while harsh words and smoothing over problems contributed little to uncover the underlying problems associated with conflict.

3. Research design

Two major research questions functioned as guide for the empirical study:

#1. Does a connection exist between the degree of market orientation and project success?
#2. How does co-operation in dyads and the solution of the pilot-user dilemma effect the project success?

Figure 1 illustrates the empirical setting for the study and the connection between the two research questions. Research question #2 is a continuation of research question #1 because one assumes that a certain level of market information gathered regarding the needs, requirements and preferences of other potential users in a broader market, public as well as private, is necessary for the existence of the pilot user dilemma. Both research questions further deals with the same set of product development projects, although the number of projects studied in question 1 is much larger. The figure also demonstrates the differences in focus the two research questions represents. In research question #1 the interaction between the company and users in a broader market is examined, while question #2 also explore the co-operation between the private company and the pilot user.

When one threat conflicting interests and incompatible behaviour as separate dimensions, four possibilities becomes clear: (1) (real) conflict is the result of both conflicting interests and incompatible behaviour. If neither conflicting interests nor incompatible behaviour exist, the result is no conflict. Latent conflict appears where conflicting interests are accompanied by compatible behaviour. False conflict involve common interests but incompatible behaviour.
asymmetry was that disparity in relative capabilities tend to frustrate the joint efforts of the partners. Harrigan (1988) refers to partner asymmetry as disparity in means, such as relative asset size, national origin, and venturing experience level. Geringer (1991) refers to compatibility when he compares partners company size, culture, trust and strategic goals. Kanter (1989) claims that partner asymmetry is a factor that particularly makes the alliance unwieldy, because the asymmetry is embodied in the partners need for and control with financial resources, information (technological and relational) and market position. The main conclusion from these studies is that industrial collaboration yields better results when capabilities are complementary and when the disparity in relative capabilities is small. In connection with communication behaviour one focused on the level of participation in the project, and the extent and content of the information that was exchanged. Four conflict resolution techniques were identified; joint problem solving, persuasion, smoothing and domination.

In figure 2 the six product development projects that were examined are positioned according to two dimensions of dyad success; amount of later sales and pilot user satisfaction. The reason for focusing on the commercial aspect is that the incentive of the private company frequently is to ensure a spill-over effect to a broader set of customers when entering an OFU-contract. Pilot user satisfaction is made use of because the principal motive for the public agency to participate in an OFU-contract is solving ones own problems and thereby performing the activities more efficiently than before.

4. Data collection method
Both survey study and case study was used as data collection methods to answer respectively research question #1 and #2. Figure 3 sums up the major characteristics regarding the two methods involved.

![Figure 3. Data collection method.](image)

The basis for the survey was a self developed questionnaire intended for both the private company and public agency. Only questionnaires filled in by the companies were used, mostly because as much as 60% of the cases were managed by representatives from the companies. The questionnaire consisted of several sections. The sections that covered market oriented activities executed during the three major project phases was built up by declarations or statements which the respondents were to assess. In order to measure the answers a five step scale (Likert scale) ranging from 1 = disagree to 5 = agree was used. The questionnaires were sent by mail to the companies as well as the agencies, and the collected data were analysed using the statistical analysis package SPSS/PC+.

many as 126 companies filled in and returned the questionnaires, but 14 OFU-projects were excluded since they were in the very early phase of the product development process. The companies in the sample are spread over several industries. However, industries dealing with EDP/data, electronics and scientific equipment cover for about 40% of the sample projects. Regarding the public agencies, government agencies cover for about 60%, regional governments 10% and municipalities 30% of the sample agencies. In order to uncover research question #2 in depth-studies of product development cases was performed. The data collection was achieved through in-depth interviews with project manager/project team members from both the agency and the company. The interviews were be organised around a "guide" of questions. After concluding the personal interviews and studying different kinds of documents (e.g., schematic representations of the product development process, written down review procedures, product information leaflets, R&D contracts and documentation concerning market assessments/studies), a comprehensive case description was drawn up, and eventually reviewed by the company and pilot user. The four cases was concentrated around governmental agencies and companies within the EDP/data industry.

5. Empirical results
For the survey study 112 projects that were finished or in the start-up of the application and commercialisation phase was considered. As many as 71 projects (63%) resulted in sales to the pilot user, 56 projects (50%) resulted in sales beyond the pilot user, 41 projects (37%) resulted in export, and 15 projects resulted in no sales at all. The majority of the sample companies have less than 100 employees, while the small and medium sized companies, i.e., companies with less than 100 and more than 20 employees, seemed to be most successful regarding sales to the pilot user (66%) and to users beyond the pilot user (52%). In figure 3, where the empirical results is presented, it is distinguished between projects that resulted in sales beyond the pilot user and projects that did not.

![Figure 4. Empirical results (Survey-study).](image)

Sales beyond the pilot user implies sales to other customers beyond the agency on the domestic market and/or the export market. The projects that are unsuccessful are named
"No sales beyond the pilot user". These projects have either resulted in sales only to the pilot-user or no sales at all. Based on the t-value statistic one has tested whether the mean values are significantly different, i.e. that the difference is not accidental, between companies that gained sales beyond the pilot-user and those which did not. Market orientation is measured differently throughout the three major phases of the product development project; initiation phase (front end of the OFU-project), development phase (middle phase) and application and commercialisation phase (back end of the OFU-project). During the initiation phase two statements were put forward in order to examine the coherence between project outcome and how well the market orientation has been undertaken. The results indicates that there exist significant differences in project success between the companies that state high and low degree of market orientation. More specifically the data show that the projects gaining high level of success, i.e. sales beyond the pilot user to users home or abroad, are identical to the companies having the highest quality on the following market orientation activities:

**Initiation phase:**
- Preliminary assessment of sales potential in the home market, before closing the OFU-contract with the pilot customer.
- Preliminary assessment of sales potential in the export market, before closing the OFU-contract with the pilot customer.

During the development phase five statements were put forward in order to examine the coherence between project outcome and how well the market orientation has been undertaken. For all the statements in the development phase, the mean value of the projects that resulted in sales beyond the pilot user, tend to be higher for those companies that executed the market orientation well than those who did not. The following four statements significantly supported the assumption that well undertaken market orientation during the development phase promotes the amount of sales beyond the pilot-user.

**Development phase:**
- Additional assessment of sales potential in the export market, e.g. through a market plan.
- Assessment of the needs, requirements and purchasing power of potential users other than the pilot customer.
- Tests of the product by users beyond the pilot user.
- Developing the product design in the view of the needs of other potential users.

The data do however not give strong enough basis to claim that adequately done competitor analyses promote the sales to customers beyond the pilot user.

During the application and commercialisation phase four statements were put forward in order to examine the coherence between project outcome and how well the market orientation has been undertaken. The data shows that the following three statements significantly support the assumption that well undertaken market orientation during the application and commercialisation phase promotes the amount of sales beyond the pilot-user.

**Commercialisation phase:**
- Presenting the product at industrial fairs and conferences.
- Developing sales- and distribution channels for the product.
- Developing documentation and publicity materials for product sales.

Using the public agency as a reference customer, does not significantly promote success. This is interesting as it implies that referring to a (assumingly satisfied) customer is not sufficient in order to capture other customers which might have other needs. Hence, the result further emphasise the importance of interaction with other potential users during the early phases of the development project.

The features outlined above are tied to single actions contributing to the development of market oriented products and are connected to one of the three major project phases. The use of indexes grouping the single actions further support the main impression that market orientation throughout the project promotes success. Hence, the conclusion of the survey study indicate that companies derive advantages from starting the development of a market orientation already in the initial project phase. Postponing the market orientation development to the later phases apparently reduces the chances of taking into consideration the needs and requirements relevant for other users in a product solution, and thus the possibility of sales beyond the pilot user decreases.

In figure 5 the empirical results from the case studies are presented. As shown in the figure the six cases are divided in two quadrants - 1 and 3. Quadrant 1 represents the "successful projects where both the company and pilot-user have gained project success, while projects located in quadrant 3 are characterised by the opposite. "Sales beyond pilot-user" still refers to sales of the developed product to customers beyond the public agency while "pilot user satisfaction" is an index made up by answers given by the respondents from the agency. The respondent was asked to give his level of agreement on statements regarding whether the product was successful in use: i.e. (1) the product is satisfying, and in accordance with the original need of the agency, (2) the product escaped major adjustments before being used, and (3) the product is being applied according to the what was expected. These statements uncovers whether the product is developed according to the pilot users needs, or made applicable for a broader set of users. In the latter case one would expect that the product differs from original requirements established in the OFU-contract, and that adjustments are needed.

<table>
<thead>
<tr>
<th>Degree of need satisfaction</th>
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<tr>
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<td></td>
<td>2</td>
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<tr>
<td>Low</td>
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<tr>
<td>Project &quot;Power Supply&quot;</td>
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<td>Project &quot;Data Storage #2&quot;</td>
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<td>Project &quot;Voice logging&quot;</td>
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<td>Project &quot;Satellite&quot;</td>
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<tr>
<td>Degree of sales beyond pilot-user</td>
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<tr>
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<tr>
<td>High</td>
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Figure 5. Empirical results (Case study).
Project "Power supply": The purpose was to develop a transportable power supply unit which should prevent the agency's telecommunications equipment from being damaged as a result of a power cut down. The agency and the company were unique in their respective "industries", i.e. the interdependence was present. The pilot user found the company highly trustworthy, based on previous product exchanges. The pilot user was active in the first part of the project and the communication between the partners was efficient. However, the end users among the pilot user expressed different needs and requirements during the development phase, and this resulted in a conflict of interest. The project focused on developing a transportable variant of the stationary power supply unit initiated as a result of a market study executed by the sales office located in England. Because of this new engagement by the company a conflict appeared. The conflict resolution technique that was applied was persuasion. The company achieved considerable sales of the transportable variant of the stationary unit on the domestic market. Although the procurement of the transportable variant was delayed for 3½ years the pilot-user is satisfied because there was a strong demand for such an innovative product that for long time had not been satisfied, and that the product so far is being applied according to what could be expected.

Project "Data storage #1": The purpose was to develop a system unit for 24 hour storage of radio programs broadcasted by the public agency. The technology applied to deal with this high-quality sound was quarter inch digital tapes ("streamers"). Both the company and the pilot user were strong market and technology wise, and partner symmetry appeared. Both the agency and the company were unique in their respective "industries", i.e. the interdependence was present. The trust was high between the partners because of previous R&D collaboration, but in the development phase a conflict appeared. The pilot user expressed needs and demands that were highly specified, but the estimated project time was unrealistic according to the company. The public agency was active in the selection phase. The pilot user was active in the first part of the project, but it failed to follow up during the development phase, and this made it possible for the company to make the product applicable for other potential users. This resulted in a difficult dialogue between the partners, and the pilot user even claimed that the company was not following up on the project. The conflict resolution technique that was applied was smoothing and domination, i.e. denying the use of resources to this project. However, the company managed to sell the data storage unit to the broadcasting agency, but until now has it not been worked on. The air traffic authorities functioned as the pilot-user. This agency was not looked upon as being as strong as the company market wise, and partner asymmetry seemed to be the case. The conflict resolution technique that was applied was persuasion. However, this case was satisfactorily solved. The company gained no sales beyond the pilot user.

Project "Air traffic control": Here a digital voice communication system for monitoring air traffic around airports was developed. Both the private company and the governmental agency were strong market and technology wise, and partner symmetry seemed to occur. Both the agency and the company were unique in their respective "industries", i.e. the interdependence was present. The trust was high between the partners because of previous R&D collaboration, but in the development phase a conflict appeared. The pilot user expressed needs and demands that were highly specified, but the estimated project time was unrealistic according to the company. The public agency was active in the first part of the project, but it failed to follow up during the development phase, and this made it possible for the company to make the product applicable for other potential users. This resulted in a difficult dialogue between the partners, and the pilot user even claimed that the company lied when problems during the tests occurred. The conflict was resolved through the use of persuasion by the company. They promised to deliver the product within reasonable time. Although the product was delivered 3½ years after the project start-up, the needs and demands could easily be implemented in addition to the ones of the pilot users. The conflict resolution technique that was used was joint problem solving, and both parties are satisfied. The company have so far, beyond delivering to the pilot user, sold the product to a private broadcasting company in England. Because of this new engagement by the company a conflict appeared. The original project was "Data storage #2" and the company and pilot user were the same in project "Data storage #1", but in project "Voice logging" the public agency was not interested in the same high-quality sound as the broadcasting agency, but the public agency was interested in the same high-quality sound as the broadcasting agency, but the public agency was not interested in the same high-quality sound as the broadcasting agency - telephone quality was assessed as good enough. The fact that the pilot user wanted a low-quality sound logging system made the company look for other possible target segments. A thorough market study unveiled a large market potential in the following segments - bank/finance, police, fire departments, and surveillance companies, and the company decided to sell the product. This resulted in a considerable lack of participation from the developer and communication with the agency, and the broadcasting agency finally had to call a meeting with the company asking them whether they still were working on the project. Since the situation improved, the conflict came to an end. The way it was solved was through smoothing and domination, i.e. denying the use of resources on project "Voice logging" and withholding information about the use of resources to this project. However, the company managed to sell the data storage unit to the broadcasting agency, but until now has it not been worked on. The air traffic authorities functioned as the pilot user. However, this potential user appeared already in the first part of the project and the communication between the partners was efficient. The conflict resolution technique that was used was persuasion. However, this case was satisfactorily solved. The company gained no sales beyond the pilot user.

Project "Satellite": The purpose was to develop a turn-key system for automatic acquisition and utilisation of meteorological products of the weather satellites NOAA and METEOSAT. The company was small and weak market wise but the public agency was large with a unique relation effect world-wide, and partner asymmetry was the case. The conflict was occurring to some degree between the parties as a result of different product design that would appeal to a broader set of users. When the agency was confronted with this information the dialogue became difficult and conflict of occurred. Because of the fear of ending up with an unsatisfied piloting user, they finally obeyed the wishes of the agency, which among others thing lead to major technical difficulties, additional costs, and the development of a "reduced version". The conflict resolution technique that was applied was domination, the pilot user was unsatisfied with the product received, and the company gained no sales beyond the pilot user.
The results from the in-depth case study of product development projects indicate that the following features contribute to project success for both partners (Nesse, 1995):

**Partner attributes:**
- Balanced strength (symmetry) between the partners in the dyad. Strength refers to market strength and technology strength.
- Interdependence between the partners in the dyad. Both partners are dependent on each other as a result of political bonds, access to complementary assets, and the lack of alternative partners within the nation.
- High degree of trust between the partners in the dyad. Trust refers to whether the partners have confidence in the opponent to act according to mutual benefit, and not derive advantage for own sake only.

**Communication behaviour:**
- Active participation from the partners in the dyad. Active participation refers to various types of commitment and contribution from the partners in the different phases of the project.
- Efficient communication between the partners in the dyad. Efficient communication refers to the transfer of accurate, relevant and critical information regarding needs, technical solution, and alterations of these during the project.

**Conflict resolution technique:**
- Employing constructive and destructive techniques for solving conflicts between the partners in the dyad. Constructive techniques refer to joint problem solving or consensus, and destructive techniques refer to persuasion, smoothing and domination.

The pilot user dilemma occurs as a consequence of a situation characterised by organisations pursuing different and conflicting interests. In addition the terms of the OFU-contract defined by SND seem to contribute to the presence of the dilemma. Common to three of the projects in the case study, is nevertheless the solution of the pilot organisations pursuing different and conflicting interests. In addition the terms of the OFU-contract defined by SND can probably be attributed to the dyadic co-operation itself. What is surprising is that even employing constructive and destructive techniques like persuasion and smoothing, seems to lead to a solution both parties are pleased with. The findings is most probably linked to the empirical setting studied, where the strong interdependence exclude exit from the dyad even if the use of destructive techniques appear.

6. Managerial implications

Regarding the companies it should be useful to know that market orientation during a dyadic co-operation with a pilot user promote both sales beyond the pilot user and profitability. This type of outcome requires the company taking the market seriously, and set aside sufficient resources to ensure that the development of a high quality market orientation. Here, one refers to market orientation throughout all three major project phases, and particularly in the initial phase. That the "best way" to solve the pilot user dilemma seems to be through co-operation and consensus should also be valuable to know when looking at the dilemma in connection with purchasing in the public sector in general. The potential here is impressive as a result of the Norwegian membership in European Economic Area the total amount of public purchase among the countries in the EU is estimated to US$ 290-360 billion each year.

Also the public agencies may learn from the findings presented in this thesis. The main impression is that when the public agency act as a professional pilot user, the result obtained is in accordance with what was intended by signing the OFU-contract in the first place. However, from the case study one experiences that there is a need for further specifications; The agency should clarify and quantify objectives more precisely and the pre-project phase should be executed more thoroughly that is commonly done. Further the agencies ought to participate and contribute more in the activities during the development phase (especially the end users) after the contract is signed and the main project as started. Such contribution will simplify the follow-up of the project and make sure that current status at any point in time is consistent with the plan of progress, and that the product design is in accordance with the needs specified. Here all the agencies agreed there is a need to act more aggressively towards the companies when gaps and divergences occurred.

The Norwegian Industrial and Regional Development Fund (SND) should also be able to make use of the results in the present paper. The findings contribute to insight into the balance between conflicting objectives exposed in this kind of product development projects. If SND wishes to achieve the objective of market orientation and commercial utilisation of the OFU-product, market assessment early in the project or market launch towards the end of the project should be viewed as a natural part of the product development process. Hence, the market based aspects should be subject to financial contribution equivalent to the more technological aspects, e.g. development and tests of prototypes. In order to achieve both objectives, i.e. development and market assessment early in the project or market launch, SND should be aware of the dyads they support with grants. Already when selecting the partners for co-operation, SND ought to analyse the project plans critically and discuss with the partners problems or conflicts that may arise and hamper the co-operation. If SND fails to pick out the most suitable partners, they should make sure that they follow up the project in order to control whether the project is in accordance to the plan of progress and the direction intended in the first place. SND might also consider using sanctions, e.g. cut out the financial aid, if the project diverge to much from the original plans.

7. Conclusions

This paper presents results from a study of product innovation projects organised as collaborative agreements between private companies and public agencies in Norway. The public agency functions as the pilot user and purchase a product developed by the industrial company. The financial risk is split between the parties and the Norwegian Industrial and Regional Developing Fund. The results from the survey are consistent with the findings of Cooper and Kleinschmidt (1986). However, the results give additional insight from an empirical setting that to my knowledge is insufficiently covered so far. The study suggests that well performed market orientation in connection with product innovation projects organised as dyadic relationships, contribute to spill-over to customers beyond the pilot user. So far the literature, with exception of Hippel (1988), has primarily described studies of market orientation toward a large group of customers, e.g. a market segment, were the manufacturer does not need to behave according to a particular pilot user.

The results from the case study represent a contribution to the literature on co-operation or strategic alliances regarding NPD. The majority of the empirical findings are focused upon alliances between companies, and seldom include participation from...
public agencies. The findings therefore supplement the study of Mohr and Spekman (1994), since it analyses in-depth the factors that are associated with project success, and since the results suggest that these dyadic relationships is dealt with differently from what is documented in strategic partnerships between industrial companies. Both partners in the dyad are interviewed and this may give a more representative picture of the perception of success. Introducing the pilot user dilemma, hopefully represents a step forward concerning product development, and so far the author is unaware of the concept being applied before. Compared with Biemans (1991) "user involvement paradox" the results gives additional understanding, in the way that it describes the difficulties and possible solutions on the problems of adapting the product design to other potential users and making it more representative for the market segment in question.

Further research should concentrate on building a theoretical framework to increase the understanding of the connection between market orientation, dyadic co-operation and project success. A broader set of project characteristics should be included in order to clarify the relative influence co-operation with pilot users have on success. The pilot user dilemma should be tested in other alliances and situations in order to acquire further insight into the concept and its potential for high external validity.

References


Management of Logistic Activities in SME's

Some empirical evidence in the Italian footwear industry

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Abstract
This paper examines logistics management in small and medium-sized footwear firms. Starting with an analysis of the characteristics of the footwear production cycle and the factors of change which are currently affecting post-production phases, the critical importance of logistic flows is underlined, together with their implications for the management of the firms' logistic activities. On the basis of an empirical survey, some company profiles are then identified, characterized by different ways of organizing logistic activities, depending on the firms' strategic objectives. Finally, several initiatives are suggested which the firms should undertake to enhance the integration of the supply chain within a framework which is consistent with their respective strategic choices.

Key words: SME's, Italian footwear industry, Empirical survey

1. Introduction*

The importance of logistics management is indisputable with regard to the process of value creation (Porter, 1985), especially in mature sectors (Harrigan, 1988; Ferrozzi, Shapiro, Heskett, 1985). It is a tool for recovering business competitiveness, allowing optimization of inter-relations between supplies, production and sales. It also included a consideration of strategic importance, with the task of promoting organizational conditions and techniques which allow absorption of the factors causing increasing variability in the business environment (Rullani, 1979).

Some of the literature (Gozzi, 1984; Ferrozzi, Shapiro, Heskett, 1985; Hall, 1987; Coyle, Bardi, Langley, 1988) has emphasized the importance of a unitary vision in logistic decision making for a strategic, as well as for an operational approach, also in interventions in only some of the phases in the logistic chain (Scott, Westbrook, 1991). Several of these contributions (Gozzi, 1984; Ferrozzi, Shapiro, Heskett, 1985; Coyle, Bardi Langley, 1988) have also underlined that the variety of business situations arising from the diversity in market opportunities and constraints, as well as from conditioning and internal and external stimuli, plays an important role in pinpointing the interventions required to restructure the firm's logistics management. In particular,

*This work is part of the research entitled "Impact of the integrated logistics concept on the organization of the transport function in firms" conducted under the Progetto Finalizzato Trasporti 2 of the National Research Council (N.R.C.) by the operative unit of the Istituto di Research Institute on Service Activities. The work was carried out jointly by both authors, with sections 2 and 3 being edited by Pietro Evangelista and sections 4 and 5 by Immacolata Velleco. The introduction and conclusions are the result of joint reflections.

1The characteristics and role of distribution channels, production logistics, product localization in its life cycle, supply system, etc.

it has been proved necessary to take account of a series of elements which make it difficult to compare analyses carried out on firms in different sectors and often between firms in the same sector. Other authors (Monden, 1983; Hall, 1987; O'Grady, 1988) have drawn on their experience in the participation and study of restructuring processes in large firms, generally Japanese and/or American. Such processes, which have entailed profound organizational modifications and considerable investments, were inspired by a radical rethink in basic operative logic as applied by companies both in internal processes and in the development of external relations. The above contributions, besides illustrating the solutions actually adopted by firms during the re-organization processes (Hall, 1983; Schonberger, 1986), described the inspiring logic underlying the expected interferences, contributing to create a set of already widespread conceptual categories (JIT, TQM, Supply Chain Management).

The role of the large firm, as emerges from the above findings, appears decisive within the field of sectorial restructuring, leading to far-reaching innovation transmission and diffusion, which is both induced and imitative. Indeed, it is in large firms that the most important logistics reorganization processes have taken place, aided by the existence of conditions which are typical of large firms, such as: a) managerial culture; b) bargaining power over suppliers; c) financial and cultural readiness to use consultancy services; d) availability of tools to monitor performance which are able to swiftly identify signs of crisis, etc.

Nevertheless, the great variability and instability which have characterized the competitive scenario over the last few years, have increased the difficulties in managing business activities also in smaller firms. In the case of Italian industry, such phenomena have caused a loss in competitiveness in some so-called mature sectors - like ceramics, furniture, textile-clothing and footwear - characterized by the presence of significant aggregations of small and medium-sized firms concentrated in well-defined geographical areas. Within the above sectors, the gradual diminishment of advantages tied to technological specialization and spatial proximity has placed serious constraints on development, generating restructuring processes within the various areas that have drawn new firms to seek more competitive edges. This accounts for the attention to logistics, the interventions to recover business competitiveness, especially in those sectors - such as footwear - where the high variety/variability potential in demand resulting from changing fashion trends requires firms to be more flexible.

In the past, such flexibility was obtained exclusively through the widespread use of external synergies - chiefly based on the ease of interpersonal contacts - which was the strong point, to be exploited in order to overcome short-term economic difficulties. Today, the application of interventions to reorganize logistic activities along the whole production line requires management of interorganizational relations, which can no longer take place according to traditional approach. With regard to the reorganization of logistic processes aiming to reduce global logistic costs, the results of some studies (Barabe, Buoro, 1987) have shown that the greater the control over the logistic chain, the greater is the range of means used and the results achieved. Therefore, in this sector, "rationalization of operative activities necessarily requires an organic scheme of relations with the external network both in backward and forward production phases as well as appropriate information support" (Scicellutta, 1989).

Through the empirical survey conducted on a sample of small and medium-sized footwear firms located in three south-central Italian regions (Marche, Campania, Puglia), our study aims to highlight the various behaviours of such firms with regard to logistics management. The paper is organized as follows: starting from the
examination of the firms' production cycle characteristics, section 2 identifies the critical points in the logistic flows between firms and the supply markets; section 3 examines the main factors of change affecting the post-production phases and their effects on the organization and management of logistic activities; section 4 contains the survey objectives and methodology; and section 5 shows the results of the empirical survey. Lastly, in section 6 there is a discussion of some policy implications based on the survey results.

2. The complexity of logistic activities in footwear firms

The importance of footwear production for the Italian economy chiefly derives from its substantial contribution to employment and the high export orientation of the firms concerned. One of the factors behind the rapid growth in the sector and which has encouraged the start-up of a growing number of small and medium-sized firms located in highly specialized areas, has undoubtedly been the strong impulse from international demand (Varaldo, 1997). The success of Italian footwear on international markets may largely be ascribed to the particular production organization of the sector compared with that of the main competitors in other European countries. Indeed, the possibility of breaking the footwear production process down into several technically independent operations and the different impact of technological development upon the phases of the same production process has driven Italian footwear firms towards overwhelmingly productive decentralization (Bellandi, 1979; Varaldo, 1988). The great intensity of production outsourcing processes has also allowed the creation of producers of parts, components and accessories, which are real "related and supporting industries" whose integration along the Hide-Leather-Footwear filiere has for long time assured the system of a considerable competitive edge in terms of production flexibility and product quality. The development of a network of small firms specialized in one or more phases of the footwear production process has led to a growing number of footwear firms being progressively transformed from complete production cycle firms into firms which assemble parts and components produced outside.

2In 1994, there were about 108,000 employees in the Italian footwear industry. Overall production exceeded 471 million pairs for a value of about 14,000 billion lire. In the same year, 460 million pairs of footwear (56% of total production) were sold on foreign markets for a value of about 10,500 billion lire (with reference to the upper materials, both production (about 318.5 million pairs or 62.5% of national production) and exports (about 253 million pairs or 65% of overall exports) are chiefly concentrated in the hide and leather sector. Within this trade category, about 55% of production and exports concern women's footwear. The quality of exports is high insofar as about 75% of foreign sales concern medium-high-grade footwear, while the export levels of products belonging to the economic range are completely marginal (1.7%). In 1994, Italy confirmed its role as European leader in footwear production. According to 1993 data, Italy is still the third producer in world rankings, after China and Brazil, and the third exporting country after China and Hong Kong. Cfr. ANCI, 1994.

3For some phases of the production cycle, the development of technology has made it possible to introduce mechanization and reduce production times (such as the manufacturing of heels and inlays). For other phases (such as closing), production times are longer, mechanization is more difficult and thus the contribution of manual labour is still technically decisive. In such cases, it is worth decentralizing to workers' homes or to third party firms both for the particular productive skills and scales required (as in the first case) and to increase the flexibility of the productive structure and reduce the labour costs (second case).

4Nurturing precisely to the Italian hide-leather-footwear filiere, Porter highlighted the importance of related and supporting industries for gaining a competitive edge in terms of cost control, speed of response to demand, high capacity of product differentiation and adaptation to consumer needs, etc. See Porter, 1991.

The tendency of footwear firms to outsource some production phases is affected by the business area in which the firm operates and by the type of materials used. The firms operating in the "sport" business area in which there is great use of synthetic materials, generally have a production cycle characterized by a high level of integration with chiefly mechanized phases. Such firms develop simpler products, with fewer easily standardizable components, and with larger, homogeneous production batches. Thus, both the organization and control of logistic flows connected with productive activities are more straightforward.

The firms operating in those market segments more affected by fashion (where demand is thus more unstable) and natural materials are commonly used (hide and leather) have production structures characterized by rather high decentralization of the production cycle, insofar as the continuous adaptation of models deriving from changing fashion trends requires greater qualitative flexibility. In such firms, production usually starts with the presentation of the season's collection, whose planning leads the firm to make forecasts without knowing in advance either the characteristics or the quantity of the products which will be sold. The drawing-up of the production budget would appear conditional on the speed with which both market mechanisms work but also upon the capacity of the entrepreneur to interpret fashion trends. Production planning thus has the objective of minimizing the negative consequences of the variability and cyclical nature of demand by activating more regular, economic relations with other firms working in the supply markets. Hence, the footwear production system tends to operate with minimum stock since it is only activated on receipt of orders, whose dispatch generates a close network of relations between footwear firms and the other firms in the filiere. In this context, the organization and management of flows between firms working in the various phases of the production filiere is crucially important for attaining higher competitiveness thresholds in footwear firms. Indeed, the greater variety of models to be produced, the larger number of components and their heterogeneity, lead to production of a large number of small, complex lots.

Definition of precise reference parameters for stabilizing relations between the decentralizing firm and the sub-contractors is, from this viewpoint, of strategic importance, inasmuch as the high level of productive specialization attained by the sub-contractors leads the purchasers to establish "privileged" relations whose intensity varies according to the respect of a series of parameters, such as: punctuality of deliveries, respect of quality specifications of semifinished products, degree of standardization, etc.

Logistic activities in firms operating in the classic/fashion business area are thus more complex than those of companies which compete in other business sectors. In the former sector, the hide purchasing policy plays a key role in the firm's competitive position. Such importance is due first and foremost to the large number of potential suppliers in supply markets, who offer a very differentiated range of products, whose physical characteristics which decisively affect footwear quality and hence severely affect competitiveness not only of the individual footwear firm but of all the production filiere (Evangelista, Pasaro, 1993). Secondly, the variability in the cost of hides, arising from fluctuations occurring on international exchange markets, may accentuate the relation between the cost of raw materials and the total cost of the product, thus negatively affecting selling prices (Lanzara, 1988).

5It has, however, been underlined that "some entrepreneurs have expressed the need to return to a less decentralized production, both to guarantee greater time-wise integration between the various phases of the production cycle, and above all to provide greater guarantees of product quality. Decentralization means losing some strictly technical economies, such as those related to materials handling, the integration of flows and their scheduling, reliability of supplies and especially consistently high quality." (Gregori, 1990).
Table 1. Critical issues determining the complexity of logistic activities in footwear firms: comparison between two business areas

<table>
<thead>
<tr>
<th>Critical issues</th>
<th>Classic/Fashion</th>
<th>Sport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production process</td>
<td>barely standardizable</td>
<td>standardizable</td>
</tr>
<tr>
<td>Production decentralization degree</td>
<td>medium/high</td>
<td>low</td>
</tr>
<tr>
<td>Economies of scale</td>
<td>barely significant</td>
<td>high</td>
</tr>
<tr>
<td>Production lots</td>
<td>small and complex</td>
<td>large and homogeneous</td>
</tr>
<tr>
<td>Seasonality of sales</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>Chief distribution channel</td>
<td>specialized retail</td>
<td>large despecialized retail</td>
</tr>
</tbody>
</table>

3. Factors of change affecting logistics management

The production relations between footwear firms and the businesses operating in supply markets after production decentralization processes, together with the consequent effects upon the organization and management of logistics activities, appear to be increasingly affected by the profound changes which are occurring in the forward production phases. In the footwear sector firms operate in a more selective environment compared with the past, in which a series of factors has caused the transition from a horizontal competition phase to a vertical competition phase (Grandinetti, Pilotti, 1994). Such factors underline the inefficiencies in the various phases of the production filière, and have introduced elements of greater complexity into channel relations.

One source of complexity concerns the primarily qualitative changes which have occurred in the world of consumption. The salient features of such changes are as follows:

- the increasing importance assumed by differentiations in consumer preferences tied both to cultural factors and to specific consumption behaviour;
- greater selectivity as regards supply and greater sensitivity to innovations which improve footwear comfort in relation to its target use;
- greater attention paid, compared with the past, to the intrinsic quality of footwear;
- the quest for optimization of the price/quality ratio, with less willingness to buy products of a high unit price ⁴;
- less importance attached to griffe, both as choice criterion and as guarantee of greater stylistic content in the product, inasmuch as the field of possible alternatives within which to make purchasing choices has grown considerably;
- less time availability for shopping generates greater attention to service quality.

Of no less importance are the transformations affecting market access channels. A process of progressive modification of the distribution system is currently under way, heading towards a rapid change in relations between production and distribution. The recent development of the retailing sector and the increase in its degree of concentration have led to the rise of larger-scale operators, capable of expressing growing bargaining power due to:

- the larger quantities which each distributor is able to buy;
- increasing capacities to choose suppliers among many, even geographically widespread, alternatives, thereby increasing the degree of competition among producers;
- market segmentation according to precise purchaser typologies and purchasing behaviour;
- capacity to choose products to offer consumers with greater attention to the need to renew stock ranges, thereby obtaining significant economies in stock management;
- capacity to differentiate the supply of commodities, increasing the service component in the distribution formula.

Such transformations are causing traditional models of market relations management to be seriously questioned, above all from the time viewpoint, highlighting new interaction modes between demand and supply in which critical importance is assumed by the greater speed with which information flows are exchanged and decisions taken. Priority must therefore be attached to integrated management of production and marketing processes between producers, middlemen and distributors along the final stages in the filière. Hence, the development of vertical channel relations aimed at integrated management of the filière tends to improve the logistic efficiency of such processes not so much in physical terms but in terms of information (Sabbadin, 1995). This holds especially when - as in the case of the fashion sector - the demand variety/variability potential is high, necessitating the reduction in response times to the market ⁷ and the improvement in the quality of services supplied to consumers.

The above dynamic may be noted in the "fashion cycle". The traditional logic (push) with which a collection is presented by footwear firms ⁶ is on the verge of being replaced by a different logic (pull) which means that the distributors execute during the same season a larger number of orders. Thus, physical distribution flows increasingly tend to be transformed from flows characterized by marked seasonality and huge volumes, into continuous flows, with lower unit volumes, whereby there is a limited number of destination outlets only when firms manage to link up to organized commercial structures; otherwise, such flows are directed towards large numbers of outlets, making physical distribution activities (organization of deliveries, transport) very expensive and complex.

Such complexity rises with the increase in service level which firms propose to offer their clients in terms of the speed of executing orders and the variety of products offered. Retail businesses increasingly tend to postpone stock formation, requesting deliveries which are closer to the moment of sale and sometimes also split in time. The

⁶This tendency is partly due to the increasing flow of imports from new producer-countries (South-east Asia, Latin America and Europe). Towards the end of the 1980s, firms in these countries increased the competitive pressure on the markets in industrialized countries, combining the traditional advantage linked to lower labour costs with the possibility of competing in medium-fine segments through the use of tanned hides and accessories also of Italian provenance (Gregori, 1989).

⁷The need to accelerate the capacity to respond to demand changes tends to reduce the risk of unsold stock (with the relative costs of overstocking) and shortens the readjusting cycle, improving the whole logistic flow.

⁸Under this logic, about a year elapses from the start of model design to that of footwear selling to the end consumer (sell-out). Currently between 3 and 6 months are required for model creation by the stylists, while deliveries to retailers are executed after 3-5 months.
tendency towards restocking has become important in recent years. Retail businesses make ever more frequent requests to postpone purchases until after a market survey has been carried out and thus to obtain two supplies from the producer, for which orders are executed at two subsequent moments: the first at the presentation of the collection and, thus, about one year prior to the delivery date; the second (so-called restocking order) after a market survey during the season and thus a very short time before the delivery date (two months at the most). Besides the basic collection, the retailer also asks for a "flash" collection containing articles in greatest demand within considerably shorter times. Since the distributor may thus restock more frequently with smaller batches, he is able to limit the risks of unsold stock and the costs entailed in the storage of larger batches.

The possibility of guaranteeing customers product restocking gives the producer a considerable competitive edge. However, putting this into practice depends upon the capacity to despatch orders quickly and thus on the prior organization of considerable production flexibility and a system of quick, reliable stocking, particularly when production follows the receipt of orders. Hence, for footwear firms operating in the fashion sector, the decision to implement restocking policies is subject to a greater degree of complexity due to the need to integrate, within the logic of customer service, also the network of sub-contractors which execute production phases.

Also with regard to the logistic-distribution flow, changes are being forced in traditional logic. As regards the transmission of sales data, for example, under the traditional approach the producer receives information relative to sales only when the retailer's stocks are depleted below the threshold which triggers a new order. The success of Quick-Response2 and EDI systems is revolutionizing such a logic leading producers and distributors towards greater integration of their respective planning and monitoring tools, with the aim of calibrating orders in good time with stock level and sales forecasts.

The above-described changes in production-distribution relations require channel policies to be reviewed as well as a rethink in relations with intermediaries whose role is crucial in the management of relations with the final phases of the filiere, on which the organization and management of earlier production phases increasingly depend.12 The new role which distributors are playing in the process of value generation no longer concerns merely the management of goods flows but also the supply of services (pre- and post-sales consultancy) and marketing communications (such as information to customers and information-gathering from customers). In this process, distributors tend to acquire an increasingly important role, tied to improving and enriching the producer's supply. Such elements tend to increase the information component and that of product service, becoming differentiation factors in consumer preferences. This may allow footwear firms to avoid dispersion, during the later phases of the filiere, of the competitive potential created in the earlier phases, and may enable distributors to satisfy changing consumer demands (Evangelista, 1995).

9Restocking involves the range of products already present in the sales collection and thus does not require formulation of new proposals in stylistic terms and model elaboration.

10From traditionally two seasonal collections, there is a gradual transition to 4, 6 or even 8 annual collections.

11On the subject of Quick-Response see Blackburn, 1991.

12For example, the effectiveness of the hide supply phase may be negatively affected by the absence of appropriate market segmentation criteria, which should be matched by a clear identification of the reference target for the chosen product line.

4. Survey objectives and methodology

Analysis of the factors of change affecting the final phases of the Hide-Leather-Footwear filiere showed that one of the critical elements for the competitiveness of footwear firms consists in the improvement of customer service. This objective may in particular concern the reduction of time to market and/or the increase in product variety supplied to consumers; pursuing such an objective requires a coherent reorganization of logistic activities. The empirical survey therefore aimed to identify the main choices made by the firms in logistics management and indicate some corresponding firm profiles.

The survey was conducted on small and medium-sized firms (25 units) located in three regions of central-southern Italy (Marche, Campania, Puglia). All the firms mainly produce fine and medium-fine quality women's footwear, with a high fashion content. Hence, each entrepreneur or other firm manager was given a semi-structured questionnaire, which contained questions relating to firm's size, degree of production centralization and product type, as well as a series of questions on choices regarding supply and physical distribution, internal organization and the use of outsourcing in logistics management, with particular reference to the introduction of innovations. The questionnaires were later processed as case-studies.

In elaborating the results, it was hypothesized that the firms which aimed to improve the level of customer service were more oriented towards integration of the supply chain. First of all, the criteria in production planning adopted by the sample firms were examined, isolating the firms geared to respond to the market more quickly (restocking). Secondly, outsourcing in the production phase was examined, identifying cases where more complex contributions are required of suppliers (realization of finished products). In this frame of reference, internal and inter-firm interventions in logistics management implemented by individual firms were examined and evaluated.

The sample number does not permit a quantitative evaluation to be made as regards the diffusion of the observed phenomena, which are therefore to be interpreted only in the qualitative sense.

5. Survey results

Comparison of the reference variables adopted points to four types of firms:

1) Firms producing to order which outsource production phases;
2) Firms which also implement restocking and outsource production phases;

Figure 1. Objectives of customer service and operative implications
3) Firms producing to order which use suppliers for finished products;
4) Firms which implement restocking and use suppliers for finished products.

Analysis of the results shows that none of the firms interviewed falls into the last category. This may be explained by the increase in production variety and the consequent difficulties in coordinating outsourcing, which make it difficult to pursue shorter time objectives at the same time. With regard to the first three types, three profiles of firms were identified which, according to the various logics in their relations with the market and suppliers, show different organizational modes for logistic activities.

The first type is defined traditional firms, while the second is defined oriented towards internal efficiency; the third corresponds to those firms which are defined oriented towards the coordination of outsourcing.

Supplies are obtained from producers and, in particular for hides, from tanneries, who are commissioned to carry out the desired type of production. Waiting times tend to be long (up to 60 days).

Products are chiefly sold through traditional retail and the relation with the market occurs through agents, including foreign markets, who receive a very variable percentage of the products (from 5 to 40%) depending on the firm.

These firms show little attention to logistic problems. Not only is there no logistics manager within the firm, but responsibilities concerning supplies, production planning, sales and organization of deliveries are centered on one individual, the entrepreneur. The scant attention paid to logistic matters is borne out by the fact that no external consultants have been involved so far in improving cost control systems or in restructuring the internal organization. Only isolated measures have been taken chiefly with regard to stock control (finished products and/or raw materials and semi-finished products), let alone an overall integration logic and a review of strategic behaviour.

Transport has also been largely overlooked, with no firm in the group taking measures in this area. The transport of raw materials, semi-finished products and accessories is delegated to suppliers and deliveries to the firm systematically undergo delays. The transport of finished products is organized by the firm and entrusted to carriers/road hauliers, whose service is evaluated by the firms exclusively on a cost basis. Depending on the objective of achieving transport cost economies, firms tend to exploit competition between carriers and do not use a single carrier. The possibility of organizing the transport of complete loads is hindered by the geographical dispersion of firms, as stated above, by small retail. Nevertheless, the organization of transport is rendered easier by the fact that the firm produce to order without delivery scheduling and therefore the flows of finished products towards the market are highly concentrated in terms of time, also considering the seasonality of the footwear product).

5.2 The firm oriented to internal efficiency
In the above firms are equipped with information systems for managing stocks of raw materials, semi-finished products, accessories and for monitoring the progress of production schedules. Moreover, information systems have also had to be

Figure 2. Production planning criteria, purchasing decisions and firm profiles

5.1 The traditional firms
Most of the sample firms (13 cases) operate with traditional productive logics which do not correspond to those intent on improving the service level for customers. Such firms tend to be rather small in terms of turnover (between 2 and 12 billion Lira). Production is entirely planned with regard to orders which have a delivery date about a year later. Commercialized models are all created within the firm, which decentralizes production phases exclusively according to a cost logic.

Production of various models is scheduled by working on similar models in shape or type of leather used, and thus without scheduling series of processes which aims to complete the range of products required by a single customer. This does not permit a high turnover of stocks of finished products, which, in the case of footwear, is already impeded by the seasonality of demand. Moreover, there is wide production variety in terms of the number of models (80 models on average), which leads to a low turnover/model number ratio (approx. 30 million Lira). This represents the first hurdle to be overcome in implementing rationalization measures in production.

The introduction of restocking production was encouraged by the tendency of these firms to relate to the market through direct contact with large organizations which, thanks to their greater bargaining power vis-a-vis producers, require higher service levels in relation to the delivery scheduling. As a function of their new objectives of customer service, such firms are therefore led to take measures to reorganize logistic activities, which has made them resort to outside consultants. Such measures aim to improve both internal efficiency and product quality, although they are, for the time being, exclusively in-house and represent an initial step towards the integration of the supply chain.

The above firms are equipped with information systems for managing stocks of raw materials, semi-finished products, accessories and for monitoring the progress of production schedules. Moreover, information systems have also had to be
implemented for monitoring stock-in-trade, considering the substantial variety in the number of models in production and the need to constantly monitor the clearing of finished product stocks - used as a "safety-valve" - for rescheduling production.

In order to carry out restocking, these firms implement supply policies aiming to reduce waiting times, exploiting whenever possible their geographical proximity to suppliers. In particular, semi-finished products and accessories are purchased from producers, of which there are many in Central Italy. For the supply of raw materials (hides), agents with a warehouse are used, which shorten the waiting times which would be incurred in a direct relation with tanneries but prevents the firms from making certain demands upon the originality of the materials used, as intermediate tanning ad hoc cannot be requested.

It is significant that this group of firms directly effect, with their own vehicles, the transport of purchased materials, in particular raw materials, in order to overcome the problems and delays due to suppliers' inefficiency. Also in the transport of finished products, the need to effect rapid deliveries takes priority over the need to contain costs.

Other measures are being studied to help organizations adapt to the implemented changes (introduction of a logistics manager) and to rationalize transport management through agreements with transport firms. In their relations with carriers, these firms appear disadvantaged by the fact that product flows towards the market are split in time compared to those of traditional firms. However, there is a greater possibility of stabilizing relations with carriers when firms deal with large commercial organizations. In this case, such flows are directed towards a limited number of destinations, since large commercial organizations usually have transit point warehouses from which they carry out distribution to their own point of sale.

5.3 Firms oriented towards coordination of outsourcing

A very different type of firm (8 cases) is that which has the objective of increasing the number of models in production and the need to constantly monitor the clearing of finished product stocks - used as a "safety-valve" - for rescheduling production.

In this group of firms, the primary function is only performed inside the network leader, which also supplies partners with the templates on which to cut the hides. The supply of templates constitutes a "safety-valve" function as well (7 cases). In 3 cases this function is performed jointly with partners, who make an important contribution which reduces their replaceability. In 4 cases the purchase of raw materials was centralized both to achieve cost economies, as a function of the greater volumes acquired, and to hold greater control over the quality of resources used, which is considered critical for the quality of the finished product.

In this group of firms, in only two cases was there the presence of an explicitly defined logistic function. Nevertheless, it is evident that the set of functions performed by the network leaders on behalf of its partners indicate a fundamental role, of both strategic and operative importance, in coordinating the logistics of the whole network. Within this group of firms, although contributions from suppliers are more qualified in terms of complexity (consisting in the realization of finished products), existing supply relations are hardly characterized by punctuality. All the firms stated that there were frequent delays of deliveries from suppliers (at least 20% of deliveries arrived after the due date) and that they represented a barrier which they firms propose to overcome, with the aim of creating an integrated supply chain.
With regard to the role of leader within the network, the firms belonging to the group would be expected to play an active role in the physical distribution of products. On the contrary, in several cases (5) the choice was made to entrust management of the finished product warehouse to an operator specialized in distribution logistics (carrier, forwarding houses) which centralizes and consolidates flows of finished products earmarked for the market. In the firms which made the above choice, the supply manager also handles production planning. In firms which do not use outsourcing for storage, production planning is entrusted to the sales manager, and the supply manager also organizes the deliveries and transport of finished products.

Outsourcing the storage function represents a critical phase within a process of reorganizing the firm in order to seek greater efficiency. It allows efforts to be concentrated on internal reorganization processes. However, it should be pointed out that, in a logic of progressive widening of the firm's control over a growing number of phases in the logistics chain, storage activities tend to be once again internalized, albeit managed with information tools and efficiency logics which are typical of the specialized operator.15 The outsourcing of storage services becomes worthwhile when there are many codes (models, colours, sizes) to manage (in the cases observed the number of models in production ranges from 80 to 200) and when the firm achieves a turnover of at least 15-20 billion Lira.

The service cost varies according to the stock positions assigned to the client (which may be variable in the case of products for different seasons), to the handling turnover (proportional to the number of items and number of order rows handled, and to the management cost of each expedition). In the footwear sector, a similar choice is encouraged by the seasonal character of the demand for finished products, which appears to oblige the firms oriented towards internalizing physical distribution to make available for the whole year some areas for stocking finished products, with large enough capacity for the peak storage of goods. Outsourcing is almost forced upon those firms which achieve, over short periods of time, intense growth in commercialized product volumes, as an alternative to the construction of new storage structures to replace those which existed prior to the development process. Furthermore, there is a considerable advantage gained from the use of specialized staff and economies of scale which the logistics operator manages to achieve both in stock management and transport organization. For the firm which resorts to outsourcing the storage of finished products, information links must be set up with the logistics partner in order that the latter may be delegated the final phases (in particular, picking from the store and sorting of the shipments) of dispatching the orders. Indeed, without such links there would be a total break between the information flows relative to customer orders and the physical flows of the products to be distributed which, in some cases, arrive at the central warehouse for finished products without being strictly coordinated in terms of time: they may come from various origin points consisting of the production plants of the firms amongst which the firm network leader has split each customers' order for individual items.

However, the contribution of suppliers of logistics services does not extend to the supply of raw materials or those activities which, in a unitary vision of the division of the production process among various firms, may be considered as "supporting production".16In particular, the transport of semi-finished and finished products purchased from other producers is organized by the latter, with their own vehicles or through hauliers, and the coordinating role of the network leader seems lacking in this part of the flows. Such a role delegates the execution or organization of such activities to the suppliers within the framework of contractual relations. This behaviour conflicts with the objective of broader control (and closer integration) of the various phases of the supply chain, which should be pursued so as to maximize the firm's product value.

6. Conclusions

From a reading of the company profiles described above, differences emerge between the types of firms identified, in relation to the role and position which they occupy in the supply chain. In particular, it emerges that firms oriented towards internal integration show a stronger productive mission compared with the firms oriented towards coordination of outsourcing. The latter, by virtue of their stronger marketing orientation, play a role as integrators of physical and information flows between the market and its production. The more widely other producers are used for manufacturing activities, the more accentuated is the role in question. In relation to information flows, coordination concerns both qualitative elements (stylistic design of models) and quantitative elements (orders relative to sales). The coordination of physical flows chiefly occurs through agreements with third parties (operators specialized in distribution logistics).

The growth of such firms and the strengthening of the role of integrators which they perform depend on the capacity to observe the control of information flows and accentuate their distributional-logistic orientation, increasing their control over physical distribution activities. Moreover, the volume of physical flows towards the market places them in a strong bargaining position with regard to those who manage transport activities, over which they may extend control more directly.

The service level supplied to the market largely depends on the efficiency of interorganizational relations with suppliers. Thus, these firms may improve their competitiveness depending on how well they manage to transmit "backwards" in the network their customers' needs, not only relating to product quality but also to the service level of deliveries (split, speed and punctuality in dispatching orders). According to this objective, such firms should select and stabilize links with their suppliers, encouraging development towards greater internal efficiency and a substantial reduction in time to market.

The firms oriented towards internal efficiency are dependent on the capacity to consolidate the choices made and the reorganization processes initiated. Particularly critical is the selective strengthening of channel relations through the reduction in the number of interlocutors after the production phase. The above choice would allow more efficient management of physical and information flows to and from the market, and would thus lead to rationalization of production and supply according to consistent logics. Moreover when the customers themselves are characterized by high technology and organizational capacities and strongly oriented towards logistics coordination, this may stimulate the introduction of information links, thereby helping this type of firm to develop and encouraging rationalization processes with a prospect of medium-long term collaboration. However, such rationalization encounters two obstacles:

1) small firm size, which diminishes its bargaining power with customers and key suppliers (tanners), from whom it becomes difficult to obtain a good service level in deliveries;

15Of the sample firms which outsource storage, two forecast future internalization of the activity.
16Understood as (Bowsen, Closs, Helfrich, 1989) the subsequent handling of materials or worked products which occurs between different plants of the same firm, once production operations have started.
2) the fairly low level of entrepreneurial culture, which makes it difficult to achieve internal reorganization, even when there is willingness to use outside consultants. Entrepreneurs generally have difficulty in their relations with consultants, since they are unable to make specific requests, to evaluate proposed solutions and manage suggested changes.

In a context characterized by such dynamics, traditional firms appear to run a very high risk of being forced out of the market, in the absence of changes in strategies and organizational processes. On the other hand, the choice of whether to evolve towards the first or the second of the two other observed profiles is limited to one of the alternatives, that is they cannot both be pursued at the same time. Evolving towards the profile of the firm oriented to outsourcing coordination depends on the availability of skills, a factor which must be carefully assessed by the firm in question prior to undertaking a process of change in this direction. By contrast, evolving towards the profile of the firm oriented to internal efficiency depends on the strengthening or creation of channel relations and the willingness to implement even radical changes in the organizational logics (internal and external relations) hitherto pursued.

From the viewpoint of policy implications which may be drawn from these results, it should be considered that:

a) the development of effective channel relations necessitates the greater diffusion of technological support tools for integration initiatives between planning and control systems of suppliers, producers and distributors;
b) the development of forms of cooperation between producers for the purposes of commercialization requires an appropriate tool for starting up the concentration of physical and information flows needed to reorganize management logistics starting from the distribution phase;
c) the promotion and start-up of associative structures (like consortia) between producers and distributors may help to build up a wealth of information. This may give partners an incentive to overcome the entrenched conflicts in the traditional-type business culture.

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Increasing Supplier Involvement in a Concrete World — Buying the Process, Not the Product

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Abstract
The objective of the study is to demonstrate the shift towards the need for increasing supplier involvement in the construction industry, specifically the market for concrete (prefab and mortar). As products and prices in the market become more similar, producers try to achieve a competitive advantage through value added services. In this particular case, de concrete market, logistical services appear to be important. Performance criteria were evaluated and a general market performance was described. From a customer viewpoint the added value of logistical services was confirmed. Based on the customer's wishes and needs and including major developments in the industry, a scenario for the next years was established: customers will be buying the process and not the product. Based on this scenario a number of implications are made regarding the relationship between supplier and buyer.

1. Introduction
From both a marketing and a purchasing perspective the focus on logistics is increasing. From a marketing perspective logistical services provide a way of establishing a competitive advantage. From a purchasing perspective logistics are increasingly important to meet marketing's output needs. Increasing supplier/buyer cooperation should lead to improved chain logistics. In several industries this has been investigated and reported, but the construction industry has paid little attention to this respect. Yet, in this industry logistics seems to be of the utmost importance. In the Netherlands, construction materials account for nearly 20% of the total volume transported annually (Wouters et al., 1996). Of the total turnover in the construction industry almost two thirds consists of purchasing value (both products and services) amounting to an estimated 12 to 15 billion NLG annually.

In this study we looked at the role of logistical services in the supplier-buyer relationship. More specifically the following questions were addressed:

- What is the nature of the supplier-buyer relationship in this industry?
- What is the level of awareness level concerning the importance of logistic performance?
- How do suppliers react to the increasing emphasis put on logistical services by purchasers?

The construction industry provides the opportunity to look at several product categories: 'raw materials' (mortar), 'components' (prefab elements), 'necessities' (hammers and nails) and 'finished goods' (appliances). These types of products put different demands on the logistical services through product characteristics and through the criticalness to the throughput time of the construction process.

In this study the focus is on "concrete" for two reasons. Concrete accounts for a major part of the total volume transported and it is used in almost every construction project. Secondly, concrete appears in two modalities; mortar and prefab elements. Mortar can be seen as a simple standard product, a commodity. Although the basic product is quite simple, the logistical process is complicated and actually comprises of a substantial element of the buying process. The production of simple prefab products can be compared to make-to-stock production. The production of more complex customized prefab elements is similar to engineer-to-order production.

The mortar and prefab elements sections are based on literature and interviews conducted in the Netherlands, using in-depth interviews (based on a checklist) with purchasing departments of construction companies (6) and with marketing/sales functionaries of prefab elements and mortar producers (3). A broad general industry perspective was used meaning that no specific suppliers or construction companies were included in the research. The total number of mortar production sites in the Netherlands is approx. 200 (production sites are owned by only a few suppliers). There are approx. 400 producers of concrete prefab elements. There are over 20,000 construction companies in the Netherlands. Respondents were selected in order to interview a broad range of companies. The size of the companies varied between 5 to over 3000 employees, as did activity; from roadworks, housing and utility construction to hydraulic engineering.

For illustrative purposes several case studies from the Dutch and Swedish markets are used.

In paragraph 2 we will first describe the role of logistics in the construction industry. Paragraph 3 focuses on the actual mortar en prefab elements cases. In paragraph 4 a framework for analysing the cases is presented. Conclusions and implications of this study are presented in paragraph 5. Finally, in paragraph 6 suggestions for further research will be made.

2. Logistics in the construction industry
Three basic characteristics of the construction process emphasize the importance of logistics. First, the organization of the construction industry mainly has a temporary and unique character. Secondly, construction projects are constantly being carried out at different places. Thirdly, there is in many cases a strict division of work between the firms involved (Voorhuis, 1994, pp. 88-89; Pries, 1995, pp. 60-61).

Construction projects are very diverse, and the subsequent lack of standardization makes construction an example optima forma of unit production. For each individual project, the organization of the construction work has to be planned all over. New contractors and suppliers are involved, new working methods are being implemented, new drawings are being made, new purchasing procedures are adopted, etcetera. This means that the logistical procedures for delivering building materials can differ for each project too. For example, the size of delivery batches may vary, the delivery frequency may vary, and the delivery sequence of the different materials may also vary. However, the increasing usage of standard components tends to decrease these project-like production characteristics. Consequently, logistical procedures can increasingly be standardized - at least to some extend.

The fact that construction projects are mainly carried out at the location of the customer or user, leads amongst others, to a large dependence on external influences like the weather, and the approachability and spaciousness of the site. This means that...
suppliers of construction materials have to adapt their logistical processes to the needs of individual sites. For example, in Sweden during the winter time, certain materials that are delivered at the construction site have to be packaged in such a way that they can resist snow and low temperatures. When a construction site is situated in a city centre, it may be impossible to store large amounts of materials, which necessitates just-in-time deliveries, or access for delivery trucks may be limited during rush hours.

Additionally, there are increasing demands on the construction process. There is continual pressure to reduce total throughput time of construction process because of shareholders' demands for higher return on investments and because of restrictions around construction areas (e.g., noise, roadblocks).

The activities in construction projects are not only divided in terms of design versus construction, but also within the construction process itself there are clear divisions between different activities. Different activities are often carried out by various, largely autonomous contractors and subcontractors, who work together in shifting coalitions. This makes the coordinating of the deliveries of the different building materials for the contractors, a rather complex issue.

All these elements contribute to the great importance of logistics within the construction industry and of the purchasing function in this industry.

It is not surprising that many suppliers are looking to achieve a sustainable competitive advantage by using logistical services.

To differentiate oneself from competitors on 'service' is possible in many ways. Looking at the marketing/purchasing interface from a service perspective it would be more appropriate to use the 'service mix' replacing the classical four p's (see Figure 1). The original marketing instruments can still be identified in the service mix but are now approached from a service perspective. Furthermore, a number of elements are added.

![Figure 1. The service mix (van der Hart et al., 1994)](image)

Each of these service elements can be subdivided into relevant purchasing criteria. In this paper the focus will be on the logistical service.

The concept of logistical service covers the following performance criteria (Hutt and Speh, 1995):

- **Delivery time**: The time from the creation of an order to the fulfilment and delivery of that order includes both order-processing time and delivery or transportation time.
- **Delivery reliability**: The most frequently used measure of logistical service, delivery reliability focuses on the capability of having products available to meet customer demand.
- **Order accuracy**: The degree to which orders received correspond to the specification of the order. The key dimension is the accuracy of orders; shipped complete and without error.
- **Information access**: The firm's ability to respond to inquiries about order status and product availability.
- **Damage**: A measure of the physical conditions of the product when received by the buyer.
- **Ease of doing business**: A range of factors including the ease with which orders, returns, credits, billing, and adjustments are handled.
- **Value-added services**: Such features as packaging, which facilitates customer handling, or other services such as prepricing and drop shipments.

In the next paragraph the general buying process for mortar and prefab elements will be discussed before going into detail about the logistical services.

3. The concrete cases

3.1 Mortar

3.1.1 The buying process

The Dutch mortar market is quiet transparent; construction companies are acquainted with most suppliers. There is a high density of mortar production sites, each supplying their own area (approx. a half hour drive around the production site) and the substitutability of the product is very high. Furthermore there is limited variation in price. Although this would seem to indicate a market structure where the balance of power is tilted toward the buyer this does not appear to be the case. Purchasers state that the power balance lies in favour of the suppliers. This situation has both positive and negative aspects according to the respondents. The positive aspects are:

- that it is always very clear where to look for the supplier, given a certain construction site;
- mutual agreements between mortar suppliers guarantees delivery to customers, especially if one supplier is not able to deliver (due to break down or limited capacity) according to the arrangements;
- this has led to a currently relatively stable and secure market situation.

...
Negative aspects are:

- limited degrees of freedom in choosing a supplier;
- although prices tend to vary across regions (north-east, west and south of the Netherlands), within regions the price setting is very fixed;
- purchasers are not so much frustrated by the actual price levels but by the perceived inability to influence the price setting.

The quality of mortar has to be according to specs at all times. Most purchasers are satisfied with the product quality performance of their suppliers.

Obstruction of the construction process at the site has to be prevented at all times. If the construction process has to be stopped, high costs (2) will be incurred on the construction company therefore the logistical performance of a mortar supplier is of the utmost importance. Also a quick and adequate response to ordering is relevant to purchasers.

The following service mix criteria are important when purchasing mortar (see also Figure 2):

1. logistical service
2. product quality
3. customer orientation of supplier

All three criteria are weighted against price.

![Figure 2. The purchasing mix for mortar](image)

3.1.2 Importance of and performance on logistical services

The relative importance of logistical service has now been established. Let's focus in detail on the different aspects of logistical service:

- Delivery reliability as mentioned before is very important. Deviations from delivery schedules incur high costs. Repeated difficulty meeting delivery arrangements is punished severely through incurring costs on the supplier, decreasing purchased volume.

- Purchasing of mortar is based on annual contracts with actual delivery on request. Due to the unpredictable nature of construction projects (the weather, environmental objections etc.) orders are made on a short term basis (varying from a week to same day delivery).

- Order accuracy is understood as meeting mortar product specifications. This is considered the basic order qualifier and therefore not relevant to this discussion.

- Order status information is not considered an important issue in the purchasing decision. Though respondents have indicated that it would become extremely relevant if something goes wrong. Again efforts should be made to prevent obstruction of the construction process.

- Damage and complaints in the mortar industry are mostly related to delivery problems. As described earlier in this paper, if a mortar supplier is not able to meet the delivery arrangements other suppliers in the area would take over.

- Ease of doing business is also important, especially the efficient processing of orders.

- Value-added services are not considered high priority however, a number of extra services do influence the satisfaction of the buying company. For example, providing a solid test cube of mortar for testing purposes is considered a very useful value-adding service. Furthermore, elements such as reporting, invoicing procedures, the use of professional transport companies are all evaluated positively.

On the whole the respondents evaluated the performance of mortar suppliers as satisfactory. The performance of delivery time and delivery reliability were especially perceived as good. The results of importance and performance are summarized (see Table 1):

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<th>Importance/performance in the mortar industry</th>
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The overall opinion of respondents in the industry is as follows:

1. the suppliers remain loyal to each other
2. the performance is qualitatively good (product quality, delivery reliability)
3. the customer orientation could be improved
3.2 Prefab concrete elements

3.2.1 The buying process
Prefab products are produced in a wide variety ranging from pavement stones to bridge compartments. The market is transparent. Respondents know what is available and use 'long lists' for potential suppliers. This list can consist of as many as 70 suppliers for large nation wide operating construction companies to approx. 5 for smaller local operating companies. Product quality is a major issue for purchasing. Logistical performance is also of great importance though not as dominantly compared to the purchasing of mortar.

Price too is a major issue but due to greater product variety and more possibilities to add value to prefab concrete elements, there seems to be more degrees of freedom for negotiations.

Price setting is determined, depending on the need of the purchaser and the degree of capacity utilization at suppliers plant which will therefore vary per case. If the prefab element can only be produced by a few suppliers whom have a high capacity utilisation, prices will go up. A similar complex prefab element may cost 30% less when the supplier is in need of the business. Both parties are aware of this mechanism and try to use it to the fullest. This implies that there are few standardized situations leading to extensive contract negotiations per case.

Figure 3. The purchasing mix for prefab concrete elements

The most important criteria in the purchasing process of prefab elements are (see also Figure 3):

1. product quality
2. logistical performance
3. technical know how, problem-solving attitude

These criteria are constantly weighted against the price level. Yet, respondents indicate that in the case of complex concrete prefab elements "guaranteeing delivery reliability precedes reducing the price just a little bit more".

3.2.2 Importance of and performance on logistical services
Again delivery time and reliability are crucial (see Box 1). The unpredictability of the construction process can effect these elements in a different way because the products are either made to order and therefore delivery can be planned in advance or these products are purchased from stock.

Order accuracy is a major concern for the process. Delivery of the wrong coloured tiles or a non-fitting prefab element can be extremely inconvenient.

Box 1: Importance of delivery time and delivery reliability (Voordijk 1995)
The importance of logistical performance can be demonstrated by the following case. It concerns the construction of a large government building in a densely populated area of the Netherlands during the early nineties.

Approximately 95% of all construction materials comprised of heavy complex prefab elements. In total 12,000 prefab elements had to be delivered within 18 months (approx. 30 prefab elements per working day).

The construction site was no bigger than the actual measurements of the building under construction leaving no room to stock prefabricated elements. The prefab elements had to be driven in by lorry and then hoisted onto the assembly spot directly. Only one and half hours unloading time per lorry was available. The total cost for the hoists were 2.5% of the total construction costs. Construction on the building site was performed in three parallel processes.

Due to numerous adaptations the average batch size per prefab element in production was smaller than 20. Orders had to be carefully planned to follow construction progress. For economic and risk management reasons the orders were spread among 6 suppliers, each of them located at a considerable distance from the construction site. See also box 2.

Order status information is very relevant particularly for complex prefab elements. Purchasers express their desire to be constantly informed about the order status. They often involve this in the buying process by building-in several checks during the production of the prefab elements. Typical checks during this production process are for example the approval of the template design, the construction of the template, steps in the actual production of the prefab elements etc.

As for complaints, purchasers do expect the supplier to notify them as soon as irregularities occur. Subsequently, a number of options are possible. Primarily problems are discussed with the supplier. By changing his production schedule delivery dates could possibly still be met. Due to the fact that many prefab products are made to order there is no possibility to change the supplier. If no solution is found the result will inevitably be a late delivery. The cost for the construction company will be incurred on the supplier. This arrangement is very often part of the contract negotiations between both parties. None of the respondents have had any major problems with this recently.

Similar to the mortar case value-added services are not high priority. When probed several interesting services are mentioned:
The overall opinion of respondents in the industry is as follows:

1. the industry is very heterogeneous
2. the product quality in the Netherlands is generally good
3. the suppliers are very flexible

3.3 Future developments
All respondents expect continuing pressure on price and throughput time of construction projects. This implies further cost reduction and quicker and more efficient procedures and methods. The cost reduction will be passed on to the suppliers. Furthermore, construction companies expect to shift to take on the role of project organizer more and more and subsequently expect suppliers to not only make prefab elements or mortar but also to use their expertise in the actual assembly/application on the construction site.

Although the need for ISO-certification will increase, not all respondents were fully convinced of the necessity of ISO. However, they feel there is no escaping (due to their customers demands). Suppliers will therefore be asked to be certified as well.

Much concern was given to product innovation (technical performance, new applications and aesthetics) and environmental performance (e.g. using recycled waste grit); the importance of which will continue to increase in the future.

4. A purchasing framework for comparing the cases
In Hakansson (ed., 1982), relationships between buyers and suppliers are characterized by using the concepts of problem solving and transfer. Usually, we talk about products or services being transferred from a supplier to a buyer. However, it is also possible to conceive these products or services as solutions to a problem or need. The need of a buying firm can then be described in terms of the actual problem, which needs to be solved, and how the solution should or can be applied to it.
This study suggests that the industry as a sophisticated and well-tuned machine. New ways of communicating and doing business will emerge.

5. Implications

Constraints on the construction industry and therefore putting more emphasis on cooperation between suppliers and buyers will have to be transformed into a highly level of integration in the construction process. Just the passing through to suppliers of logistics. They will make greater demands on the suppliers in that industry to invest in time and financial constraints will not be enough to sustain a competitive advantage.

The results indicate that the current logistical performance in the construction industry is already at high level. But the importance of logistics as a major component of the product is not yet fully recognised by suppliers.

Purchasing managers of larger construction companies are more aware of the future constraints on the construction industry and therefore putting more emphasis on logistics. They will make greater demands on the suppliers in that industry to invest in production flexibility, information technology and a higher involvement of suppliers to meet the increasing constraints.

Their views can be summarised by the following statement: Increasingly purchasers of construction companies will be buying a process, not the product.

In terms of the purchasing framework a shift towards the upper-right quadrant, the 'customer integration' strategy, will be demanded from the suppliers.

5. Implications

This study suggests that the industry as a whole should be moving towards a higher level of integration in the construction process. Just the passing through to suppliers of time and financial constraints will not be enough to sustain a competitive advantage. Cooperation between suppliers and buyers will have to be transformed into a highly sophisticated and well-tuned machine. New ways of communicating and doing business will emerge.

Future developments like diminishing throughput time will put even greater demands on delivery time and reliability. In fact, the industry is already heading rapidly towards Just-in-Time logistics. This confirms that the path for suppliers now is to start implementing a logistics' strategy and from there on, develop a 'customer integration' strategy.

Consequently, supplying companies will have to invest more in better production flexibility, increased customer orientation, problem solving attitudes and communication in general (see Box 2 and 3).

Box 2: The Dutch government building case (continued) (Voordijk, 1994)

To be able to deal with the complexity as described in Box 1 logistical aspects were explicitly included in the pre building planning stage (1989). To be able to deal with this logistical complexity a special automated ordering system was developed. This programme (MARS, material supply and registering system) used a main frame at the head office of the construction company and a terminal at the building site. The programme determined production schedules, delivery times and assembly schedules. Any disturbances in the production or delivery could be fed into the terminal at the construction site and necessary changes in production, delivery or assembly schedules would be suggested by the programme. The programme produced a script, with an hour detail, for all parties involved.

Suppliers were not directly connected to the system but received listings of the elements to be produced and the expected delivery dates. Adaptations were communicated through new listings up to five days before scheduled delivery.

The whole process was managed by a new functionary on the construction site: the logistics foreman. This functionary was engaged full time with communicating between suppliers, transport companies and the construction teams.

Box 3: The Siab construction company (Asplund and Danielson, 1991; Wijnstra 1994)

The Swedish construction company Siab (turnover ± 1 billion ECU) has been very active in changing logistical procedures regarding the deliveries of several kinds of components to its construction sites. Projects have been carried out in the fields of household appliances, gypsum board, glass wool, steel reinforcing, and 'necessities' (hammers, nails, screws, etc.). All projects deal with improving and rearranging logistical activities throughout the whole activity-chain: from the production of construction materials to the delivery of the construction project to the final customer. The focus is on costs and the effect of the whole chain. The central question is: which logistical activity adds value, and which activity can be performed best by which actor?

The foundations of these projects were laid in the late 1980's, when a number of studies were carried out at Siab regarding the logistical costs of materials purchased. These studies revealed that in general, 50% of the total cost of purchased goods was related to administrative and physical handling activities.

To tackle this 'logistical burden', attention was first focused on changing the pattern of thinking within the purchasing organisation. 'Necessities' (drilling machines, screws, nails) were the first group of items to be dealt with. These items were always bought ad hoc, with the advantage having them delivered very quickly by local suppliers - at a high cost. Site supervisors themselves often rushed to the hardware store to get things, resulting in incredibly high transportation costs. The range of products was enormous,
and there was no coordination of the requirements between the various construction sites or regions Siab operated in. Altogether, this was extremely expensive for Siab. A decision was made to establish close relationships with just a few suppliers of these necessities, and to look for cost savings together with these suppliers. Agreements have now been signed with two distributors of necessities, but first, an effort had to be made to reduce the range of products. Both distributors now have a standard 'Siab-catalogue', limiting the number of items in their product range which people at Siab's construction sites can order.

When orders are placed before a certain time, the items are delivered the next day. The distributors have pre-scheduled routes for the delivery trucks, so that every site is supplied at a specific time. This means that Siab's employees working at the site know when to expect the delivery, and can take care of the goods immediately so no wastage occurs. The distributors do no longer send an invoice for each delivery, but combine invoices for different construction sites with specific periods.

This project has been extremely successful. One of the distributors greatly emphasizes these logistical aspects of its product offerings in its marketing strategy.

The evidence of this research seems to indicate that currently, suppliers are forced along these paths through purchasing's demands (see Box 3). Only a few suppliers in this industry have anticipated this trend and are pro actively putting it into practice. Without exception, these suppliers are leaders in their market segments.

6. Future research
The study was meant to look deeper into the role of logistical service within the supplier/buyer relationship of the construction industry. Although the results are only considered to be indicative, they have provided prove that the demands on logistical performance are increasing rapidly. Thus it is this driving force, which is creating a strategy shift within the industry.

Future research should start with providing quantitative support for the ideas developed in this paper, incorporating different product categories (raw materials, components en necessities and finished goods).

Furthermore, case studies should be conducted to provide insight in successful ways of implementing a 'customer integration' strategy.

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Situational Configuration of Supplier Relations

A framework-model for analysis and design of logistic systems

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Abstract

Based on a contingency-inspired framework model for approaching the relations between product, internal cooperation and inter-organizational relations, the paper describes the development of a new internal structure in the case-company. The project was originally seen as a clarification of aspects regarding supplier relations but it became also a major organizational-development-project. The paper applies an idea of 'partitioning' of the business processes to approach the product-development process for industrial projects and it draws attention to some important differences between this and traditional development-processes. The paper puts forward some suggestions regarding product-configuration and how this can be applied to design (configure) and manage differentiated relations with suppliers.

Key words: Case-study, action-research, industrial projects, internal strategy, purchasing, product development.

1. Background and Context

The empirical part of this paper is based on studies in one case company, Adtranz, Denmark (previously ABB Scandia), the only train-manufacturer in Denmark. The company is part of the multi-national corporation, ABB Daimler-Benz Transportation. The company has developed the so-called Flexliner-trains, diesel- and electrically driven multiple-units. The number of employed is about 650 and the annual turnover is approximately 100 MUSD.

In recent years, the international train-market has become a more difficult and complicated arena to be in. Increased international competition and over-capacity amongst train-manufacturers has led to a number of mergers in the business. The latest and so far the biggest of these includes the case-company, the merging of the rail transportation activities of ABB and Daimler-Benz.

During the last ten years, the case-company has developed from being mainly a mechanical craftsmanship oriented company producing rail-waggons on license-agreements with foreign manufacturers into a modern industrialized train manufacturer with its own train-concept.

As part of this change a strategic decision was made that the company was going to make "more trains and less details". Consequently, the company began an outsourcing process mainly to Danish suppliers. The outsourcing in question included in many cases simple manufacturing tasks consisting of traditional manufacturing processes. In some cases however, the new suppliers got the manufacturing responsibility for sub-assemblies and for the management of the second-tier suppliers.

In recent years the strategy has been further developed and the company regards itself as an integrator, where the main manufacturing-task is the final assembly of the trainsets. The latest evolution of the outsourcing-strategy includes placing responsibility for the engineering activities with the first-tier suppliers.

Consequently, the company's core competencies in engineering and design will be limited to the 'architectural design' of the complete train and the detailed design of some core systems in the trainset, e.g. the characteristic front-system which enables the coupling of up to five trainsets and free passage from one trainset to another.

If the "tidying-up" in the workshops can be labelled as the "first phase" of the outsourcing strategy process, the outsourcing of the total system-responsibility may be referred to as the "second phase". In this process there have been several cases where it seems as if the decision of "high-level purchasing" and choice of suppliers have been made without sufficient consideration of in-house competencies. Also the structure of the trains and how the train has been split up in systems and subsystems have in some cases caused problems, e.g. blurred interfaces between systems and subsystems, and incoherence of external and in-house competencies.

The company's train-concept evolved from a close co-operation with the Danish State Railways, at that time the company's sole customer. Since then, the company has moved into other Scandinavian and European markets as well as the Middle East. Several other potential markets are under development. From being a "design & production department" for the State Railways the company is becoming a player in the international train-business, both on its own and as a part of a multi-national corporation.

For the train manufacturers, the intensified competition results in customer demands for lower prices and shorter times of delivery. In addition, the customers are now asking for trains consisting of proven technologies and standards. The solution at the same time the trains must fit special needs and operating-conditions. This "mass-customization tendency" is familiar for many other industries (e.g. Pine, 1993).

Besides this, the case-company is receiving considerably smaller orders than previously, partly due to increasing privatization in the train operating business. The typical order-size is now 3-5 trainsets compared to 20 trainsets or more earlier. In order to maintain the activity-level and turnover necessary to maintain the company's critical size, it is obvious that the company must carry out many more customer order-projects as well as tender-projects than earlier.

2. Challenge and approach

The challenge for the case-company is now to deal with the strategic situation as described above. The customer order-projects carried out in the company demand considerable engineering efforts. One of the main challenges is therefore to adapt the existing train-concept to the new market conditions described earlier. Flexibility in the system layout and on interfaces are among the tools by which the company can be properly prepared when orders are received.

It might seem as if the consequences of an outsourcing-strategy were not clear to the company from the start. When the markets demands for shorter delivery times, lower prices and customer-oriented solutions are added, the situation comes to a head. In order to get a more detailed picture of these challenges, the authors interviewed a total of 20 of the company's directors, managers and employees about their experiences and perceptions concerning the company's strategy for outsourcing and core competenced. The main questions were: in what sense the company's organisation, supplier-base, and train-concept matched these strategies.

A report based on these interviews uncovered very diverging perceptions about the roles and responsibilities between the purchasing-, development- and engineering-departments on one side and the customer order-projects on the other. A number of
statements gave a picture of a glaring lack of communication resulting in the absence of synergy and, what was even worse, created an unnecessary disagreement between ‘processes’ and functions. The overall conclusion was:

that there was a big gap between the company’s overall strategy on one side and the tactical and operational dispositions on the other, or in other words that the strategy had not been understood - or at least had not been converted to structures and procedures that people could comprehend and use in their daily work.

It was obvious, that in order to make the company capable of carrying out its customer order-projects in an effective manner in line with the market’s demand of shorter times of delivery and lower prices, and in order to be able to exploit external as well as internal resources better, a radical restructuring of the business-processes and the relations between central departments/processes such as purchasing, engineering and development was needed.

The report put forward two main proposals for changes. Since the focus from the beginning had been on the company’s ability to handle supplier-relations, these proposals were mainly focused towards the purchasing process/department.

These proposals were:

- a cross-functional “conceptual-committee” on managerial level, led by the purchasing department, securing the overall relations between the market, product and supply-network.
- the “idea of tripartitioning” proposing that the supply management process should be seen as consisting of three main-elements: “development of preparedness”, “application of preparedness” and “operations”.

The “tripartitioning” was agreed upon as a conceptual idea for an model for internal organizational and process relations in the company. However, such a model must involve other critical business-processes than the purchasing, i.e. development, engineering, marketing and supplier support.

In the following sections we will propose models by which the relations in a logistic system may be further described and examined.

The first of these models is the “framework-model for analysing and designing a logistic system”. The framework-model can be used to analyze different activities in a business-network. We will in this paper concentrate on those activities that in some sense have a logistic aspect. Thus, we will not attend aspects such as innovation in the network or the development of new business-areas. But although the primary focus is on the operations, e.g. the tender-process and the customer order-process, we will also take a glance at the preconditions for these to be effective. We will not develop a new train but we would like to contribute to a logically effective design of the product-structure, business processes, and supplier relationships.

The framework-model is very much inspired by the contingency approach applied by e.g. Persson (Persson, 1982). In our opinion, a more differentiated approach is needed when forwarding normative prescriptions on logistics management.

Fremont and Rosenzweig defined the contingency-approach as something between on one side the approach that there exist universal principles for organization and management and on the other the approach that every single situation must be analyzed separately (Fremont and Rosenzweig, 1973). Academics in logistics are widely spread on this scale, but it is our opinion that most of them want to see themselves as belonging to the “contingency-school”.

The other model is the “tripartitioning of business processes”, suggesting a non-sequential approach to the product development process. The background, idea and elements of “tripartitioning” will be further explained.

Finally, the two models will be put together in one “synthesis-model” thus supporting a tripartitioned approach to the analysis and design of a logistic system. We will also propose the use of a portfolio-model when applying the framework-model.

3. Theoretical context
The radical changes in the company’s environment have created new premises for its operations. In order to deal with this new situation it is necessary to find an approach that includes all those aspects relevant for the total effectiveness of the operations and business processes. This efficiency will be referred to as the “logistics efficiency”.

Our analysis indicate, that there is a strong coherence and interaction between 1) inter-organisational relations, 2) configuration of product-concept, and 3) internal organisational and process relations in the company. Our analysis also indicate, that the interaction between these three factors plays an important role for the efficiency of a logistic system.

It is not sufficient isolated to focus on the external relations, e.g. look for suppliers, evaluate and choose between those. To gain logistics efficiency, the internal competencies, design of business-processes as well as the overall structured design of the train and the split up of the product, have to correspond to the structure of the supplier-network.

This might sound as an opposite approach! It is obviously not very appropriate and neither is it realistic to think, that the conditions in the supply-market shall decide the product-structure or the company’s internal structure. But it is our strong belief, that the three factors interact with each other and that it is these factors that constitute an integrated input to the company’s overall logistics efficiency. Therefore, these factors must be considered in an integrated manner as illustrated by the framework-model in Figure 1.

![Diagram](https://via.placeholder.com/150)

Figure 1. Framework-model for analyzing and designing a logistic-system.
The "configuration of product-concept" element contains parameters such as complexity, flexibility, interfaces, and standardization. For describing the "inter-organizational relations" element, relevant parameters will be the number of suppliers for a certain task, time for involvement, complexity of the supplier market and split of risks and responsibilities between the customer and the supplier as well as between interfacing suppliers. The "inter-organizational and process relations" element will be described by factors such as organization, competencies and split of responsibilities.

It is our hypothesis, that this coherence not only exists for the case-company but applies in general for all companies. The nature of the elements and the interaction between them will of course vary depending on a number of factors, e.g. product complexity, standardization, supplier market, etc.

For instance, in a standardized product environment the parameters to adjust on in the "configuration of product-concept" will be very limited. The internal as well as the external relations will probably be directed towards the manufacturing process and the optimization of this.

In the case-company the one most important factor is the extreme complexity of the product. No matter which factors are applied to measure complexity, the result will be overwhelming! Factors such as the number of:

- components
- features
- systems, subsystems, and interfaces between these
- (alternative) manufacturing technologies
- customer specific demands about the final product as well as systems and subsystems

can be applied. In all cases a magnifying prefix might be put in front in the case of the Flexliner-trains. The complexity of the product puts the "configuration of the product concept" in Figure 1 in focus.

The huge amount of existing literature on Supply Management (Christopher, 1992), Relationship Marketing (McKenna, 1992), Partnership Sourcing (Macbeth and Ferguson, 1994), Lean Supply (Lamming, 1993), and other labels for this significant area of "strategic logistics", is in many cases very relationship-oriented. Furthermore the literature tends to focus on a single relationship or a single type of relationships, ignoring or downplaying the important inter-relationships between the different relationships (Olsen and Ellram, 1995).

Much of this literature describes and rejects what is called the "traditional approach" containing concepts such as "transactional exchange relationship", "multiple sourcing", "arms length approach", etc. The characterization of the "traditional approach" is in often followed by an argumentation for closer and long-lasting relationships between customers and suppliers and strategies for building these relations in order to achieve the so-called win-win situation. The message seems to be: "Build closer relations and get better results!" We do not disagree. However, we have some reservations in our conclusion, as we sometimes feel that the constant stream of writings becomes somewhat monotonous and almost religious in its praise of closer relations. New and Ramsay have expressed their scepticism about relationship-logistics or "Lean Chain Approach" as they call it and they argue that it has "achieved the status of near-instant orthodoxy in some academic circles and amongst many practitioners and their advisors" (New and Ramsay, 1995, p.1).

The variation in the parameters used to describe the three elements of the framework-model in Figure 1, will end up in some kind of taxonomy. This calls for a portfolio-approach. A number of authors have developed portfolio models to analyze supplier-relationships. One of the best known models is developed by Kraljic (Kraljic, 1983). The two main-dimensions in Kraljic's model are "Importance of purchasing" and "Complexity of supply market". The model is in other words very purchasing-oriented and in our opinion the product-element is missing.

Kraljic's model is widely used in industries e.g. in the former ABB Transportation segment. Some other companies have used the model as inspiration and developed their own models some of which include the product. This applies e.g. Siemens AG's "Rag-system" that uses a combination of "sourcing-risk" and "technical complexity" as one dimension in the portfolio-matrix (referred to in Christensen, 1992).

Christensen proposed a "model for taxonomy of suppliers", based on the factors "degree of coordination" (between customer and supplier) and "complexity of tasks" these types range from "supplier of standard products" to "the partnership-based relationship" (Christensen, 1992, p. 41).

Another factor urgently missing in most portfolio-models is the "engineering-dimension", by this we mean the scope of the engineering task carried out by each of the parties in a relationship. Wildemann is close to this in a model where he proposes four types of co-operation. His taxonomy is based on two dimensions, "suppliers competencies" and "scope of task". The two "extremes" in the latter are "pre-defined products and methods" and "system- and problem-solver" (Wildemann, 1992).

Later in this paper, we will propose a two-dimensional portfolio-model in order to dissect the "configuration" element in the framework-model.

4. "Tripartitioning" vs. traditional approaches to product development

Earlier in the paper we mentioned as one of the great challenges for the case-company, the development of a higher degree of standardization of systems, interfaces, and processes and other means by which the company can be properly prepared when orders are received. Due to changing market conditions, it is no longer possible entirely to design a product, and the supplier-network necessary to support the design and manufacturing of the product, inside the time-span between the signing of a contract and the delivery of the trains. The customers no longer have the time, money or interest to become involved in that kind of projects. Therefore, the company needs to restructure some of the business-processes such as the tendering- and specification-process, and order-processing.

Furthermore, to shorten time of delivery, the company has to conduct some of the tasks previously being a part of the customer order-projects, outside these. This must partly be as long-term development and partly in the tender-process.

As a "vehicle" for an approach dealing with this new situation, the idea of "tripartitioning" has been applied. The "tripartitioning" consists of three elements: "development of preparedness", "application of preparedness", and "operations". When focusing on these elements it is important to consider the specific characteristics of each one of them. The three elements are illustrated in Figure 2.
Development of Preparedness
The "market"
- product-concept
- marketing
- supplier-base
- competencies
- corporate co-operation
- etc.

Application of Preparedness
The (potential) customer
- supply management
- systems engineering
- tendering
- systems-integration
- etc.

Operations
The order
- detailed engineering and design
- manufacturing preparations
- purchasing
- manufacturing
- logistics
- testing
- final assembly

In "operations" the criterion for success is simply, by "automatization" and clear divisions of responsibilities to make the product, ordered by this specific customer, in due time and deliver to the customer.

The figure shows, that between "application of preparedness" and "operations" there is an iterative interaction. The figure also illustrates the very important feed-backs from both these elements into the "development of preparedness". Finally, the figure indicates the content in the three elements showing, that in the "development of preparedness" this can be characterized as "results" whereas the content in "application of preparedness" and "operations" is more activity-oriented.

The split of the development-process in a customer-initiated and a non-customer-initiated part, is a very important factor when dealing with a company carrying out this type of projects known as industrial projects. These can be characterized as:
- multi-site
- engineer-to-order
- capital goods
- complex projects
- extensive contracts

The "tripartitioned" development process can be described as a discontinuous development-process contrary to traditional, continuous development-processes for e.g. consumer goods. This difference is illustrated in Figure 3.

This of course is not to be taken literally - the customer-initiation simply has a longer horizon here!
The "outputs" from "development of preparedness" (concepts, definitions, specifications etc) are put on "stock" to be used later, contrary to the traditional consumer-oriented process. Here the ideas and concepts are further developed, detailed designs are made and finally the product is manufactured and launched. Here, it is the final product that is on stock.

In the "tripartitioned process" it is not finished products that are launched to market but concepts and possible options of features and performances. The challenge is to develop these to a level so the "application of preparedness" and "operations" are not to be seen as a "design- and make-to-order process" (Christopher, 1992), but rather as a "combine-to-order process".

Although the definition of one-of-a-kind manufacturing as a business "where most of the manufacturing and at least a part of the product design is carried out after the receiving of an order" (Sederholm, 1991) still applies, the new process in order to distinguish it from an one-of-a-kind process, might be defined as an "once-and-for-all customization".

5. Model for internal organizational and process relations

The three main-elements in the "tripartitioning" are represented by the three main-processes:

- product-development
- tendering
- order

Supply-management must become a natural part of these main-processes. Only in that way, the most suitable connection between the three elements from figure 1 can be created.

The process-model is based on the idea of "tripartitioning". The main goals set up for the model were to 1) create a natural relation between the three main-elements; "development of preparedness", "application of preparedness", and "operations" 2) create a better synergy between the various customer order-projects by organizational learning and transfer of experiences from one project to another and 3) create a stronger continuity between tender-projects and the resulting customer order-projects in order to reduce risks and increase efficiency in the order-process.

Until recently, customer order-projects were carried out by project-teams mainly consisting of engineers from the technical departments. Other departments such as purchasing, manufacturing and logistics have only had an informal attachment to these project-teams. The project-management-team has consisted of a Key Account Manager (KAM) and the Technical Project Manager (TPM) for tender-projects and development-projects they are responsible for. The group becomes truly capable of being tota responsible and it is the group that proposes technical solutions and makes plans & budgets for implementing these in the customer order-projects.

The most important feature regarding customer order-projects is, that all the relevant system-groups are involved in every tender-project. It is the system-group that proposes technical solutions and makes plans & budgets for implementing these in the customer order-projects. Hereby the groups become truly capable of being total responsible and it becomes evident that the system-groups are supposed to "push the solutions" into the different customer order-projects according to the plans they have made themselves. The type and scope of the tasks is known by those supposed to carry them out and it is not the TPM who has to "fight" a constant fight for resources to get things done.

The model for internal organizational and process relations is illustrated in Figure 4.

Figure 4. The structure of the model for internal organizational and process relations at Adtranz Denmark. DR = Development (project)-Responsible.

The system-groups are six self-managed teams, each responsible for a well-delimited part of the train e.g. interiors or carbides. Each group contains all the organizational functions that have a role in development-projects, tender-projects and customer order-projects, and the group bears the total responsibility for the complete process. Thus, the system-groups secure a CE-approach, a "simultaneous design of a product and all its related processes" (Parsaei and Sullivan, 1993, p. 4) in the three main-processes.

The project-owners are for the customer order-projects the Key Account Manager (KAM) and the Technical Project Manager (TPM) for tender-projects and development-projects they are members of the tender-team and the development-team.

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The model has now been formally agreed upon as the future structure of the internal co-operation in the company. The implementation is planned to last until the middle of this year. This "long-lasting" implementation-period is due to a decision that the changes were not to be announced as a "big bang" but as adjustments of organization and business processes that by no means should create unnecessary disturbances in ongoing projects.
6. "Tripartitioning" and the framework-model - a synthesis

As mentioned earlier, the framework-model can be used to analyze different activities in a business-network. The "tripartitioning" does, by definition, contain all business-processes, although we in this paper have primarily been focusing on those processes directly related to the product and the development of the product. It therefore seems obvious, that a synthesis between the two models does make sense. This is illustrated in Figure 5.

The logistic efficiency of the company and its network-partners can be seen as the network’s ability to develop, adjust and apply solutions, competencies, resources etc. necessary to develop, design, manufacture and sell the product in question.

Suppliers can be seen both as actors and instruments in the model. Actors in the sense that they contribute to the development of the technical part of the "preparedness" and instruments in the sense that they are part of the company’s "preparedness".

Another interesting implication regarding the suppliers is, that the co-operation with suppliers occurs as part of all three elements; "development of preparedness", "application of preparedness", and "operations". In the model for internal organizational and process relations, these three elements are "administrated" by three different organisational units (see figure 4) and therefore there are three different coordination-mechanisms as well as there are three different time-horizons for the co-operation.

Depending on the different patterns of interaction between task, internal-relations and the supplier-relations there will exist relations where the suppliers are playing important roles in all three elements, in other cases they will only be involved in the "application of preparedness" and "operations", and finally there may be suppliers only involved in the "operations". In this last case it might be relevant only to consider the supplier as an instrument.

As mentioned before, the variation in the three elements of the framework-model in Figure 1, in some sense calls for a portfolio-approach to dissect the elements.

But although the supplier element has some interesting implications and a significant importance in the framework-model, we find it most logical in the case-company that a portfolio-approach to an analysis and design of a logistic system takes the "configuration" element in the framework-model as point of departure.

As parameters in the portfolio-matrix we propose the "complexity of supply-task" as one dimension and the "degree of specification" as the other. This is illustrated in Figure 6.

![Figure 5](image1.png)

Figure 5. A synthesis between the framework model and the tripartitioning-model.

![Figure 6](image2.png)

Figure 6. A portfolio-model for situational configuration of supplier relations.

For a product defined as "complex" it might be relevant to split the complexity-dimension in two, an internal and an external complexity. By "internal complexity" we mean the "generic" complexity of the task i.e. the complexity of technologies and engineering-disciplines necessary to design the component or system. By "external complexity" we mean the context in which the component or system is included in the final product. This has mainly to do with factors such as the number and type of interfaces, potential variation of "neighbour-elements" etc.

As interfaces we consider the physical interfaces such as electrical, pneumatic and mechanic connections as well as the so-called "technical budgets" i.e. available space, limits for weight etc. Least but not last, "interfaces" that have to do with the engineering-process itself, i.e. the information-inputs and -outputs necessary, are a part of the external complexity.
By using the dimensions shown in Figure 6, the "configuration" element in the framework-model is dissected into nine types of supply-tasks. For each of these, it is possible to outline the demands put on the two remaining elements in the framework-model, i.e. the supplier(s) of the task (external relations) and the internal structure in the process. In Figure 6, some of these factors have been listed for the "extremes".

The placement of a certain task in the model depends on the company's strategy. For a certain final-product (or concept), each supply-task can be unambiguously characterized by the complexity-dimension. But the "degree of specification" depends on, which split there has been decided between the company and supplier(s) - which design- and sourcing-strategy that has been decided for a certain component.

The elements in such strategies will be factors such as number of suppliers, split of risks and responsibilities, time for involving suppliers etc.

Depending on these strategies, worked out for a certain level of the product-structure - each supply-task can be placed in one of the 9 fields. The model can then be applied to evaluate the suitability of the strategies. This of course must be done in relation to the other two elements in the framework-model - the model for internal organizational and process relations (how qualified is the company to act according to the strategies?) and the inter-organizational relations (how suited are the suppliers to support the chosen strategies?). Based on these evaluations, the company's design- and sourcing-strategies - the core-strategy - can be re-designed.

But the most interesting application of the model occurs when all three elements from the framework-model can be adjusted, i.e. the product-structure and delimitation of tasks can be decided upon, the internal process-structure and competencies in the company can be developed and the number and type of supplier-relations can be changed.

7. Conclusion and further work

In this paper we have argued, that in order to design an effective logistic-system, it is important to consider the three elements inter-organizational relations, internal organizational and process relations and configuration of product-concept and the interactions between these. This is illustrated in the framework-model in Figure 1. We have also argued that in the case-company, the complexity of the product makes the product-element extremely important.

We have argued, that when looking at the product-element, parameters such as the complexity of the individual tasks and the scope and complexity of the engineering-process are of great relevance.

In order to support a task-oriented approach to the analysis and design of a logistic-system, we have put forward a "portfolio-model for task-related configuration of external relations". In the coming months the model will be further developed regarding choice of dimensions as well as filling out the fields. Furthermore, the model will be applied in the development of a "configuration-base" for the Flexliner-concept at Adtranz Denmark.

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COST TRANSPARENCY:
A source of supply chain competitive advantage?

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Abstract
This paper presents the findings of the Authors’ research into the concept and implementation of the Cost Transparency concept within UK and multinational supply chains. The research was conducted as part of the Supply Chain Development Programme drawing on the experiences of organisations from the automotive, electronics, retail, clothing and fast moving consumer goods sectors. The research findings explore the perceived advantages and risks in introducing Cost Transparency and conclude that risk aversion and cultural inertia within organisations may inhibit implementation of the concept even where clear benefits are discerned. Consequently a Cost Transparency Implementation Model is proposed which places the concept within a wider framework of the development of innovative relationship management strategies.

Keywords: Lean Supply, Costs Transparency, Supply Chains

1. INTRODUCTION

The work presented within this paper describes the findings the first phase of the Supply Chain Development Programme (SCDP) research project on ‘Cost Transparency’ (CT). The SCDP is a joint research initiative between the Lean Enterprise Research Centre (LERC) at Cardiff Business School, University of Wales and the Centre for Research in Strategic Purchasing and Supply (CRUPS) in the School of Management at the University of Bath. Funding for this research comes from nineteen major UK and multinational industrial sponsors, drawn from the automotive, electronics, public service, retail and fast moving consumer goods sectors. The aim of the programme is to develop concepts and tools, to assist the sponsor organisations to become world class in the management and operation of their supply chains, and to disseminate research findings to the wider academic and practitioner community.

The subject of CT, first described by Lamming (1993, p.214), was identified by the SCDP sponsor organisations as a subject which they felt should be addressed within their supply chains. While it is widely apparent, from cases in practice, that customers and suppliers are often willing to share technical information, there still appears to be a great deal of reluctance to share sensitive cost data, even within so-called ‘partnership’ relationships. The thesis of this research is that this reluctance may prevent organisations from maximising the potential competitive advantage available from within their supply chains. The practical objective of the project was therefore to test whether, within the concept of lean supply (Womack et al., 1990, p.148; Lamming, 1993, p.178), the introduction of CT might be of mutual benefit to customer and supplier organisations, and to devise a model outlining the practical steps necessary for the successful implementation of CT within the supply chain.

The following discussion explores the concept of CT, trace its antecedents and explains the fundamental advantages which its implementation offers. The findings of the project are explored in detail, with particular reference to the perceived benefits and risks arising from the introduction of CT, and the factors which inhibit innovation within organisational relationships. The implications of these findings for organisations that are considering implementing CT within their supply chains are discussed, and a model for the implementation of CT within a broader ‘Relationship Management’ strategy is proposed.

2. COST TRANSPARENCY: CONCEPT, ANTECEDENTS AND RATIONALE

The practice of ‘open book’ negotiation is now commonly observed in many industries, with several variations upon the central theme. The idea is that the supplier must explain process cost structures and other relevant data pertaining to a product or service (much of it confidential) to the customer so that, subsequently, the customer may help the supplier to achieve cost savings. This understanding is based on the assumption that the customer is capable of aiding the supplier, an assumption which is not always valid, or simply on the ‘two heads are better than one’ principle.

In those sectors where the customer’s operation is closely aligned to that of the supplier (such as the automotive industry) it may be expected that a common understanding of, say, production engineering exists. Furthermore, in such an industry, when the customer organisation is larger than the supplier, able to deploy greater resources, and has access to information unavailable to its supplier, it may be assumed that the basic tenet of open-book negotiation applies: the customer should be in a position to aid the supplier. However the internal dynamics of such relationships can result in a reluctance on the part of the supplier to comply with the customer’s requests to initiate open-book costing. This reluctance can be manifested in an outright refusal to comply, or by recourse to ‘massaged’ costs which give a misleading representation of the supplier’s processes.

CT is not synonymous with open-book negotiation. Just as lean enterprises exhibit different sets of management concerns (see Womack and Jones, 1994), so lean supply is concerned with reducing costs in entire supply chains or networks in novel ways. A finite locus for an operation does not equate to limited responsibility: for value to flow, all parties to the stream are concerned with all areas of activity (Lamming, 1996). Using the logic of lean supply chains, therefore, it becomes clear that the exchange of cost data within a customer-supplier relationship must be two-way, in order for both organisations to concentrate on the optimisation of the supply chain. In essence, therefore, CT can be defined as:

“A practice in supply in which the customer and supplier share detailed confidential information on their in-house activities, pertinent to the supply of goods and services which links them. It can be seen as an extension of open-book negotiation, the difference being that the customer shares information on its activity with the supplier in addition to the flow of information in the other direction. The objective of practicing cost transparency is to reduce costs through joint development of good ideas, thereby improving the mutual competitive position of both organisations”

(Lamming, et al 1995)
Practices akin to CT are evident in accounts of the Japanese automotive and electronics industries of the post war period (Cusumano, 1989, Smitska, 1991; Nishiguchi, 1994) while forms of cost information exchange were developed in a variety of Western industries and commercial communities much earlier. In an eighteenth century Britain, for example, the Quakers developed a high degree of integrity and transparency in their business practices (see Hurst, 1992, p.77) while public procurement practices in several European countries, notably the UK, have always required partial exposure of a supplier’s costs as part of the contract award and management process. Similarly, the ‘cost plus’ contracts which existed in both the European and North American defence industries during the cold-war period involved suppliers presenting detailed cost information to their customers.

Williamson notes that the developing North American industries of the nineteenth century found difficulty in managing costs within supply chains:

‘Manufacturers in the 1870’s and 1880’s used trade associations to devise “increasingly complex techniques to maintain industry-wide price schedules and production quotas”’ (Chenoff, 1977, p. 317). When these failed, the manufacturers resorted to the purchase of stock in each other’s companies which “permitted them to look at the books of their associates and thus better enforce their cartel arrangement”. But they could not be certain that the company accounts to which they were given access were accurate. As with roll and telegraph effective control required the next step - merger.

(Williamson, 1985, p. 160)

While the North American difficulties may have led to the vertical integration characteristic of mass production, the Japanese industries famous equity exchange, half a century later, appears to have left that nation with a more comprehensive understanding of managing value. The significant factor in the Japanese automotive industry’s use of CT, present in the Quakers’ approach but lacking in the other cases described above, was its incorporation within a coherent strategy which recognised the importance of the supply chain as the prime determinant of competitive success as opposed to the individual organisation. This strategy emphasised the importance of developing strong collaborative relationships between suppliers and customers, allowing the supplier greater responsibility (and obligation), in order to integrate and optimise the production processes of the supply chain. The demonstrable success of this strategy, embodied by the Toyota Production System and widely understood as ‘lean production’ (Womack et al, 1990) has persuaded many western organisations to adopt its principles and practices.

The diffusion of lean production into the western business environment, with its traditional predilection for adversarial customer-supplier relationships founded on competition challenges organisations to transform their organisational relationships (Lamming, 1993; Macbeth & Ferguson, 1994) and develop a new focus which seeks to optimise the total flow of value, rather than the individual organisation. The requirement for the adoption of a supply chain focus, seeking to eradicate non-value adding costs, is contentious at the abstract level, but in practice few objectives could prove more challenging. It is not only the fact that in order to optimise the supply chain it may be necessary to sub-optimise the performance of individual functions within the supply chain which creates difficulties: more fundamentally, the information on which to base any optimisation is simply not available.

In these circumstances, CT might provide the essential mechanism for making the strategy of supply chain optimisation a practical reality. The fundamental rationale for CT is that it allows organisations to understand and evaluate the performance of their supply chain processes in an objective manner. As a consequence, subsequent supply chain optimisation can be founded on rigorous comparative data rather than value judgements, prejudice, or blinkered self-interest.

3. APPROACH

The project adopted a dual research methodology: semi-structured interviews with the sponsor organisations and nominated customers and suppliers from their supply chains, and a postal questionnaire to 600 UK organisations (300 Purchasing Directors and 300 Sales and Marketing managers) chosen at random from the Gales Directory of UK Purchasing managers. The questionnaire was targeted at Purchasing and Sales/Marketing managers within different organisations.

The novelty of the CT concepts meant that many respondents were not able to complete the questionnaire, but some provided written responses in their own manner. Thus, while the response rate for fully completed questionnaires was 6.6% (7.6% for Purchasing, 5.6% for Marketing), the actual rate of responses containing useful data was 15.5% (15% and 16%)

The questionnaire was targeted at Purchasing and Sales & Marketing Directors within separate organisations. The responses are therefore not from departments within the same organisations, nor indeed from the same Customer-Supplier relationships.

Notwithstanding these limitations, the project gained valuable data from more than 100 customer and supplier organisations and may thus be used as the basis for initial conclusions on the development and implementation of CT. Further validation of this is planned, using detailed pilot case studies.

4. RESEARCH FINDINGS

One of the clear messages provided by the research project is that most of those questioned felt that implementation of the CT concept would significantly benefit their organisation. Enthusiasm for CT was greater within purchasing functions than within sales and marketing departments. This is shown in Figures 1 and 2.

Figure 1: Customers’ Responses (Agree/Disagree) to the Statement that Cost Transparency would Bring Benefits

<table>
<thead>
<tr>
<th></th>
<th>Purchasing (customer) %</th>
<th>Sales (Supplier) %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>D</td>
</tr>
<tr>
<td>Would minimise overall costs</td>
<td>53.0</td>
<td>29.4</td>
</tr>
<tr>
<td>Would improve competitiveness</td>
<td>41.2</td>
<td>41.2</td>
</tr>
<tr>
<td>Would enhance profitability</td>
<td>41.2</td>
<td>17.6</td>
</tr>
<tr>
<td>Would provide a basis for an equitable split of profit through co-operation</td>
<td>47.1</td>
<td>23.5</td>
</tr>
<tr>
<td>Would enable successful target costing throughout supply chain</td>
<td>76.5</td>
<td>11.8</td>
</tr>
<tr>
<td>Would allow development of more cohesive strategic planning</td>
<td>64.7</td>
<td>17.6</td>
</tr>
<tr>
<td>Would bring about long-lasting relationship with suppliers/costumers</td>
<td>76.5</td>
<td>15.9</td>
</tr>
<tr>
<td>Would increase efficiency of new product development</td>
<td>50.9</td>
<td>18.8</td>
</tr>
<tr>
<td>Would form basis of supply chain optimisation</td>
<td>70.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Would provide more dynamic mechanism for collecting cost information</td>
<td>58.8</td>
<td>11.8</td>
</tr>
</tbody>
</table>

The Net...
These data support the contention that CT may provide a source of competitive advantage. In particular, CT appears to be viewed as a mechanism for making the strategy of supply chain optimisation a practical reality - allowing managers to understand the cost drivers of the supply chain and assisting in the elimination of non-value-adding activities. These organisations which were already collaborating with their supply chain associates to eradicate non-value-adding activities credited CT with the ability to enhance effectiveness by providing the improvement process with 'more fact and less opinion' and facilitating change in 'replacing internal politics with objectivity'.

While CT was valued principally for the contribution it could make to the process of supply chain optimisation, there were clear indications that it was felt to have several other important contributions to make towards organisational effectiveness. In particular, CT was viewed as a mechanism for building individual relationships between supply chain trading associates.

Nevertheless, it appears that the same individuals who felt that CT might hold significant potential benefits for their organisations also felt that it posed significant risks. This is the paradox which lies at the heart of the CT issue. The survey indicated that respondents (suppliers and customers) identified the principal risk of CT as the exposure of sensitive information and the revealing of strategic plans. The risk is that this information, shared in good faith, could be abused by the other party to the exchange, resulting in loss of competitive advantage and independence.

The fact that the sharing of commercially sensitive financial information with external organisations was felt to constitute a serious risk is not surprising. The fact that very few of the organisations conducted comprehensive CT suggests that UK industry is 'risk averse' in this regard. The perceived risks associated with CT were viewed as outweighing the perceived advantages, with the result that those advantages were foregone. This view is supported by the fact that a large minority (47.8%) of purchasers and a majority of sales and marketing managers (70.6%) agreed with the suggestion that 'The risk and uncertainty to relationships outweigh the perceived gain from the introduction of CT'. In short, the fear that CT might damage the interests of the organisation appears to inhibit organisational adoption of the concept in practice, even where the potential advantages of change are apparent.

The respondents appear to fall into three broad categories. There was a small minority of individuals who did not perceive any advantage in the application of CT, and who felt that it represented a contradiction of 'good business practices'. There was a second and much larger group who were supporters of CT in principle, but who also recognised that, in practice, the implementation of the concept should be approached with caution. Finally, there was a third, smaller, group who had embraced the CT concept and felt able to introduce it to some extent with a number of their trading associates. These individuals were grappling with the practical structures which were required to make CT a reality. From studying the questionnaire returns and interview transcripts it is possible to differentiate the many reservations, suspicions and concerns which effectively inhibit the adoption of CT. These are outlined below.

The research project identified organisational culture as a very strong factor inhibiting the acceptance of CT. Indeed, one respondent went so far as to say that the successful adoption of CT within UK industry would require:

'... brain transplants for junior and middle managers throughout British industry.'

It does appear that the current business culture within the United Kingdom is in many ways inimical to the concept and practice of CT. 61% of purchasing managers and 76% of sales and marketing managers agreed that CT was 'alien' to their company culture or philosophy. Conventional business wisdom seemed to emphasise that organisations should defend their independence vigorously, even to the point where turnover or profit were foregone. Sharing sensitive financial information was seen as tantamount to a 'surrender' to suppliers or customers. An illustration of the clash between CT and organisational culture is given in the quote below:

'Our MD is completely hostile to the idea [of CT]. He would rather turn business away.'

This feature of organisational culture appears to lead individuals to regard CT with some trepidation. It was expected that sensitive commercial information would be abused by suppliers or customers. This abuse could take the form of leverage or misinformation within ongoing organisation relationships and negotiations, or the betrayal of sensitive information to competitors. Indeed, one respondent described CT as a 'lose-lose' situation: should the supplier be seen to be doing well, the customer would attempt to claw back some of the profit; should the sensitive financial information present a poor picture, the customer could move its custom to a more attractive supplier.

Organisational culture affects the actions and behaviour of departments and individuals. If a culture of mistrust exists, it is because experience convinces managers that any other attitude could prove extremely detrimental to their individual and organisational interests. This is reflected in the following quotes which were given as part of the questionnaire survey:

'[CT is not possible because of] mistrust justified over a time period...by us!'·

'...Talk [within the industry] is now emerging of the need for stable relationships but bad examples on both sides abound.'

While these cultural inhibitors did appear to be widespread, it was noticeable that they were not ubiquitous. Their influence in many organisations was relatively weak and individuals and groups...
could contemplate new methods of doing business. In other cases the traditional, adversarial culture formed an apparently impenetrable barrier to innovation in the way customers and suppliers related to each other. It appears that managers who have been successful under the traditional culture, and have been promoted as a result, may have a vested interest in perpetuating the system they know and understand.

Whatever the causes of this secretive, adversarial culture, the result is clear. A suggestion for implementing CT is often regarded with suspicion. The sceptical managers, suspecting that an organisation calling for the sharing of sensitive information would have ulterior motives, saw CT as "just another tool to negotiate gain". This is especially true when the company being asked to share cost information feels itself to have less power within the relationship than its associate. This view is represented strongly in quotes such as:

"the call for CT is viewed as a threat if it is not complied with."

and, from the automotive sector:

"[there is]... no true partnership with major vehicle manufacturers: partnership is a one way flow of information!"

A respondent from the clothing industry had this to say:

"[CT]... driven by big brother!"

But perhaps the most powerful quote of all came from a senior manager who felt that:

"The whole partnership message is utterly developed and corrupt out there. It's a joke and it's become a joke because all the suppliers have experienced that what this is really about is the latest good technique for screwing down the supplier."

This mismatch in buyer/seller perceptions of CT is illustrated clearly by the differing responses made to the questionnaire. 73.5% of respondents from the procurement function felt that the 'exposure of sensitive information' would be a barrier to the introduction of CT with their suppliers. On the other hand, 100% of the sales and marketing respondents felt that the need to expose sensitive information would form a barrier to CT.

This anomaly relates to the fact that it is easier to ask another party to take a risk than to take that risk oneself. It may also mean that there is a persistent resistance to understanding CT as a two-way sharing of information. Instead, the term is taken by managers within the supply chain to mean the transfer of sensitive cost information from the supplier to the customer. 88% of sales and marketing respondents felt that they would be reluctant to declare their profit margin although interestingly only 59% felt uncomfortable in declaring the rate of return desired by their organisation.

The inhibiting factor of managerial instability was a recurring theme in the project. As explained above, it is clear that the adoption of CT involves risk. For the concept to be accepted within an established business culture, individuals and organisations must believe that the 'bad old days' are over and that future trading will take place in an atmosphere of collaboration for mutual gain. The research team discovered several situations where managers who were being asked to share cost information were satisfied that their trading associates at the level of the organisation and the individual were sincere and could be trusted not to abuse the information they would receive. However, a profound problem still blocks the path to CT: how can one be sure that this benign environment will persist into the future?

It appears that, when an organisation is asked to institute CT, concern is often reinforced by confusion. Questions arise concerning the meaning of CT, its ownership and relation to policy. There is frequently concern for what happens to the process if key individuals leave the organisation. One procurement manager, who felt it was vital to develop long-term contracts and agreements between customer and supplier, added the caveat:

"Suppliers are only people though, and people change."

For CT to be successful, it appears that it should become an integral component of the organisational mission, so that even if key individuals do move to new positions, or suffer a sudden loss of enthusiasm, the organisation's commitment - not to abuse information supplied in good faith - remains.

Even in those situations where supply chain partners were convinced of the need for CT and further convinced that sharing sensitive information would not lead to an abuse of trust, there still appeared to be the question of how to go about the mechanics of sharing cost information in a meaningful way. "Who shares what information, with whom, when, and for what purpose?" This miscellany might be termed practical inhibitors. A quote from an interviewee illustrates both these points and the dangers faced when the sharing process suffers from a loss of momentum:

"As they go further into detail people start to take up defensive positions, 'My facts are better than yours. No, they're not. No facts are perfectly OK. You start to challenge their logic and thinking. You start to challenge something fundamental about them. What this does is generate conflict and we're finding a big problem in this area. We don't know how to get out of it by the way!"

The research distinguished between two related practical difficulties. The first involved actually obtaining the required information. Disaggregating cost data to make them relevant to a single trading relationship would be difficult unless simplistic assumptions were employed as the basis of the exercise. This situation is aggravated when the profits from certain relationships are employed to subsidise the losses of others.

Another practical difficulty involves constructing supply chain structures capable of using the information for developing process improvements. The main limiting factor in this activity is often not inter-organisational but intra-organisational relationships. It was felt by respondents that for CT to realise its full potential in terms of initiating action to optimise value stream activities effective cross-functional management practices must be in place within organisations. To highlight this point, 74% of the questionnaire responses from procurement functions and 65% of those from sales and marketing departments felt that successful CT required cross functional management within the customer organisation. Furthermore, 78% of purchasing respondents and 47% of those from sales and marketing felt that cross functional management was required within the supplier's organisation. Without this advantage, political in-fighting between functions within the same organisation could easily subvert the inter-organisational benefits generated by CT.

The distinction between structural and operational inhibitors was found to be of great assistance in providing a coherent framework to facilitate understanding of CT. Structural inhibitors arise as a consequence of an integral aspect of a company's internal operation or its relationships with external organisations. Such inhibitors are themselves likely to prove resistant to change and appear to be extremely difficult to overcome. An operational inhibitor, on the other hand, does not express the consequence of an integral aspect of organisational activity but merely the result of tactical deficiencies in the organisation's internal activities or organisational relationships. As a result, operational inhibitors may be addressed over a much shorter time-frame than that
required for more serious structural inhibitors. It is unlikely that organisations can implement successful CT without addressing both categories of inhibitor.

To illustrate our distinction between structural and operational inhibitors we can examine the nature of inter-organisational trust. There is at present a renewed debate on the nature of trust and its importance within organisational relationships. The protagonists of trust argue that intercompany trust forms the basis of successful collaborative relationships. Sako (1992) identifies three forms: contractual trust, competence trust, and goodwill trust. On the other side of the debate are those who feel that assigning human emotions such as trust to commercial organisations is anthropomorphic and misleading. Such researchers prefer to talk of interorganisational dependency as the positive driving force within collaborative relationships.

The results of the research presented within this paper indicate that contributors felt that both trust and dependency were important prerequisites for successful CT. Interviewees and questionnaire respondents repeatedly identified these two factors as being of crucial importance. However, it appears that trust and dependency exist at different levels. First, it is imperative that dependency exists at the organisational level, i.e. the two organisations share a genuine community of interest in the marketplace that extends beyond the limits of the immediate transaction. This provides a genuine and independent practical justification for collaboration which allows both parties to contemplate the introduction of CT.

At the same time, it appears equally important that individuals feel that they can trust their counterparts within their trading partners. Without that personal bond of trust between individuals, it was felt extremely unlikely that CT could be implemented, even where organisations shared a community of interest. It was interesting to note the number of times interviewees began speaking of their relationships with another organisation, referring to company 'x or company 'y, but then personalising the relationship by alluding to named individuals within those trading organisations, or 'the guys' at company 'x or 'y. This need to 'personalise' organisational relationships has clear implications for the change management aspects of CT implementation programmes.

Within the determination of the structural and operational classification of inhibitors, interorganisational dependency (or the lack of it) is classified as a structural inhibitor, while a lack of trust between individuals is seen as an operational inhibitor. While it would take significant time and some degree of structural change to develop a genuine community of interest (even if it were decided that such a development was desirable or possible) it would be easier and more practical to build a meaningful trust between individuals, conditional on motivation and commitment. This has important implications for the introduction of CT, as the number of customers or suppliers with whom an organisation shares a genuine community of interest may be limited. This illustration also serves to reinforce the finding of the research project that it is not sufficient simply to address either the structural or the operational inhibitors: for successful CT both types of inhibitor must be overcome.

5. DISCUSSION

This paper began with the premiss that CT is implicit in the principles of lean supply and supply chain management and that a central theme of lean production is the need to optimise the performance of the supply chain rather than that of individual organisations within the chain. The research project thesis suggested that in order to make supply chain optimisation a practical reality, organisations would need to share detailed and often sensitive cost information pertaining to their business processes. The research findings provide support for this hypothesis, and

suggest that a broad consensus exists which believes CT holds the potential to transform supply chain competitiveness.

Nevertheless, while the research project highlighted the significant rewards to be gained from the concept, only 21% of questionnaire respondents claimed to use some form of CT, and then only in an extremely circumscribed manner. This reflects the conclusion, emphasised continually within the research programme, that to share sensitive cost information within a traditionally secretive, adversarial, opportunistic relationship, with no consideration given to the potential consequences, can prove an extremely risky course of action. Within this context, requests to external organisations (whether supplier or customer) to expose themselves to this risk are likely to be met with scepticism.

Acceptance of this leads to the realisation that it is futile for organisations whose commercial relationships are of the traditional competitive type to attempt to proceed directly to the exchange of sensitive cost information. Instead such organisations should concentrate on developing the conditions necessary for successful CT within their commercial relationships. This is likely to require a revision of corporate culture and its impact on the conduct of the organisation's commercial relationships. This will require both organisations to invest considerable time and effort in developing relationships capable of sustaining CT. This fundamental change in business culture requires senior management commitment and must represent an irrevocable change in company policy rather than a personal initiative on the part of an individual or simple function. The difficulty and time required in such a change process should not be underestimated, particularly when addressing the consequences of many years of operating relationships founded on opportunistic, adversarial and secretive behaviour. CT must therefore be viewed as a tool to be employed within a wider 'relationship management' initiative.

To facilitate the implementation of CT within customer supplier relationships the 'Cost Transparency Implementation Model' (see Figure 3) was developed. It provides a coherent framework, consonant with the findings of the research project, which would allow organisations to develop the free flow of sensitive cost information as the centre-piece of their relationship management and supply chain optimisation strategies. The model is based upon the premise that CT can be used for the mutual benefit of the entire supply chain, and that organisations with an interest in implementing CT within their supply chains are motivated by the desire to do so for that mutual benefit rather than to obtain sensitive financial information in order to enhance or abuse their relative power within their supplier/customer relationships.

The research findings indicated that in implementing CT the crucial step is to create the conditions necessary within the organisation's commercial relationships for successful positive (reciprocal) exchange of information. This will require the organisations to overcome the inhibitors discussed earlier within this paper. Failure to put into place the conditions which effectively overcome structural and operational inhibitors to CT should be taken as a sign that CT, in the full sense, may not be immediately appropriate. A failure to overcome structural inhibitors may signify that full and genuine CT will not be appropriate for the foreseeable future. A failure to overcome operational inhibitors, given the required commitment, may only preclude CT over the short to medium term.

The model describes a commercial relationship between customer and supplier. Such a relationship is influenced by the internal organisational culture of both parties, which are in turn influenced by the external culture of the global trading environment. The six steps of the implementation model are initiated within the internal organisational environment. This reflects the need to establish an organisational strategy for the management of relationships which can provide a coherent framework for the tactical operation of commercial relationships in practice, and the fact that if a commercial relationship is unsatisfactory it is just as likely that innovation is
required within one's own organisation as much as from customers or suppliers. The dual strands of the process steps therefore represent organisational policies which are formed within each organisation. The merging of these dual strands into a single stream within the relationship environment signifies a mutual process shared between customer and supplier, which is driven forward on the basis of dialogue and mutual benefit.

Step 1: Self Appraisal

The first step toward implementing CT is to build a commitment to and understanding of the concept within one's own organisation. This process will call into focus the manner in which the organisation conducts its commercial relationships and may require that the organisation reviews its relationship management strategies. It is also an opportunity to prepare responses to the questions which will inevitably be put when the desire to implement CT is introduced to suppliers or customers.

The initial responses to these questions, formed within the organisation, will need to be modified as the implementation process receives the contribution of supplier or customer organisation. Nevertheless, it is extremely important that the initiating organisation makes clear at the outset of the project what it expects to gain from the introduction of CT, how that gain will be achieved, and how success (or otherwise) will be measured.

Step 2: Partner Appraisal

The second step, having built an internal commitment to CT, is to examine potential suppliers or customers with whom it is desired to introduce the practice. At this point the firm may wish to audit its entire supply base, identifying suitable organisations which may make themselves immediately apparent. Alternatively, it may be decided to pilot the concept with a particular organisation. The partner appraisal will have focused on the characteristics of particular relationships and their implications for the implementation of CT. The conclusion of the partner appraisal should be the approach to the chosen organisations with the proposal that the CT concept be considered. This may be either in the form of customer approaching supplier or vice versa. In either case it takes the form of a commercial proposition.

Step 3: Address Structural Inhibitors

Having begun to work together with another organisation on the introduction of CT, it is necessary to assess the existence and nature of structural inhibitors. The model proposes a three stage approach consisting of identifying, evaluating and overcoming structural inhibitors. One might take the view that it would be possible to identify any structural inhibitors at Step 2 of the model (partner appraisal). However each party will have its own perceptions of the relationship and while one's own organisation may not perceive the existence of structural inhibitors, this may not necessarily be the case for the customer or supplier company.

Structural inhibitors are those which appear to be permanent features of the relationship. For example there may be limited potential for a true community of interest to exist between the two organisations outside the limits of the immediate transaction. Without overcoming these structural inhibitors the CT initiative may be vulnerable and likely to fail. It is also likely that overcoming existing structural barriers will require a significant amount of management time and commitment.

Step 4: Address Operational Inhibitors

The fourth step, having examined and overcome any structural inhibitors, is to repeat the three stage approach to identify, evaluate and overcome operational inhibitors. Operational inhibitors are more transient in nature than their structural counterparts; for example, there may be a lack of interpersonal trust, the absence of appropriate channels of communication or the lack of departmental resources to conduct CT. It may also be necessary to provide employees with additional skills to make CT a practical reality. Again, overcoming the operational inhibitors is likely to require the determined commitment of management.

Step 5: Create an Integrated Cost Transparency System

The penultimate step, having removed the barriers to the CT concept, is to set up the CT system itself. This involves more than simply exchanging what was previously sacrosanct financial information. It involves providing practical solutions to the questions put forward in step one of the process model. This involves formalising the benefits that it is expected CT should achieve; identifying the information which is to be shared (and when it is to be shared), deciding on the individuals, functions, cross-functions or supply chain groups who will share it and the action they will take, armed with the cost information and the wider organisational relationship within which the exchange will take place.

Step 6: Quantify & Evaluate Benefits

The final step, having created a CT system integrated within the normal operation of the business, is to measure the relative success of the CT implementation. This is vital to allow sceptics and enthusiasts alike to see the value of the concept in operation. The benefits of CT should be quantified, and expressed in the cash benefits they have brought to the supply chain. It is also important to evaluate the effectiveness of the integrated system and institute modifications where necessary, and periodically to re-evaluate the structural or operational barriers which have reappeared with time.

6. CONCLUSION

It appears that CT may hold significant potential for increasing supply chain competitive advantage. Its implementation might enable organisations to optimise their supply chain processes objectively and allow them to evaluate the potential for process improvement. The need to optimise the supply chain rather than individual organisations or functions within the chain is widely accepted. CT allows the possibility for managers (in suppliers or customers) to measure the effectiveness of their supply chains. As a consequence, subsequent supply chain optimisation could be founded on rigorous comparative data rather than value judgements, prejudice, or self-interest.

The evidence and results of the CT project are unambiguous. CT holds the potential to minimise supply chain costs by identifying areas of non-value adding activity. However, CT exists not in a vacuum but within an organisation's relationship with its trading associates. For CT to be successful, that relationship must be conducive to its application. For the most part, traditional organisational relationships, built around secrecy and opportunism, are inimical to the concept of CT. If the implementation of CT is to be successful, commercial relationships within the supply chain may have to be re-shaped to create the necessary conditions. This will require the development of organisational relationships within which customers and suppliers feel comfortable and with the assurance that the sensitive information they share will not be abused by either trading partner.
The challenge of creating such organisational relationships where they do not already exist, and of implementing CT, will undoubtedly require a great amount of commitment over an extended period of time. However, the conclusion of this research is that a joint commitment to CT could prove to be of mutual benefit to the supplier and customer in minimising overall costs, and is therefore a worthy objective.

REFERENCES


AUDITING INTANGIBLES AND KNOWLEDGE

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ABSTRACT

This paper presents a technique for developing partnership strategies. The technique is based on an analysis of the intangible resources which constitute the current strengths of each partner. The technique codifies the tacit knowledge which each company has of itself thereby enabling this understanding to be communicated to its partner and used as a basis for joint strategic development. The major outcome of this analysis is the identification of the capabilities which the partners wish to create. The paper then proposes a model which can be used to explore the issues to do with the management of knowledge, specifically the knowledge acquisition and diffusion processes which will be required in order to create new capabilities.

KEYWORDS


AUDITING INTANGIBLES AND KNOWLEDGE

1. INTRODUCTION

The purpose of this paper is to describe a new approach for developing partnership strategies and for analysing the knowledge acquisition and diffusion processes which will be required in order to create new capabilities. The approach has two parts:

Part one involves the use of a technique which has been validated for auditing the roles of intangible resources. The work on this technique to date has been carried out within single firms and has focused on the contribution which intangible resources make to a firm's current, and future, competitive advantage. The proposed approach involves each member of a partnership using the technique in conjunction with its partner in order to develop a partnership strategy.

Part two is in development. It is concerned with auditing the different types of knowledge which each company in a partnership possesses and with the identification of the issues to do with the management of the knowledge base.

Part one is an extension of a research programme commenced in 1989 and written up in the Strategic Management Journal (Hall, 1992; Hall, 1993) and Competence Based Competition (Hall, 1994). The technique which has been developed concerns the identification of the intangible sources of competitive advantage and the development of plans to do with their protection, sustenance, enhancement and leverage.

Practitioners have quoted the main benefits obtained from this technique as being:

- The identification of a new strategic perspective.
- The provision of a language which enables this perspective to be communicated.

The technique codifies the tacit knowledge which each company has of itself thereby enabling this understanding to be communicated to its partner and used as a basis for joint strategic development.

Part two concerns the issues to do with the management of knowledge in an inter-organisational learning context. It will employ Boisot's (1995) Learning Cycle model, presented in Section 2.2, as a theoretical framework.

2. AN OUTLINE OF THE THEORETICAL FRAMEWORK

2.1 Intangible Resources

It is usually the case that the ratio of a PLC's market value to net asset value is a multiple of 3, 5 or even 10; this means that between two thirds and nine tenths of the worth of a company is accounted for by the off balance sheet items which represent the stock market's assessment of future earning potential; these off balance sheet items are hereinafter called intangible resources.

When a purchasing organisation enters into a partnership relationship with a supplier, thereby denying itself the benefits of a free market, it does so because it believes that the capability creating potential of the partnership justifies the sacrifice. The source of this potential resides in the intangible resources possessed by each company. The analysis technique described below is concerned with identifying the intangible resources which constitute both the current strength of the company and its future potential.
Any company which is making sales must possess an advantage in the eyes of its customers otherwise they would not be buying the product and/or service. It is productive therefore to identify the product/delivery system attributes which current customers value. Examples of such attributes are:

- **Price.** Is the company’s generic strategy one of selling price leadership?
- **Availability.** How important is short lead time?
- **Rapid response to enquiry.** How important is it for the supplier to produce designs, quotations etc. quickly?
- **Achievement of advised delivery.** How important is it for advised delivery dates to be met?
- **Quality - the product's fitness for purpose.** Does the product, or service, deliver exactly the benefits which the buyer wants?
- **Quality - the consistent achievement of defined specification.** Is constant conformance to specification vital?

It is usually possible to capture the essence of the package of attributes which constitute sales advantage in terms of five or six key attributes. Each of the key attributes will be produced by intangible resources such as:

<table>
<thead>
<tr>
<th>Patents</th>
<th>Licences</th>
<th>Company Reputation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution network</td>
<td>Employee know-how</td>
<td>Supplier know-how</td>
</tr>
<tr>
<td>Organisational ability</td>
<td>Organisational ability to manage change, etc.</td>
<td></td>
</tr>
</tbody>
</table>

These intangible resources may be placed in a framework of capabilities. Any organisation has four, and only four, capabilities. The first two are concerned with assets - things which one has. The second two are concerned with skills - doing abilities. The four capabilities are:

- **The Regulatory Capability.** This is to do with assets which are legal entities; they often have property rights which make them legally transferable.

- **The Positional Capability.** This is also to do with assets, but assets which are not legal entities and which do not have property rights. These assets cannot be bought or sold and can only be acquired as a result of endeavour - usually over a long periods of time.

- **The Functional Capability.** This is concerned with the doing intangibles, as opposed to the having intangibles described above, this capability will include the distinctive know-how which exists within the organisation.

- **The Cultural Capability.** This is concerned with the characteristics of the organisation as a whole; its ability to change, to respond to challenge, etc.

Following the identification of the key intangibles and the placement of each in one of the four capabilities described above it is possible to consider development plans for each resource. These plans are concerned with protection, sustenance, enhancement and leverage. In addition to development plans for each individual intangible resource it is appropriate to consider generic strategic issues concerning each of the four capabilities.

The advantage of this approach in the context of a partnership is that it concentrates on each company's strengths; as a consequence there is little reluctance to share information or to use the analysis as the basis for the development of joint strategic plans. The joint planning exercise will facilitate the identification of what it is that each partner wants from the relationship and the identification of the capabilities which their inter-organisational learning processes are required to produce.

Details of the ‘Intangible Resource Technique’ are given in Section 3.

### 2.2 Inter-organisational Learning

Max Boisot (1995) has proposed a dynamic model of knowledge acquisition which he describes as "The Social Learning Cycle". The basic features are shown in Figure 1.

![Figure 1 The Social Learning Cycle (Boisot, 1995)](image)

Boisot describes the characteristics of points A, B, C and D as follows:

- **Point A** This **Personal Knowledge**, which is uncodified and undiffused, is held by individuals or small groups of people. It is described by other authors (Polanyi (1948), Nonaka (1994), Badaracco (1991)) as Tacit, or Embedded, Knowledge. This knowledge is characterised by causal ambiguity; it is acquired by observation and experience, e.g. the training of a Buddhist novice!

- **Point B** This **Proprietary Knowledge** is codified but undiffused. The codification, which has been produced in order to reduce its uniqueness and specificity also renders it liable to diffusion, it can leak away.

- **Point C** This **Textbook Knowledge** is codified and diffused. It is the public knowledge which is the stuff of education.

- **Point D** This knowledge (Common Sense) is diffused and uncodified, i.e. tacit. It is Textbook Knowledge become second nature, e.g. fluency in a language.

Boisot suggests that knowledge acquisition normally proceeds in an iterative cycle from 'A' to 'B' to 'C' to 'D' and back to 'A'. More limited cycles may be experienced when, for example, a profession limits the diffusion of its proprietary knowledge; the cycle is then restricted to points 'A' and 'B'.

Know-how is normally described as comprising: Personal Knowledge (Point ‘A’), Proprietary Knowledge (points ‘B’ & ‘C’) and Common Sense, or implementation skills, (Point ‘D’). In order to manage the know-how base it is necessary to determine the relative composition of the different types of knowledge and the dynamics which apply.
3. THE INTANGIBLE RESOURCE TECHNIQUE

This technique comprises three main stages:
- The identification of the key product/delivery system attributes.
- The identification of the key intangible resources.
- The production of development scenarios.

In the first instance each member of the partnership will carry out the analysis independently. Each of the three stages is described below.

3.1 The Key Product/Delivery System Attributes

The analysis of the product/delivery system attributes which currently win sales may be carried out for the company's total product offering or it may need to be carried out separately for individual product ranges. The exercise may be carried out by a single senior executive, or a team of senior executives.

**Table 1 A Checklist of Product/Delivery System Attributes which Produce Sales Advantage**

"What are the product/delivery system attributes which produce current sales advantage - why do the existing customers buy the product/service?"

The 'checklist' which follows is not exhaustive:

| Image What is the image of your product range? Is it important? |
| Price Is a low price a key buying criteria? |
| Value for money Is the achievement of a certain ratio of specification/purchase crucial? |
| Availability Is product range availability crucial? |
| Quick response to enquiry Is it important to produce designs, quotations etc very quickly? |
| Quality The product's fitness for purpose Is the product, or service, deliver exactly the benefits which the customer want? |
| Safety Is safety in use a major concern? |
| Regulatory requirements Does meeting regulatory requirements easier/faster than the competition give you an edge? |
| Provenance of advanced specification or speciality service Are you the only people to do what you do, and is this important to the customer? |
| Value chain configuration Are your current resources in relation to your competition? |
| Quality of development environment Is your environment good enough to produce high quality products/services? |
| Ability to vary product specification Is it important for you to produce products/services modifications easily and quickly? |
| Ability to vary product volume Is it important for you to be able to increase, or decrease, production volume easily? |
| Customer service Is the quality of the overall service which customers receive is a key to winning business? |
| Provision of after sales service Is the supply of spare parts, advice etc a key aspect of winning business? |

It is usually possible to capture the essence of the sales advantage in terms of 5 or six key attributes. These key attributes should be given an importance weighting so that the prioritisation may be communicated and compared.

### Table 2. The Essence of Sales Advantage

<table>
<thead>
<tr>
<th>Key Attributes</th>
<th>% Importance Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

It will be appropriate at this stage to check that the key product/delivery system attributes identified by the supplier are congruent with the key buying criteria of the purchaser. It may also be appropriate for the companies to compare the supplier's performance on these attributes with those of its competitors.

3.2 The Key Intangible Resources

Having identified the key attributes it is now necessary to identify the intangible resources which produce them. The 'checklist' of intangible resources given in Table 3 is not exhaustive, it may be necessary to identify others.

### Table 3. A framework of Intangible Resources

<table>
<thead>
<tr>
<th>Regulatory Resources: legal entities, often with property rights.</th>
<th>Positional Resources: assets which are not legal entities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patents, Trademarks, Copyright, Registered Designs, Trade Secrets,</td>
<td>Reputation of Company and Products,</td>
</tr>
<tr>
<td>Contracts, Licences, Proprietary Operating Systems.</td>
<td>Value chain configuration, Distribution</td>
</tr>
<tr>
<td>Proprietary Operating Systems.</td>
<td>Network, Unique Access to Raw Materials,</td>
</tr>
<tr>
<td></td>
<td>Organisational Networks, Installed Operating Systems e.g. MRP, EPOS etc., Databases.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional Resources: individual or team skills.</th>
<th>Cultural Resources: the characteristics of the organisation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee know-how, Distributor know-how, Supplier know-how,</td>
<td>Perception of high quality standards,</td>
</tr>
<tr>
<td>and groupings of the above</td>
<td>The organisation's ability to manage change, innovate,</td>
</tr>
<tr>
<td></td>
<td>work as teams, respond to challenge</td>
</tr>
<tr>
<td></td>
<td>Tradition of Customer Service, etc.</td>
</tr>
</tbody>
</table>

Each key attribute should be entered in Table 4 and the intangible resources which produce each attribute should be listed, placing each resource in the appropriate capability column.
Table 4 The Intangible Resources Related to the Key Product/Delivery System Attributes

<table>
<thead>
<tr>
<th>Key Product Attributes</th>
<th>Regulatory Resources</th>
<th>Positional Resources</th>
<th>Functional Resources</th>
<th>Cultural Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 The Strategic Issues with Respect to the Management of Intangibles

It is now possible to draft scenarios with respect to the development of the key intangible resources. In drafting these scenarios it is necessary to consider issues such as the protection, sustenance, enhancement and exploitation of each key intangible resource.

Some examples of the questions appropriate to the development of each intangible resource are shown in Table 5.

Table 5. Issues with Respect to the Development of Intangible Resources

<table>
<thead>
<tr>
<th>With respect to protection</th>
<th>Do all concerned recognise value of this intangible resource to the company?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Can the resource be protected in law?</td>
</tr>
<tr>
<td>With respect to sustainability</td>
<td>How long did it take to acquire this resource? Is it unique because of all that has happened in creating it?</td>
</tr>
<tr>
<td></td>
<td>How durable is the resource, will it decline with time?</td>
</tr>
<tr>
<td></td>
<td>How easily may the resource be lost?</td>
</tr>
<tr>
<td></td>
<td>How easily and quickly can others identify and imitate the resource?</td>
</tr>
<tr>
<td></td>
<td>Can others easily &quot;buy&quot; the resource?</td>
</tr>
<tr>
<td></td>
<td>Can others easily &quot;grow&quot; the resource?</td>
</tr>
<tr>
<td></td>
<td>How appropriate is the resource? Can it &quot;walk away&quot;?</td>
</tr>
<tr>
<td></td>
<td>Is the resource vulnerable to substitution?</td>
</tr>
<tr>
<td>With respect to enhancement</td>
<td>Is the &quot;stock&quot; of this resource increasing?</td>
</tr>
<tr>
<td></td>
<td>How can we ensure that the &quot;stock&quot; of this resource continues to increase?</td>
</tr>
<tr>
<td>With respect to exploitation</td>
<td>Are we making the best use of this resource?</td>
</tr>
<tr>
<td></td>
<td>How else could it be used?</td>
</tr>
<tr>
<td></td>
<td>Is the scope for synergy identified and exploited?</td>
</tr>
<tr>
<td></td>
<td>Are we aware of the key linkages which exist between the resources?</td>
</tr>
</tbody>
</table>

In addition to considering the protection, sustenance, enhancement and exploitation of the key intangibles it is also appropriate to consider the generic strategies for the four capabilities. Some examples of the questions relevant to the generic strategies are shown in Table 6.

Table 6. Generic Strategies

<table>
<thead>
<tr>
<th>Regulatory Resources:</th>
<th>Is the company willing and able to defend its property rights?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positional Resources:</td>
<td>Does the company choose operational practices which reinforce its position?</td>
</tr>
<tr>
<td></td>
<td>How long would it take a competitor to match the company's position?</td>
</tr>
<tr>
<td>Functional Resources:</td>
<td>Do all concerned in the company understand what the core competencies are?</td>
</tr>
<tr>
<td></td>
<td>Are these the foci of training and development plans?</td>
</tr>
<tr>
<td></td>
<td>To what extent can the core competencies be acquired by training and to what extent must they be &quot;learned by doing&quot;?</td>
</tr>
<tr>
<td></td>
<td>If the latter is the case is it reflected in the way the &quot;doing&quot; is organized?</td>
</tr>
<tr>
<td>Cultural Resources:</td>
<td>Is there a plan for developing tomorrow's competencies?</td>
</tr>
<tr>
<td></td>
<td>Is the company's culture appropriate? If not what can be done about it?</td>
</tr>
</tbody>
</table>

The strategic issues may be summarised in a framework such as that shown in Table 7.

Table 7. The Strategic Issues with respect to the Management of Intangibles

<table>
<thead>
<tr>
<th>Key Intangible No.1</th>
<th>Protecting</th>
<th>Sustaining</th>
<th>Enhancing</th>
<th>Leveraging</th>
<th>Generic Capability Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Intangible No.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Generic Capability Strategy</td>
</tr>
<tr>
<td>Key Intangible No.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Generic Capability Strategy</td>
</tr>
<tr>
<td>Key Intangible No.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Generic Capability Strategy</td>
</tr>
<tr>
<td>Key Intangible No.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Generic Capability Strategy</td>
</tr>
</tbody>
</table>

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The Netherlands
In the research carried out to date all analyses have listed employee know-how as a key intangible resource; indeed it is usually the case that there are many different categories of employee know-how which are identified as being major sources of competitive advantage. This finding supports the work of many authors writing on the subject of core competencies, the most noteworthy of which are Prahalad and Hamel (1990) who have identified four major components in the concept of corporate core competence:

- Temporal Dominance. Competencies are more stable than products which are their momentary representation.
- Learning by Doing. Core competencies do not diminish with use, they are enhanced as they are applied and shared.
- Competitive focus. Inter firm competition is essentially concerned with the acquisition of skills.

Vollmann, Cordon and Raabe (1995) suggest that the prime candidates for partnership status are the companies which make the greatest contribution to the distinctive competencies of the purchasing organisation. The completion of Part One of this approach results in each partner having a better understanding of the key intangible resources which constitute the distinctive competencies of the other. The next part of this paper outlines an approach which will provide participants with a deeper insight into the nature of the knowledge which they possess and into the ways in which this knowledge can be managed.

4. THE MANAGEMENT OF KNOWLEDGE

Chesbrough and Teece (1996) suggest that the structure of supply chains - the degree of vertical, as opposed to virtual, integration - should be considered in the light of the nature of the innovation which is required. They argue that managing innovation which is independent and autonomous, e.g. switching from drum brakes to disc brakes, needs a different supply chain structure to that required by innovations which are essentially systemic, e.g. an advanced lean manufacturing capability. They summarise as follows:

The distinction between autonomous and systemic innovation is fundamental to the choice of organisational design. When innovation is autonomous, the decentralized virtual organisation can manage the development and commercialization tasks quite well. When innovation is systemic, members of a virtual organisation are dependent on the other members, over whom they have no control. In either case, the wrong organisational choice can be costly.


Systematic innovation usually involves a high degree of tacit, or embedded, knowledge and because it is uncodified it is difficult to communicate to a subcontractor even when a close relationship exists. Chesbrough and Teece (1996) argue that innovation which depends on this type of tacit knowledge is usually best tackled within the organisation. These considerations, and others which will be identified, indicate the desirability of analysing the nature of the knowledge which constitutes distinctive competencies and the alternative ways there are of managing and developing it. The theoretical framework which will be used to explore the issues involved in the management of knowledge will be Boisot’s (1995) model of the Learning Cycle which was presented in Figure 1. For the purpose of this analysis the model has been adapted as shown in Figure 2.
This restricted domain model will usually be that chosen by management with respect to their proprietary knowledge because, by virtue of its restricted diffusion, it constitutes a distinctive competence - others do not have it.

In some situations, e.g. language tuition by means of conversation, or an apprentice learning a craft by exposure to his master, the knowledge is diffused in a tacit form. In this case the domain of the cycle will be as shown in Figure 4.

When management decide to patent a piece of original proprietary knowledge they have, de facto, decided to diffuse the knowledge through the 'literae patent' (open letters) which become public knowledge. In exchange for this disclosure they obtain a legally enforceable restriction on the application of the knowledge. In this case the cycle would be as shown in Figure 6.

In view of these considerations some of the issues relating to the management of knowledge which need to be formally addressed by the partnering organisations are as follows:

**Tacit Knowledge**

If 'black magic' is eliminated by codifying tacit knowledge the advantages are obvious; but when it has been codified it can leak away. The following questions occur.

- Are there occasions when one should keep the knowledge tacit in order to limit its diffusability?
- If the desired innovation is based on systemic knowledge then is innovation best tackled in house?

This is an illustration of the Polanyi (1948) syndrome - "We know more than we can say."
Polanyi suggests that there is, to a greater or lesser extent an information loss whenever one attempts to codify tacit knowledge.
- If tacit knowledge is shared between partners who ‘owns’ what? Indeed can the components of the ‘what’ be identified?

**Knowledge Diffusion**
It will usually be the case that the members of a partnership will wish to limit the diffusion of the proprietary knowledge which has been created. The following questions occur:
- What are the pros and cons of diffusing the knowledge through patents (where it is possible to do so) whilst protecting the application of the knowledge?
- Should the proprietary knowledge be kept as trade secrets and not be the subject of patent protection? If so how serious is the lack of protection against innocent copying and is the scope for licensing severely reduced?
- Does one want to reveal some proprietary knowledge, to ‘trail one’s coat’ in areas where one wants others to follow (setting industry standards), but to retain some key items of proprietary knowledge as secret?
- If partners have jointly produced proprietary knowledge, with or without intellectual property rights, who owns what?

**Innovation**
The achievement of higher levels of insight is the key process in the Learning Cycle. The third dimension - the "Level of Insight" dimension, makes the cycle like a spiral, sometimes continuous, sometimes stepped. Sometimes someone like Max Planck would take a big step out of the Newtonian Mechanics paradigm into the Quantum Mechanics paradigm! Sometimes such shifts may require the combination of the personal knowledge from one paradigm, with the common sense of another, with the textbook knowledge of a third. An example is the multi-disciplinary approach to product development.

In areas of rapid innovation it may be appropriate to avoid partnerships. For example the IT hardware market is moving so fast that arguably one should avoid the risk of partnering with a company which is in danger of losing its lead in technology or price in the near future.

**Auditing the Different Types of Knowledge and the Knowledge Creating Process**
When a company has identified its core competencies it is appropriate to identify not only the constituent parts (surface chemistry, validation expertise etc.) but also the composition of the competence in terms of:

- Tacit Knowledge, Explicit Knowledge, Public Knowledge, Skills and Level of Insight

Not only is it appropriate to analyse each core competence in terms of these categories, it is also necessary to establish the distribution of the knowledge between the partners. The dynamic aspect of the Learning Cycle suggests that a measure of knowledge productivity may be gained from the speed with which the cycle is completed, i.e. from the rate of increase in the 'stock' of the different categories of knowledge, particularly with respect to the growth in the 'stock' of personal knowledge which measures the rate of innovation.

5. **CONCLUSION**
The Intangible Resource Technique is a proven technique with respect to individual companies. It is well suited for application to partnerships because it enables each member of a partnership to codify the tacit knowledge it has of itself in a way which concentrates on its proven strengths.

Boisot's (1995) Learning Cycle model articulates and compliments the technique for analysing intangible resources. The complimentary nature of the two approaches may be illustrated as follows:
- A company's *Positional Capability* will often be represented by its 'stock' of Tacit Knowledge. This 'stock' takes time to accumulate and it cannot be bought.
- A company's *Regulatory Capability* will be closely related to its 'stock' of Explicit, or Proprietary Knowledge if that knowledge is protected by means of patents, copyright or trade secrets.
- A company's *Functional Capability*, its conventional learning capability, is closely related to the issue of diffusability and the creation of Public Knowledge.
- A company's *Cultural Capability* ("The way we do things around here") is closely related to the acquisition of Skills and the creation of new Tacit Knowledge.

In summary therefore the approach which has been described endeavours to identify the sources of partnering companies' strengths, and the potential which they possess for jointly growing new capabilities. Finally the approach concentrates on a means for achieving a greater understanding of the nature of the knowledge base which comprises the core competencies thereby facilitating the management of that knowledge.
REFERENCES


Supply Network Strategies

The case of health supplies

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Abstract

There has been increasing interest in the 1990s in holistic approaches to managing supply networks and chains though little work has been provided yet that informs potential managers of supply networks how they should formulate and implement strategies that support these emerging concepts. This paper proposes a supply network strategy conceptual framework and process, providing examples from the health supplies sector to support the potential application of the ideas. The work is in very early stages but is providing empirical support for the need for differentiated supply network strategies for commodity groups with total supply networks.

Keywords: Supply networks, supply network strategies

1. Introduction

Networks are made up of inter-coupled connections (Cook and Emerson 1978). Mitchell (1969) defined a network as a specific type of relation linking a defined set of persons, objects or events. The set of persons, objects or events of which the network is comprised can be called actors or nodes. The term 'business network' may be used to refer to a set of firms or organisations that are connected through trading, or through research and development relationships. The most developed body of work on operations aspects of inter-organisational networks has been provided by the Industrial Marketing and Purchasing (IMP) group.

To date there has been a relatively small amount of work in the area of supply networks. An holistic approach to supply networks, with the concept embracing the network of operations from original source to ultimate consumer, has emerged during the 1990s (see Womack et al 1990, Christopher 1992 and Harland 1996). Some research on structural aspects of supply networks has also been in evidence in the 1990s (see, for example, Nishiguchi, 1994, and Hines, 1994). However, we still know relatively little about supply networks and less about strategies for their creation and management.

This paper describes initial research into the formulation of supply network strategies. Building on foundations of work provided from the areas of business networks, operations strategy, purchasing and business strategy, it offers initial ideas for conceptualising supply network strategy and its formulation. Empirical research in the health sector, currently at a very early stage, is used to provide examples of the application of the concepts.
2. Formulating Supply Network Strategies

The IMP group has provided the conceptual base and the language for communication about business networks. Their network model (Hakansson 1987) conceptualised the key elements of networks as being actors, resources and activities. Their interaction model (Hakansson, 1982) conceptualised the content and context of the exchange relationship between customer and supplier. However, from a strategic supply chain perspective their work has, to date or by way of frameworks or guidance on how network strategies might be formulated, what they might look like and how they could be implemented. This may be due, in part, to the views expressed by some of the group that grand strategic designs for networks are not feasible and that, rather, actors in networks cope the best they can by acting and reacting in relationships with single specific other actors (Hakansson and Snehota, 1996). This view is in accord with business strategists who support the concept of emergent strategies that "emerge by accident, muddle or inertia" (Whittington, 1993).

However, operations strategists are observing and attempting to understand the actions of companies who appear to be successfully managing their networks (Harland 1996). Quoted examples of firms who have improved their operations performance reportedly through strategic management of the network include Toyota (Womack et al 1990), Benetton (Christopher 1992) and Nissan (Nishiguchi 1994). Business strategists have also shown interest in strategic management of networks, focusing on the value chain for analysis. Jarillo (1993) reported that IBM was active in design and manufacture of some of its components, very active in computer design and assembly and had some control over a complex network of distribution. Conversely, Dell collected components and software designed and manufactured by other businesses, assembled computers then provided distribution and value-services right the way down to the end customer. There are similar case study observations made about management of the value chain in consumer electronics (Ebeling and Doorley 1983), drugs and health care products (Johnston and Lawrence 1988), telecommunications and banking (Pieier 1989) and commodity chemicals and specialty pharmaceuticals (Houlbhan 1989). The theoretical underpinning for these operations and business strategists approach to networks lies with the classical views of strategy promoted by Ansoff (1965, 1991) and Porter (1980, 1985). This paper continues in this normative approach, with underlying assumptions that some form of strategy for a network is desirable and may improve network position.

2.1 Decision Elements of Supply Network Strategies

Manufacturing strategists, notably Hayes and Wheelwright (1984) and Hayes et al (1988) categorised the decision elements of operations strategy as structural and infrastructural. They proposed that these decisions were made in the context of the competitive priorities facing the operation, these priorities being quality, dependability, price (and therefore cost) and flexibility. Structural decisions included those relating to capacity, facilities, production equipment and systems, internal / external sourcing and infrastructure included human resource policies, quality systems, production planning, new product development, organisation and performance measurement. Hill (1989) provided a manufacturing strategy framework and process that structured the relationship between competitive priorities (or order winning criteria as he termed them), structure (process choice) and infrastructure. His strategic process was applied to product families containing products with similar order winning criteria.

These concepts of operations strategy are extended here to the supply network, changing and adding to the decision categories where appropriate as shown in Table 1. Supply network strategy is necessarily a larger concept than operations strategy as it includes aspects relating to more than one network player and the interaction between players. Each focal organisation is in its own unique network; this network comprises a unique set of actors, resources and activities which together constitute its identity (Gaddie and Hakansson 1993). It also takes a position in comparison with other organisations and networks; "the position of a company with respect to others (its relationships) reflects its capacity to provide value to others (productiveness, innovativeness, competence)" (Hakansson and Snehota 1995). Therefore, as an organisation re-positions itself, it changes its identity.

Table 1. Extension of Operations Strategy Elements to Supply Network Strategy

<table>
<thead>
<tr>
<th>Manufacturing Strategy</th>
<th>Supply Network Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive Priority</td>
<td>Of the operation:</td>
</tr>
<tr>
<td></td>
<td>Of the end customer and</td>
</tr>
<tr>
<td></td>
<td>each</td>
</tr>
<tr>
<td></td>
<td>supply network actor</td>
</tr>
<tr>
<td></td>
<td>- Price (cost)</td>
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<tr>
<td></td>
<td>- Dependability</td>
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<td></td>
<td>- Flexibility</td>
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<td></td>
<td>- Quality</td>
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<td></td>
<td>- Range</td>
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<tr>
<td></td>
<td>- Service quality</td>
</tr>
<tr>
<td></td>
<td>- Reliability</td>
</tr>
<tr>
<td>Structure</td>
<td>Capacity - size, volume,</td>
</tr>
<tr>
<td></td>
<td>timing</td>
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<tr>
<td></td>
<td>Supply network actors</td>
</tr>
<tr>
<td></td>
<td>configuration</td>
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<tr>
<td></td>
<td>Production equipment</td>
</tr>
<tr>
<td></td>
<td>configuration e.g. fleet,</td>
</tr>
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<td></td>
<td>buildings, materials,</td>
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<tr>
<td></td>
<td>handling systems</td>
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<td></td>
<td>Do or - boy</td>
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<tr>
<td>Infrastructure</td>
<td>Human resource policies</td>
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<td></td>
<td>Supply network human</td>
</tr>
<tr>
<td></td>
<td>resource policies</td>
</tr>
<tr>
<td></td>
<td>Quality systems</td>
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<td></td>
<td>Supply network quality</td>
</tr>
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<td></td>
<td>systems</td>
</tr>
<tr>
<td></td>
<td>Production planning and</td>
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<td></td>
<td>control</td>
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<tr>
<td></td>
<td>New product development</td>
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<td>New product / service</td>
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<td></td>
<td>development</td>
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<td></td>
<td>Network organisation</td>
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<td></td>
<td>Performance measurement</td>
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<tr>
<td></td>
<td>Performance measurement</td>
</tr>
</tbody>
</table>

2.2 A Supply Network Strategy Process

A process connecting these elements of supply network strategy is shown in Figure 1. The large arrows in this figure signify a sequential process which starts at the top segment containing core competitive supply network priorities. In the formulation of long term strategies or in a green field situation, these core priorities should be decided upon prior to decisions being made about the structure of the supply network, adopting a Chandlerian approach that "structure follows strategy" (Chandler, 1962). Similarly, structural decisions about the supply network should be made prior to committing to infrastructure regarding the management of systems and processes within the supply network structure.
Supply Relationships in the UK Oil & Gas Industry

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Abstract
Changes in contracting and purchasing customs in the UK offshore oil and gas industry have led to changed relationships between companies, including the small, technically-based, oil-related companies (STOBs) which have been a source of much innovation. Issues raised by the research reported here include the impact on these changes on the industrial network and supply relationships of the industry. Continuing innovation from suppliers and sub-contractors is regarded by all industry members as of great importance for reducing costs and uncertainties in the North Sea oil and gas industry network. Changes in contracting customs within the industry have broken many of the linkages between firms which mediated this innovation in the past (Green, 1994; Bower & Young, 1995; Bower & Keogh, 1995). This paper presents the initial findings of a project to analyse the new pattern of relationships which is developing, and the impact on innovation of the changes. The early conclusions are, in accordance with predictions from theory, that personal relationships assume relatively greater importance when industry norms are poorly established, and that multiple relationships between firms under these circumstances are characterised by little trust and incomplete integration of network knowledge.

Key words: supply networks; innovation; oil industry; conflict; relationships.

1. Introduction
1.1 Knowledge networks
As Howells notes (1995) innovation within an industry depends on there being an appropriate pattern of social distribution of the total body of knowledge required for that innovation process, i.e. the necessary skills will be present in the contributing organisations. If a function is transferred from one organisation to another without the necessary body of tacit and formal knowledge to fulfil the function, the innovation process to which it contributes will be likely to fail.

In addition to the requirement that the knowledge be distributed within the industrial network, there is a further requirement that the pattern of communication within the industry be such that this knowledge can be functionally integrated in the process of specific innovation projects. There is an extensive literature pertaining to the conditions under which organisations can access network knowledge in the pursuit of specific projects. In many of the cases studied, the necessary knowledge flows are mediated by long term relationships between technology suppliers and their clients (see, e.g. Håkansson, 1987; Gemünden & Heydebrec, 1995; Bower & Whittaker, 1993). Their long-term nature is of central importance, since another feature of these relationships is "trust" (see, e.g. Luhrmann, 1979; Barber, 1983; Zucker, 1986; Powell, 1990). According to Luhrmann (1979), trust can be of two kinds - personal trust and institutional trust (i.e. inter-firm trust). In long-standing relationships between firms with stable work forces, both types of trust can develop.

Many studies have demonstrated that institutional trust is generated by adherence to the social norms of the industry/business environment (Macneil, 1963). As Maxell (1987) has reported, these norms are set up over time in the course of many exchange relations. Following the above analyses, where the norms of the industry are unclear, or in a process of rapid evolution, and inter-firm relationships are only recently formed, institutional trust is unlikely to be great. Berger et al (1991) have predicted that under these conditions, personal relationships will become relatively important.

Where groups of firms within a network are engaged in multiple relationships with each other which involve collaboration and exchanges of knowledge, it has been noted that opportunistic behaviour by one will be more visible and lead to greater loss of reputation (and inter-firm trust) than where a single, dyadic relationship is concerned (Grant and Baden-Fuller, 1995). According to the reasoning of the previous paragraph, where these inter-firm relationships are relatively new and industry norms are unclear, it is probable that individual firms within multiple relationships will fear that their partners will be more likely to behave opportunistically, due to lack of trust and uncertainty about norms.

1.2 Supply chains and networks
The use of terms such as Supply Networks and Supply Chains may lead to confusion and, from the experience of the authors, the terms are often used synonymously. The effects of this confusion may, in most instances, be irrelevant. However, in the case of STOBs, it is extremely important that they realise "where they fit" in relation to the Supply Networks in which they operate and the Supply Chains of which they form an integral part. This section seeks to explain what the terms mean and how they relate to STOBs.

Supply Networks can be viewed as operating on a number of levels. Describing networks on three tiers (Slack, 1991) gives the viewer an insight into the complex interactions, dependencies and relationships which exist. For example, in the case of a small manufacturing company, standing back from day to day operations and mapping the internal processes within the organisation gives the viewer/manager an insight into the overall operation of the organisation. This insight into the operation of the organisation is the view of the internal supply network. Information which the viewer could accumulate from this level would include say, production flow, materials flow, the communication of information between sections/departments. Internally, of course, individuals and departments are customers as well as suppliers within this network (Schoonberger, 1990).

The next level of the supply network is where the organisation relates to its own customers and suppliers. To many organisations this is the most important area as these interactions and dependencies can determine how well the organisation will flourish or shrink in their market niche. This is known as the immediate supply network and it is vital for many organisations that the links already in existence are nurtured and managed as effectively as possible.

At the top level the total supply network allows the organisation to be placed in relational context to other organisations. Figure 2, which illustrates some elements of the upstream oil and gas industry, can be viewed in such a way. For the purposes of this paper (and our research), the authors are concentrating on "Oil Extraction". The total supply network in this area is extremely complex. However, viewing this as the total supply network allows for the identification of the key players, allows the
organisation to see where they relate to other organisations, and possibly even presents them with alternatives for expansion.

Supply networks can be split into "Supply Chains". Many operations which occur in organisations can be viewed as requiring linear and sequential activities which are carried out by groups, teams or departments. Thus they would have a limited number of objectives to meet and the output from their part of the process becomes an input to the next stage in the process. Examples of supply chain management have been reported by Schonberger (1982, 1990), Jones (1995) and Laming (1993).

1.3 The paper
The study described here examines the patterns of several such multiple relationships in the North Sea oil and gas-related industry today, in order to clarify the factors affecting these relationships. This industry is undergoing a major change in contracting relationships from highly adversarial, arms-length subcontracting to close, "win/win" partnership relationships. The starting proposition is that in this situation, as Berger et al (1991) predicted, personal trust will become relatively important in mediating exchange relationships.

2. Background
2.1 The industry
The UK offshore oil and gas industry continues to maintain a key role in the UK economy, with sales of oil and gas produced in 1994 estimated at £9.5 billion and the sector contributing almost £12 billion to the nation's GDP. Since the late 1970s, the industry has been responsible for some 20-25% of total industrial investment in the UK. In 1996 it is predicted that the level of oil and gas production by volume will exceed that of any previous year. An estimated 300,000 people are directly employed in oil and gas related activities in the UK, of which 27,300 work offshore (DTI, 1995). These figures are not expected to fall substantially until 2010 (DTI, 1995).

As in the recent past, these figures are not expected to fall substantially until 2010 (DTI, 1995).

While the industry can now be described as mature, it is not yet in decline, with each new forecast showing increased oil and gas prospects. While early estimates of the productive life of the North Sea oil province were brief, forecasts continually push the productive life of the province out, possibly for another 60 years. However, this will be dependent on continuing innovation to push down costs and to extract reserves which are inaccessible with currently available technology. While there has been a very high rate of innovation in the North Sea in the past, necessitated by its location as the first, major subsea oil province, there is no certainty that this will be maintained at the required rate.

In terms of the overall activities most of the major oil companies such as BP, Shell and Exxon, the extraction of hydrocarbons is only one facet, as shown in Figure 1. Extraction is at the "upstream" end of the industry. Refining, distribution and retailing at the "downstream" end.

![Figure 1 - Oil company primary activities](image)

Adapted from Slack et al., 1995, p. 538

It is the extraction sector which is the focus of the current study. Within this one area there exists a diverse and complex supply requirement, representing a wide range of organisational cultures and expertise. This is illustrated in Figure 2 which, while not exhaustive, identifies many of the supply requirements of the oil companies within their upstream operations. In the extensively subcontracted North Sea environment, companies from these varied backgrounds must work very closely on projects. This poses considerable management challenges.

2.2 Innovation in the North Sea
The sources of innovation in the North Sea have not been systematically studied. The trade Press awes constantly to innovation at all levels of the industrial network. The precise role of the many firms in this highly-subcontracted industry is not yet clear, but there is now evidence that an indigenous cluster of innovative small, technology-based firms (STBOS) has grown up around the exploitation of the North Sea reservoirs (Krahn, 1994; Bower & Young, 1995; Liddle, 1994). These companies provide a wide range of products and services for drilling and extraction operations. Bower & Young (1995) found that more than half of the sector were (a) founded since the discovery of oil, (b) UK-based, (c) had less than 200 employees. Technology developed in-house was perceived as the most important factor for their success by 62%. This is confirmed by another study by Liddle (1994).
contractors take responsibility for dealing with most aspects of field operations including drilling, construction and production, including maintenance, logistics, and general oil-field support.

Suppliers
Suppliers fall into two categories: those which supply basic items such as nuts, bolts, delivery services etc. and those which supply highly specialised products and services. The latter category must invest in high levels of innovation to meet the needs of this fast-changing, high-technology industry. Some are large firms and others belong to the group of STBORs. These suppliers deal directly with Contractors and, in some cases, directly with Operators.

Changes have been occurring in contracting practices, particularly between Operators and Contractors. Reasons for this include the need to cut costs throughout the industry and the declining size of viable fields in the North Sea. Many of the potential fields are marginal in terms of cost-effectiveness, particularly while oil prices remain relatively low. This led in the early 1990s to the publication of the CRINE report (UKOOA, 1993).

2.4 Cost Reduction Initiative for the New Era: CRINE
A working group with representatives drawn from all sectors of the industry recognised that in a low oil price and high cost operating environment, it would be uneconomic to extract much more oil from the North Sea. They proposed the CRINE initiative (Cost reduction initiative for the new era) in June 1992. The CRINE Report (UKOOA, 1993) presents the detailed recommendations of the steering group which was subsequently set up, with the blessing of the DTI (Report of the Working Group on UKCS Competitiveness, DTI, Feb., 1993) and the UK Offshore Operators Association (UKOOA).

The Report noted that in the North Sea development costs could be 4-6 times greater than in, for example, the Gulf of Mexico and the Pacific Rim. This was blamed on a number of factors, including the use of non-standard materials, equipment and procedures, uncontrolled documentation and certification costs, unbalanced financial risk exposure, poor communication and adversarial contracting systems. "Manning the mistrust" was identified as one of the largest cost drivers.

The Report strongly advocated the encouragement of risk/reward relationships, and the removal of adversarial clauses in contracts which led to distrust. Teamwork in the pursuit of common objectives was commended. The continuing need for technical innovation was mentioned, but with the stated assumption that the goal-setting nature of performance-related specifications would stimulate innovation.

Savings of 30% and more on capital expenditure have now been attributed to CRINE, with particular credit given to the role of partnership and teamwork (Watson, 1995). Just how much of the savings are due to these factors, however, and how much to the growth of acute cost-awareness and the introduction of new technologies, is hard to establish.

2.5 Changes in Contractual Arrangements
The response to the CRINE report and current pan-industrial trends towards downsizing have resulted in a shift of functions from Operator to Contractor. This has created new relationships with increased responsibilities for the Contractor. Contractors have had to either grow by acquiring these new capabilities, or to subcontract functions in which they have never had expertise. This is complicated by
the fact that the new arrangements do not necessarily give the Contractor full freedom to select suppliers (Beecham, 1995) since some (though not all) of the Operators still insist on the use of their own, established preferred suppliers. Where this is the case, Contractors are obliged to negotiate with these suppliers, sometimes STBORs, to join them in an Alliance to tender for the Operator's contracts.

While previously the relationships between STBORs, Contractors and Operators had taken the form of an "extended enterprise network" in Fair's (1995) phrase, with multiple linkages between all levels of the industry, the North Sea oil industry is now moving towards a linear supply chain, a "lean supply" model which in theory should lead to less duplication in effort between all parties and sourcing decisions which cut across the pre-approved suppliers lists (Green, 1994; Bower & Keogh, 1995). In this model, STBORs can only communicate with Contractors and no longer with Operators. However, STBORs and Contractors have not, generally, had relationships in the past. Thus Contractors are in the position of either forging a new relationship with an STBOR, or using/acquiring an in-house capability, with variable degrees of choice as to which route must be followed.

3. Methodology
A bipartite research design has been followed. Phase I involved consulting secondary sources and carrying out a round of minimally-structured interviews with 35 industry experts selected from all levels of the industry, as well as from public sector agencies dealing with the industry. The objective of this phase was to determine the main trends and the main players at all levels of the industry.

Phase II (current) involves semi-structured interviews with senior executives selected from each of the three levels of the industry, accompanied by in-depth questioning. Interviews have been held with the Operators and Contractors, with involvement in the procurement and purchasing process, whilst within the smaller companies interviews have been conducted with key management.

Extensive use has been made of secondary data sources, which include company reports and publications, industry and professional journals and conference proceedings, for the purposes of triangulation.

4. Results

4.1 Supply chains and networks
The research has found that companies use two mechanisms for partner and supply: a "traditional" supply chain for routine items, feeding into a more complex supply network of technology-based, specialized services and products. This is indicated in a number of ways: (1) Many firms actually have two different forms for pre-qualifications for supply, reflecting these categories. Interview data confirms that firms often implement different supplier-appraisal techniques for selecting suppliers from each of the two categories. (2) Customers' priorities differ, depending on whether they are sourcing routine or technology-critical items. (3) More complex, closer inter-linkage relationships exist where technology-critical items are involved. These are confirmed by both primary and secondary data sources.

Within the total industrial network, the supply chains tend to be short, existing for the traditionally complex supply chain of the original industry and generally restricted to material and pre-process supply. The industrial network into which these supply chains feed, by contrast, is a complex web which brings together extremely diverse players.

4.2 Supply chains
Even among the relatively uncomplicated, linear supply chains feeding into the industry, the research has uncovered evidence of change. Materials, such as steel, have traditionally passed from raw material supplier to stockist to manufacturer of oil-field equipment, as shown in Figure 3.

![Figure 3. Traditional Supply Chain](image)

Increasingly, however, the manufacturers' need to cut inventory while remaining responsive to customers is leading to much closer relationships between the manufacturers and their suppliers. In some cases, the entire responsibility for materials management has actually been handed down, by the manufacturer, to their suppliers. In these cases, a JIT approach is being established, with the stockist delivering daily and only emergency stocks being retained by the manufacturers. Similarly, some pre-processing is also typically undertaken by the stockist, with the manufacturer maintaining minimal facilities for completing this work as a contingency. At this point the relationship between stockist and manufacturer changes to one of close interdependence.

![Figure 4. Interlocking Supply Links](image)

4.3 Supply networks
The specialist supply network operating in the offshore oil & gas industry includes a diversity of players. While many supply products, a large number provide both products and services. Typically, the latter involves the supply of expert personnel to perform technical services, implementing specialist equipment and/or chemicals.

Traditionally, the Operators contracted in these services directly, via competitive tendering (see Figure 5).
In the specialist supply network, the Operators, Contractors and STBORs interact in several ways, with the same companies often involved in several different relationships within different North Sea projects. These include, with variations:

1. **Participants within a collaborative arrangement**
   - The relationship between the two firms is collaborative, within what are variously being termed alliances, partnerships and management groups. In this way, integrated services are provided by several companies working closely together, with the aim of minimising costs and accidents while maximising effectiveness, time management and opportunities for innovation. The philosophy is one of co-operation and openness between the organisations involved.

2. **Direct competitors**
   - Traditional, adversarial relationships in which companies are in direct competition through standard tendering arrangements.

3. **Supplier - customer relationship**
   - In which company A is supplying products and/or services to company B, whether as a direct supplier or as a subcontractor.

4. **Customer - supplier relationship**
   - In which company B is supplying products and/or services to company A, whether as a direct supplier or as a subcontractor.

In some instances, STBORs are directly involved in alliances or partnerships, particularly where they offer niche capabilities. More commonly, however, they are sub-contracted by alliance members. Some of these smaller companies, again with niche markets, still maintain their direct relationships with the Operators.

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**Figure 5. Traditional oil-field supply relationships**

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**Figure 6. Evolving oil-field supply relationships**

There has always been some complexity within industry relationships but the current situation, which has arisen as Operators and Contractors experiment with unfamiliar roles, is widely reported at all levels in the network to cause confusion and conflict. Managers involved in multiple relationships report that they are still devising their own codes of practice, and observing others in order to understand what will be acceptable.

What makes the network particularly complex is the diversity of practice. There is no common strategy at any level in the industry. The Operators do not all behave uniformly, neither do the Contractors nor the smaller companies. Further, there are no set patterns among alliancing and partnering relationships. The working arrangements are reported to differ widely, depending on both the membership and the customer, with some reportedly more successful than others. In some cases, the alliance is a loosely-based collaboration of suppliers, while in others participants are tightly linked for an extended period of time (typically 5-year contracts).

In some cases, the alliance group is led by one Contractor (variously referred to as Lead, Prime or Super Contractor), who then sub-contracts the various requirements among other Contractors. In other arrangements, a more equal partnership exists.

Consequently, all of the suppliers (Contractor or STBOR) in the industrial network who have been interviewed reported that they were obliged to conduct business through a number of different approaches, on a number of different bases. More significantly, the new arrangements have resulted in these companies facing both internal and external conflicts of interest.

Phase I research suggested that personal relationships are extremely important in the oil and gas industry. This issue was, therefore, further explored during Phase II. Phase II data confirms that personal relationships can be very powerful, with many interviewees using the term 'incestuous' when describing the industry. In many instances, we have been told, the decision to award work to a particular company may have as much to do with the presence of key individuals who are known, respected and trusted than with the overall reputation of the organisation concerned.
4.4 Conflict

External conflict is reported to arise at each company as each company strives to maintain a range of complex and conflicting relationships with those companies that traditionally represented direct competition, and which are still competitors in other business relationships. Depending on the customers concerned, they may be partners in one relationship, customers in second, suppliers in a third and direct competitors in a fourth. Two managers based in different companies may find themselves personally wearing these different hats on different days of the same week. Several interviewees have stated this to be a common occurrence, with the following quote being typical:

"Yes, absolutely, that is exactly what is happening out there...in one alliance you are partners, in the next one you are competitors, or maybe in another one as a third party supplying services."

![Figure 7 - Sources of external conflict](image)

Figure 7 - Sources of external conflict

It may well be that the close geographical proximity of these companies, most of which are located within Aberdeen, intensifies these conflicts. As a result, it is frequently the same individuals who interact within the various relationships, raising issues of personal as well as corporate integrity.

Internally, many of the larger contractors have formed "integrated services divisions" aimed to provide the total solutions required by their customers. However, two managers based in different companies may find themselves personally wearing these different hats on different days of the same week. Several interviewees have stated this to be a common occurrence, with the following quote being typical:

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Figure 7 - Sources of external conflict

It may well be that the close geographical proximity of these companies, most of which are located within Aberdeen, intensifies these conflicts. As a result, it is frequently the same individuals who interact within the various relationships, raising issues of personal as well as corporate integrity.

Internally, many of the larger contractors have formed "integrated services divisions" aimed to provide the total solutions required by their customers. However, two managers based in different companies may find themselves personally wearing these different hats on different days of the same week. Several interviewees have stated this to be a common occurrence, with the following quote being typical:

"Yes, absolutely, that is exactly what is happening out there...in one alliance you are partners, in the next one you are competitors, or maybe in another one as a third party supplying services."

![Figure 7 - Sources of external conflict](image)
The implication for the management of collaborative innovation which is of key importance for the industry are a concern. The authors are continuing to collect and analyse industry data before undertaking any further conceptualisation of the situation. A key difference between the moves from rapid innovation to standardisation in industries which have been studied, and the case of the North Sea oil industry, is that the decision to make these changes and the plans have been arrived at by a conscious process of denning on theoretical models derived from the original studies to describe and diagnose problems of other industries. This is quite different from the changes in the earlier cases from which the models were derived. These models were not informed by pre-existing consultants' models of how to manage a supply chain, but built on empirical data from the industry studied. The danger is that if the wrong model is being applied in the North Sea, through a misunderstanding of the upstream petrochemical industry and inappropriate comparisons, then the solutions imposed might have results quite different from those desired.

The study is revealing a number of difficulties facing STBORs when interacting with much larger organisations within the industrial network, which will be explored further as the study progresses.

Acknowledgements
This study is supported by the EPSRC, Project Code: GR/K72230. The research team would also thank all those, throughout the industry, who have contributed their time and knowledge to the project.

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Green, R. (1994) | Collaborative relationships between producers and contractors in the UK oil and gas production industry, | British Academy of Management Annual Conference proceedings, 297-299, September, Lancaster.
Core Competitive Supply Network Priorities

Supply Network Infrastructure → Supply Network Structure

Figure 1. Supply Network Strategy Formulation Sequence

2.3 Supply Network Strategy Hierarchy

Chandlerian business strategists take the strategy/structure approach further to divide organisations into divisions, each with their own business strategy that fits with some overall corporate strategy. This hierarchical approach to strategy is evident in Hill's manufacturing strategy framework which has strategies formed at the level of the product family, supporting a marketing strategy and an overall business strategy. The hierarchical approach can be extended to supply network strategies as shown in Figure 2. Here a focal organisation supply network strategy is an over-arching strategy within which product/service family supply network strategies are formulated.

2.4 Supply Network Strategy Implementation

There is then the set of issues relating to the management and implementation of strategy. There are those that prefer quantum leap revolutions with periods of stability in between (e.g. Miller, 1982) and others who favour incremental creeping towards strategic goals (Petigrew, 1985). Hayes and Wheelwright's (1984) four stage model of strategic change has been used here. It contains some incrementalism within it, in that operations must progress through a series of stages en route to world class status, rather than aiming to achieve stage four in one leap. However, in practice the progression between stages may represent substantial leaps ahead; it can therefore encompass both incremental and radical change approaches to strategy. Figure 3 takes the four stage model and applies it to network strategies. The changing shape of the stages is symbolic of the reducing clarity of the more distant stages at any time. This is to convey a sense of less rigid views of strategic states further into the future as conditions and priorities change. However, the cloud-like vision of stage 4 is a heavenly state to aim for of being the best supply network in the world at x, whatever x might be. Each of the stages are outlined here.

Figure 2. Hierarchy of Supply Network Strategies

- **Stage One**
  At stage one, the supply network is in internal crisis. Typically here the actors in the network are only loosely connected with friction occurring between them. There are difficulties in performing the basic operations of the network; these might manifest themselves in disagreements between network parties about what is being ordered and what is being delivered. There is little or no evidence of collaboration in the network. Purchasing is more adversarial than supportive.

- **Stage Two**
  At this stage players in the supply network are resolving issues of conflict but do not have any sense of shared destiny. Nor does the supply network have visibility and understanding about end customers and their requirements. The players in the network are not fighting each other but there is conflict with end customers who are not yet satisfied.

- **Stage Three**
  At this stage the supply network players have identified end customer requirements, have formulated and implemented a strategy on how to work together to best satisfy those requirements and are well en route to end customer satisfaction. As the network reacts to end customers, the product and service offerings are differentiated to fit customer segments' desires.

- **Stage Four**
  At stage four it is the supply network that provides the sustained competitive advantage in the end customer market by being substantially ahead of competing networks and, possibly, of end customers. Stage four supply networks innovatively create offerings for end customers which delight them. Through long term research and development in products and processes, a stage four network works together to continually provide high quality, value for money products and services that do not make trade-offs in competitive criteria.
The wheels connecting each of the stages are the supply network competitive priorities, structures and infrastructures required to move the network from one state to the next.

Figure 3. Adaptation of the Hayes and Wheelwright 4 Stage Model to Supply Network Strategy Formulation.

These initial ideas on supply network strategy formulation are applied here theoretically to examples of networks from the health care sector.

3. The Case of Health Care

Throughout the world there is a large variety of strategies and structures for health care supply networks. The way that health care is provided through state owned and private hospitals, clinics, general practitioners, care in the community and other providers is changing dramatically in some territories in response to changing demands and to legislation. These changes include:

- **New opportunities for treatment** arising from technological advance and other medical research.
- **Demographic changes** including, notably, a trend towards an ageing population.
- **Changing patient expectations** arising partly from Government pledges and increased media attention to technological development in health care.
- **Changing patterns of disease** including resurgence of known diseases, notably tuberculosis, and the emergence of previously unidentified diseases, such as HIV.

In the UK these changes have resulted in the following, amongst others:

- **A split between the purchase and provision of health care and associated funding changes**. Many general practitioners practices have chosen to become "fundholders" being responsible for a budget to manage the initial diagnosis of patients, the provision of primary care and the purchase of care from hospitals and specialist units. Many hospitals have chosen to become trusts, managing their own budgets to provide health care competitively to health care purchasers.

The implications of the purchaser/provider split on the way that health care is purchased and provided have been the subject of recent research interest. However, there has been little evidence to date of academic research that has considered issues and implications for the upstream network of suppliers to health care providers or the total supply network in this sector. Symptomatic of this is a recent health select committee report (1995) to the House of Commons on Purchasing in the NHS which failed to discuss supplies to the health care sector. In this report Purchasing was used to refer to the purchase of health care i.e. the downstream part of the health care supply network only.

3.1 Health Care Supplies

Total spend in the health sector in developed countries is a substantial and growing amount. In the UK the National Health Service spends about £20 billion per year (Health Select Committee, 1995), of which over £4 billion is on non-pay supplies (NHS Supplies, 1995). In addition to drugs and medical related supplies there are many other categories of spend involved in running hospitals, clinics and community health services. The pie chart in Figure 4 shows the relative proportion of total spend on each category. There is a wide variety of supplies purchased for health care which involve many different relationships of different types being formed in complex networks of supply from original source to end customer.

3.2 NHS Supplies' Supply Network

NHS Supplies was established in 1991 to supply the National Health Service. Prior to 1991 supplies to the health service were relatively unco-ordinated with regional, district and site teams and individuals involved in purchasing, moving and storing supplies. NHS Supplies' network at a strategic level can be represented as in Figure 5. The organisation places contracts with about 25,000 suppliers for all the items represented in the pie chart in Figure 4. These goods and services are either delivered to NHS Supplies warehouses or direct to customers in Trust hospitals, health authorities and directly managed units; these customers have been segmented as shown in Figure 5.
The strategy of NHS Supplies is to provide a cost-effective and reliable supplies service to the NHS, as well as a business strategy this also represents its total supply network strategy. NHS Supplies inherited a structure including 77 warehouses which have been reduced so far to 23. The 50,000 suppliers that were dealt with are being reduced as part of supplier base rationalisation.

The infrastructure within the total supply network includes materials management services into hospitals. NHS Supplies controls stock at the point of use at customer sites, for example on a ward. Using bar coding and computerised ordering systems, NHS Supplies personnel ensure that inventories are maintained at appropriate levels. EDI is replacing paper requisitioning between hospitals and NHS Supplies.

These are some features of the competitive priorities of the supply network as a whole, its structure and its infrastructure. However, it is not possible to manage such a diverse network without supply network strategies at the levels of commodity groups. The following example commodities demonstrate the realities of the many diverse supply networks that lie beneath the total organisation supply network.

### 3.3 Energy Supply Networks

The NHS spends about £350 million pounds a year on energy and utilities, representing about 8% of total non-pay revenue spend on supplies. An example of one of the energy supply networks is provided in Figure 6. 129 very large hospitals have have dual capability to be powered by gas or oil. For these sites interruptable gas contracts are negotiated; this enables the site to switch between gas and oil as changes in world energy prices cause the favoured energy source to change. It can be seen in this network that NHS Supplies does not take possession of the gas or oil. Neither does it "sell" energy it to the NHS. In this network NHS Supplies is providing a professional service in negotiating and arranging contracts in line with legislation.

![Figure 6. Example Energy Supply Network](image)

In this supply network the strategy is governed by competitive priorities relating to the service that is being provided. Here the features of the supply network strategy are as shown in Table 2. In addition some key concepts relevant to the commodity area strategy are offered.
Table 2. Key Elements of Energy Supply Network Strategy

<table>
<thead>
<tr>
<th>Commodity Area</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Customer</td>
<td>Energy specialist in Trust</td>
</tr>
<tr>
<td>Competitive Priorities</td>
<td>Service quality - credibility, competence, Price</td>
</tr>
<tr>
<td>Supply Network Structure</td>
<td>Small, loosely bonded network of energy suppliers, NHS Supplies Energy team and Trust specialists</td>
</tr>
<tr>
<td>Supply Network Infrastructure</td>
<td>Potential for development of information system to provide more advice to Trusts on energy management</td>
</tr>
<tr>
<td>Key Concepts</td>
<td>Service quality</td>
</tr>
</tbody>
</table>

In this supply network, NHS Supplies is competing with other energy procurement agencies who offer similar services.

3.4 Vehicle Supply Networks
The NHS spends about £93 million per year on vehicle purchase, contract hire and leasing. Ambulances are a special case of vehicle which are, surprisingly, not standardised across different Trusts, as shown in the supply network in Figure 7. NHS Supplies contracts with chassis manufacturers for standard chassis but each Trust then has its own specification for the design and fit of ambulances. Bespoke contracts with approved body builders are arranged; the lead time on these is usually about 6 months until the ambulance can be delivered direct to the required site.

Figure 7. Example Vehicle Supply Network

<table>
<thead>
<tr>
<th>Commodity Area</th>
<th>Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Customer</td>
<td>Vehicle fleet specialist or estates manager in Trust</td>
</tr>
<tr>
<td>Competitive Priorities</td>
<td>Price, Product quality, Range</td>
</tr>
<tr>
<td>Supply Network Structure</td>
<td>Small number of chassis and bespoke suppliers, commodity advisory group of NHS Supplies vehicles team and Trust specialists</td>
</tr>
<tr>
<td>Supply Network Infrastructure</td>
<td>Regular schedules of chassis, Bespoke specifications and orders for body builders, Potential for improvement programmes across Trusts including variety reduction</td>
</tr>
<tr>
<td>Key Concepts</td>
<td>Lean supply of chassis, Project management of body building, Environmentally sound supply chains</td>
</tr>
</tbody>
</table>

3.5 Wheelchair Supply Networks
There are particular issues of the supply network relating to wheelchairs that are in common with other commodity areas such as hearing aids. These items are either returned by or collected from patients no longer requiring them and recycled back in the supply network. In the wheelchair network there are also substantial innovations from manufacturers producing a wide range of lightweight, foldaway, powered and non-powered wheelchairs to better suit individual patient requirements.

Figure 8. Wheelchair Supply Network
3.6 Continence Products Supply Networks

As populations increasingly age, until a medical cure for incontinence is found there will be an increasing demand for continence products. These are very bulky, relatively low value items on an individual basis but represent a substantial amount of spend in the health sector. Some of the most interesting innovations in this supply network relate to the direct of supply of continence products to patients in their own homes. This enables patients to receive products conveniently without embarrassment. In the UK, if patients form a contract with the manufacturers direct then the products can be sold exempt of Value Added Tax. An example supply network for continence products is shown in Figure 9.

Table 3. Key Elements of Wheelchair Supply Network Strategy

<table>
<thead>
<tr>
<th>Commodity Area</th>
<th>Wheelchairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Customer</td>
<td>Buy group comprising disablement services specialists in Trusts and patients</td>
</tr>
<tr>
<td>Competitive Priorities</td>
<td>Range innovation</td>
</tr>
<tr>
<td></td>
<td>Product quality</td>
</tr>
<tr>
<td>Supply Network Structure</td>
<td>Number of wheelchair manufacturers and repairers, commodity advisory group of NHS Supplies patient aids and rehabilitation team, disablement service centres and wheelchair service centres</td>
</tr>
<tr>
<td>Supply Network Infrastructure</td>
<td>New product / service development potentially could be more collaborative in the supply network, Reverse flow supply chain management, Environmentally sound supply chains.</td>
</tr>
<tr>
<td>Key Concepts</td>
<td>Network learning, Reverse flow supply chain management, Environmentally sound supply chains.</td>
</tr>
</tbody>
</table>

Figure 9. Example Continence Products Supply Network

Table 4. Key Elements of Continence Products Supply Network Strategy

<table>
<thead>
<tr>
<th>Commodity Area</th>
<th>Continence products</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Customer</td>
<td>Patients, trusts, nursing homes</td>
</tr>
<tr>
<td>Competitive Priorities</td>
<td>Price, Delivery reliability</td>
</tr>
<tr>
<td></td>
<td>Service - responsiveness, access</td>
</tr>
<tr>
<td>Supply Network Structure</td>
<td>Small number of major suppliers and tail of other suppliers, NHS Supplies warehousing and distribution, Trusts, patients</td>
</tr>
<tr>
<td>Supply Network Infrastructure</td>
<td>Operations planning and control and associated information systems is area for most development</td>
</tr>
<tr>
<td>Key Concepts</td>
<td>Logistics, JIT, lean supply</td>
</tr>
</tbody>
</table>

4. Conclusion

An initial conceptual framework for formulation and implementation of supply network strategies has been provided here, but it is very early stages and has not been tested adequately empirically yet. The application of the concept to the health sector potentially provides a rich empirical base because of the variety of commodity areas and different types of supply networks in evidence.

This work will be developed over the next year to formulate and implement commodity supply network strategies within this sector, underneath an overarching total supply network strategy. The work should provide more information about types of supply networks, critical characteristics and should lead to the creation of a framework characterising these different types.

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Information Technology and the Efficiency of Materials Supply

The implementation of EDI in the construction industry

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Abstract

Electronic Data Interchange (EDI) and other forms of “electronic commerce” and information technology have attracted a lot of interest as a means to make the materials supply more efficient. The possibilities to save costs and increase the competitiveness by applying EDI have been recognized, among others, by the large Swedish construction companies and many of their suppliers. However, despite the outspoken interest in EDI and several years of industry-wide development work, the practical usage of EDI communication is still very limited in the construction sector. The rate of diffusion is perceived by the leading construction companies as too slow. The purpose of the present paper is two-fold. One is to describe and analyze the potential advantages of EDI, with special emphasis on the construction sector. The second one is to identify and analyze implementation problems and barriers which contribute to slow down the EDI diffusion and the development of existing EDI applications.

1. Introduction

In the construction industry, purchased goods and services account for, on average, 70% of the total production costs. The building and installation materials alone account for approximately 55% according to studies carried out in Sweden (Asplund and Danielsson, 1991). Besides the high direct costs for input goods, the indirect costs associated with the materials supply are considerable. In fact, more than half of the total costs incurred to get the purchased goods in the right place at the construction site consists of indirect costs for transportation and materials handling (including those activities carried out by the supplier). Against this background, it goes without saying that purchasing and materials supply is a key function in the construction company, and that the efficiency and effectiveness of that function has a crucial impact on the company’s overall performance and profitability.

The leading construction firms in Sweden have for a long time been aware of the importance of having an efficient purchasing function, and they have for example tried in various ways to utilize scale advantages in procurement, monitor the market development for input goods, and follow price changes. However, it is more recently that the great cost saving potential in the field of logistics and materials management has attracted more serious attention. The purpose is to reduce the high indirect costs caused by the acquisition of goods and services. Buyer-specific product range catalogues, regular delivery services by truck and new types of packaging and materials handling systems are some examples of materials management improvements which have been introduced by Swedish construction firms.
The administrative information flow between buyers and sellers is one area with great cost-saving potential. Few industries have larger communication needs than the construction industry. As an illustration it can be mentioned that Skanska, the largest Swedish construction company, has about 4 000 working sites and 30 000 suppliers only in Sweden. The modern information technology (IT) offers a number of possibilities to rationalize this information flow and by so doing making the materials supply more effective. “Electronic commerce” has attracted a lot of interest in this context. Electronic commerce is a broad term used to denote a variety of techniques for transmission of commercial documents. Electronic Data Interchange, EDI, which this paper is concerned with, is one such technique. Other means of transmitting information electronically include facsimile, electronic mail (e.g., via Internet), Electronic Data Access (also called on-line databases) and Computer-aided Acquisitions and Logistic Support.

Typically, EDI is used for transmitting messages between organizations which have recurrent exchange of structured information. Common applications are placing of purchase orders, transmission of delivery plans between an assembly plant and a subcontractor, a payment order between a company and a bank, and a customs declaration.

According to the literature as well as the advocates of EDI, there are many advantages of EDI. As will be discussed in more detail below, EDI is first of all seen as an administrative tool to make the information handling more efficient. But it is also argued that EDI can be used to save costs related to the physical flow of goods and to the production activities.

The possibilities to save costs and increase the competitiveness by applying EDI have been recognized by leading construction companies and suppliers to that industry. Since the late 1980s, a sector-wide development work has been carried out in Sweden. The purpose is to make it possible for the actors in the construction sector to trade electronically by using materials management messages which are based on the international EDIFACT standard.

Despite the outspoken interest in EDI and the wide-spread participation of various actors in the joint development activities, the usage of EDI in practical applications in the construction sector is still very limited. There seem to be a number of barriers and problems which in various ways slow down the rate at which EDI applications are spread throughout the construction sector. As will be explained later on, some of these barriers are of a technical nature, while others are related to organizational factors.

The purpose of this paper is two-fold. One is to describe and analyze the possibilities to save costs and increase the competitiveness by applying EDI. The other is to identify the above-mentioned barriers and discuss their impact on the implementation process. The analysis is based on the literature and empirical data collected through interviews with a number of representatives of Swedish construction companies and other “industry specialists”.

2. What is EDI?

Many different definitions of EDI are found in the literature. For example, the United Nations uses the following one: “EDI is the direct transfer of structured business data between computers by electronic means, i.e. the paperless transfer of business documentation” (UN/EDID UN/CEDIC Issue 5.5.9A). Central in most definitions is that two computer applications exchange messages without manual interference, i.e., one application creates the message and the other receives and interprets it. The following criteria are often used as requirements (Fredhom, 1995, pp. 8-9):

- **direct communication** between information systems, internally or externally, via public or local networks; there should be no human interference,
- **standardized format**, such as EDIFACT,
- **structured information**, re-usable information, i.e., it can be fed directly into the information system of the receiver without rekeying,
- **independent** of which kind of hardware or software that is used.

These criteria distinguish EDI from other forms of electronic commerce such as electronic mail, which is exchange of unstructured messages between two individuals, and Electronic Data Access (EDA), which is exchange of electronic messages between an individual and an application. An example of the latter is when a company uses a terminal which is connected with a supplier’s system to send orders or payments. Compared to EDI there is a considerable amount of manual work involved.

An EDI solution consists of five different components: business function, business application, EDI system, communication system, and network service (Figure 1).

![Figure 1. The five components of an EDI solution.](source: adapted from EDI inom svensk handel (1994, p. 9)]

Normally, EDI is used between two parties who have a business relationship with each other. Within the relationship different business functions or departments in the two companies interact with each other. For example, a purchasing department in one company may be involved in a business process (purchasing) with a supplier’s sales department. In such case various trade procedures are used according to what has been agreed upon by the two parties. If EDI is used, it becomes a part of the trade procedures.

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1Trade procedures are thus a broader concept than EDI. It includes all those administrative measures and routines that are necessary to carry out business transactions, such as offering, invoicing, payments, assurance, customs declaration, certification, etc. EDI is thus used as a means to improve the trade procedures.
The business functions are involved in business transactions for which they use various computerized business applications to support the trade procedures and to create the necessary business messages/documents. Examples of such internal applications are: purchasing systems, order systems and accounting systems. Examples of typical messages are request for quotation, quotation, purchase order, delivery plan and invoice. The application defines the message in terms of its content.

The task of the EDI system is then to transform the message into an agreed structure and format so that it can be received and processed by the internal application of the business partner.

The task of the communication system is to pack, address, initiate, and transfer the EDI message to the business partner. The file containing the EDI message is transferred by using some kind of standard communication protocol and some kind of physical network service.

The business applications as well as the EDI and communication systems mainly consist of computer software programs. However, for a number of reasons these softwares are rarely packed and handled as one entity. For example, they are quite different in nature and are usually developed and marketed by different vendors. Instead, the different components are linked by using various more or less well-defined interfaces.

3. Advantages of EDI

There are three types of flows involved in the exchange of goods and services between a supplier and a customer: a physical flow of goods, an information flow, and a financial flow of payments (Figure 2). By definition, EDI is used as a means to exchange information, for example between two business partners. In the next section we shall therefore start off by discussing the cost-saving effects on the information flow itself. But as emphasized by many writers and advocates of EDI, these immediate effects are not, or should not be seen as, the most important driving force. More important, at least in the long run, are the indirect effects on the physical flow and on the production activities carried out by the seller and the buyer. These effects will be discussed in subsequent sections.

![Figure 2. The three types of flows in a distribution system](Image)

### 3.1 Cost-saving effects on the information flow

EDI has at least two direct effects on the information flow between buyer and seller. First, the information handling is substantially simplified, since the creation, transmission and reception of commercial documents are carried out automatically and paperlessly. The information can thus be directly fed into the receiving party's computer applications without manual intervention, and the information exchanged can be reutilized for various purposes without retyping. The substitution of computerized information exchange for conventional paper-based communication implies that the amount of manual administrative work (i.e., working hours) carried out by personnel involved in procurement activities can be reduced. For example, much of the clerical work devoted to such communication activities as collecting prices and delivery information, order placing and calling off can be eliminated. Furthermore, since the information is directly fed into the receiver's own applications (such as the purchasing system in the case of the buyer and the order system in the case of the seller) a lot of time devoted to internal information handling can also be reduced. One example is invoice handling. It has been estimated that it costs about SEK 300 (approx. USD 45) to process an ordinary invoice within a construction company. It has been argued that this cost can be reduced by 90% by taking advantage of the possibilities offered by EDI to simplify this routine. Given the huge number of invoices which are typically handled by a construction company, the cost-saving potential is substantial, even if it is true that all invoices cannot be automatically processed.

How much time, and labor costs, that can be saved depends of course on what types of messages/documents that are sent via EDI and how the administrative routines are adapted to the new, simplified way of communicating.

A second direct effect of EDI is that the quality of information is increased. By reducing the amount of manual work an important source of error is eliminated (errors caused by faulty retyping are often difficult to trace). Furthermore, the usage of codes instead of plain language, if correctly used, contributes to increase the clarity and precision of the messages. As a consequence, less time is needed to communicate in order to sort out misunderstandings, and this also contributes to lower the information handling costs.

Besides these two advantages, which have direct cost-saving effects on the information flow, EDI has a number of other advantages whose cost effects are more indirect. Firstly, the information can be transmitted more rapidly, provided that the companies have the capability to automatically process the received information in their own applications. The lead time in the information processing can thus be substantially reduced. Secondly, the information can be sent more frequently. For example, the information concerned with a certain order can be continuously updated, and it is not necessary to wait to send a message until all information is available. Thirdly, it is easy to add more elements of data, which can be used to make the content of the messages more detailed and exhaustive. In principle, the capacity of an EDI message is unlimited, and more information can be added at low cost.

It is doubtful whether these three last-mentioned advantages have any cost-saving effects on the information handling as such. On the contrary, certain costs may arise, for instance if the possibilities to increase the frequency of transmission and the amount of data are utilized. Instead, these benefits are related to the efficiency of the physical flow of goods and the production activities. These effects will be elaborated below.

What has been discussed in this section is the potential to use EDI as a tool for administrative rationalization. For many companies this opportunity has been the main driving force behind their EDI investments. But for other companies the long-term vision of achieving more far-reaching effects on their operations and competitiveness has been more important. As pointed out by many writers and EDI

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1. The administrative handling of a supplier's invoice by a construction company is described in EDI Bygg Sverige 1993, p. 24-25. The writer implies that a number of people at different positions in time have to take action. Registration, copying, sending, checking, attestation and book-keeping are just a few examples of all those activities which have to be carried out.

2. It has been argued that the enhanced quality of information is the most important advantage of EDI, since it leads to both lower costs and more satisfied customers (Fredholm, 1995, p. 23).
specialists, the great potential of EDI is not related to the rationalization of existing information flows. The major benefits will be created when the aforementioned advantages of automated communication are used to make the physical flow of goods and the internal production activities more efficient and effective. This potential has been described for instance by Scott-Morton (ed., 1991):

Electronic sales channels eliminate much of the paper handling and clerical work associated with making a purchase; processing the order, billing the customer, tracking the delivery and accounting for the sale require many people and take a long time. Electronic sales channels stream-line much of that. Some systems let customers reduce their materials inventory by arranging just-in-time deliveries of components. All of this translates either directly or indirectly into savings for the customers.

3.3 Cost-saving effects on the physical flow
The improved quality of information does not only reduce the time spent on communicating internally and with business partners in order to remedy various misunderstandings. Elimination of communication errors leading to wrong deliveries—in terms of product, quantity or time—will also improve the efficiency in the handling of goods. Cost savings may be realized both with regard to the transportation between supplier and customer and the goods handling taking place at the working site.

The increase of speed and frequency of transmission and the possibilities to exchange more detailed information can affect the physical flow in several ways. Thanks to more rapid and precise information, delivery planning can be improved. This will result in shorter lead times, which in turn means smaller inventories and that production costs of the contractor will be reduced. Skanska has in fact found that the total administrative and distributive “additional costs” incurred at the supplier and at the customer for many product categories are of the same magnitude as the manufacturer’s costs for producing the good.

In order to reduce these additional costs, Skanska needs to establish closer cooperation with the actors in the supply chain. One obvious reason is that both customer and supplier have to be involved in order to develop and implement new administrative and distributive solutions. But this type of supplier cooperation may not be enough. The ambition of Skanska is to reduce the total additional costs, all along the chain from the factory where the product is manufactured to the building site. This ambition will make the procurement more complex. Take the example that Skanska is making a deal with a subcontractor. Normally, the latter then buys the material from a distributor who acts as an intermediary between the manufacturer (or wholesaler) and the customer (see Figure 3 a). But in order to rationalize the physical and administrative flow throughout the whole supply chain, Skanska itself may want to buy the material, either from the distributor or directly from the manufacturer (see Figure 3 b). And beside this solution there may be other alternative ways. Hence, it is expected that a more complex pattern of interaction will develop.

In order to make the new way of cooperating with the suppliers work smoothly, Skanska realizes that the communication must be improved. With the traditional way of communicating there was no time to do other things than “chasing prices” and monitoring the deliveries. But if EDI can be implemented the speed and safety of the communication can be substantially increased, which saves a lot of time for the purchasing personnel. It means that they can spend more time on “all the other

In the same period Skanska started a new project for developing closer cooperation with suppliers. As will be explained below, EDI is here seen as a tool to make the communication more efficient. Initially, the focus was on relationships with manufacturers of building materials. In a second phase, which has now begun, distributors as well as transport companies are included. In a third phase, Skanska will start to exchange EDI messages also with subcontractors.

At present, Skanska has some kind of EDI connection with about ten different suppliers. This is still seen as testing activities, but the company is now planning to implement EDI on a larger scale in order to take advantage of the potential cost-savings. These are assumed to be considerable. It is thus expected that the utilization of EDI communication within Skanska will expand rapidly during the coming years.

The direct cost-saving effects on the information handling are important to Skanska but do not constitute the main driving force. Instead, it is the indirect effects, related to the way of interacting with suppliers and carrying out the own production activities, which is the most important factor. The background is that Skanska’s purchasing and materials supply function is now undergoing radical change. Previously, procurement of materials and other goods was done, as one purchasing manager put it, “by making agreements with suppliers, either frame agreements or agreements for single purchases”. As a consequence of this strategy, price was seen as the most important parameter and other cost aspects of materials supply management were neglected. But the purchasing strategy is now being changed, and in this connection EDI will have an important role to play. Studies made by the corporate purchasing department have shown that the dominant cost-saving potential does not consist of lowering the purchasing prices (e.g., by using Skanska’s bargaining power to put pressure on the suppliers). Instead, the potential cost-saving effects by reducing the indirect costs for administration and materials handling are larger. Skanska has in fact found that the total administrative and distributive “additional costs” incurred at the supplier and at the customer for many product categories are of the same magnitude as the manufacturer’s costs for producing the good.

In order to reduce these additional costs, Skanska needs to establish closer cooperation with the actors in the supply chain. One obvious reason is that both customer and supplier have to be involved in order to develop and implement new administrative and distributive solutions. But this type of supplier cooperation may not be enough. The ambition of Skanska is to reduce the total additional costs, all along the chain from the factory where the product is manufactured to the building site. This ambition will make the procurement more complex. Take the example that Skanska is making a deal with a subcontractor. Normally, the latter then buys the material from a distributor who acts as an intermediary between the manufacturer (or wholesaler) and the customer (see Figure 3 a). But in order to rationalize the physical and administrative flow throughout the whole supply chain, Skanska itself may want to buy the material, either from the distributor or directly from the manufacturer (see Figure 3 b). And beside this solution there may be other alternative ways. Hence, it is expected that a more complex pattern of interaction will develop.

In order to make the new way of cooperating with the suppliers work smoothly, Skanska realizes that the communication must be improved. With the traditional way of communicating there was no time to do other things than “chasing prices” and monitoring the deliveries. But if EDI can be implemented the speed and safety of the communication can be substantially increased, which saves a lot of time for the purchasing personnel. It means that they can spend more time on “all the other
things", that is making the materials flow more cost-efficient. In other words, EDI enables changes in the interaction with the suppliers.

\section*{Future pattern}

\begin{figure}[h]
\centering
\begin{tikzpicture}
% Add nodes and edges as needed
\end{tikzpicture}
\caption{Illustration of changing business patterns}
\end{figure}

As pointed out by representatives of the corporate purchasing department, the increasing safety in the information exchange is of paramount importance to Skanska. It not only contributes to save time for the purchasing personnel, but also allows Skanska to reduce margins in the materials supply management. For example, by enabling shorter lead times and smaller inventories, EDI can help Skanska to rationalize its own production. The point is that these changes in the materials supply will unveil bottlenecks in the operations, which in turn forces a streamlining of the production activities. Skanska has estimated that there is a big cost-saving potential in using EDI for this purpose. But at the same time it should be noted that EDI is just one of several tools which are used to increase the cost-efficiency of production.

The increasing emphasis on materials supply management, including the implementation of EDI, is a reflection of the fact that Skanska, like many other construction firms, is more and more becoming a "logistics company". Increasingly, the task of the company consists of coordinating the flows of goods and services which are produced by other companies. In summary, EDI is in first place seen by Skanska as one of several means to make the materials flow and the production activities more efficient. But the utilization of EDI to rationalize the information handling is also important. While the former effects are difficult to quantify, the latter can be more easily measured. The ability to demonstrate tangible cost-saving effects of EDI is important not the least from a motivational point of view. In order to motivate people, internally and externally, to participate in the implementation work there is a need for visible results to point at.

\section{EDI within the Swedish construction industry}

In 1988 a project was started under the auspices of EDI Bygg, a trade association for the Swedish construction sector (with currently some forty members). The purpose was to open up the possibilities to exchange information electronically by using EDI messages based on the international EDIFACT standard. The infrastructure for electronic commerce to be created should be open and neutral from a competition point of view.

In 1994, the development of EDIFACT messages for purchasing and materials management had been almost completed. At this point in time there were some 30 functional messages which had been packed into 15 commercial messages. After having created the necessary tools for implementing EDI in the industry, the continued activities of EDI Bygg in the field of materials management are now concentrated on spreading the technique. Among other means this is done by education and by organizing tests of the new messages.

In parallel with the joint development activities some of the construction firms, in particular Skanska and SIAB, have invested own resources in developing their own EDI applications. These two companies have also been the most active participants in the standardization work carried out under the auspices of EDI Bygg. The two other large construction firms in Sweden, NCC and PEAB, have stated that they support the work and will use the standard messages developed by Skanska and SIAB.

It has already been described how Skanska began to use EDI already in the mid-1980s. SIAB, who has also been involved in materials management-related projects with suppliers since the early 1980s, started to introduce EDI in 1993. Trials have been carried out with five suppliers, viz. one white goods manufacturer, one distributor of building materials and three distributors of industrial supplies.

In the spring of 1994, when the purchasing managers of Skanska and SIAB met to discuss the EDI development, they concluded that the progress was too slow. Despite the potential advantages of EDI, to all parties, and the existence of standardized messages, the EDI usage did not increase as rapidly as desired. A number of reasons for the slow rate of diffusion were identified. They will be discussed in the following section, where we develop a model for describing and analyzing implementation barriers and problems within the construction sector.

\section{Implementation problems and barriers}

The rate of implementation of EDI in a certain sector, such as construction, is mainly dependent on two factors. The first is the number of companies which are connected with each other. The second is the nature and quality of EDI applications developed for practical use.

To affect the rate of implementation, therefore, it is necessary to increase the number of companies who are connected with each other via EDI. In Sweden, Skanska and SIAB have been the only contractors using EDI, and the number of suppliers with whom they are connected is very low. In addition, the number of building sites that are involved in the ongoing trials within the two companies is also limited. This is, in fact, one of the reasons why many of Skanska's and SIAB's suppliers have been reluctant to invest their own resources in EDI. Another dilemma discovered by the two companies was that their own purchasing personnel was reluctant to send purchase orders via EDI as long as the number of EDI-connected suppliers was low. The conclusion drawn by the purchasing managers was that a critical mass, expressed in the number of building sites and suppliers, was needed in order to get the implementation process going. Furthermore, in order to make the suppliers really interested in EDI, the technique had to be adopted not only by Skanska and SIAB, but also by other construction companies. Therefore it was important to have the other major construction companies (NCC and PEAB) expressing their intention to adopt the same standard solutions.

The other important issue for the implementation of EDI is to develop existing EDI applications in order to utilize the advantages of the technique and turn the potential cost-savings into real economic benefits. These efforts include such measures as increasing the number of standard messages which can be transferred via EDI, thus making it possible to take advantage of the different opportunities to rationalize the information and materials handling and the production activities.

In the coming sections of the paper we will analyze the implementation process. For this analysis we turn back to Figure 1, where the characteristics of an EDI solution were identified. From this framework it is possible to identify factors that can work as
The technical aspects have to do with the internal computer systems and their way of functioning as well as the EDI competence of the company. An organizational issue of importance is the status of IT and materials management issues in the company. Obviously, the prerequisites for solving the technical and organizational issues on the company level are dependent on to what extent the industry/sector-related barriers have been eliminated.

Technical and organizational aspects are thus of importance both at the firm level and at the industry level, which leads to four potential barriers for EDI implementation. A fifth factor to consider is related to the concept of business process in Figure 1. By that we mean that the way companies are doing business with each other will have an impact on the potential for EDI implementation. The nature of the business relationship will be affected, for example, by the purchasing strategy employed by the buying company.

The five major factors identified, and illustrated in Figure 4 on the next page, will now be discussed starting on the industry level.

5.1 Industry/sector-related implementation barriers

5.1.1 Technical factors

Historically, the technical factors regarding transmission solutions and the absence of standardized messages have been severe obstacles to EDI implementation. Over time, however, these barriers seem to have been more or less eliminated. In order to exchange EDI messages between companies with different computer environments there is first of all a need for physically and logically defined transmission solutions. Thanks to the standardization work already carried out by various international organizations, several standard network services and communication protocols are now available (e.g., X.25 and X.400/X.435 respectively). Therefore, the availability of suitable transmission techniques does not constitute a real problem for today’s adopters of EDI.

Also when it comes to the EDI messages, the present situation is quite satisfactory. As a result of the standardization work carried out within EDI Bygg, and its international counterparts, a number of functioning EDIFACT-based materials management messages for the Swedish construction sector are now available. As a matter of fact, this development work is now practically finished, and the continuing activities of EDI Bygg are entering a maintenance phase. The EDIFACT standard itself is steadily developing, which leads to a constant need for updating. In addition, future changes in the materials management practices in the construction sector may require certain modifications of the messages.

A third field of standardization concerns the codification of the information to be transmitted. This was one of the problems discovered by Skanska and SIAB when they came together in 1994 to discuss the slow development of EDI. At that point in time the same code could have different meanings depending on who had sent the message. Needless to say, this confused the suppliers and made them uncertain about how they should interpret the received information. It was therefore decided to put the computer specialists of Skanska and SIAB together and let them work out uniform codes. After having worked through one message after another the codes for eight prioritized messages are now identical.

It means that this type of standardization problem has been solved, and that the lack of uniform codes does no longer constitute a practical barrier to the introduction of EDI in the Swedish construction sector.

Today, the major technical obstacle to a rapid EDI diffusion seems to be the lack of modern computer applications that are adapted to EDI. In the construction industry only the very large contractors have suitable applications, such as the type of purchasing system developed by Skanska. On the supplier side most companies lack suitable order, inventory and invoicing systems. This is partly an internal problem for companies, of course. But, at the same time, the suppliers of standard applications have not done enough to prepare their products for electronic communication, and this leads to high adaptation costs. According to a Swedish survey this is the most critical

Figure 4. The five types of implementation barriers

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*These messages are: price catalogue, request for quote, quotation, purchase order, purchase order response, purchase order change, despatch advice note, and invoice.*
point in order to speed up the diffusion of EDI ("Framgångsrik EDI"). Slowly, however, the standard applications are gradually improved and an increasing number of systems are capable of handling EDI messages.

5.1.2 Organizational factors

Another work which also to a large extent remains to be done has to do with the adaptation of administrative ordering directions to the EDIFACT language. AFAMA for contracting and AFK for procurement of building materials are two sets of jointly developed ordering directions used by the Swedish construction industry. In order to be able to transmit as much information as possible in the form of codes, there is a need to adapt the directions to EDI. Svensk Byggplåt, a trade organization which is responsible for revising the directions, is planning to do this in connection to the next periodical readjustment. An additional problem is that all construction companies do not follow the common directions but use their own home-grown variants.

As experienced by Skanska and SIAB the limited number of EDI users in itself constitutes a barrier to rapid implementation. Since there are not so many customers or suppliers to link up with, many companies prefer to postpone their EDI investments until a critical mass of users exists. There is thus a kind of catch-22 situation which tends to slow down the rate of diffusion.

5.2 Company-related implementation barriers

5.2.1 Technical factors

The lack of IT competence, especially among the personnel at the building sites, has turned out to be an important problem which slows down the spreading of EDI within the company. It seems that the computer support of the daily administrative routines is not as well developed in the construction industry as in many other industries. Therefore, as long as the number of EDI-connected suppliers is limited, the personnel is not motivated to use the new opportunities. Both Skanska and SIAB have come to the conclusion that the IT competence must be raised in order to speed up the internal implementation. SIAB, for example, is now investigating which of the building site's information flows and administrative tasks that are suitable to computerize. The idea is that if the computer is employed as an ordinary tool for administration, then it will also become easier to introduce computerized purchasing routines (even if the time spent on EDI is limited). The usage of EDI will thus be seen as one routine among others.

In order to effectively use EDI the company's own computer applications need to be adapted, both with regard to hardware and software. For example, the user interfaces may need to be changed so that the internal applications can generate, receive and process EDI messages. Experiences from the construction industry show that the work necessary to make these adjustments is easily underestimated. As mentioned above, standard systems equipped with EDI possibilities are increasingly becoming available in the market. However, to substitute such a system is a complicated process which takes a long time and affects a lot of people in the organization.

A key aspect in this connection concerns the reutilization of the received information. One of the advantages of EDI is that the information content of the messages can be used for other purposes than those defined by the means of EDI. It can, for example, be used for purchasing management, project management, etc. However, this is an intensive financial control. But a prerequisite is of course that the right information is stored in the right database. When Skanska developed its new purchasing system an important goal was therefore that it should be possible to reuse the EDI information in the own system. Otherwise we could as well use fax", as one manager put it.

5.2.2 Organizational factors

In order to take full advantage of EDI it is not enough to find and implement the right technical solutions. In addition, the work organization, procedures and routines might need to be adjusted. For instance, many companies still rely on paper-based document handling. Furthermore, in order to be able to transmit as much information as possible in the form of codes, which is desirable from a cost efficiency point of view, the purchasing behavior within the company has to be streamlined (and preferably correspond with the industry directions discussed above). Construction companies in general are highly decentralized, and in many firms there is a large variation in the purchasing behavior among different units and individuals (especially in companies like PEAB which have grown through acquisitions). This kind of freedom cannot be allowed in the future. Each person who is involved in materials supply must to a larger extent than today subordinate himself to the standardized ordering directions which have been agreed upon. Otherwise the data transmission will not work.

The introduction of EDI is one element in the company's development of its materials management (MM) system. This means that the company's degree of MM competence, whether it is a supplier or a customer, affects the prerequisites to successfully implement EDI. Lack of knowledge, insights and interest in the field of materials management may thus constitute a barrier which needs to be overcome. There are people who maintain that the MM approach has not yet made a real breakthrough in the construction industry, and that much remains to be done before MM is accepted as a strategic tool for rationalization of the entire building process. Education as well as changing attitudes will be needed in many companies.

Experience has shown that successful implementation of EDI requires active support from the top management. Top management must be prepared to create rules, provide corporate development resources and make the necessary decisions (EDI Bygg Skrift 3, 1993, p. 9). The lack of such support is perceived to be a serious problem both within and outside the construction industry. It seems that in many construction companies in the top management still do not see materials management and information technology as strategic issues. One exception is Skanska, where the top management has clearly expressed the need to invest more resources in IT and MM.

Since last year a vice president with overall responsibility for IT is a member of the top management team.

5.3 Relationship-related implementation barriers

As a complement to the ordinary commercial agreement specifying the conditions of the business exchange, the parties need to establish a separate EDI agreement which regulates the conditions for the use of electronic commerce. There are several questions which have to be solved, such as the degree of authorization of the system (e.g., when is an order binding?) and the security level (certain companies may require coding of sensitive information). Furthermore, it is important that the routines which are agreed upon comply with good accounting practices and that the system can be audited.

In the ongoing tests in the Swedish construction sector, the parties have jointly decided that the legal issue should not be allowed to prevent the development. This kind of informal agreement works as long as the number of parties is limited. But in the future, when EDI is going to be used by a large number of building sites and suppliers, and payments are transferred via EDI, then a solution must be available. In Sweden, the legal questions related to EDI are now investigated by a national trade association (EDIS). Therefore, the legal issue is not expected to be a barrier for the future diffusion of EDI—at least this is the opinion held by some senior representatives of the Swedish construction industry.
An important issue which in fact may constitute either a barrier for or an enabler of the EDI implementation is the purchasing and marketing strategies pursued by the companies involved. The reason is that the introduction of EDI is not an isolated phenomenon, but an element of change which is linked to how companies are doing business with each other. Of relevance is both how the company chooses to approach the market as a whole and how it tries to organize and control the exchange that takes place within individual customer or supplier relationships.

If used simply to automate existing information-handling routines, the impact of EDI on the relationships is limited—the business can continue to move, but on a smaller scale. But if there is a long-term ambition to use EDI as an enabling mechanism to rationalize the physical flow and the production activities, then the introduction of EDI must be combined with other changes of the interaction, such as the introduction of new logistical or production solutions. It might even be necessary to question with whom one should do business.

As exemplified by the Skanska case, certain leading construction companies in Sweden are striving to increase the cooperation with their suppliers. EDI is seen as a prerequisite for establishing a more cost-efficient materials flow. At the same time, it can be argued that the traditional purchasing strategy, emphasizing low prices and loose supplier relationships, constitutes a kind of barrier to successful implementation of EDI. It seems reasonable to conclude that the possibilities to fully realize the potential cost-savings of EDI and other related material management changes could be contingent upon the buying firms' ability to develop closer relationships with their suppliers than has been customary in the construction industry.

To establish closer cooperation with suppliers is resource demanding, however. Therefore, a parallel trend which can be observed is that several of the leading construction companies are now striving to reduce the number of suppliers, in some cases in a dramatic way.

Some companies go one step further and call into question the entire structure of the supply chain. Skanska, for example, is now increasingly buying directly from the manufacturers. At least for some categories of goods they are trying to by-pass the distribution system. Since few goods are nowadays produced locally, they mean that the tradition of buying locally is outdated. By making purchases directly from the manufacturer it will be easier to control the product quality and rationalize the information and materials flow between the factory and the building site. One effect of this new strategy, which began to be implemented in 1994, is that the distributors have been put under pressure and are forced to change their way of thinking, for example with regard to their role and function in the distribution system.

Also SIAB is actively changing its purchasing strategy in the same direction, but has taken a somewhat different attitude than Skanska. SIAB's approach is to increase the cooperation both with manufacturers and with distributors. Due to the small scale of most building projects (less than MSEK 10), they mean that the dealer level is still indispensable from a distribution point of view. Instead of trying to optimize the distribution of each individual product group, SIAB is trying to grasp larger portions of the total supply of materials. One of the leading ideas is to rationalize the distribution of certain categories of goods by changing the division of labor and role in the distribution chain. As one practical result of this new strategy, SIAB has recently made an agreement directly with one wholesaler of industrial supplies. The new business approach means, among other things, that the selection of the product range to be available is done together with the wholesaler and not with the local dealers.

One consequence of this is that the cost-saving effects which are obtained cannot be attributed to EDI alone.

Furthermore, the stock-keeping function is moved upstream from the dealers to the wholesaler. Another perceived advantage of the new business approach is that it facilitates large-scale investments in new IT solutions, such as EDI. For example, SIAB envisages the possibilities to make IT investments together with wholesalers.

6. Conclusions

We started the paper by arguing that EDI has not been adopted by construction firms to the same extent as in many other industries. Our analysis of the potential for rationalization of materials supply showed that major benefits should be possible to obtain by using EDI in the construction sector. Rather than the lack of advantages, the slow rate of implementation thus seems to be related to different barriers that need to be overcome.

Some of these barriers are of a technical nature. Obviously, the lack of different standards has been an important problem, which has hampered a rapid introduction of EDI. Successively, however, these barriers have diminished in importance. Other technically related problems, such as the adaptation of computer applications and the low level of IT competence in many companies, need to be solved, though. A development work aiming to do this is obviously going on in at least some companies.

The organizational barriers on the industry/sector level also remain to a certain extent, but their impact does not seem to be critical at this moment. The remaining two factors, however—i.e. the organizational factors on the company level and their impact on the characteristics of business relationships—work as major inhibitors. The former are related among other things to work organization and procedures regarding the flow materials. To an increasing extent buying firms have realized that suppliers constitute an important resource for improvements in this respect. In other words, by working closer together with suppliers major effects on the internal efficiency can be realized.

The examples from Skanska and SIAB clearly illustrate how EDI can be used as an enabling mechanism in the redesign of work flows and business processes within and between companies. This means that EDI becomes one of the tools used in the type of change process which is sometimes called Business Process Reengineering (BPR) or the like. As pointed out by several writers, it is in this context of linking business process redesign with modern information technology that the major strategic benefits of EDI can be materialized (see Swatman et al., 1994, for a literature survey). The objective of these change processes is to increase the overall efficiency and effectiveness of the entire production and distribution chain by completely redesigning processes—rather than by improving existing methods and procedures. Similar observations regarding EDI effects have been observed also in other industries (Sheombarr, 1992; Teng et al., 1994).

When EDI is used in this way, progress in implementation is obviously linked to and dependent on other changes with regard to marketing and purchasing strategies of the companies involved. Construction firms are changing their perspectives on efficiency in purchasing and materials management. However, such changes take time as they require adaptations not only regarding work procedures and behavior. Moreover, underlying attitudes toward what is efficiency in purchasing and toward suppliers need to be modified. It is also necessary that customer intentions in this respect coincide with those of the suppliers.

Therefore, it is rather understandable that EDI implementation takes time. It takes time to agree on a standardization regarding file transfer, messages and codes. Furthermore, these changes need to be related to strategic ambitions regarding supplier relationships and purchasing strategy. These issues need to be handled-hand.
A special dilemma in this respect is that they are handled on different organizational levels. Coming back again to Figure 1, the situation is that the technical aspects regarding standardization and messages are often dealt with by people on a rather low level in the organization while purchasing is handled on a more strategic level. Neither of the issues, however, seems to have attracted top management attention.

The conclusion from this discussion is that there is no reason to say that the implementation of EDI in the construction industry has been too slow. On the contrary, it seems logical that the issues concerning communication forms are subordinated the strategic issues concerning the nature of supplier-customer relationships and the role of information exchange in these relationships. Probably, the process of implementing EDI in the construction industry is not different from what has happened in other industries, where "the history of IT can be characterized as the overestimation of what can be accomplished immediately" (Strassman, 1985).

Concerning the future effects of EDI to be expected, we turn again to Strassman. His second conclusion was that the total impact of IT seems to have been characterized by "an underestimation of long-term consequences". The reason for this statement is that the real benefits are discovered only when firms start to interact with each other in order to take care of rationalization opportunites. The major actors on the Swedish construction arena now seem to have decided which route to follow concerning the rationalization of materials supply through closer supplier-customer relationships.

Obviously, the achievement of this objective will require the use of EDI in order to better control the material flows. The buying firms in the construction sector are powerful actors. Therefore, it is probable that they will be able to follow the same procedure as characterized the introduction of Odette in the automotive industry (in practice, the car manufacturers forced the subcontractors to adopt EDI by requiring that the information had to be exchanged electronically). In other words, the development of buyer-seller relationships might become a major enabler of EDI communication in the construction sector.

References


EDI Network and Logistic Relationships

Strategic management of logistic activities at Unilever-Sagit

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Abstract

Unilever Sagit is the Italian main competitor in the frozen food market that has very recently innovated its distribution channel by creating a private Electronic Data Interchange (EDI) network. This paper aims to emphasise the effects generated by the implementation of the EDI technology on the supply chain management. The first part of this paper illustrates the theoretical aspects about EDI impact on strategic management of logistics, while in the second part the Unilever Sagit EDI network is investigated.

Keywords: External Strategy, Logistic Network, Information Technology.

1. Introduction

Several studies have emphasised that the competitiveness of many firms is mainly based upon the efficiency of their system to transfer different types of goods to the firms of the same supply chain (Lamming, 1993; Sako, 1992; Nishiguchi, 1994). This has become particularly clear after the spreading out of the economy globalization processes and the internationalization of the production basis (Ferdows, 1988).

The transfer of tangible and intangible goods is generated with the other functions in an integrated way. For this reason logistic services increasingly require the implementation of sophisticated techniques to plan and manage the materials required for production plans (Da Villa, 1991; Chase, Aquilano, 1992; Gros Pietro, 1992). In the modern industrial firm the logistic activity plays a more complex role because it is becoming more external environment oriented. The firm in fact increasingly has to move fewer quantities of a wider range of goods to several destinations (Bowersox et al., 1986). These goods are transferred more frequently and with an embodied endowment of growing information and knowledge under different forms (professionalism, documents, and rules) or are transferred through electronic links.

Over time the attention paid to the logistic activity has progressively shifted from the management of tangible goods to the management and transfer of intangible resources since the efficient management of these latter results into relevant benefits for the management of the former. Logistics can be considered as a system aiming at implementing organisational and planning alternatives, both inside and outside the firm, which minimise the costs of the business activity as a whole (Bowersox et al., 1986). This leads us to two considerations:

i) due to its own nature, the business logistics becomes the support of a system of tangible and intangible flows, affecting both the in-firm and the out-firm environment; namely, in the in-firm environment logistics acts as an interface between the traditional marketing, production and finance functions (Gattorna, 1983); while in the out-firm environment it acts as a filter between the firm and the environment within which it operates (the main actors of this environment are business plants, suppliers of financial services, banks, market, suppliers of components and raw materials, etc.);

ii) from support to the relationship network, logistics can become the very object of the relationship and favour outsourcing phenomena (Bowersox et al., 1992).

Consequently, the logistic function has played an increasing role in the competitive and co-operative strategies of the firms, being the operational element through which firms can develop and make their relationships with the markets and the other firms more efficient, by minimising the space-time constraints (Ferrozzi, Shapiro, Heskett, 1993).

A key role in the evolution of the logistic activities and of their function within the complex business management was played by information technology. Its dissemination allowed the extension of the firm’s borders thus generating an Extended Enterprise meant as a network firm constantly connected to the other firms through computer to computer communication systems that are more powerful than the traditional ones (such as telephone, telex, fax, shipment services etc.). Electronic Data Interchange (EDI) is one of the main systems for the implementation of the Extended Enterprise as it allows information integration with external subjects. The changes and the innovations taking place in the business management as a result of the implementation of the EDI technology are then crucial not only to the single firm but also to the organisational system involving all the firms (extended enterprise) and the service providers connected to them (supply chain). This paper intends to analyse the changes induced by the introduction of the EDI systems within a business organisation by making reference to the case study of a large firm, Unilever-Sagit, that has recently implemented E.D.I technologies to manage its own distribution network. This innovation has brought about major management impacts and has emphasised the strategic role played by logistics management. Firstly the paper illustrates EDI characteristics, focusing on the modes of implementation of EDI networks and on its implications for the various actors involved; then an empirical case is illustrated and analysed. To this purpose the competitive framework within which the investigated firm operates is synthetically illustrated together with the characteristics of the firm itself and, specifically of its logistic system. After describing the organisation chart of the EDI system implemented, its impact on the pre-existing system is illustrated and an interpretation assumption is provided based upon a previous work carried out by the authors.

2. EDI technology system

2.1 Definition and components

Logistics can contribute to attain sustainable competitive advantages by managing the space-time network that links the firm to its environment. In this framework the new electronic-information technologies allow a real quality leap forward both by
removing distances - i.e. by making logistically co-present and compatible different situations - and by increasing over time the role played by experience and knowledge meant as capability of processing information.

The technological changes resulting from the implementation of the information technologies in the firm allowed to manage the flow of tangible and intangible goods by removing the time and space constraints. Resultingly, with reference to the management choices, the logical and operational distinctions related to the different localisation and timing targets are out-dated. EDI technology allows to speed-up order management and bill/invoice issue through an inter-active connection network amongst the supply chain members. This provides with the opportunity to know in real time the changes occurring in the end market, while allowing to prevent their effects through a proper stock monitoring.

There is then a new viable information transfer flow, the so called "knowledge logistics", whose integrated management provides the firms with the opportunity to achieve a competitive efficiency and effectiveness conditions (Bloom, 1985).

Generally speaking, we can assume a logistic information system (L.I.S.) (Sjøt Larsen, 1977) able to standardise three different information sub-systems in which the many supply chain members are involved:

- the distribution logistics system;
- the production control system;
- the procurement system.

Each of these sub-systems stores information managed synergically by the integrated firm so as to optimise each stage of the procurement-production-distribution process. We can then define an EDI system as a "system based on information technology that links channel members for the purpose of facilitating the flow of a product or service through the channel" (O'Callaghan, et al., 1992, p. 45). The information endowment of each sub-system can then be viewed as part of a larger system (L.I.S.) the basic characteristics of which can be summarised as follows:

- each datum from the so-called sub-systems is at disposal of the other sub-systems;
- data are stored in a shared computer-based;
- similar activities are managed by means of similar procedures so as to generate scale economies. The integration of the three sub-systems results into an information system including the various members of the supply chain in which the firms operate as extended enterprises. This is not a linear process due to the problems related both to the integration of the parties (and then to the modes of access to the information network), and to the evaluation of the advantages and drawbacks of such an integration. Both these problems - that affect the choice as to the typology of the network joined by the enterprises and that have an organisational impact on all the firms of the supply chain - will be analysed in the next sections.

2.2 Modes of implementation of the EDI networks
The implementation of EDI networks implies the codification of the information exchange between the parties. In fact the EDI technology allows the electronic exchange of information provided the information exchanged through an electronic medium is as valid as the information exchanged through a paper medium. Sometimes

The procedures of electronic exchange of orders duplicate the traditional paper exchange thus driving to a waste of resources. This is due not only to the lack of reliance of the operators in the electronic device, but also to a more general problem of compatibility between the electronic network and the system of rules and procedures of the firm. For instance, the order transferred electronically might not be legal for third parties not involved in the negotiation, i.e. it might be not in compliance with a standardised typology of orders, and, consequently, be understood only by a small number of actors. Of course this has an impact on the structure of the inter-firm relationships.

In fact the codification of the information exchanged affects the possibility to have access to the network depending on whether it facilitates or hinders the information interpretation. A high codification of the information will demand format standardisation, explicit reference to the characteristics of the goods ordered (in the EDI case), to the quantities, to the delivery times without leaving any information to the free interpretation of the target user. Conversely, a poor codification limits the number of the potential users of the information. In fact the users can be only those who already hold the pre-knowledge that allows a decodification of the order issued. Resultingly:

- the higher the level of codification of the information being exchanged, the fewer the barriers to have access to the network;
- vice versa, the lower the level of codification of the information, the higher the level of organisation of the relationship and the higher the level of closeness of the resulting network. In fact, the formalization degree of the information exchanged through EDI network is inversely proportional to the organisation degree of the inter-firm relationship. The relationships characterised by a lower level of formalization imply a high inter-activity degree amongst the networks members (spin off, long-term contracts, trust-based relationships) allowing them to interpret the whole information including the parts of it which are not codified. Conversely, highly codified relationships can be established within an open network where the members exchange goods or information only occasionally.

Based upon this consideration a taxonomy of the EDI networks can be drawn (see Figure 1) that highlights the openness and closeness degree according to the codification degree of the information and of the control level of the relationships.

For each typology of the E.D.I network this taxonomy identifies some strategic and managerial implications.

I) the internal network is a specific network connecting the in-firm units (e.g. production plants and peripheral warehouses), mainly aimed at gaining management efficiency margins through the re-organisation of the logistic information channel.

II) the private network is a network connecting few selected users, usually managed by a leader firm issuing the information codes. The information exchanged in this network are intentionally poorly codified as the member firms are linked by previous work experiences and relationships allowing a lower redundancy of the information. This is the case, for example, of the network implemented by Unilever Sagi connecting its own warehouses and the out-firm licensees charged with the distribution.

III) the open network is a free "virtual market" of orders, typified by occasional relationships confined to single transactions. As there are no entry barriers to these
networks the information has to be highly codified. This is the case of the Odette network in the automobile industry.\footnote{The Organisation for Data Exchange by Tele Transmission in Europe (Odette) is one of the most well known EDI network. It includes the main car producers, and has been designed and managed by Fiat Auto Spa since 1984.}

![Figure 1. An EDI taxonomy based on the information](image)

This taxonomy has strategical and organisational implications resulting from the typology of the network which the firm wants to enter and from the role the firm itself wants to play within it. In fact, the choice to implement an internal network or a private network emphasises the will of the enterprise to build up a highly structured inter-firm network that it wants to drive to specific business efficiency and effectiveness targets (Benjamin et al., 1990). These different choices correspond to different commitments in finance, management, professional skills and structures. On the other hand the firm’s participation in an open network implies less critical targets such as timely information as to the suppliers’ offer conditions, adjustment of its channel to the market standards, integration of logistic services supply.

Moreover, in order to implement an integrated network the channel members have to be compatible and consistent from the structural and strategic standpoints. The structural standpoint relates to the specific information technology endowment of the members that, due to the wide range of available networks, may also be equipped with incompatible systems. In fact the network small firms may be unable to equip themselves with an information system compatible with the systems implemented by the large firms (O‘Callaghan et al., 1992). The strategic standpoint, concerning the strategic consistency of the targets of the firms involved, will be dealt with in the next section.

\section{2.3 The strategic consistency of the EDI network members}

The strategic consistency of the EDI network members relates to the convergence of targets and opportunities, allowing for advantages and drawbacks in implementing EDI technologies. This is the case, for instance, of the agreements between manufacturers and distributors as to the handling of the storehouse stocks that can be eliminated by means of an integrated management of the logistic channel resulting into advantages for both the manufacturer and the distributor (Martin, 1984). It is also the case of the products mix at the distributor’s premises that can be wider if the flow of the goods re-ordering is more regular. In its turn this flow can be more regular if the service level provided by the supplier is higher (short delivery time, compliance with the ordered volumes) (La Londe et al., 1988).

As a matter of fact the implementation of logistic networks allows the member firms to achieve some competitive advantages (Slater, 1989):

a) optimal exploitation of the plants less affected by the seasonal market demand, i.e. by the demand instability;

b) consolidation of the deliveries (scale economies in the distribution field) achieved through a constant monitoring of the stocks and a proper planning of the product mix;

c) higher possibility to forecast the demand thus allowing the optimisation of the production process and the reduction of the safety stocks. In fact the planning of these stocks, stored to meet temporary wants of supply of finished products, is inversely correlated to the possibility to forecast the events that can affect procurement and distribution. A higher/lower level of organisation of the relationship - in addition to the technological support that makes procurements compatible, fast and effective - brings about a higher/lower reliability of the relationship and of the risk related to it (Bolisani, Gottardi, 1994). Resultingly, if there are internal or private networks, the safety stock will be lower and viceversa;

d) long-term contracts implying cost reductions and involvement of the parties to improve the final product (Krcmar et al., 1993);

e) leaner supply and distribution relationships and a resulting decrease in the administration costs.

The drawbacks (Table 1.) include first of all the high cost of the plants that is a specific entry barrier to the network. This cost relates not only to the purchasing of plants but also, and above all, to the re-arrangement of the in-firm logistic management. This affects the whole management of the firm as well thus generating potential inefficiencies.

\begin{table}[!h]
\centering
\begin{tabular}{|l|l|}
\hline
\textbf{Opportunities} & \textbf{Limits} \\
\hline
Speedy transactions & High initial barriers \\
Lower commitment of the personnel & Re-arrangement of the in-firm processes \\
Lower number of errors & Impersonal nature of the process \\
Better information management & Lower safety margins as to access to information \\
\hline
\end{tabular}
\caption{Opportunities and limits in implementing an EDI network}
\end{table}

Moreover, the order transfer process is impersonal, above all in the open networks where the inter-action degree amongst the various members is quite low and does not allow closer inter-firm relationships besides those explicitly provided for by the information technology network. Finally, the information networks imply an additional risk for the firm as actors out of the network can have access to information.
These constraints outline a quite adverse scenario, in particular to the small firms typified by a lower propensity to risk and by a lower capability to carry out innovative investments. Nevertheless, due to the rapid evolution of the markets, the small firms — also because of their weak bargaining power — are often forced to implement deep changes induced by the customers' strategies. In this case the main contractor sets up private networks and imposes information standards thus triggering a compulsory re-organisation process of the supply chain small firms.

Through the analysis of the following case study the authors intend to probe, both from the procedural and strategic-organisational standpoint, into the effects induced by the implementation of the E.D.I technology in the distribution logistic management. In fact, Unilever Sagi, a multinational firm that is a leader in the Italian refrigeration market, has re-arranged its own logistic chain by re-drawing its distribution organisation by means of the E.D.I technologies. This has induced both organisational and management changes as well as changes in the role played by its distribution service suppliers.

3. The frozen food sector

In general the frozen food sector includes two categories of products, deep-frozen and frozen food. More specifically, it includes a wide range of food products differentiated by typology of consumption and consumer market. Strictly speaking, theoretically such goods can be defined as consciously bought goods which the consumer compares with others as far as quality, satisfaction of needs, price, and style are concerned, the consumer, therefore, does not buy on impulse (Kotler, 1986). However, the frequency of purchases as to frozen and deep-frozen products is certain different. As to the latter a higher standardisation of consumer products can be assumed. The channels of distribution are also different, as well as the needs they are intended to meet. Therefore from the market viewpoint, deep-frozen and frozen food products supply different consumer markets and necessarily imply a deeply differentiated product management. However, deep-frozen and frozen food products require the same type of warehouses, as well as the same means of transport. On the other hand, this gives the firm, through an integrated management of logistic flows, the opportunity of achieving notable economies of scope.

All the frozen food products have a common bottleneck. Namely the whole sector of frozen food products is experiencing problems as to the production, supply and distribution of finished products, as the sector is trying to de-seasonalize the production processes, which, from a strictly organisational viewpoint, implies the same logistics.

More explicitly, the production of deep-frozen products implies supply planning because of the seasonal productivity typical of fresh food products. Logistical management has to face a seasonal flow of raw materials, dealing with a productive system which aims at getting standardised in order to be efficient.

The production of frozen food, however, is also subject to a seasonal demand, which mainly concentrates in the summer months, and which aims at linking itself to a standardised production in order to be effective. Although the deep-frozen food segment of food products differentiates from the frozen food segment due to its production and consumption characteristics, there still exists the common need of making seasonal phenomena consistent with standardised processes. There is then a sort of critical bottleneck shared by both segments: the technological restriction and the logistical problem. This situation necessarily makes the strategic management of products deeply different from the marketing and seasonal stand points, under the control of a common logistics management.

This consideration emphasises the critical role played by logistic services in the frozen food sector and leads us to conclude that the ability to manage logistic activities efficiently is a strategically relevant issue which affects the choices as to internalisation/externalisation of the logistic services even more than the traditional financial determinants (Porter, 1985).

A large share of the competitive advantage gained by the frozen and deep-frozen foodstuff firms is based on an efficient and effective organisation of purchasing, warehousing, information, transport, and distribution activities. They are the key elements of the logistic functions aimed at expanding the production system as a whole, and are considered as strategic activities linking all operators along the value chain. The management of logistic services implies a strategic dimension based on externalisation and internalisation decisions related to logistic services.

Due to the frequent and rapid changes in the economic system the outsourcing and the internalisation of logistic services become a mobile barrier to achieving dynamically a more efficient organisation of the purchasing-transformation-distribution chain. In many cases the key to success lies within the entire chain. As a matter of fact, the organisation of logistic services (outsourcing or internalising) is increasingly becoming a competitive tactic of the firms operating within this industry.

3.1 The Italian competitive environment

The Italian frozen food market is so highly concentrated that, based on available data, we can assume that it is a kind of oligopoly. It consists of twenty-three producers, each of them operating in this sector with at least 20 employees. As a whole, the sector includes about 3,500 units with high seasonal periods in which the number of employees doubles (6,000 units in the summer periods). In 1994 the frozen food sector recorded a total turnover accounting for one billion dollars. The two largest groups (Italgel and Unilever-Sagi) meet 57.5% of the demand (see Table 2).

The remainder share of the market is covered by small and medium-sized industrial firms which operate in specific demand areas, or by small artisan businesses which operate in geographically limited markets mainly.

Table 2. The market share of the frozen food firms in the specific type of consumer niche (in volume)

<table>
<thead>
<tr>
<th>Food Channel</th>
<th>Domestic consumer</th>
<th>Bars</th>
<th>Food and bars</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sagi Unilever</td>
<td>25%</td>
<td>25.5%</td>
<td>49%</td>
<td>40%</td>
</tr>
<tr>
<td>Italfood</td>
<td>15%</td>
<td>15%</td>
<td>25%</td>
<td>22%</td>
</tr>
<tr>
<td>Sammontana</td>
<td>20%</td>
<td>9%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Sanson</td>
<td>2%</td>
<td>1.5%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Rotobi</td>
<td>5%</td>
<td>5%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Others</td>
<td>40%</td>
<td>41.5%</td>
<td>4%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: Largo Consumo.

With reference to the management of logistic services, Italgel and Unilever Sagi have, in many cases, chosen fully opposite organisational structures. Italgel completely internalises the management of incoming and outgoing logistic flows, whereas Unilever has carried out a policy of partial outsourcing of its logistic activities which can be defined as differentiated externalisation.

Moreover, the recent transformation in the final market will force the firms to adjust their supply chain to the new characteristics of the demand. In fact the growing power
of the supermarket is constantly shifting the consumer from the retailing to the mass merchandising retailers (MMR) (see Table 3). This results into a double impact:

a) on the production mix which has to allow for the growing importance of the products sold in the MMR (see Table 3), such as Multipack which has grown by 16.6% from 1990 to 1993, or Family Cups (+13.8%) and Home Dessert (+6.3%), while products distributed in the traditional retailers are decreasing (-2.2%);
b) on the supply chain management where the firm can catch the opportunity to supply the dealers directly without any intermediator.

Table 3. The evolution of sales per different ice cream product (tons.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional walking</td>
<td>109,600</td>
<td>107,000</td>
<td>108,000</td>
<td>102,800</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Multipack</td>
<td>21,700</td>
<td>27,900</td>
<td>33,700</td>
<td>34,400</td>
<td>+16.0%</td>
</tr>
<tr>
<td>Family cups</td>
<td>25,000</td>
<td>27,000</td>
<td>29,900</td>
<td>38,000</td>
<td>+13.8%</td>
</tr>
<tr>
<td>Home Dessert</td>
<td>9,400</td>
<td>10,600</td>
<td>11,500</td>
<td>11,300</td>
<td>+6.3%</td>
</tr>
</tbody>
</table>

Source: Largo Consumo

4. Unilever-Sagit: The main competitor

Sagit is Unilever’s Italian foodstuff subsidiary and operates in the sector of frozen and deep-frozen food. In the last few years the group has a total turnover of nearly eight hundred million dollars including frozen and deep-frozen food products. The frozen (ice cream) department accounted for more than 50% of the total sales with an estimated turnover of four hundred million dollars.

The Group has 3 plants located in Central and Southern Italy. The plants in Caivano (Naples) and Cagliari (Sardinia) produce frozen food, while the plant at Cisterna di Latina (South of Rome) produces deep-frozen food. Unilever Sagit has also around 50 warehouses, differentiated by role and size, in which 160 people are employed. The firm downsized the number of these employees to 100 by people progressively favouring spin-off phenomena.

4.1 The logistic system

Since the early 1980, Sagit has been progressively modifying the organisation of its logistic services by shifting from a completely internalised organisation to a differentiated one. Some services (primary transportation and final distribution) were externalised through disinvestment policies and cross agreements with concessionaires working under sole licenses. Other activities (integrated management of the various warehouses and of the related services of Electronic Data Interchange) are managed by in-firm resources.

This evolution was generated by the need to respond to the increasingly strategic role played by 3 critical priority factors affected by the logistic activity services management:

a) integrated management of the logistical flows of frozen and deep-frozen food which allows economies of scope (and of scale);
b) minimisation of the structural rigidity necessary to increase internal efficiency, both in terms of responsiveness to changes in the demand size and quality and in terms of costs and;
c) necessity of making a greater use of final distribution as a critical marketing strategy for increasing the firm’s capability to penetrate the market.

4.2 The warehouse system

The frozen food division of Sagit includes 43 warehouses distinguished by size and purpose, and geographically and hierarchically differentiated. They are:

a) Primary Warehouses,
b) Secondary Warehouses,
c) Prestorage Warehouses, and
d) Transhipment Stations.

The primary warehouses are the main destination of the finished product from production plants. They are used to store and sort the products to be sent to secondary warehouses, adjusting them to the needs of the final demand. Moreover, they operate strategically in managing the information service network which links the distribution to the productive system.

The firm has 3 primary warehouses based respectively nearby the 3 production plants of Caivano (Southern Italy), Latina (Central Italy), and the company’s main office in Milan.

The secondary warehouses are 22 and are scattered throughout the Italian territory. Their function is complementary to that of the primary warehouses, from which they differ in size, and by which they are controlled, being not autonomously managed.

The pre-storage warehouses are 15 and are mainly concentrated in Central and Southern Italy. They are the firm’s response to the logistic difficulties in co-ordinating standard production with seasonal peaks of demand. The firm uses pre-storage warehouses, located in the sites of the primary and secondary warehouses, to store specific quantities of a single finished product.

Pre-storage warehouses serve single typologies of products and as such they cannot serve directly the final distributors. Consequently, the products in pre-storage are then transferred to primary or secondary warehouses where the shipments to be sent to the concessionaires are sorted.

The trans-shipment stations are only 3, all located in Northern Italy. They are the most flexible structure in the system of business logistic services in that they are open areas equipped to accommodate tractor-trailer trucks loaded with sorted finished products ready to be delivered to the concessionaires. They are located in areas difficult to be reached from the secondary or primary warehouses, and they are cyclically activated when the demand increases.

4.3 Integrated flows of products

The management of the physical flows of goods concerns both the inflow of raw materials and the outflow of finished products. We limit ourselves to analysing the services related to the distribution logistics of Sagit.

In this context three different logistic services can be distinguished:

a) primary transportation which concerns the flow of finished products from the production plants to the various warehouses;
b) management of the warehouses which concerns the optimisation of the flows of products and information, and;
c) procurement of finished products by the concessionaires at the primary and secondary warehouses.

The primary transportation services respond to the needs of the firm to co-ordinate constant outflows; they are linked to the production which is mainly planned in advance. Therefore there is neither the problem of managing seasonal flows nor the
problem of integrating outflows of frozen and deep-frozen food, since selection is postponed in the production phase and is carried out in the primary and secondary warehouses.

The Unilever Sagit has always fully externalised such services. However, while in the past it depended on large transport companies, in the last decade its transportation services are carried out by over 150 carriers who, individually and as an average, do not manage more than 3-4% of the total traffic volume. This arrangement can be considered: i) from the demand standpoint, a decision for acquiring a higher bargaining power with the single transport firms; and ii) from the supply standpoint, a result of the fragmentation of the frozen food transport companies already operating for Sagit. Sagit, then, has differentiated the organisation of this service by keeping on internalising the management of the transport routes planning.

The running of the warehouses responds to the critical need of managing, in an integrated manner, the flows of frozen and deep-frozen food products. The warehouses then, act as "depressurizing rooms" for the seasonal flows of deep-frozen and frozen food, and they minimise the margins of fluctuation upstream in production. In this case Sagit has internalised the monitoring of its warehouses by resorting to its own personnel, even though the buildings are owned by third parties. In this way the firm achieves its double objective of: i) controlling a strategic function in the production-distribution relationship; and; ii) minimising the sunk costs.

Final distribution is managed in an atypical way, with respect to the criteria outlined above; in fact for several years it has been completely externalised.

The final flow is, in fact, managed by monopolistic concessionaires for specific territorial areas who are required to establish contacts with the final market. The firm works out with each concessionaire an annual sales budget based on two elements relating to: i) historical analysis of sales in specific territorial areas, and ii) evaluation of the availability and potentiality of the concessionaires.

4.4 Management of the supply chain
Up to the mid-1980s, Sagit had organised its logistic functions by means of two distribution channels, one internal and one external to the firm.

In the first case the firm was endowed with an organisational structure divided into branches. These were based in regional locations and to them specific branches in the major administrative staff, and people encharged with managing the warehouse and the final distribution. Additionally there was a transversal control body made up of branch inspectors. The structure consisted of offices, one cold-storage warehouse (buildings with multiannual tent contracts were erected for both these structures) and motor vehicles for distribution. The branches were encharged with managing the end flow of the logistic chain which linked the final warehouses to the seller-customers of the firm.

Distribution was organised based upon sales contacts; sales people periodically visited the customer of their area to meet their cyclical and occasional requests. This procedure, based on a highly integrated organisation, had 3 counter-productive effects on the production management, as well as on the financial management of the parent firm:

a) The branches were not interested in gaining larger market shares because they were not sufficiently motivated. Thus they were unable to identify the dynamics of the demand.

b) It was difficult to optimise outgoing logistic flows; in fact, the system of attempted sales implied, in periods of higher demand, the probability that the carriers would travel unloaded back and forth the branch and the customer. In this way the time for supplying more demanding clients was increased.

c) The internal management of the distribution function necessarily entailed, in addition to covering all the fixed costs (linked to the bureaucratic organisation of each structure), a problem of limited decision-making and operational flexibility.

The second strategy implemented by Sagit, since the second half of the 1980s, in order to manage the end part of the distribution channel was the resort to concessionaires. This choice had already been made for areas not covered (due to structural and optimisation of flows reasons) by the internal branches. The introduction of these new intermediaries is a form of externalisation of the distribution phase by delegating it to local concessionaires. These concessionaires own their own lorries and, usually, their own warehouses. They are required to distribute the product in areas where they are the sole agents. The relationship between the firm and the concessionaires has progressively optimised thanks to:

a) definition of a sales budget assigned to each concessionaire and established on the basis of historical sales data, and;

b) improved capability of the concessionaire to contact the final market directly.

c) From the point of view of the optimisation of the relations between production and final distribution, this allowed the firm:

i) to restrict the range of fluctuations in sales thus facilitating the planning of production process;

ii) to make the final distribution more flexible by determining its size according to the expected levels of the demand, by increasing or decreasing autonomously the budget assigned to each concessionaire who, in turn, is required to get adjusted to the variability of demand, and;

iii) to externalise the costs of distribution, mainly the costs of the personnel.

To understand completely the benefits from externalisation it is worthwhile analysing the specific relationship between the concessionaires and Sagit.

The majority of the concessionaires firms are founded as a result of a spin-off process (developed by Sagit with its own employees and aimed at deverticalizing the final distribution services). Presently the network of concessionaires consist of about 150 units. In the contractual relationship the concessionaires are required to operate solely within an assigned territorial area by means of sole-agent contracts, to comply with the assigned sales budget and to accept, otherwise, penalties as a percentage of the projected turnover, and to give feedback from the market to the firm in order to facilitate production plans. They own a small-sized warehouse.

Unilever Sagit, on its part, commits itself to provide each concessionaire with a territorial sole licence, with supplies according to pre-set times and modes, with a guarantee of an incentive-based system based upon the actual turnover; additionally it usually updates the budget assigned to the single concessionaire.

As a matter of fact the relationship between the two parties is a quasi-integration as there is a sort of hierarchical relationship where the level of mutual trust tends to increase. This trust is based upon the preferential relationship which links Sagit to its own ex-employees. This preferential relationship allows the manufacturing firm to keep control over the distribution activity and the market and the concessionaires to operate in a "captive" market. The approach to the service has become more standardised because it has to comply with regulations imposed by the customer (budget, monitoring, marketing policies, and administrative rules).
5. Unilever Sagit’s new organisation of Logistic Services

This section illustrates the choices concerning the organisation of the logistic activities made by Sagit recently. The process of recruitment implemented by Unilever to control the growing power of the concessionaires in the distribution channel is also described.

5.1 The EDI network

The latest innovation introduced by Unilever Sagit in logistic management is the implementation of an EDI network involving a) Unilever Sagit itself; b) the warehouse system; c) the concessionaires, and d) the new in-firm agents (see Figure 2). The in-firm agents were not envisaged in the previous organisation. They are employees of the firms specifically devoted to manage the market segment of the MMR. They are an alternative to the concessionaires who, over the last years, had been increasing their power within the business logistic network. The traditional competitive advantage of Sagit vis-à-vis its concessionaires - generated by the sole licence of the areas and by the centralisation of the marketing and commercialisation functions - had declined as the areas controlled by the sole agents had increased. This brought about a higher bargaining power of the sole agents resulting, in some cases, into conflicts of interests.

As a matter of fact, the resort to sole agents bound to Sagit by means of long-term contracts resulted, over time, into a high operational constraint; namely the firm had lost its direct contact with the final market by delegating it to the area sole licensees.

The latest market trends — that in the large distribution channel identify a developing sector in the ice cream market — allowed Sagit to re-balance the bargaining power by encharging in-firm agents rather than traditional sole licensees with establishing relationship with the large distribution channels. This allowed to achieve scale economies through a computerised management of the orders while re-arranging the distribution network.

Additionally, this choice was supported by the establishment of 3 large Distribution Cells (the main of which is based in Pescara and supplies the whole area along the coast of the Adriatic Sea) where the firm stocks and supply the new small-sized concessionaires. Usually these concessionaires are equipped only with one refrigeration transportation mean, have the sole licence only for limited geographical areas and are periodically supplied by Sagit distribution cells.

The EDI network to exchange orders and information established by Unilever-Sagit Italia for the refrigeration sector includes three major computer science poles located as follows:

- Cisterna di Latina;
- Caivano;
- Trezzano sul Naviglio (Milan).

The information flows from the geographical areas of Northern, Central and Southern Italy are respectively conveyed into these poles. The poles are linked to:

- primary warehouses, nearby the poles themselves;
- individual traditional and new sole licensees;
- sole agents that are Sagit employees.

In this network two information flows can be identified:

The first flow links the concessionaires to the primary warehouses; i.e. it allows the firms the reduce the stocks of finished products previously assigned to the individual concessionaire. In fact, the timeliness of the order, together with a careful monitoring of the market allows the concessionaire to get procurements for shorter times and, consequently, to modify the mix of the pallets of its refrigeration warehouses according to the real market demand. Additionally, this reduces the structural constraint that linked the size of the licensed area to the capacity of the refrigeration storehouses owned by the individual concessionaire. In fact, should the storehouse not be sufficient, the EDI network would enable the concessionaire to get direct procurement from the warehouses scattered all along the territory. This evolution allows the small concessionaires as well to operate on larger areas or to widen their selling capability regardless of the capacity of their refrigeration storehouses. Finally, the implementation of the EDI network makes the relationship with the concessionaires more flexible by introducing implicit mechanisms that reward the most enterprising concessionaires.

The second flow links the new in-firm agents (over 200 all over the national territory) to the central warehouses. These agents hold relationships with the large organised distribution channel and get orders only for this specific market niche that according to the latest statistical data is developing as compared to the traditional distribution channel (retailing).

This mechanism meets three requirements:

a) acquisition of big orders by the final market (MMR). This allows to devote specific production lines to products addressed solely to MMR less affected by the seasonal nature of the market;

b) availability of large refrigeration containers at the customer’s premises who, in this way, is able to store higher quantities of finished products without affecting the traditional direct or indirect logistic chain of Sagit;

c) replacement of the attempt of sale with the planned order that facilitates the production planning process thus shifting from production for the warehouse to a sort of production to order.

By so doing Unilever goes over the concessionaires by creating direct supply channels with a specific typology of customers that is acquiring a remarkable growing share in the business turnover. Through such a mechanism the computer science poles are able to know in real time the variations in the stocks of the finished products at the warehouses and to re-orient the production mix.
The enterprise has not aimed at achieving a real production flexibility meant as a higher flexibility of the plants; in fact no specific investment were made in this field. Its aim was to create a higher flexibility in the production organisation. The variation in growing demand has been observed looking at this phenomenon.

Figure 2: Unilever Sagit's logistic flow

The enterprise has not aimed at achieving a real production flexibility meant as a higher flexibility of the plants; in fact no specific investment were made in this field. Its aim was to create a higher flexibility in the production organisation. The variation in growing demand has been observed looking at this phenomenon.

5.2 An interpretation of Unilever Sagit's supply chain management

The implementation of the EDI system has introduced additional changes in the organisation of Sagit's business logistic system. All these changes (outsourcing of primary transport, spin-off processes of the concessionaires and late internalisation of the distribution to the MMR) are driven by choices of differentiated outsourcing of the various logistic activities. These choices were analysed in a previous paper (Calza, Passaro, 1994), which highlights that the basic elements in the internalisation/externalisation of the logistic services can be focused on two main concepts:

i) the degree of strategic relevance of the single logistic service in competition, and;

ii) the level of specificity of the service related to the customised or standardised typology of the logistic service.

The strategic relevance (i) concept concerns the degree of strategic criticalness of each production factor and measures the marginal contribution to the competitive capability of the firm (Teece 1986). The criticalness of the logistics problem as a problem of strategic importance concerns the additional capability of the logistic services to create new synergy, to achieve new economies and to raise the level of knowledge through the optimal use of the information flow from the market to the production systems.

The level of specificity of the service (ii) regards the decision to use logistic services from a standardised or, conversely, from a customised point of view.

With reference to Figure 3 it is clear that:

- the primary transport function is managed by making resort to the market; it is a service of little strategic importance and low specificity (Quadrant D);

- the storage functions, management of stocks, and EDI are managed and controlled internally by the firm; they are characterised by high specificity with respect to business organisation and by strategic criticalness as determinants in avoiding to be affected by seasonal phenomena (Quadrant A), and finally;

- the final distribution function is managed in a different way in fact the traditional distribution is managed through a quasi-integration (spin off-concessionaires) (quadrant B), while the MMR is managed through internal agents (Quadrant A).

From the evolutionary point of view this drove to the shift of the distribution service from Quadrant A (matrix of choices of organised activities) to Quadrant B (spin off cases).

Nowadays the traditional concessionaires are increasingly replaced with two innovative agents:

1. Particularly it has been observed that some products are alternatively consumed. That means that the growing demand of A product will decrease the B product supply. Consequently the firm can organise the production process looking at this phenomenon.

2. In particular Teece pose the problem of determining ("How critical to success?") the contribution of each factor to the effectiveness of the business strategies. He links the decision of internalizing/externalizing R&D function of new products to the strategic criticalness of each new technology and to its possible misappropriation by others.

3. If the resources are not specific, the market assures major advantages both with respect to production costs and with respect to structure costs, because economies of scale can be better achieved through purchasing instead of producing. To the market, in fact, can sum up the uncorrelated demand, thus realizing the benefits deriving from shared risks. When the resources become more specific the first two uniting benefits of the market are reduced and the exchange progressively assumes a stronger bilateral character, as a result the costs of the activity increase and for this reason internal production supplants external supply.
- small concessionaires with whom Unilever Sagit does not hold an established relationship such as the one that linked it to the logistic spin off (a quasi-hierarchy) but rather a relationship which is exclusive and constant (quasi market) (Quadrant C) while granting Unilever a higher level of autonomy;
- in-firm agents charged with holding relationships with the MMR.

Specifically it has enhanced the relationship with the MMR — that has recently recorded increasing consumption shares — by implementing a private E.D.I network to which all supply chain members are connected. This strategy was also supported by a general re-arrangement of the whole logistic channel so as:

- to weaken the bargaining power of the area concessionaires with mini-licenses to new external agents;
- to optimise the management of the final stocks in the developing sectors by shifting from the production for the storehouse to a sort of production to order.

From the managers' and practitioners' standpoint the case investigated is quite meaningful as it highlights that — regardless of the sector analysed — the re-organisation of the logistic structure meets two requirements: a) higher efficiency through the optimisation of the product and of the information flows; b) higher effectiveness through a progressive re-balancing of the prevailing role played by the supply chain where Unilever Sagit was losing its direct monitoring of the market.

Additionally, both managers and practitioners can evaluate that specific factors of the sector, such as the importance of the logistic issue and the management complexity resulting from the various variables (technological, organisationnal, economic-financial and market), drive the firms to operate differently according to the situation, allowing for the specificity both of the firm and of its environment. Resultingly, their strategic choices are basically made allowing for the specific situation and contingency.

From the scientist's standpoint this case study highlights the development of many forms of inter-actors relationships that differentiate as a function of the degree of control the leader firm wants to have. According to this interpretation, the make or buy choices of the logistic services do not have to be considered in the framework of the hierarchy-market dichotomy, but they have to be viewed as a continuum of organisational solutions ranging from direct control to occasional contracts. Intermediate co-ordination forms can also be found that, according to the different cases, are quasi hierarchy and quasi market organisational solutions.

References

Figure 3. Unilever Sagit’s distribution management

From the interpretation standpoint the creation of the in-firm agents is due to Unilever’s choice to manage internally critical activities specifically devoted to major customers. In the case of the small concessionaires, the quasi market relationship between them and the customer is due to the opportunity of managing a distribution service specifically devoted to Unilever — even though less crucial from the strategic standpoint than the relationship with the MMR. The small concessionaires have a lower bargaining power as compared to the traditional spin-off.

6. Conclusions
The study of the re-organisation of Unilever Sagit’s logistic system highlights the crucial role played by this system in the competitive environment of the refrigeration sector. Both in the frozen and deep-frozen food sector the management of logistic services is strategically critical to the firms as it can be a source of competitive advantage. In fact, the existence of an implicit "logistics problem" in the production of frozen food forces the firms to try and optimise the production and distribution cycles which are the opposite from the seasonal viewpoint. The ability to solve logistic problems is a crucial factor in maximising the business efficiency.

EDI technologies can then undoubtedly be a useful support to optimise the supply chain management as they drive all members to create channel synergy.

In this case study, Unilever Sagit has progressively adjusted its own logistic structure to the evolution in the consumption within the refrigeration sector.
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Collaborative Relationships as an Interorganisational Strategy

The role of interfirm dependency and interfirm trust in the economic exchange process

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Abstract
This paper will summarise current research on collaboration between buying and selling companies focusing on the roles and effects of interfirm trust and interfirm dependency. It will set out the basis of the research; firstly reviewing existing literature on the subject; secondly, identifying the gap in knowledge that exists; and thirdly, addressing the gap in the form of research questions. The value of this new research lies in the link it will provide between the current literature that advocates customer-supplier collaborative strategies and interfirm trust), and the role played by interfirm dependency. It will attempt to address whether mutual interfirm dependency can substitute interfirm trust or vice versa, or can one not exist without the other. This research will attempt to provide strategies with greater understanding on why firms choose to collaborate, and what ingred ients would need to exist to offer successful collaboration. Furthermore, it will attempt to address whether individual's sociological understanding of trust and dependency is applicable to the organisational context.

Key words: Collaboration, Relationships, Interfirm, Dependency, Trust, Mutual Co-operation

1. Introduction

Brave Talk: "A huntsman, searching for a lion's truck, asked a woodman if he had seen them and if he knew where it is. The man said he would show him the lion itself. At this the huntsman turned pale and his teeth chattered. 'I am only looking for its trail,' he said, 'not for the lion. This story is meant to show up the bragadocio of the coward whose boldness is in words and not to deeds.'

Aesop (6th Century B.C.)

The UK automotive industry has had a turbulent and acrimonious history. Relationships between customers and suppliers have historically been difficult (Dyer and Ouchi, 1993). In a shrinking world, competitors, particularly Japanese, have begun to swallow market share. The Japanese have developed cooperative supply chain strategies that have done much to increase competitiveness (Dyer and Ouchi, 1993) strategies that western companies have attempted to mimic (Sako et al 1995).

Interfirm "trust" has been one of the characteristics singled out as giving the Japanese a competitive advantage (Dore, 1987). Consequently, Western companies have embarked upon developing this characteristic within their industries. It appears that trust is inordinately difficult to operationalise between companies, (Williamson 1985), especially in economic environments that foster short term opportunism. Perhaps other relationship factors need to be developed to improve interfirm effectiveness. This paper will look at the establishment of interfirm dependency (the mutual dependency of two firms based upon the need of for example a product, technology, service or level of investment) as a critical method to the promotion of collaborative exchanges.

2. Background

This paper will summarise current research on collaboration between buying and selling companies focusing on the roles and effects of interfirm trust and interfirm dependency. It will set out the basis of the research; firstly reviewing existing literature on the subject; secondly, identifying the gap in knowledge that exists; thirdly, addressing the gap in the form of research questions. At the time of writing, there has been no substantial primary research.

The prior research will be reviewed in four sections titled; (i) Methods and Theories of Subcontracting; (ii) Collaborative Relationships with Suppliers; (iii) Trust, and (iv) Dependency.

2.1 Methods and Theories of Subcontracting

The basis of this theory, which was argued by Wilkinson (1981), was that different segments of an economy are treated unequally and are not rewarded on their real worth. In the context of subcontracting, small firms (ie; contractors), are not paid their worth and their workers, often temporary are employed with lesser wages than their equivalents in larger firms. In the larger firms employees have secure jobs, good fringe benefits and relatively high wages.

The larger firms protect their businesses and employees from fluctuations in the general economy by subcontracting work to smaller firms in times of growth to meet demand, but retrench only to their employees and processes in times of recession, (and can therefore be regarded as opportunistic self interest behaviour). Consequently, the larger firms are the only ones economically capable of accessing new technologies and making new investment. In summary, the tactical subcontracting of processes and risks to small suppliers helps larger firms protect themselves in an economy of uncertainty and flux. This process results therefore in a dual economy for large and small firms and their employees respectively.

(ii) Obligational Contracting

Williamson (1975), argued that companies desired vertical integration as opposed to subcontracting, to overcome market difficulties caused by opportunistic behaviour of firms outside of their ownership or control, (reverse self interest behaviour on the side of the suppliers). He argued that by vertically integrating, firms would avoid, 'costly haggling between parties in the marketplace', and would reduce transaction costs.
Williamson supported his theory by arguing that managers of large firms would attempt to simplify the marketplace they operated within by vertically integrating. This factor was described as "bounded rationality", i.e.: "the human minds limited capacity for rationally formulating and solving complex real world problems". Williamson's theory did not explain why subcontracting continued to be a popular mode of transaction. This continued subcontracting, (as opposed to the extremes of vertical integration and spot contracting), was termed "obligational contracting". (Williamson 1985). Williamson consequently attempted to explain why obligational contracting took place. He proposed that if long term investments were incurred between two companies then they would be inclined to a relationship of this type as the switching costs would be high. (See also: Porter 1980).

These long term investments were termed 'asset specificity' and Williamson went on to define four types; site, human, physical and dedicated.

Williamson supported his argument by looking at the benefits of asset specific business to the small firms that won it. He argued that the winning bidder would gain an advantage over non-winners as:

- parity is upset between winner and non-winners
- economic values would be sacrificed if the ongoing supply relationship were to be terminated
- transaction specific savings can accrue as contracts are adapted, hence institutional and personal trust can evolve, and
- personal integrity may evolve which discourages opportunism

Without asset specificity, Williamson argued that obligational contracting was unlikely to occur. The winning bidder would have no advantage over the non-winners as:

- switching costs are low, and
- the winning bidder has continuously competitive bids from qualified rivals

The term 'obligational contracting' was used further by Sakó (1992:11), when she contrasted high dependence relationships (Obligational Contracting Relations - OCR), with low dependence relationships (Arms Length Contracting Relations). This work will be explored further in the next section but it is worthy of note here for it develops upon Williamson's transactional approach to subcontracting.

(iii) Subcontracting based on Goodwill and Benevolence

Dore (1987) termed obligational contracting as 'relational contracting' with an emphasis that asset specificity alone could not determine this phenomena, but also the presence of particular cultural attitudes. Dore was attempting to describe why subcontracting has continued to prevail in the Japanese economy. Dore cited a cultural trait of the Japanese, that of 'goodwill'; which explains the prevalence of subcontracting. Dore (1987:170), defined goodwill as:

"the sentiments of friendship and the sense of diffuse personal obligation which accrue between individuals engaged in recurring contractual economic exchange."  

He argued that this environment has led to the reduction of opportunistic behaviour, and hence long term relational contracting encouraging investment in smaller firms, improved communications and an emphasis on quality. He went further to comment that this type of contracting would most likely occur in an affluent economy where quality is seen as of primary importance.

(iv) Flexible Specialisation

Rather than subcontract work to reduce risk from economic fluctuation, (ie. dualism), Piore and Sabel (1984), argued that larger firms need to subcontract to cope with product complexity. As with Womack et al (1990), they described the inadequacy of the mass production systems to accommodate customer demand for constantly changing product. The adoption of flexible specialisation technology allows skilled workers to produce a broad and continually changing portfolio of products from general purpose machinery. In industries such as the automotive sector, the process technologies exploited are vast and any vehicle manufacturer would find it extremely difficult to retain expertise and investment in all of them. Consequently, subcontracting to firms with flexible technologies allow the vehicle manufacturers to keep abreast of all aspects of customer technology demands.

The above theories of subcontracting therefore form a spectrum of approaches to the area of buyer-seller relationships with the extremes as described by Sakó's ACR/OCR relationship types (1992:11). The next section will look at the growing body of literature that has reviewed the relative benefits of taking a collaborative approach to buyer-seller interactions, which represents more 'altruistic behaviour' end of this spectrum.

2.2 Collaborative Relationships with Suppliers

The previous section looked at the literature on the theories and methods of economic exchange (Wilkinson, 1981; Williamson, 1975, 1985; Porter, 1985) which have discussed a range of types of subcontracting from 'Dualism' to 'Vertical Integration'. Mid-range are a mass of companies that subcontract over lengthy periods of time with no share of equity but often large levels of investment by one or both parties (Williamson, 1985). Williamson termed this type of economic exchange as 'Obligational Contracting'. This section will review the large body of literature which has described further this method of subcontracting and developed the themes of collaboration between buying and selling firms. This is not only in terms of transaction cost economics which Williamson's (1975) starting point, but also the understanding and measurement of the interpersonal and interorganisational relationship itself as an important constituent in the interaction. This perspective was noted by Ford (1990:11)

"the relationship between buyer and seller is frequently long term, close and involving a complex pattern of interaction between and within each company. The marketers and buyers task in this case may have more to do with maintaining these relationships than with making a straightforward sale or purchase."

In addition, Hakansson (1982) developed the 'Interaction Model' which considered four types of variable that influence buyer and seller behaviour in the market place.

- the participants (individuals and organisations) involved in the interaction
- the elements and processes of the interaction
- the environment in which the interaction takes place
- the atmosphere affecting and affected by the interaction

The model demonstrates a spectrum of interactions from short term 'Exchange Episodes' to longer term 'Relationships'. In these long term relationships the exchanges or episodes become as Ford (1979), put it, "routinised". The IBM group argued that in longer term interactions the parties would seek to improve their
relationships by for example sharing technology, quality and cost advances. In this sense, buying and selling firms are pursuing a collaborative strategy.

This work pointed towards the need for buyers to have an understanding of the 'portfolio' of relationship types from traditional short term adversarial to long term collaboration. Other authors considered the next essential step; that of matching this range of relationship types against the portfolio of current and potential suppliers in the operating environment whilst considering the individuals, organisations and processes of interaction (Spekman, 1988; Ford, 1990; Lamming, 1992; Sako, 1992). Sako (1992) described this portfolio of transaction types stretching from 'Arm's Length Contracting' (ACR) to Obligational Contracting (OCR). The features evident in these extremes of relationships as described by Sako (1992:11) are shown in Table 1 on the next page.

Sako is very careful not to favour either approach; 'ACR is not just a negative residual redefinition of OCR, or vice versa.' (1992:14). Both ACR and OCR can be appropriate strategies if applied correctly against the portfolio of suppliers. Sako felt that the levels of trust between firms was key in determining the relationship type and consequently identified three types of trust in her model (seen in Table 1):

- contractual trust; trust that both parties will follow the agreed contract.
- competence trust; trust that both parties will perform to their best capabilities to deliver the exchange effectively.
- goodwill trust; trust that either parties would perform beyond the stated expectations of the contract or exchange to guarantee a mutually satisfactory result. In this type of trust, one party may consciously decide to suffer in order to maintain the relationship, (seen as altruistic behaviour), e.g. incur a cost increase.

The aspects of trust in an interfirm exchange will be discussed further in the next section.

Lamming (1993) took a slightly different perspective to long term exchanges. Based on extensive research into the world automobile industry he developed a chronological four phase model of customer-supplier relations that culminates in a phase characterised by longer term relationships. Lamming describes how this has developed following three phases where short term adversarial exchanges which were economically detrimental to both buyer and seller, have declined to be superseded by the 'Partnership' phase. He goes on to describe the characteristics of these partnerships, that the levels of trust between firms was key in determining the relationship type and

Table 1. Features of ACR-OCR Relations

<table>
<thead>
<tr>
<th>Feature</th>
<th>ACR</th>
<th>OCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Transactional Dependence</td>
<td>Buyer seeks to maintain low dependence by trading with a large number of competing suppliers within the limits permitted by the need to keep down transaction costs. Supplier seeks to maintain low dependence by trading with a large number of customers within limits set by scale economics and transaction costs.</td>
<td></td>
</tr>
<tr>
<td>(B) Ordering Procedure</td>
<td>Bidding takes place; buyer does not know which supplier will win the contract before bidding. Prices negotiated and agreed before an order is commissioned.</td>
<td>Contracts contain procedural rules, but substantive issues are decided case by case. Contracts may be oral rather than written.</td>
</tr>
<tr>
<td>(C) Projected length of trading</td>
<td>For the duration of the current contract. Short term commitment by both buyer and supplier.</td>
<td>Case by case resolution with much appeal to the diffuse obligation of long-term relationships.</td>
</tr>
<tr>
<td>(D) Documents for exchange</td>
<td>Terms and Conditions of contract are written, detailed and substantive.</td>
<td>Supplier often starts production on basis of oral communication, before written orders are received.</td>
</tr>
<tr>
<td>(E) Contractualism</td>
<td>Contractualism is written out and followed strictly.</td>
<td>Sole sourcing by buyer, combined with suppliers transactional dependence.</td>
</tr>
<tr>
<td>(F) 'Goodwill trust'</td>
<td>Supplier never starts production until written orders are received.</td>
<td>Little or no inspection on delivery for most parts. (Customer may be involved in establishing suppliers quality-control system).</td>
</tr>
<tr>
<td>(G) 'Contractual trust'</td>
<td>Multiple sourcing by buyer, combined with suppliers low transactional dependence.</td>
<td>Not always fully costed, as benefits are seen as partly intangible and/or reaped in the distant future.</td>
</tr>
<tr>
<td>(H) 'Competence trust'</td>
<td>Through inspection on delivery; the principle of caveat emptor predominates.</td>
<td>Extensive multiple channels, between engineers, quality assurance personnel, top managers, as well as between purchasing and sales managers. Frequent contact, often extending beyond the immediate business into socialising.</td>
</tr>
<tr>
<td>(I) Technology transfers and training</td>
<td>Only the transfer, training or commission to the diffuse group of suppliers is to be borne by each party.</td>
<td>Much sharing of risk, in the sense that the relative share of unforeseen loss or gain is decided case by case, by applying some principles of fairness.</td>
</tr>
</tbody>
</table>

Source: Sako (1992)
stagnation and decline the subcontracted firms bore the economic brunt as large firms experienced economic flux. The economic explanation of 'Obligational Contracting' is summarised below.

<table>
<thead>
<tr>
<th>Model</th>
<th>Nature of competition</th>
<th>Basis of sourcing decisions</th>
<th>Role of data/information exchange</th>
<th>Dealing with price changes</th>
<th>Level of pressure</th>
<th>etc...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional before 1975</td>
<td>Closed but friendly; plenty of business</td>
<td>Wide; enquiries; lowest bid; price-based</td>
<td>Very restricted; minimum necessary</td>
<td>General negotiation (annual); a game of win/lose</td>
<td>Low/medium steady; predictable</td>
<td>etc...</td>
</tr>
<tr>
<td>Stress 1972-85</td>
<td>Closed, deadly; chaotic</td>
<td>Dutch Auctions; price based</td>
<td>A weapon; one way; supplier must open book</td>
<td>Conflict in negotiation; a battle of low prices</td>
<td>High/medium; the volatile</td>
<td>etc...</td>
</tr>
<tr>
<td>Resolved 1982 onwards</td>
<td>Closed; some cooperation; strategic</td>
<td>Price, quality and delivery</td>
<td>Two way; short term e.g. forward build</td>
<td>Annual economics plus; negotiation; win/lose</td>
<td>Medium; some sense of relief</td>
<td>etc...</td>
</tr>
<tr>
<td>Partnership/ Japanese 1990 onwards</td>
<td>Collaboration: still dynamic</td>
<td>Performance history; long term; scarce; costs</td>
<td>Two way; long term e.g. knowledge of costs</td>
<td>Annual economics plus planned reductions with what?</td>
<td>Very high; predictable; etc...</td>
<td></td>
</tr>
</tbody>
</table>

Source: Lamming (1989)

Figure 2. The Four-Phase Model of Customer-Supplier Relations

Dore (1987) felt that Williamson's economic explanation of 'Obligational Contracting' was not enough and that based upon research carried out in the Japanese industrial sector, the presence of particular cultural attitudes such as 'friendship' and 'diffuse personal obligation' contribute to the formation of long term exchanges (Relational Contracting). Nishiguchi (1994), has attempted to put these factors into context by describing how these two industries developed different subcontracting strategies to cope with the demand demonstrating that the economy as a whole did not develop a single way forward.

In the electrical and white products area dualism remained with subcontracting occurring to expand capacity and exploit low cost temporary workers. Payments to subcontractors were delayed and the manufacturers held great power over suppliers. In the automotive sector another approach evolved. The component manufacturers were very weak but the large automotive firms decided to heavily invest in them. During the 1980's the Japanese economy went through a rapid growth period and influx of revenue led to a demand for domestic product. In 1957, only 10% of the nation owned television sets. By 1963, this figure totalled more than 90%. The growth in demand for vehicles showed a similar dramatic rise, 1960 - 0.4 million; 1968 - 6.7 million.

Nishiguchi describes how these two industries developed different subcontracting strategies to cope with the demand demonstrating that the economy as a whole did not develop a single way forward.

suspension loans and the abolition of subsidies paralysed many firms cash flows and led to the labour strife. It was in this critical period when unionism was weakened and labour and management agreements gave more power to the latter. It was not until the Korean War that the Japanese economy got it's much needed kick start. This occurred for two reasons:

1. The U.S. government felt that Japan must be able to stand on it's own feet and act as a barrier to the spread of Communism in that region of the world.

2. The demand for munitions for the UN forces in Korea invigorated a dying economy. The economy consequently went through a rapid growth period. We refer to this as a game of win/lose as the large firms invested in more capable firms and the growth period and influx of revenue led to a demand for domestic product. In 1957, only 10% of the nation owned television sets. By 1963, this figure totalled more than 90%. The growth in demand for vehicles showed a similar dramatic rise, 1960 - 0.4 million; 1968 - 6.7 million.

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to explain the consequent structured tiering of the supply chain that occurred, defining it in his 'clustered control' model. Other authors such as Turnbull et al. (1992) and Richardson (1993) have explored this tiering. As obligatory contracting continued, value analysis, value engineering, profit sharing rules, supplier design innovations and various other pro-active and collaborative activities emerged. They did so in response to the long term nature of the contracting to form contemporary practice. If one is to agree that culture takes centuries and not decades to evolve, then the above historical development of subcontracting in Japan to the contemporary practice has not come about as a result of cultural or national characteristics as a dominant factor.

Putting potential Japanese cultural attitudes as key influences apart, authors continue to identify successful collaborative strategies based on Japanese approaches (Carlisle and Parker, 1989; Eltang, 1991; Macbeth and Ferguson, 1994). Like the IMP Group, Carlisle and Parker (1989) argue that one must see the interaction not only as a transaction, but as a relationship. Consequently, they argue that any successful relationship must between the two parties have;

- a high level of clear communication that leaves neither party with misunderstandings of how the relationship is
- a sensitivity to each other's needs and a high level of pro-active work to deliver the needs of the relationship
- a willingness to risk becoming vulnerable to the other party with a confidence that advantage will not be taken
- a trust that both parties will do as they say they will do

These all fall within the bounds of Sako's (1992) 'goodwill trust'. It is this level of trust that Sako et al. (1995) argue still does not exist within the UK automotive industry therefore leading them to the conclusion that;

"the perceived increase in commitment from vehicle manufacturers towards partnerships does not appear to be resulting in practical benefits, with non-partnership suppliers appearing to do just as well or even better than partnership suppliers".

Cousins (1994:318) questioned this theory proposing that perhaps it is 'interfirm dependency' that is the most important factor in fostering a long term exchange between two firms. This work will be further explored in the final section.

2.3 Trust

The concept of trust as an important factor in any relationship is accepted by most cultures and societies yet its definition can vary somewhat. As Barber (1983:1) noted;

"As with other emotionally charged words, such as love and duty, we are in a verbal and conceptual morass."

Nevertheless, Barber concluded that because of the wide nature of meanings and synonyms associated with it, trust was an integral part of all social relations. Blau (1964:99) in his work on social order and social exchange commented that trust was "essential for stable social relationships."

In a social context, Barber went on to define trust fundamentally in three forms of expectancy:

- expectation of the persistence and fulfilment of the natural and moral social orders. (Sako's 'contractual trust?' 1992:37). In an economic context Diamond (1971:31) described this as;
  "Individuals playing a game with fixed rules that they obey. They do not buy more than they know they can pay for, they do not embezzle funds, they do not rob banks."
- expectation of technically competent role performance from those involved with us in social relationships and systems. (Sako's 'competence trust?' 1992:38). ie; trust that people or organisations perform to their declared technical competence and do not take short-cuts that could effect others.
- expectation that partners will carry out their fiduciary obligations and responsibilities; that is, their duties in certain situations to place others interests before their own. (Sako's 'goodwill trust?' 1992:38).

Barber focused briefly on the existence of trust among business firms. He argued that economists who upheld the competitive market model including opportunism, also conceded that trust between firms was important; Arrow, 1975; Hirsch, 1978. Arrow (1975,24) stated that;

"virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time", and that in world economics, much backwardness could be explained by; "the lack of mutual confidence."

In his work on economic altruism and morality, McKeen (1975:30) concluded that even in the earliest history of man;

"It must have been apparent to almost everyone that it was economically better if each person could have considerable confidence in the other's word regarding exchanges."

True to their profession, economists attributed the value of trust in terms of cost and efficiency. McKeen (1975:29) stated that 'Greater ability to trust each other to stick with agreed-upon rules would save many costs'.

Luhmann (1979) argued that trust would reduce complexity for individuals and systems by stabilising relations.

Macaulay (1963:64) viewed the concept from the other extreme by arguing that in a business context, the cost of not being trustworthy would be; 'both monetary and non-monetary'. Arrow (1976) summarised the position; "trust has a very important pragmatic value, if nothing else. Trust is an important lubricant of a social system. It is extremely efficient; it saves a lot of trouble to have a fair degree of reliance on other people's word."

Although all of the above authors advocate trust as a fundamental success factor to close relations, it is still a commodity that cannot be acquired easily. Arrow (1974:23) commented that if you had to buy such a commodity then you would instantly begin to question what you had bought. He termed trust among other values such as loyalty as 'externalities';

"They are goods, they are commodities; they have real, practical, economic value; they increase the efficiency of the system, enable you to produce more goods or more of whatever sellers you hold in high esteem. But they are not commodities for which trade on the open market is technically possible or even meaningful."
In this he meant that trust alone would not sustain a market or a relationship. Other governance structures would be required to hold that interface together, be it equity, law or dependency for example.

2.4 Dependency
Blau (1964) in his work on exchange and power in social life identified ‘power-dependence’ relations. He described the scenario where by supplying a service in demand to others, an individual or an organisation establishes power over them. If these services are taken up regularly and cannot be obtained readily elsewhere then a unilateral dependence and an imbalance of power is formed. This balance of power will only be addressed to form a mutual dependence if other benefits or services can be offered in return. Emerson (1962) examined further the options that an individual or an organisation has when needing a service that someone else has to offer; Firstly, they may obtain the services elsewhere, assuming that there are alternative suppliers. Secondly, assuming they are able to do so, they may coerce the provider into furnishing the service, therefore establishing a domination over the provider. Thirdly, they may learn to resign themselves to do without the service, possibly finding a substitute. Fourthly, they may have no choice but to comply with the providers wishes and take the service, losing power and becoming dependent. Finally, they may supply the provider with a service that is wanted badly enough to engender a reciprocation of services. This reciprocal exchange forms a mutual interdependence (Axelrod, 1984).

The discussion above can be applied to various forms of exchange from social to business types. This research will attempt to understand the role of ‘power-dependence’ relations between buying and selling firms who choose to transact with each other repeatedly. What can a buying and a selling firm offer each other that will foster collaboration and a mutual dependence? Blau (1964) concentrated his work upon social exchange but some interesting parallels can be drawn. In an excess on love he noted (1964:84):

"Only when two lovers’ affections for and commitment to one another expand at roughly the same pace do they tend mutually to reinforce their love."

Can the same conclusions be drawn between two firms when substituting love for collaboration, and affection for the desire to collaborate with each other to gain mutual advantage? This is a key element of this research. Can our individual understanding of such things as trust and dependency in a sociological perspective be transferred into an organisational context? Put another way, is there a distinction between individual and organisational trust and dependency.

In 1995, Sako, Lamming and Helper prepared a report to update the DTI on the development of relationships in the UK automotive sector. Although it was stated that levels of trust had improved, one of the conclusions of the report was that (1995:4):

"The perceived increase in commitment from vehicle manufacturers towards partnerships does not appear to be resulting in practical benefits, with non-partnership suppliers appearing to do just as well or even better than partnership suppliers."

One of the reasons suggested was that in the UK, suppliers who prefer partnership relationships have too many customers with differing demands, some of which are inconsistent with the establishment of partnerships. This point raises a question of dependency. If a supplier has many customers, can a level of mutual dependency exist with any of them? Are buying and selling strategies in this market diametrically opposed limiting the success of collaboration i.e.; buyers focusing on relationships with fewer suppliers, whilst suppliers still aiming to provide the same level of service to all interested customers? Or is it simply a mismatch in perceptions between the two parties as to what the relationship is (Harland, 1995)?

Cousins (1994) argued that the level of interfirm dependency would be the single most important factor in determining the relationship strategy:

"It would appear that the main reason Firm A, buys from Firm B, is because they have made a decision to become dependent upon them; trust does not enter into the equation. When Firm B, ceases to provide what Firm A requires, they are replaced."

Cousins went on to formulate a relationship sourcing model based upon this premise (Figure 3).

He argued that co-operation only occurred where interfirm dependency was present and the extent of the collaboration was determined by the level of certainty of repeated interface (the IMP’s routinisation of exchange episodes). Where interfirm dependency did not significantly exist nor would co-operation, and opportunism, and in the most extreme adversarial behaviour, would be present.

![Figure 3. Dependency and Sourcing Strategies](source: Cousins (1996))

Sako’s (1992:11; see Figure 1.A.) features of ACR-OCR patterns reflect Cousins model. In Arms Length Contractual Relations both buyer and supplier seek to maintain low dependence by trading with a large number of companies. In Obligational Contracting Relations, the avoidance of dependency is not a high priority for either buyer or supplier.

In his work ‘The Evolution of Co-operation’, Axelrod (1981:126) developed a number of features of the ‘prisoner’s dilemma’ that promote mutual co-operation. These features are also evident in high dependency interactions. He argued that as long as the interaction is not iterated, co-operation is very difficult. Co-operation is promoted when the same two individuals (or firms) interact repeatedly, are able to recognise each other from the past and are able to recall how the other has behaved. This continuing interaction is what makes it possible for co-operation based on reciprocity to be stable.

Axelrod also argued that co-operation can be stable if the future is sufficiently important to the present and the players can use an implicit threat of retaliation against the others defection, if the interaction lasts long enough to make the threat effective. In short term low dependence relationships this factor is not important as a unilateral defection can occur without the exchange mechanism for damaging
What role does interfirm dependency play in the effectiveness of collaborative strategies?

In collaborative strategies, is trust and dependency intrinsically linked or mutually exclusive?

4. Methodology

The UK automotive industry, specifically the customer-supplier interface of Rover Group Ltd and its production parts suppliers will serve as the setting for this research. Various research methods will be employed to collect data. The target informants on both sides of the interaction will be as follows: At Rover Group Ltd the whole Purchasing function (at all levels within the organisation structure) including Buyers, Purchasing Managers and Directors, Supplier Development and Process Improvement Engineers. Other functions that interface with suppliers will be captured, specifically Staff Engineering personnel. A number of production parts suppliers will be targeted at Managing Director, Key Sales Account Manager and Engineering Management level. Consequently, the key personnel that both participate in, and formulate, buying and selling strategies will be covered giving both a management and a practitioner perspective.

The research methods will be structured firstly to identify the reasons why firms do or do not choose collaborative strategies, and secondly with the aid of a set of constructs and measures; (Zaheer and Venkatraman, 1995), the roles of interfirm dependency and interfirm trust in collaborative strategies will be investigated in isolation and in conjunction with each other. This phase will also test the individuals sociological understanding of such things as trust and dependency, in an organisational context.

4. Conclusion

The above passage poses a dilemma that we face in both a social and a business context, i.e. when should one choose to act either only with self interest, or with the consideration of others in mind? The focus of this research will address this dilemma in a business context, when organisations consider long term interfirm collaboration. The boundaries between the individual (who ultimately affect relationships) and the organisational (who ultimately set out the relationship strategy) perspective will be explored. It is hoped that the research will guide practitioners in both buying and selling organisations who are considering such a strategy. The roles of interfirm dependency and interfirm trust will be examined in order that practitioners can assess the suitability of existing or potential collaborative partners against their business objectives.

It is the authors view that the study will determine that mutual dependency, in terms of for example a type of product, service, technology or level of investment is the key to long term collaborative relationships. If the dependency is unilateral then the opportunity of defection will lead to instability in the relationship, and the importance of the level of inter-personal or inter-organisational trust is somewhat diminished. Consequently, trust alone in whatever form is insufficient as a stabilising mechanism in long term economic exchanges.

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SUPPLIER DRIVEN PARTNERSHIPS

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ABSTRACT

Partnership initiatives are in the main initiated and driven by a larger customer working with a smaller supplier. This case study demonstrates the strategy that is being used by a large supplier which seeks to initiate and establish a partnership style relationship with much smaller customers. British Steel Strip Products (BSSP) has an annual turnover of approximately £1.6 billion compared to the 1 first tier automotive presswork customers identified for inclusion in this programme who in the main have a turnover of less than £100 million. They are not supplied directly by BSSP but via steel service centres which process the steel coils to meet customer requirements. Historically BSSP has been viewed by these customers as a large organisation operating in the background. In recognition of the structural changes taking place within the automotive supply chain which place significantly increased responsibilities on these indirect presswork customers BSSP decided to develop a partnership strategy to support them which would benefit the whole chain.

Key Words
Partnership
Strategy
Customers
Suppliers

Introduction

Partnership initiatives are more usually instigated by a large customer with a smaller supplier. This paper details the strategy used by a large supplier (BSSP) to initiate and establish partnership style relationships with much smaller indirectly supplied presswork customers. British Steel Strip Products is part of British Steel plc which is the fourth largest steel company in the world and produces over twelve million tonnes of steel p.a. at various manufacturing sites across the UK. Most of the major European vehicle manufacturers are supplied by British Steel and approximately 20% of total production is supplied into the automotive industry.

BSSP has an annual turnover of over £1.6 billion and employs around ten thousand people. This compares to the 1 first tier automotive presswork customers identified for inclusion in this programme who in the main have a turnover of less than £100 million.

These presswork companies are not supplied directly by BSSP but via steel service centres which process the steel coils produced by BSSP to meet customer requirements. Historically BSSP has been viewed by these indirect customers as a large organisation operating in the background. In recognition of the structural changes taking place within the automotive supply chain which place significantly increased responsibilities on these customers BSSP decided to develop a partnership strategy to support them which would benefit the whole chain.

This paper will explain the background reasons why this strategy was adopted and give an outline of the structure of the programme and some of the work undertaken. It is intended demonstrate that it is possible for smaller companies to have successful and useful partnerships with much larger suppliers and that partnerships can be initiated by suppliers.

Background

BSSP recognised that major structural changes were and are still taking place within the automotive supply chain. Some of the key trends identified which have a major impact on first tier companies are ongoing supplier reduction programmes, the planned growth in outsourcing and the increasing requirement for systems solutions.

Almost every European vehicle manufacturer (VM) is engaged in dramatic supplier reduction programmes slashing the number of direct suppliers and indirectly creating a supplier tiering structure. Simultaneously the VMs are dramatically increasing both by volume and value the proportion of work which is outsourced. First tier suppliers need to become system providers able to design and integrate products in ever shorter lead times. It is not intended to examine this process in detail but to note some of the major consequences for the first tier presswork companies.

Firstly there will clearly be fewer first tier companies supplying directly to the VMs. These companies will have to take on a greatly increased responsibility for product design and liability and material specification and selection. They will have to engage in major supplier reduction and development programmes with their own supplier base and pass increasingly sophisticated logistics systems such as EDI.
scheduling and synchronised deliveries down the chain. They will need to work in partnership with customers and suppliers in order to achieve the cost reductions essential to retain competitiveness.

It is recognised that steel can account for up to 50% of the total costs of the automotive presswork companies and as such the strategic decision was taken that BSSP are ideally placed to provide help and assistance to meet these challenges and that any strategy which helps to improve the overall competitiveness and strength of these companies will be to the advantage of the whole supply chain.

Historical supply chain communications

Historically within this particular supply chain routing communications have been on a one to one self contained basis (Figure 1). This tends to result in some duplication of efforts and an amplification of schedule variation. Direct communications do not exist between all parties for different supply routes. For example BSSP and the service centres supply direct to the vehicle manufacturer. One aspect of the partnership initiative is to build upon existing links and establish new ones so that all the parties in the chain can work together to reduce waste and improve overall competitiveness.

Figure 1. Historical Supply Chain Communications

BSSP Partnership Strategy

The partnership strategy has been started with a range of related initiatives which concentrate on commercial and technical support to the selected customers. Some examples are given below.

Supplier Days

A supplier day is organised specifically for each individual customer. The day is based at a BSSP site and is attended by a multifunction range of customer representatives covering purchasing, technical, production, and sales. A range of BSSP and service centre personnel attend covering commercial, technical, production and logistics areas. Several presentations are made by BSSP covering the partnership initiative, overall commercial objectives and strategy, organisation structure and the customer technical services that are available. Discussions also take place on general supply chain issues. A detailed presentation is also given on a subject agreed in advance of particular interest to the customer eg High Strength Steels. A presentation is given by the customer outlining their organisation and what they are looking for from their suppliers. The day includes a tour of a BSSP production facility so that the manufacturing process can be explained and a detailed tour of the Customer Technical Centre (CTC).

As part of the CTC tour customers are introduced to key technical experts covering specialist subjects such as example forming, welding and bonding. Practical demonstrations are given of the type of assistance available to customers in the areas of problem solving and new product design and development utilising technologies such as laser cutting and welding for example.

The day ends with a round up session where follow up actions are agreed and champions nominated for any specific issues that have been raised. The service centres are closely involved in all activity to ensure the co-ordinated effort of the whole chain. In the main a follow up meeting with representatives from all parties usually takes place at the customer’s premises.

Specialist Supplier Days

The specialist supplier days are arranged for customers to cover specific topics which are jointly agreed to be of particular interest. The events are entirely funded by BSSP and utilise the services of outside experts. It is usual for more than one customer to attend the same event and as such they provide an opportunity to discuss practical experiences in the particular subject area. The main topic covered to date has focused on the cultural and commercial aspects of how to approach business dealings with Japanese companies. This is particularly relevant in light of the projected growth in demand from the UK based Japanese manufacturers. Other days are also being run on Finite Element Analysis (see below) and other topics are under discussion. In addition technical courses specifically tailored to customer requirements are run by BSSP technical staff at the Customer Technical Centre.
Finite Element Analysis (FEA) programme

BSSP has identified Finite Element Analysis with specific reference to material performance in the press as a key technology for reducing up front development costs and lead times. It can also be used to optimise material specifications and blank shapes in advance of tool completion thus cutting press try out time and initial production problems. Where appropriate FEA can also be used to help resolve problems in producing existing parts. In order to demonstrate and prove the advantages of this technology BSSP has in addition to its own FEA facilities awarded a major contract to an independent university based company under which resources are dedicated to the presswork customers. A series of seminars are being run in the format of specialist supplier days detailing the practical workings of the technology and exploring real applications. By providing this service BSSP is funding the ongoing development of this technology and proving its practical advantages so that customers can gain confidence in its long term use and make judgements with regard to possible future investments in FEA capabilities.

Early Vendor Involvement

As a part of the technical support offered to customers BSSP actively promotes and supports the involvement of the material supplier at the part concept and design stage in order to optimise the material solutions. Part of this process includes the proving and trialing of new technologies such as laser welding and the computerised modelling of parts using FEA. This service is seen as offering key support to customers whose responsibilities in this area are increasing all the time.

Consultancy and support activities

BSSP fund a team of consultants to support the pressworker supply chain with the aim of improving overall competitiveness by offering advice on operational and strategic issues. Support and advice is offered on various cost down initiatives and supply chain management issues as well as specifically requested customer projects. Internal BSSP resources are also made available to offer specialist advice on topics such as EDI. Links have also been established with industry bodies such as the Society of Motor Manufacturers and Traders so that relevant data and developments can be fed back to customers. The team helps to facilitate and implement the various aspects of the programme and actively promotes the partnership approach through the whole supply chain.

Supply Chain Management

One aspect of the partnership approach are developments in several areas of supply chain management. Some examples are given below.

1) Supply chain mapping.

Working with pressworkers and VMs the routing for particular parts are mapped through every link in the supply chain from raw material to finished product. This means that when an order is placed for raw material the quality requirements of the final part can be fully understood and monitored at every stage of production. This mapping through the whole supply chain also creates opportunities for pooling low volume requirements of specialist materials and enables material availability to be more readily checked if a problem occurs.

2) Process Mapping of Logistics Interfaces

Through meetings involving representatives of each member of the supply chain it is possible to map the mechanisms used to generate orders and scheduled demand from VM through to raw material. By working in partnership it is possible to remove duplication of effort and reduce the time taken for information to get through the chain. For example a simple reconfiguration of data can mean the need for the complete rewriting of information. This work can also be used to prepare the systems for the implementation of EDI.

3) Total Stock Reduction

By working in partnership it is possible to reduce the total stock held in the supply chain through a better understanding of the demand pattern. The composite product lead time from raw material to VM can also be reduced through the implementation of pipeline supply arrangements which work on the basis of continuous replenishment and agreed call off mechanisms. By targeting key items using Pareto analysis of consumption and risk assessment buffer stocks can be planned and controlled and thus kept to a minimum.

Joint Cost Down Teams

As material can represent up to 50% of the total product cost potential opportunities exist for material optimisation which can have a significant impact on the finished product cost. In order to address this joint teams have been established consisting of commercial and technical representatives from BSSP and the service centre and the presswork customer. Regular team meetings are held and various techniques used to provide and access possible cost reductions. For example changes in material specification, size, thickness etc. In specific cases where a particular part is considered in detail VM personnel also form part of the team.

Once established these teams can develop a wider focus and consider new product optimisation and alternative process options ahead of production leading to a simultaneous engineering approach.
New Supply Chain Communications

As a result of the BSSP partnership initiative new supply chain communications have been established and continue to evolve to the benefit of every member of the chain. Figure 2 illustrates this.

Figure 2. The New Supply Chain Communications

Summary of Advantages and Benefits

As with any successful partnership all parties must perceive and believe that there is something to gain from the relationship. For BSSP there is the expectation of retaining existing business and growing with the customer as that customer wins new business. For the pressworker the partnership provides access to a host of technical and commercial resources which it would probably not be cost effective to duplicate at an individual company level. The partnership also helps indirectly in the winning of new business by generating improvements in competitiveness. The whole chain benefits from the cost reductions which can be achieved providing a more competitive supply route to the VM and ultimately the end user.

Future plans

It is planned to have invited selected key customers to take part in the programme and held an initial supplier day with all of them by the middle of 1996. Several additional topics are under consideration for the specialist supplier days and plans are being explored to expand dramatically the amount of consultancy expertise offered under the programme by linking with a UK University.

Opportunities for purchasing/logistics

Whilst this initiative is supplier generated there are a number of implications to be considered by purchasing/logistics personnel. One aspect is that they could be instrumental in persuading their company to instigate partnership programmes with customers. This will create opportunities for supply chain management and cost reductions involving joint work with customers and suppliers for example in reducing total stocks and lead times. Also the closer involvement of purchasing/logistics personnel with customers will provide an additional and very useful perspective which in turn can be reflected in their own requirements to suppliers.

Conclusions

The partnership initiative has been well received and is beginning to show benefits for all parties involved in the process. As with any partnership programme a lot of time and effort is required to build up trust and establish relationships and this can be even more difficult where direct customer contact is not part of the day to day trading relationship. Whilst some of the shorter term cost reduction benefits can be fairly easily quantified other benefits are longer term and difficult to quantify - for example establishing communications and links that ensure a problem does not arise in the first place.

Enlightened suppliers realise that it is in their own interest for their customers to be successful and once this is fully accepted a partnership programme which is designed to aid success is an ideal strategy to pursue. By working in partnership a smaller company purchasing from a much larger supplier can take advantage of resources and expertise which would be difficult to self finance and as a result can offer extended services to their own customer.

The potential for partnership should not be viewed only as a one to one relationship between two companies but as an opportunity for all the elements of the supply chain to work together to eliminate waste. Competitive advantage will only be achieved through co-operation not confrontation.

As this case study shows smaller companies can have successful and useful partnerships with larger suppliers and partnership initiatives can be instigated by suppliers as well as customers.

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Environmental Legislation and the Supply Chain
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Abstract
This paper examines the potential impacts of environmental issues on supply chain management. With reference to some emerging concepts in environmental management, and their relevance to supply chain management, the research reviews European environmental legislation, its formulation process and expected future courses, together with its implications for supply chain management. The conclusions reached are that as environmental pressure grows, so will legislation, and although compliance with environmental legislation is important, it is, in itself, no guarantee of improved environmental performance. Environmental performance should be considered as inherently sized business practice, and a strategic issue for organisations. As such, supply chain managers who deal with the issues proactively, should provide a powerful means by which to contribute to sound environmental and competitive performance, through collaboration with supply chain partners and industry trade bodies.

1. Introduction and Background
The research upon which this paper reports forms the basis of a six month collaborative venture between London Underground Ltd (LUL) and CRiSPS. The area chosen for this research was based on a subject of mutual interest to both parties: the objective being to assess the extent to which current and future European environmental legislation will affect the supply chain. Based upon past experiences and the costs of safety compliance, LUL is concerned that, unless a proactive and preventative approach is taken to environmental issues in the supply chain, the costs associated with purely reactive measures (which are taken in a short time frame to comply with environmental regulations) will be exorbitant, and will prevent the achievement of best value for money in external expenditure. The principal outputs of the research are intended to provide a springboard for a proposed 3 year research project at CRiSPS, on Environmentally Sound Supply Chain Management (ESSCMo).

2. The Environment
Although much of the business community may have felt that the level of environmental concern that was reached in the late 1980s may have diminished, public awareness has evolved steadily through the past three decades. Described by British politicians in the 1970s as 'ecomanics' and 'emotional misfits', the environmental lobby gradually transformed the environment into a central issue in the 1980s, taking advantage of the discoveries of ozone depletion and global warming. In fact, environmental concern through the years has generally has tended to follow a cyclical trend which appears to be correlated with economic prosperity (Downs, 1973; Cairncross, 1995). However, although media attention and general concern may fluctuate, having achieved a certain level of political legitimacy, the issue is unlikely to disappear for any great period. This is because until the causes are addressed, environmental problems are likely worsens (Forsyth, 1996), and even as they are addressed, the recovery process will be slow (for example, returning the ozone layer to its original state may take another 200 years.) As the effects of pollution become more visible and affect more people, so pressure will grow further. It is likely, therefore, that the peak of concern at the last cycle will form the base of concern in the next cycle. For example, Cairncross (1991) shows the growth of total membership of seven environmental groups over time, which has increased cumulatively to new levels of public concern with each cycle.

3. The Business Perspective
Traditionally, business has opposed much of the pressure from public interest groups and government, in the belief that improving environmental performance will require a necessary increase in costs, with a resulting loss of competitiveness. As Warhurst (1994) argues, industry in the past has been structured to externalise environmental costs and therefore to achieve profit maximisation through the use of undervalued resources, and shifting the environmental cost on to others (traditionally society), rather than through efficiency and innovation. Porter (1995) explains that this is largely because the attitude which has prevailed has perpetuated the idea that there is an inherent and fixed trade-off between ecology and economy: social benefits versus private costs for clean up and prevention, which raise costs. This view is very similar to the 1970s Limits to Growth theory, and although this theory has now been widely dismissed, a great deal of environmental legislation has been developed with this trade-off view in mind. Such 'command and control' legislation has therefore generally been directed towards penalising pollution if it occurs, having set maximum possible discharge limits, and minimum levels of environmental quality.

The research found that this approach to the development of environmental legislation is beginning to be questioned, and will be discussed later in this paper. However, it is necessary to deal with the business and supply chain issues regarding environmental legislation as it is currently designed.

As the current penalties for polluting appear to be tightening, with increasing pressure from the EC, so organisations are faced with a number of new risks to their businesses. Penalties for exceeding set levels can result not only in heavy fines, but also in the imprisonment of directors and employees. Miller and Szekely (1995: 324) argue that the commercial value of environmental risk 'is at least the value of the fine that a company would have to pay to society where specific environmental damage occurs.' For Exxon, after the Alaskan oil spill, this amounted to $3.5 billion, plus $5.2 in damages to the local community. Employees are also identified as a growing source of pressure for companies to perform well, either as they begin to feel the source of pressure for companies to perform well, either as they begin to feel the
effects of pollution themselves, or as they do not wish to be associated with a recognised polluter.

The 'stakeholder' concept is now beginning to be recognised in some companies as a means of addressing some of these issues. However, sight must not be lost of the fact that business exist to make profit, and so any stakeholder analysis must necessarily include both the suppliers and customers of the organisation, as they have a direct and real 'stake' in the performance of the business. As the scientific evidence does not yet exist to determine the real environmental impact of a firm's operations, Miller and Szekely (1995: 325) argue that companies need to appreciate what each of their internal and external stakeholder groups understands by environmental performance. 'Green is a continuous process with respect to improving environmental performance. It would be erroneous to suggest that green is a fixed state that users of the environmental can eventually reach. Rather, green is a path to be taken, with obstacles, wrong turns, and achievements along the way. Companies do not become green; they become greener...'

The 'threats' of poor environmental awareness and performance, therefore are being recognised as significant, and are currently the main drivers for most organisations, in dealing with the environmental 'imperative'. However, there is growing evidence to support the belief that environmental performance is not necessarily a fixed cost, in terms of compliance, but it is in fact inherently related to good business practice. Put simply, pollution can be understood as 'waste', and is therefore indicative of some business inefficiency (Warhurst, 1994; Burt, 1995). It is a 'sign that resources have been used incompletely, inefficiently or ineffectively' (Porter, 1995: 122). It also requires additional cost, for example in terms of dealing with hazardous materials, double handling of returned or recycled products, and disposal and clean-up activities, all of which add cost, but little value. The concept of 'Resources Management' (Burt, 1995) and 'Resource Productivity' (Porter, 1995) are therefore emerging as the new thrust behind the acceptance of pollution avoidance in to the heart of business management. The new 'risk' that the environment poses lies in the opportunity cost of using resources inefficiently, because poor utilisation of resources creates waste and defects. For example, discarded packaging wastes resources and adds cost, but customers often do not view this as something for which they have paid - it is often treated as 'free'. As Porter argues (1995: 123), 'like defects, pollution often reveals flaws in the product design or production process.' therefore use inputs more efficiently, eliminate unnecessary activities, and hard to handle products.

This new view of environmental management fits well with the concept of 'lean'. (Warhurst, 1994; Lamming & Hampson, 1996). A truly lean enterprise is one which manages to produce goods with half the inputs (materials, time, labour, space), and produces twice the value (Womack et al, 1990). 'Lean production is driven by a simple principle: the elimination of all costs incurred that do not add competitive value to a product. Secondary principles include the reduction of waste, utilisation of space, the elimination of inventories, and the integration of quality control within the production process.' (Warhurst, 1994: 164). Hindle, et al (1995) build on this idea, suggesting that the critical management between environmental management and product stewardship, which is a concept that recognises that the company's value lies well beyond the traditional boundaries of the firm: it includes the environmental impacts of goods upstream and downstream in the supply chain, from raw material extraction to final disposal. 'Thus it is logical for the proactive company to look not only at its own processes, but up and down the chain of materials sourcing, production, distribution and use.' (Smart, 1992: 170).

Modern theories of the firm as described by Cox (1995) suggest, in essence, that firms should identify and concentrate upon their core competencies crucial to their prosperity and put all other activities to make-or-buy review. The more specific a competence to the 'core', the closer the optimum supplier relationship. This is sometimes termed the 'nexus' of contracts approach (Williamson, 1990). The four main types of core competencies are identified as:

1. Site Specificity (Resource Immobility)
2. Physical Asset Specificity (Technological Advantages)
3. Human Asset Specificity (Know-How Advantages)
4. Dedicated Assets (Specialised Investments)

Cox believes, 'it is these skills (key competencies) which a firm must retain internally at all costs.' He quotes Rees who argues that (commercial) strategy is 'the match between a firm's unique resources and its relationship to an ever-changing environment to attain its best performance.' Based on these core competencies, five types of key competencies can be identified, each of which allows differing potential for influencing environmental performance and for risk transfer or burden sharing arrangements:

- Adversarial Leverage
- Preferred Suppliers - a restricted number of suppliers selected and managed by vendor rating and accreditation
- Single Sourcing
- Multi sourcing
- Diversity

4. Supply Chain Management

Supply Chain Management is concerned with the regulation of the flow of materials and information between customers and suppliers. It is the connected series of activities which is concerned with planning, co-ordinating and controlling material, parts and finished goods from suppliers to the customer. the scope of the supply chain begins with the sources of supply and ends at the point of consumption. (Warhurst, 1994: 164). A truly lean enterprise is one which manages to produce goods with half the inputs (materials, time, space) and produces twice the value. The four main types of core competencies are identified as:

1. reducing the total amount of resource (materials, energy etc.) used in the production and use of a unit of service or of goods;
2. the extension of the life of that unit; and,
3. the reduction of the unwanted side effects of the unit throughout its life including pollution, and waste.
4. reuse, recycling or incineration with energy recovery at the end of a products normal useful life, instead of disposal to landfill.
Network Sourcing and Partnerships — the ultimate extension of external partnerships without vertical integration

Strategic Supplier Alliances — these are negotiated, single sourced relationships with a supplier of a product or service.

It should be noted that although some laws specify mechanisms whereby environmental risks can be transferred from one point on a supply chain to another, the main opportunity for transferring environmental risk up and down the supply chain, or alternatively for burden sharing arrangements, must lie with normal business relationships. The ‘nexus of contracts’ approach, argues that the role of purchasing should be one of the key elements of organisational strategy as a whole, in addition to its traditional commercial duties. This will encompass, among other things, some form of environmental management. The fact that there is little evidence of such arrangements in existing currently, is likely to be due to the recent revival in environmental concern, coupled with a general lack of awareness on the part of busy purchasing departments.

If an organisation that can be seen as a ‘nexus of contracts’ then environmental improvement can be brought about in two main areas:

1. reduction in the environmental impact of core activities;
2. reduction in the environmental impacts on upstream and downstream supply chains.

5. The Role of the Supply Chain in Environmental Improvement

As discussed, purchasing therefore presents a strategic opportunity to influence and manage a substantial part of an organisation’s environmental performance. This role is likely to grow as environmental pressure increases and organisations develop along the lines of the ‘nexus of contracts’ approach. Intra-value chain co-operation would appear to be a fundamental element of any environmental strategy, with the benefits from such collaboration (e.g. process improvement leading to waste reduction) being fed back into the supply chain. Indeed, as very few companies are involved with each stage in the life cycle of a product, and as both suppliers and customers have a vested interest in each other’s success, then a collaborative approach to environmental issues may prove to be an effective means of reducing supply chain environmental impacts.

Building on the concept of the circular economy (Johnson, 1994), a simplified model is proposed (Appendix 1), demonstrating the potential cyclical and linear material and energy flows throughout the supply chain.

The linear economic model assumes that there is an unlimited supply of energy and raw materials and that the environment has infinite capacity to absorb pollution and waste. The overriding policy goal is to expand the amount of economic activity. As there is no market for ‘environmental assets’ such as clean air, they are given no economic value, with no allocation of property rights. The resulting linear economy is one where such assets are under-priced and over-exploited, and society as a whole bears the cost of remedying any negative effects, rather than the companies and individuals responsible.

By contrast, the circular economy model is based on a minimum input, maximum retention and minimum output. The efficiency of such an economy is defined in terms of effective use of resources. Under a circular model, the economy is managed on the basis that the aim is to maximise people’s well-being and improve the environment while reducing this throughput. The products of a circular economy are designed for durability, manufacturing output is relatively low and repair and reconditioning more common. Recycling only takes place after products cease to function. The environmental impact in a circular economy is reduced by increasing product life spans and by intervening at various points in the life cycle so that products (or their components) are reused, reconditioned or recycled.

This model in Appendix 1 enables a view to be taken of the supply chain which allows the use of Life Cycle Analysis to determine the totality of a product’s environmental impact, from cradle to grave. Employing the concept of resource productivity, it should enable managers to analyse the stages in a product’s life cycle which produce the greatest impacts (e.g. product in use), and to ensure that environmental problems are not simply ‘shifted’ from one part of the system to another, but where possible are eliminated completely.

Business in the Environment (BIE, 1992) identify four roles that purchasing departments can play in improving environmental performance:

1. the need to purchase products and services to certain environmental specifications;
2. the need to consider alternative products and services;
3. the need to evaluate the commitment and/or performance of suppliers; and
4. the need to work with suppliers to make improvements possible, or more cost effective.

Burt (1992) introduces the concept of Value Chain Pollution Avoidance (VCPA). Strategically, this addresses the complete value chain including the links between suppliers, the company, and its own customers, to eliminate pollution. This approach should have two effects: to reduce direct costs by generating less pollution per unit of production; and to lower resource depletion and waste production. Avoidance should not only minimise add-on expenses, such as collection, sorting, storage, transportation and disposal, but also concentrate on increased process efficiency and improved value added. As waste is paid for in different ways, for example using more materials per unit of production, or extra expense in handling waste, then in supply chain terms, customers are effectively paying for their suppliers’ wasteful processes and products, by purchasing their goods at prices which reflect the costs of production and of waste.

Burt argues, therefore, that organisations, including their suppliers, distributors and customers, must focus their collective efforts on reducing the total cost of pollution within their value chain. Recycling and re-using goods is only part of the solution, however, because although they may reduce the need for extra materials, or generate a small amount of revenue, they are essentially end-of-pipe solutions: they deal with the waste after it has been produced, rather than attempt to avoid it production initially.

To this end, Burt identifies, broadly, the areas of the supply chain which need to be addressed in order to eliminate pollution and waste. These are:

1. Customer specification
2. Quality requirements
3. Interface waste due to distance, and differing customer supplier processes
4. Company internal processing of materials: scrap, stock and transport requirements.
5. Progression down value chain to next processing / manufacturing firm in process
6. Post consumption waste, not consumed by end user.

‘Companies that adopt VCPA as the guideline for their environmental commitment put supply management right in the middle of corporate environmental management: value for money and environmental issues. Environmental impact is a threshold issue in supply.’ (Burt, 1995: 24)
Lamming (1996) argues that fundamental to the theory of supply chain management is the idea of exercising control of an identified sequence of activities from a vantage point. This vantage point is usually occupied by the firm or organisation conducting the last significant transformation of the product before it reaches the consumer. He discusses two strategies for supplier development: cascade and intervention. The cascade strategy in supply chain management entails passing the customer's ideas to the supplier, assuming that they will pass 'downwards' to the supplier's suppliers, and so on. The intervention strategy is based upon the belief that the customer is able to intervene in the supplier's business operations and bring about change for the better - so called 'supplier development'.

Roy and Whelan (1992), discuss the virtues of collaboration between companies, for the purpose of environmental improvement. These include:

- innovation fostered by cross-fertilisation of skills, and complementary knowledge of technology and markets;
- sharing of costs and risks;
- development of an industry standard which can influence other companies and exert pressure on firms across the entire product value chain to develop green practices.

They also found collaborators to be particularly useful in removing many of the barriers, e.g. information, that exist in stimulating environmental (improvement) activity. However, as with all type of collaborative arrangements, there will be practical problems to overcome, for effective implementation. As van Someren (1995: 30) says, "many questions remain open. For example: who takes responsibility to initiate the process; who will operate as the organiser for the whole chain; who will gain the economic benefit; are companies prepared to supply the necessary information; which distribution of co-ordination costs among firms will appear; who is interested in integrated chain management; and which new structures are necessary to reach sustainability." In addition, a member of a leading environmental group suggested, during the course of the research, that supply chain management may not be as effective a means of achieving environmental improvement as expected, for two related reasons. The first was that the length of some supply chains means that it could take an excessively long time for the effects of any programme to trickle down to suppliers, especially those which are far removed from the specific vantage point. The second point is whether in practice, sufficient influence may be exerted upon reluctant and distant members of the supply chain.

The environment, therefore presents a number of strategic challenges to business, beyond simple compliance with legislation, and which have particular significance for purchasing and supply chain managers. They may be summarised as:

1. Security of supply
2. Bought in risk
3. Increased costs passed on by suppliers
4. Inefficient resource management
5. Opportunity cost of wasted resources.

6. European Environmental Legislation

It has been argued so far that environmental issues can be related to overall business efficiency, and in particular poses a new strategic dimension for purchasing and supply managers to consider. However, for many organisations, the need to comply with environmental legislation needs to be addressed before proceedings with such concepts. The costs of compliance with environmental legislation arise from the enforced internalisation of costs previously borne by the environment (and therefore society) as a whole. There can be significant costs associated with meeting environmental legislation requirements and as Lamming and Hampton (1995) point out, since industry regulators often appear not to recognise the effort and time necessary to implement desired changes in environmental practices, and diligent supply chain management now may give companies 'room' to prepare for future restrictions and assess the most efficient ways of dealing with them.

The costs and implications of non-compliance, however, are not restricted to fines for non-compliance, or costs associated with ensuring that products and processes meet with particular legislation. They can also extend to the criminal conviction of directors and senior officials.

Where an offence under any provision of this Act committed by a body corporate is proved to have been committed with the consent or connivance of, or to be attributable to any neglect on the part of, any director, manager, secretary or other similar officer of the body corporate or a person who was purporting to act in any such capacity, he as well as the body corporate shall be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

The translation of environmental concerns into UK environmental legislation broadly occurs through three media:

1. Domestic legislation, which is increasingly put forward to fulfil international commitments;
2. Common Law (or case law) which operates in parallel to environmental legislation, and sometimes supplements it by determining questions of interpretation. It provides a means by which civil claims can be made against polluters, and in some cases, against the owner of the land from whom the pollution emanates, even if he did not cause it;
3. International obligations, the most significant of which are EC legislation, in the form of regulations, directives and decisions.

As the majority of the legislation which organisations operating in the UK face originates from the EU, the discussion concentrates on policy making at this level.

6.1 Research Methodology

In order to assess the potential impact of European environmental legislation on supply chain management, a comprehensive literature review was undertaken in the topics of law, the European Community and its law formulation processes, the environment, supply chain management, and non-legislative factors that impact environmental performance. Secondly, the existing body of European environmental law was reviewed and existing or prospective supply chain impacts identified and tabulated in the following categories:

- Existing European Environmental Legislation (with Supply Chain Impacts)
- Proposed European Environmental Legislation (with Supply Chain Impacts)
- Existing European Environmental Legislation (without Supply Chain Impacts)
- Proposed European Environmental Legislation (without Supply Chain Impacts).

The length and detail of these tables restricts their inclusion in this paper. They will be made available by the authors in October 1996.
This was repeated for legislation currently going through European Community legislative processes. Finally, a programme of interviews was conducted which attempted to:

• assess the likely future trend of environmental legislation and its impact on supply chains;
• discuss the purposes of legislation the interviewees would ideally like to see, even if the immediate prospects of enactment are remote;
• test the model of EC law formulation processes that had been drawn up following the literature search;
• discuss possible modes of influencing the law formulation process;
• discuss the role market instruments in improving environmental performance, and their supply chain impacts.

A model of the complex pathways through which European environmental legislation was subsequently drawn up and amended after testing, to identify possible influence points and to give an overview of the process as a whole.

6.2 The Nature of EU Legislation

The EC is the only international organisation in the world with the power to agree environmental policies binding on its member states... As more has been understood about the nature of transnational environmental problems... so the importance of international organisations and international law has become more obvious. The UK now initiates very little environmental law on its own and the main drivers for environmental change are usually items of European Community legislation. (McCormick, 1991:128)

The evolving Community legal order has established itself as a superior legal order operating within, but nevertheless independent of, the national legal systems of the Member States. The principles of this order have been largely derived judiciously by the Court of Justice. There are two key features of Community law. Firstly, as Community law is part of national law, national courts can and must apply it in accordance with the authoritative rulings of the Court of Justice. Secondly, the Community legal order is based on the transfer of sovereign powers by the Member States to the Community. As such, Member States can no longer exercise those powers which have been transferred to the Community, and must abstain from any acts which hinder the Community in its exercise of these powers.

In terms of the most significant forms of EU legislation, regulations are of general application, and are binding on all member states. They take effect directly, so that no national legislation is necessary to implement them. Directives are of general application, and are binding in terms of the results to be achieved, although the method of implementation is left to the individual state. This is the most common means of EU environmental legislation. Decisions, however, are only binding in their entirety upon those to whom they are addressed. In addition there are 'Soft Law' instruments such as recommendations, opinions, conclusions, declarations, action programmes and communiqués, which, while not legally binding, are used in an interpretative role, for example, by the European Court of Justice in its rulings.

The driving force behind the initial development of Community environmental law has been a collective desire by Member States to remove distortions in the internal market by 'harmonisation' measures such as the setting of common environmental standards. This 'soft law' technique enabled the Community to develop a competency in environmental laws. Changes in the EC Treaty made by the Single European Act (1986) essentially formalised the position.

By far the most common type of environmental legislation enacted is the Directive. This obliges Member States to bring in domestic legislation to meet the requirements of the directive within a given time frame, but permits them to do so in the manner they judge most appropriate. These directives have generally fallen within the bounds of one of a succession of Action Programmes on the Environment. Currently (at start of 1996) we are roughly half-way through the fifth such programme. At its most simple, the formulation process can be seen as a single linear process as in Figure 1.

Figure 1: EC Environmental Law Formulation (Simplified Model).

6.3 The Role of Environmental Action Programmes (EAPs)

EAPs are significant because they are an expression of intent as to the EU's future policy and legislative thrusts. They are not strict laws, but measures that set out the priority objectives to be attained within a given time-frame which are complemented by annual working programmes. The action programmes effectively have two main purposes. Firstly, they suggest specific proposals for legislation that the Commission intends to put forward over the next few years. Secondly, they provide an occasion to discuss some broad ideas in environmental policy and suggest new directions for the future. They cannot strictly be regarded as constituting community policy because of the 'general approach' that the Council adopts, which does not commit itself to each point of detail. (Haigh, 1994).

The nature of the EAPs has changed substantially from the early, reactive approach in the First and Second Programmes, which essentially concentrated on setting standards and emissions limits, to the more proactive stance in the Fifth Programme. The Fourth programme laid down many managerial procedures designed to improve environmental performance, and introduced the concept that environmental performance was a fundamental factor to be considered when economic decisions were being made. The Fifth Programme sets out to initiate long term changes in the EU's approach to the environment. It calls for the greater use of market instruments, the improvement of Community wide information sources and the use of financial supporting measures. (Pocklington, 1995).

6.4 Underlying Principles of European Environmental Law

European policy on the environment takes place within a framework of principles suggested in the successive EAPs, which have evolved over time, and which not only underpin its legislative framework in the environmental field, but also contribute towards formulation of judgements of the European Court of Justice. This is an area where there is ongoing debate and evolution. The main principles and their consequences are discussed below.
The Polluter Pays Principle: This makes the originator of pollution responsible for the costs of preventing pollution or the ultimate treatment and disposal of that pollution, no matter how remote the affected site is from the source of the pollution. Although the principle has wide public support it can be awkward to enforce in practice in a number of situations, for example where damage was not caused by negligence, or where an individual polluter was principally responsible for the damage (e.g. diffuse pollution from a large number of small sources such as car exhaust fumes).

The Precautionary Principle: The Single European Act adopted the Precautionary Principle that action should be taken if an environmental risk is known to exist, even if damage has not yet occurred. The 1986 Bonn Agreement on North Sea Hydrocarbons can be seen as an early example of this.

The Precautionary Principle: This was incorporated into Community law via the Maastricht Treaty of 1993. It is a more encompassing concept than the Preventative Principle in that action should be taken even if an environmental hazard could not be proved to exist but is merely thought possible. It further includes the early detection of dangers to health and environment by comprehensive synchronised research, particularly into cause and effect relationships.

Six further principles are now enshrined within the precautionary principle:

1. Preventative anticipation;
2. Safeguarding of ecological space;
3. Proportionality of response;
4. Duty of care;
5. Promoting the cause of intrinsic natural rights; and
6. Paying for past ecological damage.

Clifford Chance (1995) comment that the full implications of the Precautionary Principle are far from clear. In essence it is a 'just-in-case' policy, requiring action once it has been shown to a specified degree of probability that damage is likely to occur unless action is taken. Proponents of the precautionary principle see the current situation as one where new technologies are proposed in well regulated regimes and where public opinion is instinctively or knowledgeably risk averse.

O’Riordan and Cameron (1994) emphasise, the crucial role played by the notion of precaution in advancing the debate on sustainable development. Accordingly, they identify a number of appropriate regimes under which the precautionary principle may flourish:

- where new technologies are proposed in well regulated regimes and where public opinion is instinctively or knowledgeably risk averse;
- where the principles of regulation allow for judgement of what is socially tolerable;
- where there is a national culture of care for the less fortunate and the defenceless;
- where there is openness and accountability in policy formulation and decision-taking;
- The Proportionality Principle: Referring to both cost and gain, this requires a measure to be no more burdensome in terms of extra costs on industry than is necessary to achieve its objective. This has led to pollution measures in the UK being specified in accordance with the use of Best Available Techniques Not Entailing Excessive Costs (BATNEEC) as opposed to the older concept of Best Practical Means (BPM) which it will eventually replace.

These concepts should not be confused with the concept of Best Practical Environmental Option (BPEO) which requires that the environmental implications of all the disposal options available for the option chosen for the clean-up decision are evaluated and the option which produces the least environmental damage and which is consistent with current legislation. The Department of the Environment is drawing up a series of some 200 or so Guidance Notes which will lay down what is considered to BATNEEC.

The Proximity Principle: This holds that pollution clean-up should be conducted as close to the source of that pollution as possible. The principle also embodies the notion of the decision-making process as the ability of future generations to meet their needs. Under this principle environmental protection is to have equal status with financial considerations.

The Subsidiarity Principle: This principle requires decisions on policy to be taken at the lowest practical level. This can be seen as contrary to some of the other principles, which are either integrationist, in that they imply that a part of national sovereignty is surrendered in order to permit regulation by the EU, or politically neutral. Its adoption in the Fifth Environmental Action Programme has signalled a policy change towards simplification, consolidation and, in some cases, revocation of existing legislation.

The Justification Principle: This has recently been established by the case of Greenpeace v BNFL over THORP. It can be seen as an extension in English Common Law. It was held that in granting THORP its operating license then it was necessary to prove that the polluting activity was justified in the public interest. This forced a round-realistic cost benefit analysis on licensing bodies.

Problems can also arise where situations similar to zero/infinity dilemmas occur. This arises where there is a very small risk of an event coming about but should it do so, the consequences could be catastrophic. In these cases, the House of Lords Select Committee on Sustainable Development has advised that 'the Committee feels that where a lesser risk is associated with a very expensive precautionary response, it could well be better to promote further research than to embark upon premature action.'

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inconsistency between public fears and scientific analysis, while working in the media spotlight of a crisis, risks reactive agenda setting, and of passing symbolic legislation. For example, the premature adoption of catalytic converter exhaust technology in response to concern over acid rain and air pollution, precluded the development of the potentially better option of lean-burn technology engines.

The new Environmental Agency was set up in 1994 with the main task of collecting and publishing reliable data. Under the maxim 'What gets measured gets done' is likely that the attention focused on its results will be an agenda setting factor in the initial five year work programme. This covers some 93 projects, contracted to five 'Topic Centres': Air quality, Air emissions, Water quality, Nature, and Coastal and Marine life. Like many institutions, the agency, will be seeking to justify its existence and its ambitious start may presage an activist stance in future.

Reviewing the evidence from the literature search, the picture has emerged of EU environmental law-making processes which have become complicated, protracted and multi-channelled, and which demonstrate a high degree of instability. Opportunities may exist at many points for parties of all kinds to initiate and influence formulation processes. However, the processes are potentially so lengthy, time consuming and multi-faceted that to suppose that a single organisation acting alone could 'manage' the process to achieve their desired result with any degree of certainty of outcome must be fanciful. The best overall approach to influencing the legislative process would appear to be a flexible, dual-channelled one involving both European and Member State approaches. The membership of trade bodies, direct lobbying and use of professional lobbyists are all useful techniques. Both the Commission and European Parliament welcome well researched position papers, at any stage of the legislative process. Evidence from the USA suggests the quality of the data is the most important point in selling the message to the regulator, rather than the specific point in the process at which it is presented (Magat et al, 1986).

7. The Effectiveness of Legislation in Improving Environmental Performance

Approximately 450-500 pieces of European environmental law currently exist. Figure 2 show the body of law accumulated over the period 1967-1994. In addition there are numerous pieces of legislation currently under review.

There is insufficient data to judge whether the volume of law-making has plateaued or whether it is likely to accelerate. However, the year 2000 looks like a possible key turning point. Not only will the Fifth Environmental Action Plan have been implemented, but any changes arising from the Inter-Governmental Conference (1996) will have taken place, and the new Member States will have been fully integrated into the Union. At that point the fundamental question arises of whether the Union work towards higher standards, or chooses to settle for a 'lowest common denominator' approach.

Fig. 2: New Environmental Legislation Adopted by European Council

Source: IEEP

The current level of infringement of European legislation remains high, however. For example, during the years 1990 to 1992, approximately a third of all formal complaints to the Commission regarding non-implementation of legislation related to environment policy. (European Official Journal, 1993). This must raise the question of the effectiveness of European law in bringing about environmental improvement, and it might be argued that such a view assumes too mechanistic an interpretation of human behaviour. Legislation is only one factor affecting environmental protection. Market forces, moral persuasion, taxes, financial instruments, customer pressure, management systems, technological change and leadership also play parts in bringing about environmental improvement.

Legislation is argued to be effective when the situation demands the banning of particular processes, for example the Clean Air Acts which restricted smoke generating processes, or the use of certain substances, such as CFCs. It also works well when it introduces the need to adopt a particular technology, such as flue-gas desulphurisation, and in seeking to regulate diffuse sources of pollution. However, as a policy tool legislation can be problematic for a number of reasons:

- It encourages government to second-guess the market and technological progress about what is the best technology to achieve a particular goal.
- If legislation does not attempt proportionality between costs and benefits, it runs the risks of political counter-pressure and non-compliance.
- If legislation is not strictly enforced, it tends to load high costs on to enterprises which comply with laws and allow non-compliers a 'free-ride';
- Legislation tends to encourage a 'plateau effect' once a specified standard has been reached, there is no incentive to improve beyond the standard.

Warhurst (1994) in a review of the limitations of environmental regulation in the mining industry claims that environmental performance is more closely related to its capacity to innovate than to the regulatory regime within which an organisation...
operates. She also suggests that firms who innovate can gain competitive advantage, while those who merely react to environmental pressures in a reactive add-on manner may eventually be forced out of business. She further argues that national regulations do not reflect the propensity of a particular operation to pollute. Rather, they deal with the symptoms (pollution) as opposed to the causes (production inefficiency, human resource constraints, poor technology). As such, there is a tendency for it to emphasise end-of-pipe, add-on and capital intensive solutions.

It can be argued therefore, that environmental legislation is a significant vector for environmental improvement, particularly for poorly performing organisations, and a framework of minimum standards that must be complied with. However, the threats of non-compliance, whether in terms of fines, prison sentences or clean-up penalties are only one side of the equation of which organisations should be aware. Commercial pressure, whether from educated consumers, or from proactive industrial customers, recognising the importance of the supply chain in addressing some of the issues is likely to be the key motivation behind environmental performance, particularly as many organisations will realise significant business efficiency benefits in the process.

8. Conclusions


Conditions necessary to operate:

1. Human and environmental safety
2. Compliance with legislation

Conditions for sustainability:

3. Efficient resource use and waste management
4. Addressing societal concerns

Legislative compliance is therefore only one environmental factor, and does not guarantee an improvement in environmental performance, nor does it necessarily guarantee public goodwill, as the Brent Spar oil rig incident demonstrated. The improvements, and associated business benefits which should accrue, require the re-examination of resource management and environmental risk, a key element of which will be role of the supply chain. As environmental and competitive pressures grow, it will be necessary to recognise the environment as a strategic issue, and to attempt to understand the affect that it will have on the markets in which the firm operates.

In determining the impact that the existing body of European environmental legislation has on supply chains, the conclusion was reached during the course of the research, that although some environmental legislation may have specific supply chain impacts, in general, most major impacts can be considered as a subset of general business activities. Any organisation should strategically manage all of its impacts, both internal (core) and external (supply chain), as a totality, of which supply chain management is a key part.

For any one organisation to try to influence the whole of the supply chain in terms of environmental impact, the most effective way appears to be through some form of collaboration with supply chain partners. While purchasing and supply managers may look to improve their own suppliers, through vendor assessment schemes which address issues of both legislative compliance and business efficiency, for the entire supply chain to be influenced would require collaboration between organisations at different stages of the chain. The closer the core competencies of the particular collaborators, so the stronger the nature of the relationship would be. While individual initiatives will be useful, the real opportunity will reside in the ability of different stages in the supply chain to understand the new issues. As Burt (1995) says, 'the goal for the future should be the development of concepts that do not push waste or costs from one side of the value chain to the other, but that reduce the total sum of produced waste and cost throughout the entire value chain.'

Secondly, there is little hope for individual organisations to influence EU legislation, as the policy making process is so unpredictable. In order for an organisation's voice to be heard, the most effective arrangement would appear to be through membership of some industry body, with many members and significant resources.

Beauchamp (1995: 47) argues that, supply chain managers should not have to be technical experts on all the interactions, uses, properties and risks associated with chemicals, materials, fibres and other base materials. However, they should 'rely on informed comment from Government, Health & Safety Organisations, CIPS, Engineering Institutes and other relevant concerned professional bodies who will publicise findings that may subsequently affect a buyer's positioning on the acquisition and later disposal of various kinds of equipment and products.' This suggests that the use of a horizontal, cross-functional environmental team, which would assess both the core and supply chain issues, might be a way forward in this area. Such responsibilities might include:

- compiling an environmental impact inventory, and an understanding of the causes of the impacts.
- continually monitoring and interpreting existing and forthcoming legislation, and trends, to identify potential opportunities and threats.
- alerting senior management to potential major impacts of proposed legislation and playing an active lobbying role for the organisations interests both directly with policy making and law makers but also with trade bodies.
- playing a proactive role in the design of products and production processes, to reduce material and energy usage, to and permit maximum reuse of materials, with both customers and suppliers.
- recruiting and training, as a key in-house resource, a supply chain team trained enthusiastically in environmental risk awareness and reduction.
- ensuring, through a proactive and on-going vendor assessment system the environmental commitment and performance of suppliers.
- acting as a centre of excellence and information and advice to both the organisation and its supply chain partners.

References


Purchasing's Role in Managing Disposition

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Abstract

Purchasing plays a critical role in by-product disposal, creating a distinct set of activities within the purchasing function. Senior management expects supply managers to be familiar with disposal markets and to oversee related vendor management activities. This paper presents recent research of ferrous scrap disposition practices and strategies at twelve manufacturing plants in North America, and offers the following contributions: a framework is developed highlighting the variables associated with by-product disposal, the role of the purchasing function is reviewed and the performance measures used to evaluate disposal programs are discussed. Key words: disposal, ferrous scrap, strategy, reverse logistics and environmental management.

1. Introduction

Firms tend to place responsibility for disposal activities with the purchasing or materials management department under the assumption that the employees responsible for buying the equipment and materials are best qualified to sell the resulting scrap (Bird and Clopton, 1977; Croell, 1977; Fearon, 1988). Consequently, senior management expects purchasing to be familiar with markets and outlets for disposal, and to oversee related vendor selection and development activities. The extensive involvement of purchasing in disposal has been supported by recent research (Fearon and Leenders, 1995) and represents an opportunity to advance the level of theoretical development in the procurement area (Williams, 1986).

By-disposition creates a distinct set of responsibilities within the realm of the purchasing/materials function. Important among these are an understanding of markets for scrap materials, compliance with evolving government regulations and coordinating segregation and processing activities with plant operations.

The purpose of this research is to clarify the role of purchasing in residual disposition and to identify how managers evaluate the effectiveness of their disposal programs. In doing so, this paper examines the following two research questions: First, what is the role of the procurement function in by-product disposal? Second, what methods are used to evaluate disposal activities?

This research makes a contribution in three areas. First, a framework is developed which identifies the variables associated with ferrous scrap disposal. Second, the role of the volume driver is identified and evaluated. Finally, the role of the procurement function in the ferrous scrap disposal process is examined along with the range of performance measures used to evaluate ferrous scrap disposal programs.

2. The ferrous scrap recycling system

Scrap is an integral part of almost every production process, requiring effective methods of handling and disposing of such materials. The ferrous scrap recycling...
system in North America encompasses three key players: firms which generate and must dispose of the material; the approximately 1000 brokers and processors which collect, reprocess and transport the material; and, the steel mills and foundries that consume ferrous scrap as part of their manufacturing process. The characteristics of the ferrous scrap recycling system make it an example of an efficient, private-sector driven recycling network. Without the assistance of government programs to promote recycling or regulation, ferrous scrap has emerged as an economically viable business proposition for generators, processors, brokers, steel mills and foundries. For this reason, it is useful to examine the characteristics of the ferrous scrap recycling system to establish opportunities which can be applied to other residuals.

Figure 1. Ferrous scrap disposal loop

The ferrous scrap recycling system represents a significant level of economic activity, with estimated revenues of $8 billion in the U.S. Minimills, which have been expanding their share of world steel output, rely on ferrous scrap for virtually 100 percent of their feedstock, and traditional oxygen furnaces require ferrous scrap for 25 to 35 percent of their raw material. The rate of steel recycling in the U.S. in 1994 was 68% and U.S. domestic and export shipments of ferrous scrap is approximately 64 million tons/year.

Disposal alternatives for firms which generated ferrous as a by-product of their manufacturing process include selling to steel mills, foundries or ferrous scrap processing companies ("processors"). Intermediaries, such as processors, are frequently used in the disposition process in order to provide a specialized service, which the generating plant is not otherwise capable of performing in an efficient manner. The scrap disposal loop presented in Figure 1. This research focuses on the relationship between the plant and the processor and examines how plants organize their by-product disposition programs with their disposal partners.

Plants negotiate with their processor more than the selling price of the scrap. Implicit in this relationship is the need to establish the parameters of the plant scrap disposal system by defining the activities for which each party is responsible. Ultimately, the plant must define which combination of activities best matches the plant's objectives.

It is common practice for processors to handle ferrous scrap disposal for plants on a contract basis. Due to wide, frequent fluctuations in ferrous scrap prices, most scrap contracts have a price adjustment clause which is usually based on a negotiated price or a formula which adjusts pricing levels monthly according to published ferrous scrap prices.

3. Research design

Case-based research design was selected as the research methodology for this study. McCutcheon and Meredith (1993, p.240) describe case-based research as "an objective, in-depth examination of contemporary phenomena where the investigator has little control over events". This methodology is appropriate for understanding how or why events occur (McCutcheon and Meredith, 1993).

Yin (1994) maintained that the use of a particular research strategy is dependent on the type of research question posed, the extent of control an investigator has over actual behavioral events, and the degree of focus on contemporary as opposed to historical events. This study was characterized by a low level of theoretical development, little was known regarding the variables under examination, a range of evidence was required to conduct the investigation, and the study focused on contemporary events. For these reasons, case-based methodology was used for this study.

A single residual, ferrous scrap, was chosen to be the focus of this study. Focusing on a single residual controlled for differences among firms when analyzing similarities and differences of their disposal practices.

A common technique used when building theory from case studies is theoretical sampling, which involves the selection of cases for theoretical, not statistical, reasons (Glaser and Strauss 1967; Eisenhardt 1989; McCutcheon and Meredith 1993). Theoretical sampling was used for this study for the purposes of selecting information rich cases which highlighted the commonalities and differences among sites.

Twelve plants, located in Michigan and Ontario, participated in the study. Table 1 provides a profile of the sites which participated in this research, and is rank-ordered based on the volume of ferrous scrap generation. Pricing and volume data presented in Table 1 were based on the most recent six month period at the time of data collection. For reasons of confidentiality, company names have not been disclosed.
Table 1. Ferrous scrap value analysis

<table>
<thead>
<tr>
<th>SITE</th>
<th>ANNUAL PLANT SALES</th>
<th>MONTHLY VOLUME</th>
<th>AVERAGE PRICE</th>
<th>SCRAP REVENUE AS % SALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANT A</td>
<td>$1.3 mil. CAN</td>
<td>2 tons</td>
<td>$15 ton</td>
<td>.03%</td>
</tr>
<tr>
<td>PLANT B</td>
<td>$4.0 mil. US</td>
<td>16 tons</td>
<td>$121 ton</td>
<td>.06%</td>
</tr>
<tr>
<td>PLANT C</td>
<td>$30 mil. CAN</td>
<td>85 tons</td>
<td>$100 ton</td>
<td>.3%</td>
</tr>
<tr>
<td>PLANT D</td>
<td>$26 mil. CAN</td>
<td>195 tons</td>
<td>$104 ton</td>
<td>.9%</td>
</tr>
<tr>
<td>PLANT E</td>
<td>$29 mil. CAN</td>
<td>210 tons</td>
<td>$101 ton</td>
<td>1.3%</td>
</tr>
<tr>
<td>PLANT F</td>
<td>$40 mil. CAN</td>
<td>480 tons</td>
<td>$188 ton</td>
<td>2.7%</td>
</tr>
<tr>
<td>PLANT G</td>
<td>$32 mil. CAN</td>
<td>575 tons</td>
<td>$139 ton</td>
<td>3.0%</td>
</tr>
<tr>
<td>PLANT H</td>
<td>$25 mil. US</td>
<td>580 tons</td>
<td>$133 ton</td>
<td>3.7%</td>
</tr>
<tr>
<td>PLANT I</td>
<td>$1.5 bil. CAN</td>
<td>1,500 tons</td>
<td>$107 ton</td>
<td>1%</td>
</tr>
<tr>
<td>PLANT J</td>
<td>$1.0 bil. US</td>
<td>9,700 tons</td>
<td>$136 ton</td>
<td>1.6%</td>
</tr>
<tr>
<td>PLANT K</td>
<td>$1.2 bil. US</td>
<td>11,700 tons</td>
<td>$81 ton</td>
<td>.9%</td>
</tr>
<tr>
<td>PLANT L</td>
<td>$1.0 bil. US</td>
<td>15,700 tons</td>
<td>$126 ton</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

Site visits were conducted between April and December 1994. During that time, 47 managers were interviewed; several of these managers were contacted for follow-up interviews in order to clarify responses or to investigate additional information.

Appropriate procedures were developed for data collection and analysis, and relied heavily on the tactics recommended by Yin (1994) and Miles and Huberman (1994) to address threats to validity and reliability. The data collection instruments facilitated collection of data through multiple sources in order to support triangulation during data analysis. Table 2 summarizes the data collection and analysis procedures which were incorporated into the design of this study.

Site-ordered displays, ranking low to high volume sites, were used extensively in order to establish patterns for the proposed volume groups. Several of the tactics recommended by Miles and Huberman (1994) for generating meaning were incorporated as part of the data analysis: noting patterns and themes, clustering, counting, making contrasts and comparisons, subsuming, factoring noting relationships between variables. The data collection and analysis procedures were designed to support partitioning variables, finding intervening variables and building a logical chain of evidence.

Table 2. Data collection and analysis procedures

<table>
<thead>
<tr>
<th>DATA COLLECTION PERIOD</th>
<th>PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>During Each Interview</td>
<td>interview protocol, field notes to record responses, impressions, quotations, insights, interpretations and leads</td>
</tr>
<tr>
<td>After Each Interview</td>
<td>review and clarify notes, complete contact summary and document summary forms, prepare memos: observations and opinions, follow-up with respondents for clarification as required</td>
</tr>
<tr>
<td>After Each Site Visit</td>
<td>code the data, classify the words, prepare master case study reports, rank variables, prepare memos: observations and opinions, follow-up and clarification from respondents, prepare matrix displays: organize the data, prepare cluster analyses and process flow diagrams, distribute case report summaries for feedback from respondents</td>
</tr>
<tr>
<td>After All Site Visits</td>
<td>prepare site-ordered matrix displays, statistical analysis, modify research framework</td>
</tr>
</tbody>
</table>

4. A conceptual framework

As part of this research a conceptual framework was developed, which identified key variables and the relationships among them. Variables were categorized as either drivers (independent variables), moderators, or outcomes (dependent variables). Figure 2 presents a conceptual framework outlining the relationship between the variables and Table 3 summarizes the variables included in the framework.
A total of eight drivers, or independent variables, were identified: volume, scrap grades, cost control, housekeeping needs, financial resources, regulatory compliance, raw material supplier management and verified disposal of defective product. Of these drivers, volume was among the most significant.

The relationship between the plant and the processor was substantively influenced by the volume of ferrous scrap generation. Volume was found to influence the cost recovery, market demand, processing capabilities, and plant space.

### Table 3. Drivers, moderators and outcomes

<table>
<thead>
<tr>
<th>DRIVERS</th>
<th>CORPORATE FACTORS</th>
<th>SCRAP MARKET FACTORS</th>
<th>PROCESSOR FACTORS</th>
<th>PLANT FACTORS</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrap Grades</td>
<td>Regulatory Compliance</td>
<td></td>
<td></td>
<td>contract administration</td>
<td></td>
</tr>
<tr>
<td>Cost Control</td>
<td>Raw Material Supplier Management</td>
<td></td>
<td></td>
<td>price negotiation</td>
<td></td>
</tr>
<tr>
<td>Housekeeping Needs</td>
<td>Verified Disposal of Defective Product</td>
<td></td>
<td></td>
<td>forecasting</td>
<td></td>
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<td>performance measures</td>
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<td>weight verification</td>
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<td>Resources:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>labour inputs</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>plant space</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>technical support</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4. Volume Groups

<table>
<thead>
<tr>
<th>VOLUME GROUP</th>
<th>MONTHLY VOLUME</th>
<th>SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>99 tons or less per month</td>
<td>A,B,C</td>
</tr>
<tr>
<td>MEDIUM</td>
<td>100 - 1500 tons per month</td>
<td>D,E,F,G,H</td>
</tr>
<tr>
<td>HIGH</td>
<td>greater than 1500 tons per month</td>
<td>I,J,K,L</td>
</tr>
</tbody>
</table>

Corporate, scrap market, processor and plant factors represent the four categories of moderators identified. Plant factors is the central moderating variable, interacting independently with the others. Individual plant disposal strategies are, therefore, shaped by the structure of plant factors. Twenty-one plant factors were identified, with the majority under the headings administrative activities, resources and processing activities. Additional variables, logistics management, duration and switching were also identified in the plant factors category.

A total of eight corporate factors were identified. These variables contributed to a range of corporate systems and procedures that influenced plant level decisions, contributing to the adoption of more sophisticated disposal methods.

Plant disposal systems were heavily influenced by both their regional market and the North American scrap market. Both scrap market demand and price for regional and North American markets were seen as influencing factors.

Processor factors included a range variables relating to the capabilities and characteristics of the individual processor. A total of ten variables were identified; important among these were location and dependability of service.

Six outcome variables were identified: cost reduction, cost avoidance, cost recovery, verified disposal, improved public image and effective disposal. Cost recovery represented the prominent outcome, although cost reduction offered the most significant opportunity for the plants.

### 5. Purchasing’s role

Bauer (1976, p. 5) observed that “purchasing must play an active, probing role throughout the materials cycle if procurement is to be cost effective”. Fearon and Leenders (1995), in a study by the Center for Advanced Purchasing studies, found that scrap/surplus disposal reported to the purchasing function in 63% of the firms surveyed, up from 57% in 1988.

The findings supports the argument that procurement plays a central role in plant disposal activities. Table 5 provides a summary of the managers responsible for ferrous scrap disposal.

With the exception of only two plants, Plant C and Plant I, the purchasing/materials management department had primary responsibility for ferrous scrap disposal.
Plants adopted either a passive or active approach to ferrous scrap disposal. Factors such as the age, seniority and background of the purchasing manager did not seem to influence the approach used. The basis for such decisions were a combination of the strategic and economic benefits.

Table 5. Responsibility for ferrous scrap disposal

<table>
<thead>
<tr>
<th>SITE</th>
<th>PRIMARY RESPONSIBILITY</th>
<th>SECONDARY RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLANT A</td>
<td>plant manager/owner</td>
<td>office manager</td>
</tr>
<tr>
<td>PLANT B</td>
<td>materials manager</td>
<td>plant manager; corporate materials manager</td>
</tr>
<tr>
<td>PLANT C</td>
<td>purchasing manager</td>
<td>materials manager; facilities engineer</td>
</tr>
<tr>
<td>PLANT D</td>
<td>president/owner</td>
<td>purchasing manager; operations manager</td>
</tr>
<tr>
<td>PLANT E</td>
<td>V.P. Purchasing</td>
<td>plant manager</td>
</tr>
<tr>
<td>PLANT F</td>
<td>corporate purchasing agent</td>
<td>plant manager; plant supervisors; facilities engineer</td>
</tr>
<tr>
<td>PLANT G</td>
<td>materials manager</td>
<td>corporate controller; plant manager; operations manager</td>
</tr>
<tr>
<td>PLANT H</td>
<td>materials manager</td>
<td>operations manager; corporate materials manager</td>
</tr>
<tr>
<td>PLANT I</td>
<td>buyer</td>
<td>facilities engineer</td>
</tr>
<tr>
<td>PLANT J</td>
<td>corporate scrap team buyer</td>
<td>plant buyer; powerhouse engineer; corporate scrap team</td>
</tr>
<tr>
<td>PLANT K</td>
<td>corporate purchasing specialist</td>
<td>plant controller; facilities engineer</td>
</tr>
<tr>
<td>PLANT L</td>
<td>corporate disposal agent</td>
<td>facilities engineer</td>
</tr>
</tbody>
</table>

Plants which took a passive approach did so to avoid administrative and capital costs. Under this strategy, the plant was highly dependent on the processor which controlled a range of activities, including secondary processing, logistics and marketing. As part of this approach, plant management sacrificed a level of knowledge regarding their disposal activities.

Under the passive strategy, purchasing managers responsible for ferrous scrap disposal tended to be less familiar with scrap market information and were less aware of their secondary processing and logistics costs. Most decisions in such areas as marketing and logistics were made by the processors. Management's responsibilities were limited to monthly review of recovery revenues and periodically addressing capital investment issues for scrap processing systems.

Plants which played an active role maintained disposal expertise and defined a less critical role for their processor. Under this scenario, the plant would manage secondary processing logistics and marketing. For example, at high volume plants J and K processors were responsible for handling only 5 - 10 percent of the plant's scrap. The scope of activities controlled by the plant necessitated the development of appropriate competencies. Consequently, specialists with the corporate purchasing organization oversaw company-wide ferrous scrap disposal activities.

When plants maintained control of their disposal activities, the scope of purchasing's influence over disposal was quite broad. These individuals participated in a variety of activities, including development of new secondary processing operations, monitoring logistics costs, negotiating freight contracts and marketing scrap material.

6. Managing the disposal system

Plants performed a range of administrative activities as part of the ferrous scrap disposal process. A total of seven distinct administrative activities were identified: contract administration, scrap marketing, price negotiation, forecasting, performance measures, informal performance measures and weight verification. As demonstrated above, the purchasing/materials management department most often had responsibility for these activities. Table 6 summarizes the administrative activities observed at each site, and illustrates the relationship between volume with these variables.

Table 6. Administrative activities

<table>
<thead>
<tr>
<th>Administrative Activities</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<th>I</th>
<th>J</th>
<th>K</th>
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<tbody>
<tr>
<td>contract administration</td>
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<td>scrap marketing</td>
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<td>price negotiation</td>
<td>v</td>
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<td>forecasting</td>
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<td>performance measures</td>
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<td>v</td>
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<tr>
<td>informal performance measures</td>
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<tr>
<td>weight verification</td>
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<td>v</td>
<td>v</td>
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</table>
High volume plants consistently demonstrated the greatest level of sophistication with respect to administration activities. Economies of scale allowed these organizations to dedicate internal staff in the purchasing area to oversee ferrous scrap disposal. Corporate purchasing actively interfaced with plant operations under a formalized set of procedures and guidelines.

7. Measuring performance
We found that purchasing managers used a range of formal and informal methods to evaluate their disposal activities. Formal methods are defined as those systems which are quantified and reported systematically, such as monthly cost recovery revenue. Informal methods include subjective measures, considered important to plant management, but are difficult to measure. One such example is processor service. Table 6 summarizes the methods observed.

Plants in the study failed to demonstrate common measures of ferrous scrap disposal systems. Even plants within the same volume group established different procedures to evaluate common outcomes, such as cost recovery. This finding indicates a lack of industry standards to evaluate key indicators of plant disposal systems. Competitive pressures seemed to interfere with the willingness of companies to share details of their ferrous scrap disposal systems.

Table 6 illustrates the prominence of cost recovery as a performance measure. Each plant used cost recovery as at least a partial measure of the effectiveness of their ferrous scrap disposal system. Several managers interviewed in the study viewed ferrous scrap disposal as primarily a cost recovery activity, thereby ignoring the associated impact on cost control, plant efficiencies and productivity. As a result, several plants expended considerable resources segregating material in order to support marginally higher recovery revenues.

As also demonstrated in Table 6, a distinct shift in evaluation methods was evident as volume increased. High volume plants established formal systems designed to monitor both revenue and cost elements of ferrous scrap disposal. Therefore, although cost recovery was important to these plants, other factors, such as cost reduction activities, were monitored and controlled. These elements were noticeably absent in the low and medium volume plants. Low volume plants tend to concentrate on cost recovery and avoidance, dedicating labor inputs to segregate material in order to maximize recovery revenues and disposal through a processor to help avoid landfill expenses. Only two sites in the medium volume group pursued cost reductions.

8. Implications for procurement
This study supports the findings of previous research: the procurement function frequently has primary responsibility for the disposition of residuals. Senior management, therefore, expects purchasing managers to be responsible not only for securing cost-effective sources of supply, but also for identifying and implementing
efficient methods of residual disposal. The challenge of managing this activity is becoming increasingly complex.

This research illustrates the complexity of the process, and highlights the range of issues that need to be taken into consideration. For example, evaluating the credit worthiness of vendors and monitoring receivables is a necessary, but nontraditional activity for purchasers. For several plants in the study, however, ferrous scrap recovery values exceeded 2 percent of total sales.

Effective disposal programs can lead to lower overall costs and provide opportunities for strategic links with raw material suppliers. Decisions regarding what disposal activities are outsourced and which are internalized impact both the structural and infrastructural elements of plant operations. However, successful management of this process involves managing not only the range of internal activities, but also developing and structuring appropriate vendor relationships. Purchasing dictates the effectiveness with which the disposition process is conducted.

Purchasing should not be restricted to the domain of the purchasing manager. Soliciting input from managers in other functional areas is critical to the development of an effective strategy. Plant operations managers can provide input regarding suitable levels of segregation and assist in determining the appropriate in-plant handling equipment. The plant controller can assist in establishing proper procedures for monitoring material removal and invoicing.

Effective and efficient disposal management places special demands on those supply managers responsible for disposal. Appropriate disposal strategies need to be fashioned to suit organizational objectives and strategies. The ferrous scrap disposal system provides a unique insight into the dynamics of disposal where environmental considerations are less important than economic factors. There are numerous alternative strategies available to firms for ferrous scrap disposal, and significant opportunities exist to improve the overall efficiency and effectiveness in which this process is managed.

References


Strategic Positioning of Suppliers

Strategic renewal of Dutch automotive suppliers in international perspective

H.A.M. Weken, H.R. Commandeur and P.A. Moerman

Abstract

The Dutch automotive supply industry is relatively small and fragmented and consists mainly of small third tier subcontractors depending heavily on the national home-market. Moreover a large part of the supply industry can not meet the worldwide requirements. The recent restructuring of the European automotive component industry has therefore severely hit the Dutch automotive supply industry, and the process of rationalization has not yet been ended. The main question dealt with in this paper is: “Can sustainable competitive advantage be attained by individual suppliers, in geographic regions with a automotive cluster?”. A number of successful suppliers located in the Netherlands, that even an unfavourable competitive environment individual suppliers can a strong market position focused at the automotive industry. Suppliers should mixing market positions at different levels of the supply chain. This way even can flourish. Moreover being part of foreign supply chains is critical for success.

1. Introduction

Since 1991 the department of Industrial Economics of the Erasmus University studied in depth the automotive component industry, for local and national governments and for private companies (see Appendix II for a more complete description of the research). The inducement for these studies were the dramatic changes taking place in the worldwide automotive industry which among others resulted in a loss of market-position for Dutch suppliers. This made clear that in general the Dutch automotive supply industry had a weak position and was very vulnerable for changes in the competitive environment.

The two fundamental questions dealt with in this paper are a) can sustainable competitive advantage be attained by suppliers, in geographic regions with a weak automotive cluster, and if so, b) what factors are critical for the success of these suppliers?

2. The automotive industry in a worldwide perspective

Over the past five years the European automotive component industry has been under severe competitive pressure, and more restructuring is required. The productivity rate, which is lagging behind the Japanese and American competition in terms of lean-production and lean supply, will have to take a big step forward. The restructing of the production process has forced assemblers to substantially rationalize their supplier base. The only feasible way for European automobile producers to preserve their market position is by sourcing from world class suppliers. The effects on the structure of the supply industry have been and will continue to be dramatic. These include: reduction of the number of direct suppliers; strong improvements in productivity resulting in decreases in employment; need for “globalisation”; and strong demands on organisational, management, and development-skills of suppliers. Assemblers in Europe plan to reduce the average number of direct suppliers from 400 in 1992 to around 200 by 1997.

Fewer first tier suppliers will be used to supply larger quantities of more complex components. Suppliers need to be able to unfold shared development with contractors, and to calculate on a target pricing basis. Worldwide presence with local doorstep plants, to supply end producers on a just-in-time basis will become more and more common. To enable innovation in both the process and production stages, suppliers need to utilize the latest technology and have insight into the demands of final customers. The financial capacities required to fund the required investments in production, chain management, logistic capabilities and product development, will grow, as will the timespan covered by decisions and the level of uncertainty for suppliers with respect to expected pay-offs. The creation of international chains will however, strengthen the position of the suppliers in the value chain, if they are able to gain a position in this chain.

To fulfill the needs of end producers constant improvements in quality, efficiency, flexibility, speed of delivery and in capabilities with respect to innovation are needed at all levels of the supply chain. Research revealed (Nootenboom 1992, Weken et al. 1992) that the generic strategies in which a company can choose for competing on quality or for competing on price by striving respectively for a premium quality or for cost-leadership, can not be recommended as strategic options for suppliers in the automotive industry. Simultaneously meeting the standards in the market are critical for the success of these suppliers.

3. The Dutch automotive industry in transition

The trends mentioned above will create opportunities for suppliers who demonstrate global presence, technological leadership, economies of scale and scope and the management resources to innovate, design, develop and supply complete sub-assemblies or systems. The Dutch automotive industry has been severely hit by this changing competitive environment at the supply level. Our research also indicated that, if the policy doesn't change, a further drawback in the competitive position is expected. The absence of a strong automotive industry at the end production and supply level can be seen as a very important factor in this loss of market position.
The Dutch automotive industry can, at the end production and supply although highly not integrated, source on average about 15 to 20% from suppliers commercial companies can be classified as main suppliers with respect to their market position, are of minor importance for the turnover of the companies lower in the supply chain, described as relatively C IPSERA because even the main suppliers source majoratively abroad. Furthermore they use the geographic region without a strong automotive suppliers' The average size of these companies is small. The employment generated by geographic region where the automotive industry is better developed, as for example in the south of Germany. The Netherlands can therefore be described as a geographic region without a strong automotive cluster. The effect on the supply chains has been dramatic. Only 150 companies can be classified as automotive suppliers. The average size of these companies is small. The employment generated by automotive suppliers is far less than could be expected from employment and production volume at the end production level (see Figure 2). Only about 20 companies can be classified as main suppliers with respect to their market position, their supply chain position and their capabilities as stated above. These main suppliers are of minor importance for the turnover of the companies lower in the supply chain, because even the main suppliers source majoratively abroad. Furthermore they use the Netherlands to source mostly minor components which could be sourced anywhere in Europe.

Figure 1. Production of cars per country (Fabrimetal, 1995)

The Dutch automotive industry can, at the end production and supply levels be described as relatively small and very open to international competition. As can be seen in Figure 1, the number of cars produced per inhabitant is one of the smallest in the developed countries. Dutch car manufacturers produce less than 1% of the total European production volume. The few major car manufacturers and producers of commercial vehicles located in the Netherlands source mainly abroad. End producers in other European countries source up to 80% nationally, while Dutch manufacturers, although highly not integrated, source on average about 15 to 20% from suppliers located within the Netherlands. Research also revealed that the major main suppliers located in the Netherlands source mainly abroad. All main suppliers, including end producers will only be able to retain and improve their market position if they buy components from the best sources available worldwide. These world class suppliers are located in geographic regions were the automotive industry is better developed, as for example in the south of Germany. The Netherlands can therefore be described as a geographic region without a strong automotive cluster. The effect on the supply chains has been dramatic. Only 150 companies can be classified as automotive suppliers. The average size of these companies is small. The employment generated by automotive suppliers is far less than could be expected from employment and production volume at the end production level (see Figure 2). Only about 20 companies can be classified as main suppliers with respect to their market position, their supply chain position and their capabilities as stated above. These main suppliers are of minor importance for the turnover of the companies lower in the supply chain, because even the main suppliers source majoratively abroad. Furthermore they use the Netherlands to source mostly minor components which could be sourced anywhere in Europe.

With almost no national sourcing, it is not surprising that an analysis of inter-firm relationships resulted in the conclusion that there are almost no integrated supply chains of automotive suppliers with strong inter-firm relationships. The Dutch automotive industry consists mostly of scattered suppliers and moreover mainly of small, third tier subcontractors (also called jobbers) (see Figure 3 for an overview of the facts and figures of the Dutch automotive supply industry). More than half of them concentrates on metalwork. A large proportion of the suppliers, namely jobbers, sells mainly to small-scale truck, bus and coach producers and produce and products of special vehicles located in the Netherlands. Because of increased internationalisation and competition among end producers in this segment and changes in market demands making it more and more comparable to the car industry, they will lose their position in this, until now less demanding segment, just as they have in the car industry. That is unless their capabilities increase. A comparison of the current ‘car manufacturers within a 500 kilometre range in the Netherlands’ supplier list with a list of companies supplying to the automotive industry in 1994, shows that a number of companies have already left the industry because of bankruptcy or changed to other markets.

This category of jobbers is under severe pressure, because of competition from low wage countries. Their local presence is their only unique selling point in relation to foreign competition. Process technologies used by these suppliers are generally available worldwide. A combination of low entry barriers and high exit barriers because of investment in computer controlled machinery, leads to a high treat to price competition. Competition from new competitors in low wage countries actually entering this market, and increased sourcing by Western European companies from these low wage countries, makes the competition cut-throat.

 Suppliers are classified as automotive if their automotive turnover was more than 5% of the total turnover. The number of automotive suppliers would reduce substantially if a higher percentage would have been used.

Automotive production of Philips is not included in the figures.

Metalworks refers to grinding, pressing, grooving, drilling, welding, tapping, etc.

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Figure 2. Employment in the Dutch automotive supply chain

152 companies
Suppliers
Automotive turnover
Export: 59% of turnover

Raw materials suppliers € 2.340 million (16% of total turnover of these raw materials suppliers)
Main-supplier € 1.240 million (70%)
Co-supplier € 540 million (35%)
Jobber € 300 million (25%)
Vendor € 70 million (51%)

4.4 % R&D (% of turnover)

Figure 3. Facts and figures of the Dutch automotive supply industry

As stated earlier the worldwide requirements on suppliers are increasing steadily. On the other hand Dutch suppliers in general, cannot meet the demands of the car industry today. In terms of for example quality, speed of delivery and development capabilities the Dutch suppliers on average can not perform at worldclass standards.

Quality level Dutch suppliers
automotive industry (1994)

Quality
On average the Dutch suppliers are lagging behind the worldwide requirements with respect to quality (see Figure 4). In particular the average quality level of the third tier-sub-contractors is striking, because faults at jobber level will cumulate at the level of sub-assemblies. One of the possible reasons for this lack of product quality is that almost 30% of the suppliers still have no quality certification. This certification can be seen as a minimum demand to supply in the automotive industry.

Innovation
At all levels of the supply chain there is a relatively large group of suppliers which supplies to customers' detailed specifications. Clearly this group has not yet conquered a market position where product development is required.

Table 1. Supply at the basis of functional demands and/or technical specifications

<table>
<thead>
<tr>
<th>N=81</th>
<th>Functional demands</th>
<th>Technical specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main supplier</td>
<td>75%</td>
<td>75%</td>
</tr>
<tr>
<td>Co-supplier</td>
<td>61%</td>
<td>70%</td>
</tr>
<tr>
<td>Jobber</td>
<td>27%</td>
<td>97%</td>
</tr>
<tr>
<td>Vendor</td>
<td>67%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Speed of delivery
The "order-to-delivery-lead-time" is an important indicator of a company's performance because it is directly dependent on the ability of the company to produce and supply on a just-in-time basis. Just-in-time production is of prime importance for constant organisation improvements, because of the extremely high visibility of shortcomings in the whole organisation. It is also the basis of the famous concept of lean production. For main suppliers the norm for delivery is 24 hours (Bullinger 1995). Interpretation of this norm requires knowledge of the assemblies supplied. For example the order-to-delivery-lead-time for seats is less than 2 hours. However comparing this average norm with the average lead times of Dutch suppliers shows that a large part of the Dutch industry does not meet this norm by far.

Table 2. Order-to-delivery-lead-time

<table>
<thead>
<tr>
<th>N=54</th>
<th>&lt; 24 hour</th>
<th>1-2 days</th>
<th>&lt; 1 week</th>
<th>&gt; 1 week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main supplier</td>
<td>21%</td>
<td>14%</td>
<td>29%</td>
<td>36%</td>
</tr>
<tr>
<td>Co-supplier</td>
<td>24%</td>
<td>24%</td>
<td>0%</td>
<td>56%</td>
</tr>
<tr>
<td>Jobber</td>
<td>13%</td>
<td>0%</td>
<td>31%</td>
<td>56%</td>
</tr>
<tr>
<td>Vendor</td>
<td>50%</td>
<td>0%</td>
<td>33%</td>
<td>17%</td>
</tr>
<tr>
<td>Europe all supply categories</td>
<td>31%</td>
<td>27%</td>
<td>13%</td>
<td>29%</td>
</tr>
<tr>
<td>Europe subcontractors</td>
<td>12%</td>
<td>21%</td>
<td>25%</td>
<td>42%</td>
</tr>
</tbody>
</table>

It can be concluded that the automotive industry is a very competitive industry, with high requirements to suppliers. Dutch supply industry in general cannot meet this demands with respect to innovation, quality and speed of delivery.

European figures are based on Bullinger, 1995.
Co-suppliers and jobbers.
4. Competitive challenge for individual suppliers

The situation in the Dutch automotive industry can be summarized as follows:

- The demands in the automotive industry are worldwide increasing and altering, not only in the car-industry but also in the small scale truck-, bus and coach industry;
- Worldwide competition between suppliers will further increase;
- The national market demand for Dutch suppliers is rather small;
- The supply industry in the Netherlands is fragmented, supply chains are not well developed;
- On average Dutch suppliers can not meet the global requirements of the automotive industry.

According to Porter (1990) the bases for worldwide sustainable competitive advantage for companies located in geographic regions are:

a) a strong and innovative local market demand;

b) availability of favourable local factor conditions;

c) local availability of well developed supply industries;

d) local availability of a strong related industries; and

e) strong local rivalry among companies.

One of the fundamental questions to be dealt with is therefore “Is it possible for a supplier located in the Netherlands to be in a competitive position?” Moreover is a Western European country with high wages, relatively small automobile production and without a well developed supply chain a competitive basis for suppliers?

Our research indicates that these questions can all be answered positively. We found a number of very successful companies supplying the European automotive industry.

Companies with a steadily growing turnover and market position. Although we expected these companies to be in a first tier main supplier position, some very successful and profitable jobbers competing head on with the competition from low wage countries were also found.

Successful companies included nationally owned companies and companies which are part of an international conglomerate. One of the items dealt with were the discriminating factors between companies with a strong competitive and market position and companies with weak positions. How can some firms increase their international market positions by meeting the worldwide requirements of the automotive industry, while others firms are losing automotive customers, leaving the automotive markets and/or selling capacity just above variable costs.

5. A focussed competitive and market position is the basis for success

We found that the main discriminating factor which leads to sustainable competitive advantage is sound decisions for strategic positioning. The very specific needs in the automotive industry demand a very focused position, with respect to both level in the tiered structure and the markets supplied. Although competitive threats such as competition low wage countries and changing market demands are often expected to be the cause of loss of market position, companies anticipating these threats have been able to sustain or even extent their position. In order to make clear why focusing on a narrow market position makes the difference, we will firstly describe a typical not successful company (see text-box below). The company is a good example of an automotive supplier whose competitive position has deteriorated. Metalwork jobbers and jobbers in the polymer sector, in particular, can be identified from the characteristics of the company we describe.

Caught in a price-trap

The company is historically strongly focused on Dutch industry and dependent on sales to a few automobile producers. Due to the changing sourcing strategies of Dutch end producers (increasing sourcing abroad, it starts losing market position). The production technologies used by the company are generally available and even easy for suppliers in low wage countries to copy, simply by buying the machinery at the market. Price competition is, therefore, cutthroat. There company does hardly specialize in some levels. Because they are used to selling to a few end producers, their market knowledge is non-existent. Strategic orientation has not been previously required, because customers described in detail what components to produce with which tools, machinery etcetera. The lack of market knowledge and marketing experience makes it almost impossible for the company to replenish its loss of turnover by sales to potential automotive producers in other European countries. Moreover the company's only unique selling point is geographic proximity to clients, so export is not an option. Its capacities are generally available from local suppliers, so the only reason for not buying local is cost advantages. However if geographic distance is not of great importance, buying from low wage countries is cheaper the majority of the time. The company starts drifting and reacting on every sales opportunity and ends up producing parts, sub-assemblies and even end products for different markets and for clients at different levels in the supply chain. The company becomes a mix of different technology-product-market-combinations, all with different needs to be fulfilled by this company. Production facilities cannot, therefore, be built for specific market requirements. Quality, efficiency, flexibility and innovation capabilities are not suited to customer demands. And all kinds of unnecessary overheads become a burden on cost price. In order to survive sales prices are lowered, to a level only sufficient to cover variable cost. Therefore machinery is not replenished, because cash flows are not available. The only way out for the company is, stopping loss generating activities, but this will result in loss of turnover and cash-flows in short term and certainly lead to more lay-offs which then leads to severe social problems. The company therefore chooses not to end the non profitable activities, which would be done by focusing on a well and narrowly defined technology product-market-combination and is in this way trapped in a vicious circle.

5.1 Lessons learned

Of course the situation is not as dramatic as described above, for all not successful companies. However generally speaking the following threats are commonly faced:

- severe price competition with low wage countries and with other West European suppliers in the same situation;
- minimized profitability or even losses;
- high fluctuation in turn over;
- loss of market-position in the automotive industry;
- not anticipated downgrading in the supply chain i.e. becoming a third or second tier supplier instead of the first tier supplier;
- being pushed towards a market position in only the small scale part of the Dutch automotive industry (Coaches, trucks etcetera);
- leaving the automotive industry in favour of less demanding markets.
Searching for less demanding market segments does only mean a delay of execution, because due to the growing international competition in these segments, demands on suppliers will ultimately come up to the same level as in the automotive industry.

To understand the importance of a well defined technology-product-market-position it is useful to differentiate between various categories of supply levels (see Appendix I). Although specialisation counts for each of the categories, the recommended specialisation will be for suppliers using the same facilities, technology, manufactured product and markets supplier varies for the different categories. Focus was not affected by the level of the supply chain. For all categories of suppliers (main supplier, a co supplier or jobber) focus at business unit level is required. Mixing within one business unit a main-supply position assembling complex systems and a jobber position of single manufacturing tasks, at the same time, should be avoided. As can be seen in Table 3, not all suppliers focus on one chain position. The text below describes which discriminating factors lead to success for some of the categories of suppliers. In summary:

- successful jobbers focus on one or a few manufacturing tasks;
- successful main suppliers focus on assembling exclusively for the worldwide automotive industry;
- vendors need to have direct relationships with automotive OEM’s.

Table 3. Market segments supplied to.

<table>
<thead>
<tr>
<th>N=50</th>
<th>Manufacturers of:</th>
<th>System or component suppliers</th>
<th>After-market</th>
<th>Other clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main supplier</td>
<td>82%</td>
<td>59%</td>
<td>41%</td>
<td>47%</td>
</tr>
<tr>
<td>Co-supplier</td>
<td>56%</td>
<td>62%</td>
<td>46%</td>
<td>50%</td>
</tr>
<tr>
<td>Jobber</td>
<td>55%</td>
<td>79%</td>
<td>51%</td>
<td>27%</td>
</tr>
<tr>
<td>Vendor</td>
<td>100%</td>
<td>44%</td>
<td>44%</td>
<td>56%</td>
</tr>
</tbody>
</table>

The percentages describe the percentage of suppliers within the category (main supplier, co-supplier, jobber and vendors) supplying to one of the market segments (car-manufacturers truck-manufacturers etcetera). As can be seen, more than one segment can be supplied to by a supplier.

ad a) Successful jobbers

We found profitable jobbers specialising in working on metal parts or polymer parts with generally available machinery. Constant cost reduction, by reduction of overhead and mechanisation and automatization of production, is their way of resisting price competition. Scale advantages by supplying to different customers appeared to be an important element in their competitive strategy. No attempts to specialise in one market segment or in product categories, need to be made. They realise scale advantages by specialising in a limited number of machining tasks, within one business unit or company. For the same reason a maximum number of customers are sought in different market segments, because the requirements of the automotive industry towards suppliers differ for jobbers not substantially from other segments. The number of products worked upon is virtually unlimited, as long as the single manufacturing technology is the same. Total focus on specific jobber activities, namely single manufacturing tasks of parts, was however one of the success factors. It prevented this category of suppliers from creating unnecessary overheads as may be the case when involved in product-development or logistic systems for just-in-time on sequence delivery. A good example is the Van Der Leegte Group. Among this company’s business units are a number of metal working jobbers with a successful market position due to specialisation and focus on constant cost reduction. The basis of the success of this company, is not only constant improvements in production mechanism and automation, but also the specialisation in a few fabrication activities per business unit and a strong focus on reducing indirect costs. Moreover, the portfolio of companies in the group are managed as independent firms, with functional registration as the only centralised function. This leads to a strong focus on continuous improvement of their own competitive position.

Other jobbers improved their competitiveness by specialising in unique machining activities not yet accessible to competitors in low wage countries. Again focusing on one innovative manufacturing technology per business unit or company, was the basis for success. Because of the unique characteristic of the materials worked up, both local and international sales were made.

The success of companies with a third tier jobber position, proves that a profitable market position for this category of suppliers, is possible and that upgrading to a main supplier position is by far not the only way to survive. Moreover the capabilities required by a main supplier to survive, are very different from the capabilities required for a jobber to be successful. As pointed out earlier in this paper, companies striving for upgrading of their position in the supply chain, without having the required capabilities, risk getting stuck in the middle. Although the added value of companies upgrading to a main supplier position is expected to rise, the expected increase in profitability of this highly depending on the capabilities of the company. We found jobbers supplying to the main European car manufacturers, pressure by their clients into becoming a main-suppliers by forward integration towards systems assembling. In this case successful suppliers do not automatically choose for this upgrading in the value chain. They choose on the basis of the expected profitability. If they start with assembling (which automatically leads to the need for supply of assembled parts, thought to product development and other logistics systems) they choose for keeping the assembling activities separate in another business unit. Integrating into the present facilities may lead to a loss of competitive advantage in the present manufacturing capabilities, due to a loss of focus.

ad b) Successful main-suppliers

Successful main suppliers generally have at strategic business unit level, a strong focus on a limited numbers of product categories supplied exclusively to the automotive industry. The high demands with respect to product development, quality, planned flexibility in production, just-in-time delivery, require total focus on meeting these demands and ever increasing performance for each business unit. Increasing complexity of systems and the constant growth in electronics, has lead to an increase in the number of product technologies to be managed by the companies. However, by outsourcing special sub-systems it is possible for the main supplier to use state of the art technology, without specialising in all those different technologies. The knowledge should be concentrated on the integration of different parts and subsystems. For companies which specialise in manufacturing parts or sub-systems themselves, this means a total changeover in skills and management capabilities.

This focus is even higher for suppliers supplying sequence products, such as seats, to their customers. These suppliers are required to build doorstep plants which produces exclusively for a particular client, near that client’s facility. Although the demands for on-sequence delivery differ largely across the different product categories, the increasing complexity and degree of composition of systems sourced by car manufacturers, leads to growing demands for doing parts production of product exclusively for one client. Moreover the trend is that these plants extend their product range by including products related on the basis of production...
technology or in the level of integration in the production process of this client. For example a seat producer also starting to supply interior parts such as door panels.

Some of the production and product technologies used in the automotive industry can be used for other markets, the integral production and marketing for these other markets should be totally separated from the automotive markets. Automotive producers demands for quality, flexibility, efficiency and innovation differ too much to make integration possible. Moreover the requirements of automotive producers are increasing constantly, so total focus on meeting these demands by improving the capabilities is required. In order to spread development cost for advanced technologies over more than products over the automotive industry alone, main-suppliers doing independent research for new technologies and for new applications of technologies in products, generate synergies by using the technologies in more than the "automotive" business unit alone.

A good example of a successful main supplier is Inalfa which supplies sun roofs to automobile producers worldwide and has growing number of production facilities abroad, for local production. Through its total concentration on one business unit on the production of sun roofs and folding blinds for car and truck producers the company has become worldwide the third largest supplier of these products worldwide. An other example is Arvin Exhaust. A company that started in the Netherlands and is nowadays as part of a global firm, worldwide one of the largest exhaust manufacturers. The European head-office is located in the south of the Netherlands. From this location twelve manufacturing companies and assembly cells through Europe are managed. New investments in developing regions as South-East Asia are planned for. McKechnie is a lesser known company which successfully supplies fuel pipe systems to the worldwide automotive industry. Van Doornes Transmission, which was recently taken over by a German company, has a unique competitive position in the worldwide industry. Both Dutch suppliers who perform well and a number of successful transplants, which assemble products and use local developments task and sourcing, are located in the Netherlands. The company is also part of a multinational firm. Recently taken over by the German Robert Bosch company is Van Doornes Transmission, with a unique competitive position in the worldwide industry. Not only well performing suppliers from Dutch origin are located in the Netherlands, but also a number of successful transplants, not only assembling products in the Netherlands but also employing local development task and sourcing locally. This supports the conclusion that sustainable competitive advantage for individual suppliers is possible even in a country with a relatively small automobile industry and without a well developed supply chain. Examples of these transplants are Davidson Marley producing dashboards for car manufacturers, Sicar assembling car seats, Kelsey Hayes producing modules for ABS-brake systems and Morton International manufacturing airbag systems in the Netherlands.

Besides a focusing on supplying a limited product range to only the automotive industry there are other discriminating factor for success. Others include an international orientation with respect to sourcing parts and selling products. International orientation is however as much the cause for sustainable competitive advantage as the result of it. We found that successful main suppliers enlarged their market orientation to foreign countries in order to become less dependent on the Dutch automotive producers. On the other hand main suppliers fulfilling the demands of its clients are required to supply the clients plants abroad, because vehicle manufacturers strive to reduce their supplier base to one system supplier worldwide per sub-assembly per car model. As explained earlier in this paper, unfortunately the successful main suppliers rarely source products in the Netherlands and therefore few complete Dutch supply chains exits. The opposite of this is that these companies are strongly integrated in international automotive networks. They source most of their parts and sub-systems from suppliers in European regions with a better developed automotive industry. The same is true for knowledge transfer. They have partnerships with universities located across Europe. Moreover there are no successful main suppliers with Dutch clients only. They supply mostly to the major European car manufacturers. Some of them do not supply Dutch clients at all. So these could be seen as automotive islands in the Netherlands, successful because they are integrated in the European or worldwide automotive industry. However, because it is for vehicle manufacturers not self-evident to source abroad, Dutch suppliers can only be successful if their performance in terms of efficiency, flexibility, innovation and quality is ahead of the international competition.

Market-relations for vendors are changing

The success factors for vendors of complex systems (like liquid petroleum gas systems and exhaust systems) are more or less the same as for main suppliers. However a number of vendors, whose sales have traditionally strongly focused on after sales, face extra complications. Rising demands with respect to environmental pollution, petrol usage, safety and comfort lead to an increased use of electronics and increasing complexity of systems and system integration. This makes it even more difficult for vendors to develop systems independently from the car manufacturer. So vendors of complex systems face an extra complication in that their potential client bases changing from dealers, importers and specialised car service shops, to car manufacturers. Among other market relations will change thoroughly form relations at transaction basis to long term relationships. Therefore in the future the differences between vendors and main suppliers are expected to vanish.

6. Upgrading of Dutch supply industry

Does the conclusion that individual suppliers can flourish, even in geographic regions/nations without a strong automotive cluster, mean that Porter's (1990) theory on competitive advantage given a geographic region is not valid? Does the situation in the Dutch automotive industry validate his view. As concluded earlier particularly successful main suppliers are integrated into the European or worldwide automotive industry. This supports Porter's conclusion that openness to international competition can compensate for a lack of competition in the home market and for limited local demand, as basis for competitive advantage. Moreover the Dutch automotive industry has some more or less complete clusters in which the development of competitive advantage is a direct result of the geographic proximity of the companies in the cluster. The most clear example are multi-company cooperations in the polymer industry. The location of strong suppliers of raw material, resulted in a cluster of raw-material suppliers, mould-producers, injection moulders and other polymer processing suppliers, who in cooperation develop new products and production processes. Another example is the cluster around liquid petroleum gas systems, which consists of advanced suppliers who have remained ahead of the international competition. One of the factors responsible for the development of the cluster is government regulations, which directly boosted local market demand. The worldwide changing emission regulations made in the near future, eventually lead to a pole position for the Dutch automotive liquid petroleum gas cluster.

From a meso economic point of view it is, therefore, in the industry's best interest to strengthen the automotive supply chains. If the Dutch automotive industry position

1. An example of a company doing so, is the Robert Bosch company in Germany.
continues to be weak at the end production and supply levels, this will be disastrous for this industry sector. Some of the effects to be expected are:

a) the amount of components sourced abroad by end producers will increase even more. Especially because of a shortage of main suppliers,
b) foreign suppliers and end producers planning to invest in production facilities in Western Europe will prefer a location with a better developed supply chain.
c) the knowledge of suppliers, who are not part of international networks will erode because of a lack of knowledge transfer between suppliers, end producers and related companies in the local market.

As pointed out earlier, for individual suppliers a strong and profitable competitive and market position is attainable, in spite of the non favourable structure of the Dutch automotive industry. However in order to improve the competitive position of the Dutch automotive supply industry, in general, the minimum requirement would be that at least part of the supply industry upgrades to the position of main supplier. Upgrading up to the automotive industry standards is for suppliers at all levels in the supply chain requested. With respect to the needed improvement of the Dutch automotive cluster, it is promising that already a number of transplants choose for the Netherlands for their plant location. Also at end production level the recent investments by Mitsubishi and Volvo in the Nedcar plant are rewarding, if this leads to a growing local demand for components.

For upgrading for individual suppliers either within their supply position, e.g. becoming a better jobber, or towards a supply position at a higher level in the supply chain, strategic positioning is requested. Unfortunately Dutch suppliers in general and especially the category of third tier jobbers are not used to strategic decision making. Investments are mostly a reaction on temporarily fluctuations in turnover, making the companies extremely vulnerable for economic downturns. Predominantly, present “strategies” are described in terms of short term financial targets. The financial capability of companies are often not sufficient to invest in development of a long term relations in the automotive industry. Moreover the time span of the decisions is relatively short. It is clear that this way, improvement of the competitive position can not be expected in an industry, were long term relations are common and were building a supply relation can take up to more than 6 years.

One of the strategic decision models very useful for manufacturing suppliers is the framework on technology-product-market combinations (Carroad, 1982) as the basis for competitive positioning. His basis assumption is that companies should take into account these three dimensions. We suggest that suppliers should incorporate, the level in the supply chain as a extra dimension into their decisions with respect to market-segments to approached (Abel 1993, Weken et al. 1994). Interviews with suppliers indicated that they mostly segment horizontally on criteria as geographic locations and end product (cars, trucks etcetera). This way treating car-manufacturers and main suppliers in the car industry as one segment. As pointed out earlier in this paper, large variations in demands from clients at different levels of the supply chain, request for adding an vertical segmentation dimension (Praet 1992, Penner 1990, Weken et al. 1994). The basis for the industry specific strategic positioning framework we developed, are the individual capabilities of suppliers in relation to needs of customers at the different level of the supply chain (see Appendix IV). By comparing the present capabilities with respect to the needed capabilities a supplier can define what aspects with respect to market, technology, product and organisation should be improved to become world-class. Also it is more easy to define for a supplier what changes should be made if he wants to alter his position in the supply chain. In order to facilitate suppliers in their process of competitive positioning, appendix V summarizes a number of recommended strategies for attaining the desired competitive position.

7. Summary of main conclusions

The contents of this article can be summarized in four main conclusions:

1) In general a well developed industry with respect to local supply, demand, related industry and strong rivalry among local companies is the basis for worldwide competitive advantage for local companies. However if most of these favourable conditions are lacking, individual companies can still attain a positive market and competitive position. Therefore suppliers need to make at strategic business unit level, distinct choices for a technological and market position focused at the automotive industry. They should avoid mixing market positions at different levels of the supply chain. Moreover being part of foreign supply chains is critical for success.

2) Third tier jobbers can flourish, even in a geographic region with relatively high labour cost compared with industries in the “low-wage countries”. Moreover upgrading to a main supplier position is by far not always recommended or feasible for this type of company.

3) Strategic positioning is a prerequisite for survival at all levels in the supply chain, due to changing competitive and turbulent market environments.

4) In general Dutch suppliers are not used to coherent and consistent strategic decision making. To support the management of supplying companies in the decision making process, needed is a strategic decision making model incorporating the most relevant strategic aspects a supplier is confronted with. Customer demands differ greatly for different categories of suppliers. A model on strategic positioning should, therefore, take into consideration the level of the supplier in the supply chain (see Appendix V for the framework on recommended market/chain strategies). In order to target the desired competitive position a dimension of vertical segmentation in addition to the segmentation with respect to market, technology and product, is recommended.

7.1 Limitations to the used methodology

Although we did quantitative research to the competitive position of the Dutch automotive industry in general, our recommendations on company strategy and our framework are largely based on in depth interviews with the top management of automotive suppliers and on case studies of individual companies. Therefore there are limitations to the extent in which the conclusions can be generalized to other suppliers. Suppliers that use the framework for deciding on their strategies for upgrading their present position should take in mind that a in depth insight in the own strength and weaknesses and the opportunities and threats of the competitive and market environment, should be the basis for strategic decision making. The framework on recommended strategies (Appendix IV) and the list of requirements to define both present position and the gap with the desired position (Appendix V), can be helpful in structuring this insight.

* Manufacturing companies need, among others, to decide on the process and product technology to use, the market-segments to approach and the products to market.
7.2 Suggestions for further research

The framework is especially useful in the car industry. Trends in other automobile segments are generally lagging behind and therefore adoptions should be made when using the framework. However researches in the metal-, electronic- and electrotechnical industry indicated that the framework on strategic positioning of suppliers is also valid in other industries than the automotive industry. Further research in other industries than the automotive industry is suggested, in order to define more in depth to what extent, the framework could be applied by suppliers in other industries.

So far, a pressure on the supply industry to get organized in a chain structure, seems requested, in order for the framework to be useful. Indicated is that the following industry characteristics are the basis for such a pressure:

- Global competition. Only world class end producers can survive.
- Manufactured end products are combinations of assemblies with a high degree of complexity.
- A large number of technologies are incorporated in the end product.
- The technologies used are changing swiftly. A high pace of development is needed.
- Geographic proximity between suppliers and end producers is of major importance for some component categories.

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Appendix I — Supply chains

Automobile producers concentrate on core activities such as design, product development, final assembly and marketing. The production and development of sub-assemblies is sourced from first tier main suppliers also called system suppliers. Main suppliers can be divided into dependent and independent main suppliers. 

- Dependent main suppliers develop sub-assemblies mainly at request of the end producers. Examples of dependent main suppliers are Cummins producing motors and Robert Bosch producing motor management systems.
- Independent main suppliers concentrate on the development and assembling of these systems and source the production and development of sub-assemblies from second tier co-suppliers. Third tier sub-contractors, also called jobbers, manufacture single parts. Part of the category of jobbers, the special jobbers, who concentrate on advanced manufacturing technologies.

These different categories of jobbers are part of a tiered supply chain. As well as the mentioned categories, the supply industry consists of raw material suppliers, vendors of systems, and vendors of standard parts. Vendors supply on a transaction basis, parts or systems to end producers, other suppliers or to the after sales. Of course, the framework is a simplification of the real world, different supply relations exist. There are also, for example, jobbers supplying directly to the end producers.

Appendix II — Methodology

The research domain was the Dutch automotive supply industry. Although the Dutch automotive industry is rather small in international perspective, this sector is highly important for the Netherlands, especially for the geographic regions that are the automotive industry is concentrated. The employment generated is substantial and the technological innovations in this industry are of great significance for the manufacturing sector in general. The ongoing process of changing demands with respect to safety, comfort, and fuel economy have accelerated innovation in the large number of technologies incorporated in the automotive industry. Technologies which then have become quickly available for other industries because of developments in the car industry. Also the spin-offs to other industries from continuous process improvements, fuelled by the worldwide competition are enormous. Concepts of lean production and just-in-time production and supply were born in the automobile industry and have been adapted by various other industries. The same is true, for example, for flexible production automation, single minute tool change-over, and cell and pull production. Moreover because of the need for higher efficiency the rationalisation of the supply chain started in the automotive industry. The automotive industry is one of the most studied industries in the world. What value adds our research to the results of other researchers? Researchers studying the automotive industry from the perspective of suppliers, concentrate in general on trends for main suppliers. The demands at different levels of the supply chains are less often subject of study. Also the geographic area is often so large that if suppliers are taken into account only the excellent and well known suppliers are part of the research. We concentrated the research in a relatively small geographic area, where suppliers at all levels of the supply chain were studied in depth. Moreover to a large extent the study focused on the jobbers.

Because we carried out various researches subsequently, different problem theses were involved. The initial problem theses were: What is the competitive position of the Dutch automotive suppliers in relation to the changing international competition and changing market demands? Followed by: How can Dutch automotive suppliers guarantee their continuity in the future? With the sub questions, a) What is the composition of the supply chain; b) what components are produced and what value chain activities are carried out by suppliers; and c) what strategic development options are open to suppliers.

Ongoing research in the automotive supply industry has been carried out by the department of Industrial Economics, since 1992. The initial theoretical framework for the study, was Porter's model on competitive advantage of industries in geographic regions (Porter 1990). Before completing a comprehensive framework for classification of suppliers (appendix I), the existing theories and models on the supply industry were screened. This supplier evaluation framework has been in case studies with Dutch automotive suppliers. On the basis of this classification framework a set of recommended strategic options for suppliers have been formulated (appendix II). These strategic options were the results of an in depth field study in the Dutch automotive industry. A mailed questionnaire covering 100% of this sector in the Netherlands, resulted in an extensive database describing a number of characteristics of all the n 150 Dutch automotive suppliers at a number of characteristics (see appendix II). These questionnaires were followed by interviews with 25 suppliers and experts. The automotive supply industry has been an ongoing object of study since 1991. The researches mentioned above have been carried out for The Dutch Ministry of Economic Affairs, Dutch and Belgium regional development agencies and several automotive suppliers.
Appendix III — Information gathered from suppliers located in the Netherlands

1. Company name
2. Address information
3. Managing director
4. Holding company
5. Daughter companies
6. Turnover
7. Added value
8. Export
9. Automotive turnover
10. Automotive export
11. Research, development and engineering expenditures
12. Employment (worldwide, Netherlands, direct production and automotive production)
13. Number of engineers
14. Number of employees at marketing or sales department
15. Number of Dutch facilities
16. Number of facilities worldwide
17. Overview of production facilities worldwide
18. Quality certificates
19. General description of activities
20. Type of component produced
21. Description of manufacturing (metalwork, etc.)
22. Is company active in manufacturing, assembling and/or development
23. Horizontal cooperations
24. Vertical cooperations
25. Supply at functional demands or specifications/drawings
26. Geographic market supplied to
27. Market segments (car, truck etc)
28. Name of customers
29. Names of important suppliers
30. Changeability of production
31. Average delivery lead time
32. Average stock level
33. Number of defects in ppm
34. Items part of contractual agreements with clients
35. Average order duration

Appendix IV — Items used to classify suppliers

Items in the list below were used to classify suppliers in one of the categories: independent main-supplier, dependent main supplier, co-supplier, jobber, special jobber, vendor of parts, vendor of systems, raw material supplier. Together with the capabilities demanded by customers with respect to the these items, the list is the basis for competitive positioning of suppliers.

1. Market characteristics
   - Positive in supply chain
   - Customer relations
   - Cooperation model
   - Degree of relation
   - Number of suppliers per component
   - Mutual dependency
   - Sourcing strategy of client
   - Needed geographic proximity
   - Demands on quality
   - Flexibility
   - Efficiency
   - Lead time of contracts
   - Delivery lead time
   - By first contact
   - Repetitive order
   - Market competition

2. Technology
   - R&D&E %
   - R&D&E tasks
   - Development model
   - Production technology
   - Technology field
   - Life cycle
   - Number of technologies to manage
   - Process technology
   - Technology field
   - Life cycle
   - Number of technologies to manage
   - Influence electronics

3. Product
   - Size/weight
   - Value
   - Yes/no core component
   - Degree of assembly
   - Changeability
   - Synchronization in process
   - Supplier liability/responsibility for supply chain

4. Organisation
   - Value chain activities
     - Chain management
     - Value chain
     - Partial/integral
     - R&D
     - Manufacturing
     - Logistics
     - Marketing (final customer)
   - Specialisation of tasks
     - Production for own account and risk
     - Specifications or functional demands
     - Labour intensiveness
     - Production fluctuations
     - Size of production latches
     - Economies of scale
     - Economies of scope

5. Strategic and investments
   - Strategic decision process
   - Geographic competitive strategy
   - Market scope
   - Automotive scope
   - Competitive advantages
   - Time span of decisions
   - Targets
   - Size of investments
   - Investment risks

6. Financial figures
   - Turnover
   - Employees
   - Turnover per employee
   - Export percentage

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Appendix V — Framework on recommended market/chain strategy

<table>
<thead>
<tr>
<th>Strategy:</th>
<th>By:</th>
<th>1st tier</th>
<th>2nd tier</th>
<th>Special Jobber</th>
<th>Jobber</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Co-operation</td>
<td>a) Horizontal cooperation</td>
<td>R</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>b) Vertical cooperation</td>
<td>R</td>
<td>R</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. Consolidation</td>
<td>a) Expanding by mechanisation &amp; scale enhancing process</td>
<td>R</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>b) Cost reduction by transfer/move to low wage countries</td>
<td>RO</td>
<td>O</td>
<td>NR</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>c) Cost reduction by scale enhancing sales</td>
<td>R</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>3. Position Change</td>
<td>a) Upgrading chain position by cooperation</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>b) Upgrading chain position by R&amp;D and organisation development</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>c) Lower position in chain</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. Diversification</td>
<td>a) Expanding sales to other industries/new markets (SBU level)</td>
<td>NR</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>b) Expanding sales to other industries/new markets (nonlevel)</td>
<td>R</td>
<td>R</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>c) Expanding sales to international automotive markets</td>
<td>R</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>d) Expanding sales by introducing new products</td>
<td>RO</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>e) Transfer by introduction new processes</td>
<td>O</td>
<td>R</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td></td>
<td>f) Bailing out by leaving the automotive industry and searching for technology likewise industries</td>
<td>O/R</td>
<td>R</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. Specialisation</td>
<td>a) Specialisation in automotive industry</td>
<td>R</td>
<td>O</td>
<td>O</td>
<td>NR</td>
</tr>
<tr>
<td></td>
<td>b) Specialisation in local industry</td>
<td>NR</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>c) Specialisation in market niches within automotive industry</td>
<td>O</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>d) Specialisation in unique manufacturing technology</td>
<td>R</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>e) Specialisation on manufacturing technology</td>
<td>R</td>
<td>O</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

R = Recommended, NR = Not recommended, O = Optional, Blank = No connection between supplier position and strategy

Strategic Supplier Co-operation

An implementation study with Swedish small and medium-sized companies

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Abstract
This paper outlines a NUTEK (the Swedish National Board for Industrial and Technical Development) financed project called "Quality in Purchasing". It describes the method used and the implementation of strategic co-operation between Swedish small and medium-sized companies. This way to co-operate shall result in long term relationship beneficial for both parts. The results of the project show the importance of being well prepared and choosing the right partner.

1. Introduction
In Sweden the larger companies like Volvo, Ericsson, ABB, Electrolux etc. have their own programs to develop suppliers. These companies often have greater resources to do this than the small and medium-sized companies. Therefor small and medium-sized companies need another approach to succeed in their efforts to develop closer co-operation with strategic suppliers. IVF has carried out a development project financed by NUTEK (the Swedish National Board for Industrial and Technical Development) and the participant companies. The purpose of the project has been to develop a method for customers and suppliers to co-operate towards agreed goals. This way to co-operate shall result in long term relationship beneficial for both parts. The method will be published in a handbook concerning customer-supplier relations.

In the first phase studies of literature and interviews were done. The information were analysed and a tentative model were drawn up. Two companies, one developing and manufacturing safety items for the automotive industry and one developing and manufacturing (mainly through outsourcing) conveyor systems were contracted for the implementation study.

In the second phase the implementation study has been carried out. The companies have been analysed regarding their present supplier relations. The supplier base were analysed and potential partners were defined and evaluated. Two suppliers each were supposed to be chosen for pilot projects. For each customer-supplier relation goals and methods for improvement were to be defined in the aspect of that particular relation. A steering group was set up to define objectives, identify areas for improvement, initiate activities, evaluate and follow-up.

During the analysis the two companies choose different ways of implementation. One of the companies started with establishing a supplier development strategy and defining requirements for both the internal organisation and the suppliers before starting the pilot projects. The implementation study in the other company has more or less proceeded according to plan. For this company some problems has occurred in one of the pilot projects regarding differences in expectations on the relationship.
In phase three experiences from the pilot projects are evaluated, information is analysed and the implementation model adjusted. A handbook will be written and published.

2. Approach

During the first phase of the project a tentative model was drawn up. To produce a practical approach that would be suitable for smaller companies with less resources, a number of known cases were studied. A model designed by Partnership Sourcing Ltd. were found to be the best starting point. The Partnership Sourcing approach were adjusted and simplified to better suit small and medium-sized companies and the Swedish situation. The basic steps in the tentative model used in the company cases are:

- Project definition
- Analysis of present situation
- Design of the co-operation
- Improvement activities
- Follow-up

2.1 Project definition

2.1.1 Executive management commitment

First of all the executive management have to be committed to start up a more close cooperation with their suppliers.

2.1.2 Project organisation

Second a project organisation has to be defined. The Project leader must have the resources and authorities needed, a project plan and allocation of resources shall be drawn up.

2.1.3 Inform the organisation

There must be a plan for how to inform the organisation during the project. This information should not be a big kick-off. It should be done through the normal information channels.

2.2 Analysis of present situation

2.2.1 Purchasing strategy

The company strategy for purchasing is evaluated, and revised when necessary. The strategy must agree with the overall company strategy, it must also agree with the co-operation philosophy.

2.2.2 Purchasing procedures

Next is to assess the company quality system regarding the present supplier contacts. This is to map out the procurement process and the supplier involvement in the company. It is also the first part in identifying improvement areas.

2.2.3 Supplier base

To find the strategic suppliers a map out of the supplier base must be done. The map out will rank and classify the present suppliers in different groups. Example of groups are:

- value; how big share of the total purchasing value does a product or supplier stand for?
- risk; how important is the supplied product for your product and the end user?
- complexity; how complex is the product design or the production process?
- life cycle; what are the demands on faster product development?

2.3 Choose partners

2.3.1 Define potential partners

Starting from the map out of the supplier base potential partners are defined. There will be a selection of approximately five suppliers who are considered most strategic.

2.3.2 Evaluate

These five suppliers are evaluated regarding performance on quality, delivery and cost. Even more important is probably the evaluation of the executive management commitment to this kind of co-operation. Suppliers with whom the company has experienced a lot of problems should not be considered for a pilot project.

2.3.3 Choose

The company's executive management shall finally choose partners for one or two pilot projects. First now it is possible to ask the chosen suppliers directly. It is very important to present the project properly for the supplier executive management and to carefully evaluate their attitudes to the project. Suppliers may answer yes to participate, just because they want to please the customer. There must be a way for the supplier to say no without any direct risk to future business.

2.4 Design the co-operation

2.4.1 Organisation

Once the two companies have decided to go along with a closer co-operation, the organisation and form must be defined. The organisation should consist of the project co-ordinator at each company. It is now important to inform all employees who have contact with the particular supplier/customer.

2.4.2 Assessment

To collect areas for improvement an assessment is done at the supplier facilities. The result of this assessment and the one from the company assessment earlier will combined form a list of problem areas that need to be improved.

2.5 Improvement activities

The list of problem areas mentioned above will be the starting-point for the improvement activities. The steering group prioritise and form improvement teams to solve certain problems. The companies are recommended to just start with tasks with a good potential to succeed. It is also good to start to assess areas that are well known in the companies and where a successful solution would be widely spread.

2.6 Follow-up

The steering group will during the first 12 months meet every second month. Thereafter they will meet every third month. The steering group will during these meetings evaluate the progress of the improvement activities. The meeting will also be important for the members to get to know each other better and build up trust in the relation.
After the first 12 months experiences in the steering group will be evaluated to improve the work. This evaluation should be done at the customer and supplier separately and preferably by an independent body.

3. Case study A — SAFE

Company SAFE is developing and manufacturing safety items for the automotive industry. SAFE has approximately 500 employees and is a fast growing company.

SAFE has very well succeeded in their supplier co-operation in one of the two pilot projects. Both parts, SAFE and their supplier Alfa, experienced important improvements and a much better relationship after the first year.

3.1 Preparations

When SAFE joined the project a decision were already made by the top management to increase their efforts with supplier development. Information regarding their participation in this study was disseminated through the line organisation. The purchasing manager was assigned as project leader, and the quality manager was the main support.

The present supply base was analysed and ranked according to:

- total value purchased during the last two years
- criticality to finished product
- cost for disturbance
- cost for change of supplier

The list gave five suppliers suitable for a closer co-operation. These suppliers were then evaluated regarding quality and delivery performance. The selection of suppliers was presented to the executive management who choose two suppliers as preferred candidates for the pilot projects.

The two suppliers, Alfa and Beta, are both sheet metal companies located in the same geographical area. They are also in some ways competitors. The companies have approximately 150 employees each. Both companies agreed to participate in the project without knowledge of each others.

Supplier Alfa is a company with some problems in the past. Since a couple of years they have a new managing director who has had a positive impact on the company development. During the project time Alfa has registered to ISO 9001. SAFE is their biggest customer. Alfa was before they agreed to participate in the project, a bit concerned if they for the moment had enough resources for this commitment.

Supplier Beta is a family owned company, also with some problem history. The managing director is one of the owners of the company and is a real entrepreneur. SAFE is an important customer but they also deliver directly to the car manufacturers. Beta was never doubtful about participating in the project.

3.2 Improvement activities

An assessment was carried out at all three companies to identify problem areas and potential improvement activities. The problems that were discovered seemed to be about the same in all three companies and between them. Typical areas were:

- delivery plans
- engineering change orders
- inquiry and order process
- improvement activities

For each customer supplier constellation was a steering group formed. The steering groups consist of the SAFE purchasing and quality manager and the suppliers executive management. The steering groups started out to meet every 6th week during the first 6 months of the project.

At the first meeting the problem areas were evaluated and ranked. Working groups were formed for different tasks. At the steering group meetings the working group progress were reviewed.

After about 6 months the Beta pilot project failed. The reason to that was misunderstandings and disagreements. It had in the project become more and more clear that the two companies had different opinions about how the relationship should work. In the bottom was also problems with a new product.

The Alfa project has worked well.some disagreements has turned up but because of the more close relationship it has been more easy to solve them. After a year the meeting frequency for the steering group is every third month. Both parties agree that the project has been a success. A major problem with EDI has been solved and a lot of money will be saved.

3.3 Experiences

During the project with SAFE some more valuable experiences has been drawn. The most important ones are:

- get commitment in the whole organisation
- be sure to evaluate potential suppliers properly

3.3.1 Commitment in the organisation

The participation in the project was initiated by the top level management. Although they had problems to inform and commit their own organisations. The suppliers got different messages from for example purchasing and product development.

3.3.2 Supplier evaluation

It is important to do the supplier evaluation thoroughly during the process to find suitable partners. To just analyse facts and figures is not enough. Most important is to evaluate the supplier attitude and expectations towards a closer co-operation.

4. Case study B — FLEX

FLEX is a fast growing company with about 150 employees. They have a clear strategy of outsourcing for production and logistics. Their business is conveyor systems.

FLEX' organisation was not ready to start close co-operation with their suppliers as soon as expected. The project had to focus on the internal organisation and how to work with suppliers. There is no pilot projects started during the project. FLEX will continue the work on their own.

4.1 Process mapping

To determine how FLEX work with their suppliers today the company processes were mapped. From this mapping problem areas were identified, for example unclear
responsibilities. During the process mapping a few suppliers were visited to study the interface between FLEX and the suppliers.

4.2 Organisation
FLEX reorganised the purchasing department during the project. The purchasing department changed name to Supplier Development and the responsibility for the suppliers became more clear. The responsibility for quality assurance of products were moved into the Supplier Development department from the Product Development department.

4.3 Supplier program
Most of the efforts in the project were put on designing a supplier program. This program would define which demands FLEX had on different kinds of suppliers. The Supplier program will be launched during this year to the suppliers. There will then be an evaluation of the supplier base to determine which suppliers will be able to fulfil the requirements.

4.3.1 Content
The Supplier program consists of a general part which describes FLEX overall policy and strategy regarding suppliers. With the general part there are two appendices for product suppliers and service suppliers. The program was divided into three parts because requirements are different for different types of suppliers and it makes the program more easy to read.

4.3.2 Requirements
The different areas of requirements are:
- Quality - System, product
- Technical - Resources, competence, systems
- Logistics - Systems, competence, precision
- Environment - System
- Market - Position, evaluation
- Finance - System, strength, growth
- Values - Human rights, ethics, society
- Service - System, accessibility

4.4 Experiences
A lot of experience was gained during the implementation at FLEX. The most important ones are:

4.4.1 Policy and strategies
Before you decide how to work with your suppliers the company and management must be clear of their policy and strategies for purchasing and sourcing. From these the requirements on the suppliers and the organisation must be drawn.

4.4.2 Organisation commitment
You must make sure that the whole organisation is committed to the new way of dealing with the suppliers.

4.4.3 Resources and competence
Before starting a close co-operation with the suppliers there must be enough resources with the right competence in the organisation.

5. Main conclusions of the project

5.1 Define strategies, objectives and requirements
Before starting close co-operation with your strategic suppliers make sure the executive management and the organisation have the same view on what, when and how to co-operate.

5.1.2 Choose partners who are your equal
Be sure to define both your own and the suppliers expectations of the co-operation. Evaluate thoroughly your own company and the supplier. It is hard to make a relationship work if one of the parts has to act as a parent towards the other one.

5.1.3 Communication is a key to success
Communication skills are critical for the co-operation to succeed. Just the opportunity to meet in person was experienced important for the effectiveness in further communication and problem solving.

5.1.4 Do not forget it is still a customer-supplier relation
The typical customer-supplier "game" will not disappear. True partnership is hard to reach and will take years to complete.

5.1.5 Start small
For small and medium-sized companies it is important to start small to succeed. But as mentioned earlier a strategy must be defined.
Information Technology for Purchasing in a Process Environment

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Abstract
This paper addresses the question of information technology for purchasing in a process environment. After a short sketch of the importance of process orientation, we focus on the impact of process orientation on purchasing by analyzing changes of the procurement and product development process, i.e. processes which contain purchasing activities. Afterwards we give an overview over information technology currently in use. This information technology aims at fragmented processes and structured data and therefore is not appropriate for supporting purchasing in a process environment. Having articulated the lack of currently employed information technology the paper describes nine categories of information technology based on the future challenges of purchasing "business horizon" and "degree of structure of activities". Finally, we describe future information technology such as the Internet.

Key words: Internal tactics - information technology for purchasing, process orientation, supplier-oriented procurement, product-oriented procurement, the Internet

1. Introduction
1.1 The case of Pacific Bell

The case study of Pacific Bell shows the tendencies of a purchasing redefinition over years and the role of information technology in the process of change and in fulfilling the new tasks (O'Leary, 1993, p.34):

Pacific Bell had the opportunity to redefine its purchasing department after the divestiture of AT&T in 1984. At this time purchasing activities were conducted centrally. Pacific Bell spent a few years forming a regional purchasing unit and began building a mainframe system to handle the activities. At the same time, it began looking for ways to make the procurement process more efficient and to save money on warehousing space.

The results of the efforts can be seen today. Pacific Bell reengineered its purchasing department out of existence. The name of the organization created in its place is called "contract and supplier management". The main function of this organization is not purchasing but establishing long-term, mutually beneficial relationships with its suppliers. In order to fulfill these activities, it uses information technology to put administrative decisions and non-strategic-purchasing out to regional business units. On the one hand, Pacific Bell uses information technology which enables users to make their own decisions about purchasing and vendors, on the other hand, a financial decision support system is in use, which helps supplier managers making contract decisions.

1.2 The research problem and approach

During our research we observed that a lot of research and business activity is done redefining industrial purchasing. Analyzing the existing approaches, we find out that there exist two main areas. The first area aims at defining new purchasing ("purchasing is becoming supply management"). Its representatives are making valuable suggestions to increase the efficiency of purchasing focusing on collaboration with suppliers and internal functions, but they neglect the potential of information technology. The second area concentrates on the use of innovative information technology ("doing business on the Internet"). This area evaluates advanced information technology but is often based on the traditional understanding of purchasing. Both areas are playing an important role in redefining purchasing, but to gain business benefits it is necessary to link these main areas.

We are approaching the research problem by using Business Reengineering theories. Our research is based on the model of Österle (Österle, 1995, p.26). The model consists of three levels (see Figure 1).

Figure 1. The model of Österle

The first level is business strategy, the second represents processes, tasks, and organizational forms, and the third level stands for information technology. The levels have mutual effects on each other. Business strategy determines processes, tasks, and organizational forms, while the second level fixes the requirements for information technology. On the other hand, information technology enables new processes, tasks, and organizational forms.

Following the logic of the model, the first step we did in our research was analyzing the change in business strategy. Secondly, to find out new processes, tasks and organizational forms of purchasing, we analyzed literature and conducted personal interviews with purchasing executives and consultants. The interviews consisted of semi-structured questions, which were answered orally. The interviews also should find out, what kind of information technology is currently used. The third step was to examine the capability of the existing information technology compared to the requirements of the new understanding of purchasing.

The paper focuses on information technology supporting the new understanding of purchasing. It presents an overview of an ongoing research project that examines information technology for purchasing, which is called Arbeitskreis Informationstechnik im Einkauf (Working Group Information Technology For Purchasing).
2. The change of business strategy in the 90ies

2.1 From Taylorism to process orientation

At the moment a lot of companies are giving up the Tayloristic understanding of work and tend to process orientation. This actually is a response to the internal and external changes companies have been faced with since the middle 80ies, like increasing of customer's wishes and competition. Companies based on hierarchical structures and fragmented processes with functional boundaries, shared responsibility and competences (Taylorism) do not meet these challenges.

Process orientation focuses on activities along the value chain. The central element of the process orientation is the conception and implementation of processes. It represents an holistic approach combining information technology, people and processes. The initial point of the process orientation is modelling the process, i.e. the process activities will be analyzed and sorted into the chain where they are most efficient (Scheer/Nüttgens/Zimmermann, 1995, p. 430). Meanwhile there exist plenty of names for process orientation like Business Process Improvement (Johansson et. al., 1991), Core Process Redesign (Kaplan/Murdock, 1991), Process Innovation (Davenport, 1993). These concepts have in common that they are able to describe enterprises with the help of a few reference processes (Scheer, 1994, p. 86) like:

- production process
- product development process
- procurement process

2.2 Impact of process orientation on purchasing

To describe the impact of process orientation on the functional units, like the purchasing department, we have to look on the processes the department is involved in.

For marking the impact on purchasing we have to focus on modelling of the procurement process in which purchasing traditionally takes part and the changes of the product development process which also contains purchasing activities.

2.2.1 Engineering the procurement process

The procurement process is defined as a process that includes all activities required to get the item from the supplier to final destination (Weele, 1994, p.10). A procurement process does not lay within the domain of a single functional area, it is an interfunctional and -organisational process, including purchasing but also receiving department. It passes the following stages:

- identification of available suppliers
- supplier selection
- recognition of need
- ordering
- evaluation of supplier

What process orientation does mean to the procurement process and therefore for purchasing is described by Hammer and Champy using the example of Ford (Hammer/Champy, 1995, pp.41-42).

In the early 80ies, Ford reengineered the procurement process by changing the rule from "We pay if we receive the invoice" into "We pay when we receive the goods". The result is a streamlined procurement process with less people involved. Other changes in rules are having similar effects today. Instead of "We pay when we receive the

Figure 2. Material portfolio

Fundamental to this approach is the idea that buyers have different interests in suppliers depending on the items purchased. The interests in suppliers which provide items with low supply market complexity are marginal. In opposite, the interest in the suppliers procuring items with high supply market complexity is high. In this case suppliers should be used to assure supply and to solve problems (Kem, 1991, p.166).

Following this idea, two idealistic procurement processes can be distinguished. A process corresponding to low interest in the supplier termed product-oriented procurement process, and a process used for procuring strategic items named supplier-oriented procurement process. These processes represent the ends of a continuum scale between buying on a free market and buying from a single source. The distinctive feature of both processes is the degree of collaboration between suppliers and buyers. Table 1 describes the features of the processes on five criteria - adapted from Lamming and Venkatraman (Lamming, 1993, p.152; Venkatraman, 1991, p.145).
The product-oriented procurement process is limited to the exchange of products. A decisive mark in this context is the point of procurement (POP), the point at which the product is procured. As a matter of fact, this takes place after the completion of the product, i.e. specified performances are exchanged. The supplier-oriented procurement process is characterized by a long-term relationship to a few preferred suppliers. This kind of collaboration is comparable to a common project. Features are an exchange of low-specified performances such as knowledge and an early POP, i.e. even before the product has been produced or even developed, the buyer decided on a certain supplier. In most cases, the collaboration has its origin in a common product development. The different intensity of collaboration entails, that the processes differ as to their activities, the sequence of activities and the responsibility for the activities. Table 2 compares the activities lying within the domain of purchasing in a product-oriented and supplier-oriented procurement process.

Table 1. Features of the product- and supplier-oriented procurement process

<table>
<thead>
<tr>
<th></th>
<th>Product-oriented</th>
<th>Supplier-oriented</th>
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<tbody>
<tr>
<td>Time horizon of collaboration</td>
<td>From order to order</td>
<td>Product life cycle</td>
</tr>
<tr>
<td>Basis of source decision</td>
<td>Lowest bid</td>
<td>Performance history</td>
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<tr>
<td>Nature of exchange</td>
<td>Standard parts as leverage items structured data</td>
<td>Products especially strategic items unstructured information</td>
</tr>
<tr>
<td>Role of data/information exchange</td>
<td>Very restricted, no scheduling of capacity</td>
<td>Two-way exchange of knowledge and data, jointly planned capacity</td>
</tr>
<tr>
<td>Purpose of process</td>
<td>Cost reduction, operational benefits by making use of competition</td>
<td>Continuous improvement, strategic emphasis, cost less important than benefits</td>
</tr>
</tbody>
</table>

2.2.2 Engineering the product development process

Similar to the procurement process, the product development process is an interfunctional and interorganizational process. It starts with generating a product idea and ends with the introduction of the product on the market. It passes through five stages (Pay, 1994, p.25, Vinkemeler et al., 1996)

- product planning, including systematic idea generating and R&D release
- basic engineering, including defining requirements specifications and starting up capacity planning
- detail engineering and construction, including developing new product components
- production planning and production, working out product documents and preparing of preproduction
- introduction on the market

Traditionally the product development process is either sequential or parallel. Either of which makes the process slow (Hammer/Champy, 1993, pp.45-46). In a sequential process, individuals working on a part of a product wait until the previous step is completed. In a parallel design process all parts are designed parallelly and integrated at the end, with the problem that parts may not fit together.

New methods like concurrent or simultaneous engineering have a different approach. In concurrent engineering all engineering requirements will be addressed at the time, when the product idea is conceptualized or the basic engineering has begun (Rose, 1994, p.83). This includes the cost and material requirement. What does it mean for purchasing activities?

Formerly purchasing activities, like searching and selecting suppliers were mainly conducted in the phase, where construction was already done (detail engineering). This entails that a lot of companies had problems to translate the knowledge available at the marketplace into their products (Burt/Soukup, 1985, p.90). The results are renunciation of supplier knowledge and therefore low-quality or even customer-unfriendly products, long time-to-market cycles, high developing costs, despite optimal facilities and high-skilled engineers. Reengineering the product development processes tries to solve the problem by realizing purchasing activities already in the stage of basic engineering (Mendez/Pearson, 1994, pp.5-7), i.e. after the determination of the material specifications. Companies, which realized this approach, can be found in the automobile and electronic industry. For example automobile producers like BMW or Chrysler initiate researches of the supply market already within the product planning phase - about 75 month before production (Advanced Purchasing) (BMW, p.15, Rose, 1994, pp.109-110).

2.2.3 Purchasing profession in a process environment

The process orientation of the companies will change purchasing which traditionally is functionally oriented and mainly viewed as a handmaid of production (Vogege et al., 1995, p.7) towards an active role of purchasing, i.e. to a more comprehensive concept of supply management. Characteristics are that it uses its market knowledge already at the beginning of the product development and that it takes influence on the procurement market by animating suppliers to take part in the product development process.

In the scope of rethinking the procurement process special activities are transferred to the using department or to suppliers, like recognition of need. At the same time new activities are added, like selecting and certificating suppliers or conducting cost improvement programs.

These new activities - independent on whether they are part of the procurement or the product development process - have following the features (Brenner/Hamm, 1995, p.192):

- coordinating, planning and consultative character
- higher strategic and analytic level, i.e. unstructured tasks, more responsibility and decision making power
- managing more in-depth information of supplier
- oriented to the need of internal customers as part of a broader process
- based on a strategy, i.e. purchasing operates in a more entrepreneurial mode
A further decisive change of purchasing is that activities are no longer solved individually but in a team, either with other employees or suppliers. Purchasing in a process environment differs from the functional purchase therefore in its tasks, its realization (team) and understanding (part of the process), respectively.

3. Information technology for purchasing

3.1 State of the art

In the past, purchasing used applications that were part of a much larger program. A typically automated purchasing department had terminals hooked into mainframes running MRP programs that catered to manufacturing or finance, but not purchasing (Purch... 1994, p.65) in order to automate administrative activities, such as selecting supply source or checking invoice. A study which was conducted with the help of 1,027 purchasers by the National Association of Purchasing Management in Tempe, Arizona, in March 1995, reveals that this purpose is still dominant. The study brought out that there is a significantly high implementation of internal applications for processing structured data compared to the implementation of information technology for interfunctional and -organisational use and for processing of unstructured information (Karoway, 1995, p.20). Neglecting the use of information technology to link the supplier becomes really evident looking at a study done by Richeson, Lackey and Stamer (Richeson et al., 1995, p.24). This study examined the communication links between a buyer and a supplier in the just-in-time-relationship. The links include written exchanges, computer-to-computer hook-ups, telephone exchanges and group meetings. Although information to just-in-time-suppliers is provided even many times a day, approximately 61 percent of the participating firms do neither have Electronic Data Interchange (EDI) capability with their supplier, nor do they use it if they have it. Preferred information technology is telephone.

3.2 Lack of currently employed information technology

Buyer's biggest complaint about the information technology was in the near past that it did not speed up the process (Purch... 1994, p.65).

Purchasing in a process environment needs information technology in purchasing especially for processing the increasing number of unstructured information and for linking suppliers electronically (Ham/Brenner, 1996, Karoway 1995, p.18). There is a need for information technology on the one side to make use of the competition between suppliers in the scope of a product-oriented collaboration on the other side to open up the knowledge and service performances of suppliers in a supplier oriented collaboration.

In our research we observed six main shortcomings of the currently employed information technology:

- isolate alignment on functional and operational buying requirements
- no assistance of process flow of document
- processing restricted to structured data, such as price and quantity
- focussing on automating internal activities instead of making use of supply market potential
- no assistance of groupwork, i.e. neglecting a two way information exchange or face-to-face communication
- insufficient assistance of business-to-business communication

3.3 Appropriate information technology for purchasing in a process environment

The lack of existing systems induces the demands on information technology in a process environment. According to the challenges for purchasing in a process environment, information technology must be at least capable of:

- processing qualitative, unstructured information, e.g. supplier performance, in addition to structured data
- supporting inter-personal and cross-functional communication
- linking of suppliers electronically

Following the demand on information technology for purchasing mentioned above, we classify information technology for purchasing in a process environment by the variables "business horizon" and "degree of structure of problem and activities". In the following we distinguish nine categories according to their primarily emphasis and intent for purchasing (see Figure 3). Figure 3 shows also the currently IT-supported quadrants of the information technology portfolio.

Figure 3. Information technology portfolio for purchasing

Administration systems are defined as systems that support or/and automate administrative tasks (Schneidhofer, 1995). They provide ways to process structured data, to create documents and to manage information. Especially packaged software such as R/3 of SAP or Oracle Financials belongs to administration systems. Administration systems are widespread compared to other systems (Karoway, 1995, p.20, VDMA, 1993, p.6). The benefits of an administration system is given by Böhler, an Austrian company with a purchased volume of USD 200 million. Böhler was able to reduce the procurement lead time by 20-90 percent (Schneidhofer, 1995) by using an administration system.
Decision support systems are interactive systems that help people making decisions. A decision support system allows to ask 'what if' questions and to make decisions that require both manager and judgement and the analysis of a large amount of data (Emmelhainz, 1993a, p.114). Decision support systems are based on databases, providing buyers with information about suppliers and the items. Their use enable to increase the productivity of decision making by speeding up the decision making process or by improving the quality of the resulting decisions. An example for a decision support system supporting purchasing is given by Siemens in Munich, Germany. The system named BELI supports purchasing personnel by judging and selecting of suppliers. The system enables to improve the process of getting the supplier information and to early decisions by processing criteria like innovation capability of suppliers and market structure in selecting suppliers (Mertens et al., 1990, p.115).

Office systems facilitate processing and exchanging unstructured and structured information within the company (Aelter, 1995, p.214). These systems include a wide range of tools including spreadsheets and groupware systems like electronic mail and workflow. Workflow has a central position. It enables routing of documents in intraorganisational procedures on a fix process. In opposite, electronic-mail enables textual exchange of information. The benefits of workflow shows TRW. TRW shortened the time for creating a purchase order from 116 to 28 days by using workflow to push decision making power out to the buyers (O'Leary, 1992, p.35).

A purchasing transaction system supports the exchange of structured data, like purchase order or invoices between buyer and supplier. It enables the communication at different time and place. The direction of communication is one-way. Most of all products and services are brought together at different time and place. The direction of communication is one-way. Examples of messaging systems are electronic mail or bulletin board systems (Elliott, 1991, p.43). It is used to coordinate internal processes between independent companies. The benefits of a messaging system is the reduction of the activities of clerical employees and the transfer of activities to suppliers as the example of Ford shows. Ford gives their preferred suppliers access to the information system, the system enabled to improve the process of Ford (Hubmann, 1992, p.113). The data access enables the functions online query and update, printings as well as file transfer with down-loading and up-loading. Concerning the just-in-time delivery news are transmitted to the suppliers by EDI at a certain time - once a week for example. For an early recognition of alternation of supply within this discrete time the suppliers also have to gain insight into the stock and supply situation for their items and the facts entail that Ford needs to inform its suppliers wherever the production fluctuates.

A know-how-sharing system is a groupware system, which supports a two-way synchronous communication (Kremar, 1992, pp.426-428) used for the exchange of knowledge between persons working on a common task (Stiebich, 1994, pp.214-216). The participants, i.e. the buyers and suppliers can exchange individual statements to an unstructured problem. This enables to increase the problem solving and decision making productivity. A know-how-sharing system supports the development of suppliers demonstrates the Hewlett-Packard case study: At quality problems of items Hewlett-Packard offers its suppliers a technician to help the supplier's team to solve the problem (Burt/Doyle, 1994, p.33). The solution to problems can be build by transmitting construction drafts to the buyer. A direct analysis of the problem is possible added by real time communication (synchronous) in form of language (telephone) or language and picture (video-conferencing). The advantages are quick solutions and the identification of weaknesses at both the supplier and the buyer.

Know-how-sharing systems are very appropriate by problems in the procurement or in the product development process.

In the following we describe the employment of information technology adapted to the activity and intent of the procurement process. Figure 4 and 5 shows the employment of information technology adapted to the activities in a product-oriented procurement process. In figures 4 and 5 shows the employment of information technology adapted to the activities of the purchasers' and suppliers' departments involved in the procurement process are mentioned in the top row. The process activities can be divided into three stages. The first stage is the buyer's and suppliers' departments involved in the procurement process. The second stage is the determination of criteria for potential suppliers and seeking suppliers to build up a supply base. The third stage is the evaluation of the potential suppliers and seeking suppliers to build up a supply base. The fourth stage is the evaluation of the potential suppliers and seeking suppliers to build up a supply base.

The first activity of the procurement process is recognizing the need for items. This comes from the using department. In order to communicate the need office systems can be used. In the scope of the second activity the purchasing department is identifying potential suppliers and seeking suppliers to acquire the products. After the identification of weaknesses at both the supplier and the buyer the procurement department is identified. The third activity is the evaluation of the potential suppliers and seeking suppliers to build up a supply base. The fourth activity is the evaluation of the potential suppliers and seeking suppliers to build up a supply base. After the quotation has been chosen, the buyer prepares the

spent 1992 USD 8 million less than it did 1991 for comparable levels of goods and services (O'Leary, 1993, p.36).

A messaging systems is a kind of groupware system, which supports asynchronous communication especially the exchange of textual information, between companies. The direction of communication is one-way. Examples of messaging systems are electronic mail or bulletin board systems (Elliott, 1991, p.43). It is used to coordinate internal processes between independent companies. The benefits of a messaging system is the reduction of the activities of clerical employees and the transfer of activities to suppliers as the example of Ford shows. Ford gives their preferred suppliers access to the information system, the system enabled to improve the process of Ford (Hubmann, 1992, p.113). The data access enables the functions online query and update, printings as well as file transfer with down-loading and up-loading. Concerning the just-in-time delivery news are transmitted to the suppliers by EDI at a certain time - once a week for example. For an early recognition of alternation of supply within this discrete time the suppliers also have to gain insight into the stock and supply situation for their items and the facts entail that Ford needs to inform its suppliers wherever the production fluctuates.

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Figure 4: Product-oriented procurement process

The diagram illustrates the product-oriented procurement process in detail. The process begins with the identification of a need, followed by the selection of a supplier, and then the ordering and receipt of goods or services. The process includes stages such as evaluation, ordering, and receipt, with a focus on the integration of information technology (IT) systems in the procurement process.

Scene 4: Fast information technology developments

The integration of IT systems has significantly improved the procurement process. IT systems allow for faster and more efficient communication and processing of procurement information. The use of IT systems has also led to the development of new procurement methods, such as e-procurement.

Scene 5: Information flows in the procurement process

The diagram shows the flow of information in the procurement process. Information flows from the procurement department, through the organization, and back to the supplier. The flow of information is supported by IT systems and is crucial for ensuring that the procurement process is efficient and effective.

Scene 6: The role of technology in the procurement process

Technology plays a significant role in the procurement process. The use of IT systems has led to the development of new procurement methods, such as e-procurement. These methods have significantly improved the efficiency and effectiveness of the procurement process.

Scene 7: The challenges of the procurement process

The procurement process is not without its challenges. The integration of IT systems can be complex and requires significant investment. Additionally, the use of new procurement methods, such as e-procurement, can be challenging for organizations that are not accustomed to such practices.

Scene 8: The future of procurement

The future of procurement is likely to be shaped by the continued development of IT systems and the adoption of new procurement methods. The integration of IT systems will continue to improve the efficiency and effectiveness of the procurement process, leading to significant improvements in the delivery of goods and services to the organization.
The Vendor Agents decide independently, whether to bid, and then respond to the Purchasing Agent with their prices. Meanwhile, the Purchasing Agent listens to incoming "SUBMIT-BID" messages, and collects bids received before the deadline. When the bidding closes, the Purchasing Agent sorts the received bids according to their prices, and presents to the buyer a WWW-page summarizing all the vendors' prices in ascending order. Now, the buyer can select a vendor from the list. The selection of a vendor from the list will then invoke the Purchase Order Generator program, which returns an electronic version of a pre-filled Purchase Order. After the buyer approves the Purchase Order, it is translated into an EDI transaction and e-mailed to the winning vendor. In further future the functions digital signatures, invoices and payments will be integrated.

Advantages for the purchasing personnel from this system arise by reducing the inquiry frequency at the supplier, using unknown delivery sources, increasing of the flexibility especially at small order quantity. Using the SmartProcurement System the marginal costs for the comparison of several offers are decreasing, so that the supply market bandwidth can be used by the buyer.

Will this scenario become reality? What does the Internet mean for purchasing? Which changes are necessary to adapt purchasing to the Internet or the Internet to purchasing? An answer to these and other questions may give a study conducted by the NAPM-Silicon Valley Inc. and CommerceNet, which will be concluded in June 1996.

4. Summary

Purchasing is about to change. One reason is that companies tend to process orientation. In this context, purchasing activities gain more importance which increase the demand for the use of information technology. A prerequisite to realize the potential given by information technology is to adapt them to the new processes, tasks, and organizational forms.

The currently employed information technology aims at a Tayloristic understanding of purchasing. This understanding is based on fragmented processes and structured data. The consequence is that they can not face the new challenges of purchasing such as processing and managing of unstructured information or linking value chains. Therefore especially for linking suppliers, the use of specific information technology called electronic commerce technology is necessary. Today, for CEOs in most Fortune 500 companies, electronic commerce is high priority because it supports many of their strategic initiatives: building more responsive relationships with suppliers improving quality and getting new products to market. It also provides the ability to outsource entire business activities or integrate processes across enterprise boundaries (Price Waterhouse, 1994, p.537) in the scope of supplier-oriented procurement or make use of competition by product-oriented procurement processes.

Finally, we want to point out, that no information technology replaces face-to-face communication between buyer and supplier or even substitute the right attitude and skills of purchasing personnel. Each technology has a niche where it is useful. The challenge is to apply appropriate technology to meet the demand, i.e. information technology only bear fruits if it is adapted to the environment.

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On the Way to Supportive Information Technology for Contemporary Industrial Purchasing

A summary of four years of Dutch design-oriented research

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Abstract

Without question, one of the most significant developments in business in the last decades has been the application of Information Technology (IT). From the start of the computerization of business, however, purchasing already was perceived to lag behind other organizational functions in its assimilation to computers. And still, IT is being called upon merely to perform and support fairly routine purchasing tasks and it is focused primarily on obtaining efficiency in these routine, administrative activities. 1992, the Eindhoven University of Technology, supported by the Dutch Association of Purchasing Management launched a four year lasting research project. The challenge of this research project was not only to validate current IT applications in industrial purchasing but also to answer the question what IT functionality should and can be applied to effectively support contemporary industrial purchasing. The resulting reference models constitute the basis for creating new and more effective IT applications in purchasing. This paper reports on the results that followed from this research project.

Keywords: Information Technology, Purchasing

1. Introduction

Nowadays, industrial companies are increasingly dependent on an adequate information provision, geared to the way the business is managed. To provide this information, companies make use of information technology (IT). It is therefore that IT plays a crucial role in the industrial company of today. It is even hardly imaginable that present-day companies can do without IT. Moreover, IT even forms an essential enabler in permitting companies to respond to the constantly changing industrial environment (Hammer and Champy, 1993). Without question, one of the most significant developments in business in the last decades has been the application of IT. From the start of the computerization of business, however, purchasing already was perceived to lag behind other organizational functions in its assimilation to computers. IT is being called upon merely to perform fairly routine purchasing tasks and it is focused primarily on obtaining efficiency in these routine, administrative activities.

1 This WWW-site contains over a 150 interesting links to WWW sites on purchasing and supply management, and the use of IT in this field.

2 This research was, in part, sponsored by the Dutch Association of Purchasing Management, P.O.Box 494, NL-2200 AK Leidschendam, the Netherlands.

This was the conclusion that Moore and Fearon (1974) and Parasuraman (1981) once drew. Other, more recent studies, still report on the underutilization of IT within purchasing. According to a recent survey of CMG in the UK, 70% of the respondents felt that their needs were only adequately or even less met by the automated information system that was in place (Purchasing & Supply Management, 1995). Scheure (1994) claims that activities beyond the operational level were covered in only 10-20% of all cases. The existence of many clerical activities within purchasing served to focus initial attention upon the potential savings from computer assistance in this kind of activities. Effectiveness as yet has never been a real motivation for applying information technology in purchasing.

In the literature, several reasons can be found for the arrears of purchasing in the applying IT (Moore and Fearon, 1974; Parasuraman, 1981; Fai, 1986; Pinkerton, 1986; Plattford, 1986; Valenbreder, 1987; Van Eck, 1990). These can be summarized as follows: (1) the low identifiable potential savings in terms of manpower reduction in the already relatively small purchasing departments, compared to reductions possible in other functional areas made it difficult to justify the often huge investments in IT; (2) the insufficient insight in purchasing performance and added value of the purchasing function resulting in a low status of purchasing for top management compared to other business areas such as marketing and logistics; (3) the fact that the impetuses for most developments in the information systems within purchasing have been initiated by adjacent areas other than purchasing (e.g., logistics and finance), which has resulted in systems that are not adequate for purchasing activities except for some of the activities directly related to these adjacent business areas; and (4) a lack of education and training resulting in a gap of purchasing-knowledge in the possibilities and opportunities of the use of IT within purchasing, and of knowledge of the systems from the automation department in purchasing practices and working methods. For these reasons, purchasing is still a far cry away from applying the potential of currently existing IT to its advantage.

Therefore, in 1992, the Eindhoven University of Technology, supported by the Dutch Association of Purchasing Management launched a four year lasting research project. The challenge of this research project was not only to validate current IT applications in industrial purchasing but also to answer the question what IT functionality should and can be applied to effectively support contemporary industrial purchasing. The central question in the research project therefore was:

• What IT functionality should and can be applied to effectively support contemporary industrial purchasing?

To answer this question on functionality, Bemelmans argues that it is first necessary to gain insight in the decisions that have to be supported by the software (Bemelmans, 1994). In the field of industrial purchasing this implies that the functional requirements upon the systems are dependent on the purchasing decisions, the corresponding decision making processes and their management. A first, and essential sub question therefore related to the tasks and decisions that are involved in contemporary industrial purchasing, the typical decision making situations and the way decisions are made in these situations, and the management of these processes. The results related to this research questions are summarised in section 3 of this paper.

As in any research, it is senseless to 're-invent the wheel' and therefore, before any functionality was developed or possible applications of IT in industrial purchasing were listed, the current coverage of IT systems in this domain was covered in detail. After
having assessed the currently existing coverage of IT in industrial purchasing, the 'blank spots' (i.e., purchasing decisions that are currently not well or not at all supported by IT) were identified that required further attention. This is reported in section 4 of this paper.

Only then, when all the foregoing sub questions were answered, the central question of this research could be answered, i.e., the question of what IT functionality should or can be applied to effectively support contemporary industrial purchasing (section 5). This newly accrued knowledge on both as well as potentially beneficial applications of IT have to be recorded in a proper and useful way. In the research we therefore made use of reference models. A reference model can be defined as a simplified construction of the actually complex reality of industrial purchasing, valid for a number of situations (In't Veld, 1992). These reference models can be interpreted as the main result of the research. These reference models can subsequently be used in more effectively and efficiently developing as well as selecting software supportive to contemporary industrial purchasing. However, before we go into the results of the research, first we briefly elucidate the design of the research.

2. Research design
2.1 Methodology
Two types of (scientific) research approaches can be identified in the methodological literature, namely, the theory-developing or analytic research approach and the design-oriented or applied research approach (Van der Zwaan, 1990; Den Hertog and Van Assen, 1988; Swanborn, 1987). The differences between the design-oriented and the theory-developing approaches are not so much to be found in the structure and the methods they apply, but rather in the purpose of the research and the techniques that are used (Swanborn, 1987; Florusse and Wouters, 1991). Theory-developing research focuses on describing, explaining and predicting phenomena, whereas design-oriented research focuses on the guidelines and procedures needed to influence and actually change phenomena. The research project described in this paper was primarily design-oriented. This implies that (a) the result of the research is an artefact which is imperative, normative and prescriptive, (b) the emphasis is on synthesis of knowledge from different disciplines, and (c) the process of designing is a creative, ingenuitive process where the not-yet-existing comes into being.

2.2 Research method
The research that was carried was phased according to the research questions posed in section 1. This implies that the first phase dealt mainly with the analysis of contemporary industrial purchasing as well as the current state-of-the-art in IT in industrial purchasing. Based upon this analysis phase, improvement areas as well as challenges for new application areas of IT in industrial purchasing were identified. This introduces the second and most important part of the research, namely the development and design of new IT functionality supportive to purchasing decision making and the management of these decision making processes.

In the design phase of the research, a prototyping approach was applied. Prototype building is characterized by the extensive use of working models as a means for communication between developers and end users, and its iterative nature that is supportive to the learning experiences of end users. Prototyping was introduced in this research for two reasons. First of all, the traditional modeling techniques lack a good language for communicating the functional specifications between developer and end users. Second, the traditional analysis methods insufficiently anticipate the evolution in information needs when end users gain experience with information systems. Prototyping thus tries to improve the effectiveness of the development process of the functional requirements.

2.3 The role of the case studies in the research
In the research, extensive use of case studies was made. In the analysis phase, case studies were mostly used in an exploratory and descriptive fashion. This is mainly due to the type of research questions. Case studies are also favored when contemporary events are examined and there is only little or no control over the events that are examined (Yin, 1989). Besides, the case studies in the analysis phase also enabled a more specific definition of the central notions in the research. Another advantage of the case study was the possibility to investigate the use of IT in purchasing in a real-life context.

The use of case studies in the second part of the research served two purposes. First, they served as the means for the required detailing of purchasing practices identified in the analysis phase; second, they served as the basis for designing the reference models. These models were subsequently evaluated on their practicability by building prototype systems based upon these models, and on their usefulness by evaluating both the models as well as the prototype systems by both the companies that were involved in the design, as well as by several experts (i.e., senior buyers, purchasing managers, consultants and IT specialists).

3. Purchasing
3.1 Introduction
The first research question was related to the tasks and decisions involved in contemporary industrial purchasing, the typical decision making situations and corresponding decision making processes, and the management of these processes. We thereby made use of general system's theory (see, e.g., Kramer, et al., 1991) and the process focus advocated in Hammer and Champy (1993).

3.2 Purchasing's objective
In the special literature several objectives of purchasing are mentioned. Ribbers (1980) states that "purchasing is responsible for enabling planned production to take place". Bally (1985, p. ix) mentions the objective of "meeting production plans, sales programs or operating needs". Van Weele (1994) states that purchasing must satisfy the needs of "the primary processes of the business, their maintenance and management".

A broader view is adopted by Feenstra et al. (1993) when they state that purchasing must enable the achievement of organizational goals. Although typical of the development in the view on purchasing, this last statement is not a very discriminating statement. More specific is the condition of cost-effectiveness in achieving customer satisfaction. Van Weele (1994) refers to the situation when he states that purchasing should take place "at the most favorable conditions for the organization".

From the foregoing it is clear, however, that there is some agreement on the objective of purchasing in that it aims at the cost-effective satisfaction of the needs of the organization. Several authors thereby discriminate between various groups of (internal) customers such as, e.g., production (or in more general terms, the primary process), its maintenance and management. However, as any process depends upon inputs and resources that potentially (for whatever reason) might be purchased from a supplier, or for the fact that (part of) a process potentially could be contracted out to a
contractor, the internal customer can be any process, even purchasing and purchasing management itself (e.g., these processes as well need writing materials, computers, etc. and might consider hiring temps via an employment agency or contracting a market research bureau, to give only some examples).

3.3 Purchasing's function
According to general system's theory, a system performs its function by providing the desired outputs to its customers (which are part of the environment). In our context, these outputs are the desired goods, materials, equipment, supplies, merchandise and components or the desired service. Ribbers (1980) as well mentions "the provision of the required materials and parts" as the function of purchasing.

It is important, however, to note that these goods and services are actually supplied by suppliers. In this paper, this primary activity engaged in the actual supply of goods and services is referred to as 'supply'. Purchasing is thereby responsible that supply actually takes place in a cost-effective way. Baily (1985) calls this the "arranging for the supply". Pooler (1992) calls it "to ensure economical supply". Håkansson (1982) also mentions the "securing of the resource inputs of materials, components, and equipment into the business" as purchasing's function. Nijs (1991) calls this function the "securing of the ... availability of products".

3.4 Purchasing's tasks
To ensure that the needs of internal customers are indeed cost-effectively satisfied by supply, 'closed loop control' has to be exercised by purchasing. The responsibility of purchasing therefore not only consists of initiating (or triggering) supply by ordering products, and subsequently paying suppliers for their products and/or services, but it also contains the monitoring and possibly correcting (e.g., expediting) of supply. Moreover, in the new view on purchasing, pro-active supply planning in the form of capacity reservation, communication of future delivery schedules, etc. also belongs to the responsibilities of purchasing.

Next to the responsibilities for these more 'temporary' aspects of supply, purchasing also has more 'structural' responsibilities. We hereby aim at the organizing role of purchasing towards supply. That means that purchasing is also responsible for the initial 'design' and implementation of supply structures and conditions (i.e., it determines suppliers, maybe even over several tiers, specifications and the (contractual) conditions (incl. price) under which supply will take place) and its subsequent administration. The foregoing tasks we consider to constitute purchasing (see Figure 1). hepatitis, we hereby assume that 'supply' to be a dynamic system, i.e., a system in which supply processes take place that need to be controlled in order to perform their function. In this respect, the structural responsibilities of purchasing can be compared to product and process design in a production environment in which the initial outline of the product as well as the process are defined.

* Administration thereby refers to the management (i.e., monitoring and improvement) of specifications, suppliers and conditions.

The purchasing tasks of planning and organizing are sometimes referred to as initial purchasing tasks whereas the tasks of initiating, monitoring and correcting are sometimes referred to as operational purchasing tasks (see for instance Van Weele, 1994).

3.5 Purchasing management, purchasing and supply as a process
Although all of the individual tasks mentioned in the previous section are important, none of them matters if the process as a whole does not produce value for the customer. Therefore, as was also argued by Hammer and Champy (1993) in their well-known book "re-engineering the corporation", we focus on the process. A process is thereby defined as a set of activities that, taken together, produce a result of value to the, in this case, (internal) customer. As Hammer and Champy put forward, any organization should organize its work around its processes. In this way, the service provided by the process can be enhanced and the customer can, at any time, question the status of the process (and get an answer).

The initial event triggering the process is the decision to satisfy a need (of an internal customer) by deploying and paying external resources (i.e., the customer order). The basis of this decision can be manyfold, e.g., it could be for reasons of efficiency (e.g., lower prices), but also for reasons such as better products, higher service levels, increased flexibility, lacking internal know-how or capabilities, or a temporary capacity-shortage to name a few.

This explicit statement of a need, however, is not the only possible event triggering the process; as purchasing is also responsible for monitoring the environment (especially in a proactive mode), triggers do not only result from monitoring possible new or possibly changed needs of the internal customer, they also might originate from events or changes in the current supply or the potential supply market. Changes in

* In this way purchasing and purchasing management are really responsible and answerable for the cost-effective satisfaction of organizational needs.
the organization as a whole, or even in the environment defined by political, legal, economic, technological, ethical and social factors might also trigger the process. Finally, 'Time' can be a last trigger that can possibly initiate the process (to give an example, a market research process can be initiated based upon the fact that it has been several years since the market was scanned on new suppliers). Monitoring and evaluating these possible triggers then initiates purchasing management, purchasing and supply activities that, taken together, produce a result of value to the internal customer.

A very important implication of this particular point of view is that there is no such thing as a purchasing process since it is this 'ensemble' that determines the ultimate value of the result of this complete process to the internal customer; the one from which purchasing management, purchasing and supply derive their ultimate right to exist. The foregoing contemplation has been summarized in Figure 2.

3.6 Decision making situations: the customer order decoupling point
When the process is triggered by an internal customer, some of the purchasing decisions that have to be made to ensure supply might already be (partly) taken whilst others might still have to made. An example of this is the decision which supplier to use for a particular need: in some cases an already qualified (or 'preferred') supplier can be available whilst in other cases market research and supplier audits will have to take place specifically for this need thus lengthening the process and negatively influencing performance (in terms of its lead time). It is clear that purchasing — in its attempts to provide a better customer service to the internal customer — therefore will try to answer most of the questions already beforehand in an often in the special literature suggested 'anticipative' mode based on experiences. Thus, purchasing is out so-called 'preparatory' activities in which the same basic tasks are carried out, however, aiming at providing (indications to) the answers to the basic purchasing questions independent of a particular case.

However, it is evident that this is not always possible and dependent on the novelty and specificity of the case presented by the internal customer, as well as the reliability of the already available data. The importance of the aspect of 'novelty' for the process was already recognized in the late sixties by Robinson et al. (1967) when they distinguished between three typical situations, namely the (1) new task, (2) modified rebuy, and (3) straight rebuy situation.

The foregoing can be interpreted as being analogous to the customer order decoupling point (CODP) in logistics theories (Hoekstra and Romme, 1997). This CODP distinguishes the customer order specific from the more 'anonymous' activities in a production process (i.e., activities that are not related to a directly identifiable customer order). We hereby introduce a similar concept to the environment. The CODP in purchasing thereby distinguishes between activities based upon a specific need from an internal customer resulting in the actual supply and satisfying of the internal customer's needs, and the anonymous, formatted pro-active activities. These pro-active activities can thus be seen as producing data that provide (indications to) the answers to the fundamental purchasing questions before an actual need of an internal customer needs to be satisfied. This can be interpreted as producing an 'inventory' of data, analogous to the inventory of raw material, semi-finished or even finished products at the CODP in logistics.

4. State-of-the-art in IT for purchasing

4.1 Introduction
Now that we have a more structured and consistent idea of what we consider as purchasing, purchasing management and supply, it was then the question of what parts of the process and what type of situations are supported by current IT applications. This is the topic of the next paragraphs.

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The CODP can therefore also be used in the management of purchasing. That means purchasing management has to decide what type of customer orders (based on novelty, specificity and importance) can and have to be identified, what the corresponding service levels should be, and subsequently what this means for the organization of the process (i.e., where should the CODP be situated and in this case, possible, what does this mean for the organizational structures and the planning and control methods, etc.)?
4.2 A brief historic overview

From the literature in the sixties it is clear that, from the start of the computerisation of business, purchasing already was perceived to lag behind other organisational functions in its assimilation to computers. If computers were used, they were merely deployed for clerical and routine activities involving high volume paper flows. The systems were deployed primarily to reduce purchasing’s clerical workload, to increase processing speed, and to reduce clerical errors. The main objective of the first (transaction processing) systems that appeared in purchasing was clearly to support the execution of operational purchasing activities in a fairly routine, repetitive situations.

During the seventies it became clear that information systems could be deployed not only to support the execution of operational purchasing activities and producing related documents such as purchase orders, but could also be used for reporting (and eventually even supporting decision making). At first, this reporting functionality was used to monitor the operational purchase process (i.e., by producing reports on open purchase orders, receiving status, etc.) which improved the ability to effectively expedite. Second, this type of functionality was used in producing summaries of consolidated operational data as well as reporting historic trends that could be used for more (unstructured and unique) tactical decision making in purchasing. Other uses of the computer that appeared on the scene at the end of the seventies were the use of the computer to efficiently answer ad hoc queries of purchasing managers, to communicate about the status of the purchasing process, and to (accessibly) record notes on specific purchase orders. The major area of computer application in the seventies however, still was in transaction processing for the rapid and accurate manipulation of repetitive data aimed at taking over the buyer’s clerical and administrative chores (reduction of paperwork, automatic numbering of purchase orders, reduction of order preparation and writing time, etc).

The application of IT in purchasing during the eighties further developed itself in the direction of management reporting and decision support for use in more unstructured purchasing tasks. The rapid adoption of IT by industrial companies has also had a profound impact on the application of IT, in particular in the use of traditional IT in supplier selection and management, and the application of new technologies in communication (EDI) and automatic identification. A last development that can be mentioned is the use of new technologies in the provision of (external) data, such as external data bases and videotex. Although the foregoing opportunities were clearly recognised, the actual implementation of these new applications seriously lacked behind the expectations.

The nineties formed the scenery for many new and exciting applications of IT in purchasing. Most prominent and innovative developments that can be mentioned are the emergence of expert systems in purchasing, the use of the purchasing card for small purchases (together with the appearance of related value-added services such as customised management reporting) and the use of the Internet for electronic commerce. Furthermore, the possibilities of EDI were further enhanced to be able to support long term visibility and multi-level supply control (MLSC) principles.

It is remarkable that most of the recent literature still report on the fact that "few ... have applied effectively this capability to purchasing", as Porter (1989) notes in his article with the telling title ‘Why purchasing can’t get the systems it needs’. Van Eck (1989) — in a very critical article — states that the main reason for this is, that purchasing cannot just be automated (especially not by IT professionals that only have a very limited perception of the content of the purchasing function). Still, however, most purchasing departments are confronted with integrated standard software packages.

4.3 Commercial software packages

Although the previous sections identified several types of information technology that are being applied in the purchasing environment, most of the applications that may be found in practice usually are part of a commercially available, integrated business application software package (nowadays mostly referred to as an Enterprise Resource Planning or ERP package). Two of the most prominent packages that can be encountered in this market are R/3 from SAP (D) and Triton from Baan (NL). Although differences will exist, these packages typically support the operational order cycle (from requisition to payment), vendor-rating as well as provide possibilities for management reporting. The typical purchasing system is depicted below.

![Figure 3. The concept of a typical purchasing system](image)

Source: Coopers & Lybrand Management Consultants

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**Note**

Section 3.2.2 is the result of extensive desk research by the author. However, due to the original size of the results and the restrictions posed by the conference, references are not included. They can, however, be obtained from the author. The whole of the results will be reported in a dissertation that will be published in the second half of 1996.
4.4 Discussion: requirements

Confronting the results from the first two research questions shows us that although various IT applications for purchasing have been developed, in practice purchasing only has the support from the typical ERP package that is in use in the company.

In terms of the analysis presented in section 3 this means that the actual support from IT is still limited to purchasing itself; it hardly offers support for purchasing management activities like capacity planning, work order assignment and issue, work load control, etc. Regarding purchasing, typical ERP packages do offer functionality in the areas of supply planning, initiation and monitoring and handling payables. However, the organisating (specification, selection, contracting) and administering tasks of purchasing, again, are hardly or even not at all supported. Only in case of repeat buys, IT supports the selection of an already existing supplier from a list of suppliers that is maintained by the system which brings us to the next point of attention.

In terms of typical purchasing situations that are supported by IT it is obvious that current IT applications mostly support repeat buys, and to some extent modified rebuys. As the novelty and/or specificity of the customer's need increases, like in a new task situation, purchasing is not at all supported by IT.

In the next, more design-oriented sections we therefore focus on the possibilities of IT in supporting the organising and administering tasks of purchasing in new task situations, and of purchasing management tasks in these situations.

5. New IT applications in purchasing

5.1 Introduction

When considering the conclusion of the previous section, IT should support purchasing management tasks, as well as 'structural' purchasing tasks in new task situations. Purchasing management thereby considers the purchasing tasks in these situations, and of purchasing management tasks in these situations.

5.2 Available IT functionalities

5.2.1 Workflow Management Systems

Workflow Management (WfM) is a management task that ensures that a specific process is carried out within specified time limits, agreed upon quality levels and effort, mostly based upon an external event or trigger. WfM ensures that the tasks defined in one of more procedures are passed among the appropriate participants (people and/or systems) in the correct sequence and completed within set times (Heer, 1994). Workflow management therefore requires control, i.e., it requires planning, progressing-monitoring, prioritizing, quality monitoring and the possibilities to actively direct the process towards the goals.

A WfM System can be defined as an information system that provides automated support for the logistics control of business processes in an administrative environment (Heer, 1994). Most of these systems are therefore also applied or aimed at banks, insurance firms, tax offices, etc. At this moment, WfM Systems that make use of IT generally are workflow 'monitoring' packages. These WfM packages can, for instance, offer support in the areas of flexible routings and progress monitoring. WIM Systems make it possible to model various purchasing procedures for specific types of customer orders, initiate their execution, assign staff, track the status of the workflow, monitor capacity loads, etc. Often, WIM packages are linked to so called image processing and document management systems (we will discuss these in a latter section).

5.2.2 Communication Tools

From the research it is clear that purchasing professionals making structural purchasing decisions, to a large extent are looking for relevant data to base their decisions on. Especially in the tasks we are looking at, these data are mostly not readily available to them. These data are 'hidden' in external data bases, in books, journals, etc., in the minds of other people, at the supplier's site or its people, and so on. Communication, access and query possibilities should therefore be core functionalities of an IT based purchasing system.

Communication tools are required to contact other people. We hereby can think of simple E-mail facilities (but just think of how many purchasing professionals make use of these common facilities at this moment...) but also tools such as video conferencing.

When data is 'hidden' in other data bases, on the Internet, etc. we need functionality to unlock this vast amount of potential knowledge. And hereby we mean web browsers, library systems and enhanced user-friendly query tools, but also facilities such as bulletin boards and Groupware and Lotus Notes applications.

5.2.3 Decision Support Systems

When all relevant data is collected, making the decision requires well-thought evaluation tools or Decision Support Systems. These might include systems based on mathematical operations research models, but also expert type of systems based on knowledge technology. Tools also might include systems capable of simulating decision outcomes over time to enhance the effectiveness of purchasing decisions. It also should be possible to analyse possible different alternatives to a purchasing decision (evaluation of various "if...then..." scenarios). It should be noted that this type of system supports, rather than replaces, managerial judgement and is aimed at improving the effectiveness of the decision making rather than its efficiency.

5.2.4 Document Management Systems

A specific problem related to the management of the data in the context of purchasing is the fact that most data are not structured data, but data recorded in documents (like product specifications, contracts, but also documents like minutes, notes, memos, etc.).
Part of managing this unstructured data in documents is the subject of document management. Document management addresses the management of the life cycle of a document. This life cycle can be depicted as follows (see Figure 4).

Figure 4. The document life cycle.

A document management system therefore should provide support for defining (i.e., conceiving and writing documents) which may include template support for conceiving and writing specific documents including the possibility for re-use of data and texts (it should be noted that this functionality also requires a close linkage with a word processor); the authorization of documents; multiplying and distributing copies of documents and their management (because copies are in principle redundant and changes therefore should be synchronized); supporting archiving, filing and numbering of (parts of) documents; handling revisions (changes) to documents; and ultimately deleting documents (taking into account required accountability of the organisation, which may require the distinction between active and passive archives of documents).

5.3 A purchasing information systems architecture

Now that we have identified various IT functionalities that might be applied in a purchasing context, they need to be put into relation to each other. This 'sketch' of the information provision in purchasing is sometimes referred to as an architecture. Such an architecture typically consists of (a) a demarcation of the information systems, (b) the most important data-sets (high level entities) in that area, (c) a sketch of the technical infrastructure, and (d) the required organization (Theeuwes, 1990). In this paper we will focus on the first aspect of the architecture, which we will further refer to as the (information systems) architecture.

Central in the architecture is the Workflow Management System (WfMS). This process-focused functionality is responsible for the support of the management of all occurring workflows. In these workflows, specific purchasing tasks have to be carried out that require support from specific decision support tools (DSS) and more general communication, access and query tools. Finally, all intermediate as well as resulting documents need to be accommodated in the Document Management System (DMS), which is also responsible for making all the data in these documents available to (authorised) others. This brief clarification of a purchasing information systems architecture is depicted in Figure 5.

Figure 5. A purchasing information systems architecture.

5.4 Prototype designs

5.4.1 Introduction

Based upon the architecture proposed in the previous section, two case studies aimed at the design and building of prototypes supportive to purchasing were carried out; the first aimed at the support of contracting and contract management, the second aimed at the support of supplier selection. These two case studies are briefly described in the following two paragraphs.

5.4.2 Case A: a system supportive to contracting

The first case was carried out at an aircraft manufacturing. The objective of this project was to deliver a definition of the functional requirements towards an automated information system supportive to contracting and document management. In delivering the functional requirements of such a system use was made of a prototyping approach. The priority of the project was first to improve availability of documents and data, second to support (parts of) the contracting process itself.

In delivering the functional requirements, specifications and prototype of the system an extensive analysis of the contract definition and contract management processes was carried out. This analysis resulted in a detailed process model of the contracting process. Contracting was thereby defined as those activities in which agreements between the manufacturer and another party are defined and managed. Contracting was therefore subdivided into (1) contract definition (i.e., contract conception (identifying the contracting situation and selecting standardized conditions), contract negotiation and contract agreement) and (2) contract management activities (monitor and evaluate the contract and follow up the evaluation). Next to the foregoing process analysis, the documents used within the contracting process were investigated.
Bottlenecks that were found related to (a) the document management of specific as well as standard contract documents and (2) the intelligent support of the contracting activities itself.

Based upon a description of these bottlenecks, the functional requirements and specifications were derived. In doing so, theoretical insights from various disciplines were used, such as data management, document management, configuration management, engineering data management and generic bills-of-materials (BOMs). Furthermore, a first prototype was built in which part of these specifications were realised (see Figure 6).

For contracting activities, the prototype addresses the support of (1) identifying and describing a contracting situation with relevant characteristics, and (2) selecting contract types based upon these characteristics. Document management functionality incorporated into the prototype consists of the (1) definition, (2) identification, and (3) validation of (parts of) contract documents. Furthermore, by making use of the generic BOM concept, provisions were made to expand document management functionality from contract documents to dossier management.

5.4.3 Case 8: a system supportive to supplier selection
The second case was carried out at a manufacturer of medical equipment. The objective of this project also was to deliver a definition of the functional requirements towards an automated information system, however, now supportive to supplier selection. Again use was made of a prototyping approach.

In delivering the functional requirements, specifications and prototype of the system an extensive analysis of the supplier selection process was carried out. This analysis resulted in a detailed process model. Selection was thereby defined as the collection of supplier choice and supplier qualification processes directed at providing the customer with an answer to the question, which combination of a supplier and a product (SPC) is the most or at least sufficiently suitable (in terms of cost-effectiveness) to satisfy the internal customer’s needs, now and in the future. Supplier choice was thereby defined as the customer specific selection process, whereas supplier qualification is triggered by a (pro-active) question of purchasing management (see section 5.6).

Next to the process analysis, a requirements inquiry was carried out resulting in a detailed overview of user requirements. These could be subdivided into (1) workflow management support (involving requirements in the field of process definition, justification, planning and management (progress and status tracking, project communication), and capacity management (prioritizing, planning and allocation)), (2) decision support (involving requirements in the field of the definition of the required decision model such as various criteria to take into account, the relative importance of criteria, how to score criteria, norms and standards for criteria, model assumptions, evaluation and comparison of scores, etc.), and (3) document management support (involving requirements in the field of report writing and (intermediate) result presentation).

A very important remark is related to the definition of 'supplier selection'. Whereas the naming 'supplier selection' might suggest that it involves choosing between suppliers, the case study pointed out that alternatives actually are supplier product combinations (SPCs).

Figure 6. The prototype of the Procurement Contracting Support System (PCSS).

Figure 7. The prototype of the Supplier Selection System (SSS).
The analysis and requirements inquiry formed the basis for a prototype of a system supportive to supplier selection processes (both customer order specific as well as customer order independent) (see Figure 1)9. The focus was thereby on supporting the process, including the provision of communication, access and query tools in the process, and some document management functionality.

6. Conclusions

Recapping the primary research question of what IT functionality should and can be applied to support purchasing professionals, in this section we evaluate the findings and results from our research.

The first research question that had to be answered was related to the decisions that are involved in contemporary industrial purchasing and the management thereof. In the research we have answered this question and provided an analysis of the objective, function and tasks of purchasing and the role of purchasing, purchasing management and supply in the process of satisfying internal customers. It was also necessary to investigate the typical decision making situations and the way decisions are made in these situations. This resulted in the application of the very powerful concept of the CODP in purchasing. The research also resulted in a thorough coverage of the current state-of-the-art in IT for purchasing.

These analyses, together with the analysis of current IT possibilities, provided the required insight in new areas for IT application in purchasing. In the design-oriented part of the research a high-level purchasing information systems architecture was proposed that can be used in developing the new generation of software products for purchasing. Besides, detailed reference process and data models were developed and evaluated by implementing these in prototypes and subsequently evaluating them as was outlined in section 2.

The research described in this paper is an example of the design-oriented research that takes place at the Eindhoven University of Technology. It has showed that research can both be theoretical, analytical as well as design-oriented and in this way can prove useful for both academics as well as practitioners. This is stressed by the fact that Daan, a major Dutch software producer of Triton, a ERP package, has used research for practical applications.

However, research in the field of IT for purchasing is still not finished, on the contrary. The developments in IT applications such as the use of multi-media, virtual reality, the Internet, as well as the advance of a global communication infrastructure only mark the beginning of a very exciting era of information technology applications in business.

References


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9 The prototype was built with the support of dr. H.M.J. Hegge, M. Wermers en M. de Iaan.
Privatisation: Learning for the Future

Impact of privatisation on buyer-supplier relationships

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Abstract

The British Conservative government has embarked upon a strategy designed to reduce costs and improve service to the public by introducing competition and market forces to public owned corporations. A number of UK public corporations that were privatised during the period 1975 to 1995 were in a monopoly position and therefore their subsequent desire and drive to increase effectiveness may have been questionable. If privatisation works, then evidence should exist within the purchasing, of a change towards 'best practice', achieving greater efficiency, lower cost and better quality of service. One might for example expect to see an increased emphasis towards outsourcing, the development of collaborative buyer and supplier relationships and improved management of the supply base. The concern is that financial constraints and short termism may have encouraged some privatised companies to develop adversarial relationships. The purpose of this research is to identify to what extent, directly or indirectly, privatisation has impacted on the development of purchasing strategies towards best practice business relationships between newly privatised companies and their suppliers. Little debate occurred at the time of privatisation about the way in which the shift from the public sector to the private sector would influence buyer and supplier relationships and clearly major gaps in our knowledge of this area exist, which this paper will address.

Keywords: theoretical concepts for purchasing, internal strategy, supplier strategies

1. Introduction

"In every great monarchy in Europe the sale of the crown lands would produce a very large sum of money, which if applied to the payment of the public debts, would deliver from mortgage a much greater revenue than any which these limits have ever afforded to the crown... When the crown lands had become private property, they would, in the course of a few years, become well improved and well cultivated."

Adam Smith, 1776.

The purpose of this research is to identify to what extent, directly or indirectly, privatisation has influenced the development of purchasing strategies towards best practice business relationships between newly privatised companies and their suppliers. In view of the large amounts of public expenditure on supply this should be apparent within the supply chain as each purchasing unit has moved towards using best practice techniques. In making this study, many external factors were considered, such as British and European Legislation, the market position of the companies, ties to original equipment suppliers, and changes in government and the economy and their influence on purchasing strategy to business relationships.
2. Literature Review

2.1 Strategy

Johnson and Scholes (1993) define strategy as ‘the direction and scope of an organisation over the long term: ideally which matches its resources to its changing environment, and in particular its markets, customers or clients, so as to meet stakeholders expectations’. Quinn (1980) sees strategy as ‘the pattern or plan that integrates an organisation’s major goals, policies, and action sequences into a cohesive whole’. A well-formulated strategy helps to marshal and allocate an organisation’s resources into a unique and viable posture based upon its relative internal competencies and anticipated changes in the environment and contingent moves by intelligent opponents. According to Porter (1985) the external environment is regarded as the most critical variable affecting the performance of organisations. The nature of the environment, whether simple or complex, stable or turbulent, has been found to influence the structure and operations of organisations (Lawrence and Lorsch 1969; Burns and Stalker 1968; Mintzberg 1979).

Quinn (1988) further referred to strategy as steps to a perceived goal or ‘logical incrementation’, while Van Weele (1994) describes the linking of concepts upon which management of the company is based. Cousins and Dooley (1994) refer to the work of Porter (1985), Farmer and Van Plooi (1991) and Hines (1994), suggesting that it is value added processes, and interaction of decisions, which make the difference in being competitive. Mintzberg (1983) expressed concern that too many aspects of the business operated independently, ‘behaving like fiefdoms protecting their own information base’ and Ansoff (1987) declared the need for synergy, in that the ‘sum is greater than the sum of the parts’.

Strategy is therefore a wide ranging concept, concerned with an organisation’s long-term policy and future direction within the environment that an organisation operates. Strategic management is the process of formulating, implementing and monitoring detailed short-term plans and targets for the organisation, or for a functional department such as Purchasing. An understanding of the influence of strategy (especially corporate strategy), and how it may influence purchasing strategy and implementation would help put into context how particular factors might influence purchasing and buyer-supplier relationships. Furthermore, it appears that the level of integration between purchasing and the rest of the organisation can have a significant effect on how competitive an organisation can be.

2.2 Strategic Purchasing

The growing importance of purchasing and supply management as a strategic contributor has been reflected in Crosby (1979), Schonberger (1986), Womack et al (1990), Lamming (1993), Sako (1992), Ford (1990) and Carlisle and Parker (1989). Porter (1985, 1990) describes ‘inbound and outbound logistics’ as being crucial to the firm’s strategic profile and concludes that purchasing and supply is strategic to the process. Caddick and Dale (1987) suggest the need exists to link purchasing strategy with corporate strategy. However, Cousins (1995a) identified that of a sample of the organisations in the UK, only 42% of respondents had a purchasing strategy and only 24% linked this strategy to Corporate Strategy. Proposals to the senior corporate management level which may conflict with Production, or Marketing, or Finance may thus fail due to limited bargaining power of purchasing should it not be adequately represented. The Purchasing department has seldom traditionally been represented at board level, and its interests and perspectives have therefore not been fully considered in the development of corporate strategy. An effective, purchasing strategy may be said to be one that contributes to the corporate goal. To be most effective, purchasing strategy must be a part of, and contribute to, the development of operational plans and targets for logistics, departments, commodities, individuals and inter-departmental teams. Grant (1992) defines three levels of strategy: corporate strategy, business strategy and functional strategy. These functional strategies must be able to operate optimally and be aligned in order to meet the overall objective of the organisation, e.g. to maximise profits. Purchasing’s role would seem to be an example of Grant’s functional strategy or alternatively, it might be seen as transcending this traditional classification - linking a functional perspective with the positioning of the organisation within its environment.

Purchasing strategy typically includes such factors as optimising the supply base, sourcing strategies, planning purchasing requirements, make or buy, global sourcing, improved management of inventory and logistics and electronic trading. The suggestion has been made that a purchasing strategy will evolve from one of clerical, and transactional, through commercial and logistics, to strategic (Syson 1992). From being a separate, subordinate department, in best performing organisations Purchasing is increasingly seen as part of an integrated approach to the supply of goods and services through its relationships with suppliers, sometimes extending beyond first tier suppliers to their suppliers (Lamming 1993). The management of this complex arrangement represents Purchasing’s strategic contribution as the ‘external resource managers’.

2.3 Buyer-Supplier Relationships

It is widely recognised that relationships between buying and supplying organisations have traditionally been of a competitive, confrontational, arms-length type, whilst in recent times the weaknesses of the traditional model and supporting literature are becoming increasingly clear (Lamming 1993). As a result, many organisations are beginning to practise closer working relationships (Macbeth and Ferguson 1994). Williamson (1975) identified the difference between ‘hierarchy’ (vertical integration) and ‘market’ (wide-ranging enquiry and quotation processes and arm’s-length dealing), and pointed out that intermediate forms of exchange or ‘relational exchanges’ (Dore 1987) did exist. Macaulay (1963), some years before concluded that contracts, whilst important, should not be considered in isolation and that the whole system of conducting exchanges should be explored. In the public sector, an outsourcing strategy was practised in the 1980’s on the presumption of advantages to be gained from competition (Cabinet Office 1984). Competitive tendering for supplies is normally associated with fixed price bidding on a short-term basis for one-off contracts based on lowest price (Slater, 1990; Speckman, 1988; Hartley and Parker, 1991). The IMP (Industrial Marketing and Purchasing group) developed an ‘interaction’ model and the concept of ‘closeness’ of the relationship related to the level of transaction cost (Ford 1990). Sako (1992) writes of the degree of interdependency between two parties and suggests that it may be analysed in terms of ‘contractual trust’, ‘goodwill trust’ and ‘competence trust’, identifying the extremes of ACR (Arms length Contract Relations), in contrast to OCR (Obligational Contract Relations). Carlisle and Parker (1989) refer to ‘commitment’ from buyer and seller, the concept of ‘mandate teams’, seeking win-win situations and the customer serving their suppliers, whilst Van de Ven (1976) warned of the ‘double edged sword’ effect: increased dependency, he advises, can result in strategic vulnerability.

2.4 Closer Relationships

The number of suppliers that a company interacts with has always been an important aspect of purchasing strategy. The traditional view of purchasing has been to have a group of suppliers competing against each other, and thus the more suppliers a
company had in its supply base the better. As stated above this approach has been repeatedly questioned, and many companies are now trying to operate a structured or 'rationalised' supply base (Cousins 1995a). Many significantly rationalise the number of suppliers that they do business with. One of the reasons for the changing view is the insight into the advantages that can be obtained from more co-operative relationships with a reduced supply base (Gadde and Hakansson 1994). Quayle (1994) argues that their are five possible voluntary sourcing strategies for purchasing: the choice of single source, multi source, buy the source, make in house, and 'forced single source'. Traditionally, organisations have avoided single source procurement, by practising parallel sourcing, which provides the incentives for supplier performance associated with multiple sourcing while preserving claimed benefits of sole sourcing (Richardson 1993). Partnership Sourcing has been advocated as the most effective Purchasing strategy for conducting business (Macbeth and Fergusson 1994), whilst Cousins (1992) argues that a strategy that promotes 'Partnership' is difficult to implement because most do not understand the concept itself. He concludes that attempts to introduce 'improved business relationships' or 'strategic sourcing relationships' often fail because the relationship is between buyer and supplier and not active throughout the supply chain. 'Partnerships' can often be seen to be dominated by one of the so called partners (Lamming 1993) and therefore the strategy of 'mutual relationships' may be non-existent.

The term 'Partnership' has been used to depict the opposite to adversarial relationships, the former symbolised by collaboration as opposed to competition. Partnership sourcing and tendering is based on long-term relationships between buyer and suppliers at all levels of the supply chain (Heide and John, 1990): the sharing of risks and rewards (Ellram, 1991), purposeful co-operation (Spekman, 1988), single-supplier contracts and win-win negotiations (Bailey and Farmer, 1990). Organisations often perceive that partnership type relationships form solely between the buyer and seller with the latter continuing to rationalise the supply base whilst at the same time changing the way that they do business. This has had great implications for the buyer with a new found role and perspective. Lamming (1993) refers to 'External Resource Management' as a new title for the purchasing function. Macbeth and Fergusson (1994) consider this to imply a one-sided approach and argues for a complete new view of the two way-nature and responsibility of the partnering relationship. Organisations appear to assume that partnership type relationships form solely between the buyer and seller organisations. Cousins (1995a) argues that, as a result, 'Partnership Sourcing has become a misused philosophical concept' and that the most important aspect of relationship building is concerned with integrating the internal organisational functions.

2.5 Models of Relationship
Bessant et al (1994) recognise the continuation towards greater collaboration and cooperation but note that little work has been done on assessing and understanding the nature of the relationship. The need is for a framework to analyse relationships and develop a better understanding of them (Lamming 1993). Lamming suggested a framework of eight factors (a ninth added later) based on practices, attitudes and immediate environment of the relationship which led to the development of his four-phase model from research in the automobile industry in Japan. It describes the change in relationships as progression through each phase, leading to a fifth phase, Lean Supply. The implication is to view the relationship as a 'quasi-firm' (Figure 1), with its own organisational structure and goals, communication mechanisms and culture. A similar approach has been developed by Macbeth et al (1989a, 1989b, 1990) within the context of 'supply chain management', concerned with optimising the whole supply chain by the use of a 'positioning tool'- monitoring the individual performance of each firm within the supply chain. Macbeth thus claims to develop a comprehensive view of relationships. Cousins and Dooley (1994) state that there is plenty of literature which explains the existence of relationships, but no model before Cousins' VMM (Vendor Management Model) on how to measure and evaluate data for them. They argue that research has been too technical, developing mathematical models to assist purchasing and supply Managers to make optimal decisions from a departmental viewpoint, but sub-optimal from an organisational level. They conclude that most decisions lack connection between what to source and well how to manage and measure the supply relationship and that those decisions are often based on the traditional variables of price, delivery and quality. They advocate the use of a ten-factor multi criteria decision making analysis tool and the need for a portfolio of strategies (Lamming and Cousins 1994) so that part of the decision process will concentrate on the development of the strategic supply base. Kap desert al (1991) suggest that not all trading relationships should be treated alike and that the need for a 'strategic relationship analysis or portfolio analysis' exists. They offer the Relationship Matrix, using relationship value against interest commonality generating four types of relationship, and derive a further model to depict relationship management modes by substituting power for value. They developed the 'Strategic Relationship Mapping Model' to help facilitate the choice of a relationship management mode to a particular relationship type, to produce optimal mappings and thus to reduce conflict in the relationship.

![The relationship takes on an identity of its own]

Figure 1. the relationship as a 'quasi-firm'
Source: Lamming (1992)

There appears to be a prescriptive aspect to the process of model development yet the presumption in favour of partnership has still to be tested, let alone established, in respect of public sector organisations. Erridge and Nondi (1995) argue that an extreme form of competitive bidding model is on the whole incomparable with successful
achievement of value for money. In particular, the rigid application of tendering procedures for low-value items regardless of on-costs, too many suppliers, short-term contracts and the absence of cooperation with suppliers will have detrimental effects.

2.6 Development of Closer Working Relationships

Increasingly, the best practice in private sector purchasing is seen in terms of the development of smaller, well-managed and partnership-oriented supply bases. (Sako, 1992, Lamming, 1993; Macbeth and Ferguson, 1994; Cousins, 1995b). Best practice appears to be leading to the development of supply chain and outsourcing relationships through partnership and networking sourcing strategies based on longer-term and closer, rather than short-term and adversarial, approaches. Management of privatized companies, released from public sector controls and with a restructuring agenda, can be expected to address existing buyer-supplier relationships. The result could be a major change in suppliers and contractual relationships with suppliers. Some companies may adhere to more competitive supplier relationships, others may opt for closer relationships. There is casual evidence that privatized companies have outsourced more supplies and are now including foreign companies amongst their recognized suppliers. The extent to which privatized companies have altered their suppliers, for what reasons and with what results has not been recorded.

2.7 Purchasing's contribution in the Public Sector

It should not be assumed that privatization automatically guarantees business success. Dunne et al (1990) examined ten British organizations which had changed status between 1969 and 1987. i.e. from public to private sector, or within the public sector. The study analyzed productivity, employment, and financial performance and concluded that the change in status had not always improved performance. A clear business or position strategy might be the most important single issue for organizations. To guide and monitor the public sector, the UK government has set up and encouraged bodies such as the National Audit Office, Central Unit on Purchasing (CUP), a host of committees, implementing procedures which have put in train restructuring in almost every area of purchasing in central government and the NHS. Ringwald (1994) concludes that government sponsored initiatives provided the impetus for the 'commercialization of purchasing' organizations in the public sector, citing: The Buying Agency, the NHS Supplies Authority, the Prison Service Agency and the Yorkshire Purchasing Organization as examples. She concluded that as a result of a government sponsored initiative, each organization saw a change in business and purchasing strategy to the extent that they would lose their secure market and have to become self-financing. This led to a change in leadership and skills, restructuring and commercialising of the culture. She does not state what direct influence the government exerted over these bodies' purchasing strategies or indeed the type of relationship that they adopted towards their suppliers.

2.8 Other political influences

Erridge and Nondi (1995) cite the CUP Guidelines (1989), Treasury Reports (1986, 1991) and the detailed accountability procedures on public expenditure, as placing great emphasis on competitive bidding within public corporations. Such procedures are enforced by legislation in respect of local authorities, and are set out in departmental directives as regards the National Health Service. More recently the government has supported and sponsored bodies such as Partnership Sourcing Ltd. and the Latham committee, both of which recommend purchasing strategies that encourage the benefits of closer working relationships with suppliers. Sir Michael Latham's report which was 'Constructing the Team' was launched at the Latham Review Conference on 25 July 1994 concludes that the UK government has done little to cultivate 'best practice' in relationship contracting in the Construction Industry (The ICF's Report of the 'Presidents Strategic Policy Group' 1994). The report suggested that government has adopted an approach of 'do as I say not as I do'. Notably at the conference, the Minister of State for Construction and Planning, Viscount Ulleswater, accepted Sir Michael's call for the government to lead by example as a best practice client. He also confirmed that the Government was 'in principle' willing to consider legislation to bring about change.

Whilst the public sector was slower than manufacturing industry to recognize the strategic contribution of its objectives, pressures on public expenditure since 1976 have led to a new emphasis on achieving greater economy, efficiency and effectiveness through the Financial Management Initiative (Turpin 1989; Metcalf and Richard's 1991, Fig. 1991). In the UK, purchasing's contribution was recognized in a Cabinet Office Report on Government Purchasing (1984), followed by the establishment of the Central Unit on Purchasing. A further report on the Organisation of Purchasing (Treasury 1993) strongly recommended a corporate role for purchasing on departmental Top Management Boards. More recently the Government 'Competitiveness' and 'Setting New Standards'. White Papers (1995) have reaffirmed the quest for professional procurement in government departments focusing on best practice procurement, seeking value for money, setting up of a contract management regime, integration of departments in the process and sharing of information and improved relationships with suppliers.

Erridge and Nondi (1995) state that the EC Directives reflect a competitive model of procurement, which is particularly evident in the emphasis on formal tendering procedures, attracting bids from a number of suppliers, and on maintaining an arms' length relationship with suppliers. They recognize that non-discriminatory selection criteria could be developed emphasizing the compatibility of potential suppliers with the contracting organization and that during the period of the contract a partnership could be actively developed.

2.9 Influence of the Public Sector on the Private Sector

In the early 1980's, Public Corporations acquired 70% of their services and supplies from the private sector in the UK (Harlow 1983). This accounted for 8-9% of private sector gross sales. Clearly the public corporations had a strong influence on the manufacture design and supply of components, influencing performance and safety standards linking industrial development and national programmes and thus swamping the efforts of the private supplier and controlling export potential. He considered it doubtful as to whether the right commercial pressures had existed at the time and if any such programmes would have survived. In addition the management of regulated-privatized companies may behave differently from management in other privatized concerns.

2.10 Privatization

Privatized firms in the UK have improved their operating efficiency, but not all (Parker, 1994a, 1995b). The reasons for increased performance are not considered to be clear. Furthermore, increases in performance were probably influenced by internal reorganisation changes before, during and after privatization. Some privatized firms have dramatically changed the proportion of their income spent on bought-in supplies (Parker and Martin, 1995). There has been little research into the supplier strategies of privatized companies, with the literature on privatization tending to focus on the improvement in the use of labour and capital inputs following privatization. It is clear...
from the literature that the aims of privatisation were to (Dick 1987; Herrington and Price 1987; Dell 1985):

- increase economic efficiency through the change in ownership and market influence,
- reduce the power and influence of the Trade Unions,
- reduce the Public Sector Borrowing Rate (PSBR),
- enhancing motivational freedom of employees,
- increase share ownership.

Little consideration is given to the impact on buyer-supplier relationships with only fleeting references to the impact on monopoly suppliers to public corporations (Steel and Herald 1984; Canes 1966; Parker 1986). Any potential change in the relationship between buyer and supplier seems to remain generally uninvestigated.

2.11 Scope of Privatisation

The main thrust of the privatisation strategy is to break up and 'privatise' the corporations. Whilst no evidence of such a strategy at this scale is apparent in the 1979 table 1 details the full extent of privatisation to date.

Table 1. Major Privatisation's in the UK

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Date</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Petroleum</td>
<td>Various 1979 to 1987</td>
<td>Oil</td>
</tr>
<tr>
<td>National Enterprise Board</td>
<td>Various 1980 to 1986</td>
<td>Various</td>
</tr>
<tr>
<td>British Aerospace</td>
<td>1981 &amp; 1984</td>
<td>Aerospace</td>
</tr>
<tr>
<td>Associated British Ports</td>
<td>1963</td>
<td>Hotels</td>
</tr>
<tr>
<td>British Leyland (Rover)</td>
<td>from 1965</td>
<td>Ports</td>
</tr>
<tr>
<td>British Telecom (BT)</td>
<td>1954, 1981 &amp; 1983</td>
<td>Telecommunications</td>
</tr>
<tr>
<td>Enterprise Oil</td>
<td>1954</td>
<td>Oil</td>
</tr>
<tr>
<td>British Shipbuilders &amp; Naval Docks</td>
<td>1954</td>
<td>Sea Transport</td>
</tr>
<tr>
<td>coils</td>
<td>from 1954</td>
<td>Ship Building</td>
</tr>
<tr>
<td>National Bus Company</td>
<td>from 1956</td>
<td>Transport</td>
</tr>
<tr>
<td>British Gas</td>
<td>1956</td>
<td>Gas</td>
</tr>
<tr>
<td>Rolls Royce</td>
<td>1957</td>
<td>Aero Engines</td>
</tr>
<tr>
<td>British Airways</td>
<td>1957</td>
<td>Airlines</td>
</tr>
<tr>
<td>Royal Ordnance Factories</td>
<td>1957</td>
<td>Armaments</td>
</tr>
<tr>
<td>British Steel</td>
<td>1988 &amp; 1989</td>
<td>Steel</td>
</tr>
<tr>
<td>Water</td>
<td>1989 &amp; 1990</td>
<td>Water</td>
</tr>
<tr>
<td>Electricity Distribution</td>
<td>1990</td>
<td>Electricity</td>
</tr>
<tr>
<td>Electricity Generation</td>
<td>1991</td>
<td>Electricity</td>
</tr>
<tr>
<td>Trust Ports</td>
<td>1992</td>
<td>Ports</td>
</tr>
<tr>
<td>British Rail</td>
<td>from 1954</td>
<td>Railways</td>
</tr>
<tr>
<td>British Coal</td>
<td>1955</td>
<td>Coal</td>
</tr>
</tbody>
</table>

Source: Parker, 1995b.

2.12 Types of Privatisation

The methods for release from public ownership included management buy out, flotation on the stock exchange, and direct sale to an interested party. For the purposes of this study, the author refers generally to such sales as 'privatisation'. Because of the nature and size and the potential impact that they may have on society, these organisations can strongly influence public opinion in the way that they perform. A result, government has retained the ability to influence them directly, through withholding the issue of a large portion of shares-the Golden Share', or by continuing to provide a subsidy, or indirectly, by monitoring through Regulators such as OFTEL and OfGas. The ultimate intention of the current Government is to release any financial control by the sale of existing shareholdings and elimination of subsidy as the companies become profitable.

2.13 Benefits to Privatisation

Generally, public corporations have been seen as operating a 'special or exclusive right' to a network or service and therefore there existed the ability to influence strongly or monopolise a market protected from normal competitive market forces. These corporations were primarily influenced by government, either directly by funding, or indirectly through the government's power to control the grant or operation of special or exclusive licences. Hence the government has held the ability to influence key markets within the British economy.

In its 1979 Manifesto the government made no even a hint that privatisation was its central theme (Steel & Heal 1984). The key to this strategy was four components: contracting out, reducing the Public Sector Borrowing Rate (PSBR), liberalisation from statutory prohibitions and charges for tax finance. This would provide for freedom of the market, improved efficiency, and reintroduction of market principles. However, the origins of privatisation may have been within that manifesto as Parker (1986) argues that whilst the Conservatives were not specific about what corporations they would privatise, a monetarist policy requires lower public spending, restricts growth of money supply, relies less on government intervention and needs 'free' markets. In 1979 the Conservatives were arguing that public spending, taxation and ownership were undermining the ability of the economy to supply competitively. He also argued that to raise the efficiency, depended not only on the transfer of ownership but on competition, with empirical evidence available to suggest that public corporations may be more efficient than privatised regulated monopolies.

'A Microeconomic experiment which will fundamentally change market and regulatory structures in a number of important sectors in the UK.' Vickers and Yarrow, 1988

Dick (1987) in his comparative study of company performance from public ownership to private ownership assessed the performance of British Telecom, British Airways, Electricity Companies and the Post Office against measures of output, employment and productivity. He cited bad performance as being due to the influence of state ownership, its monopoly position and poor management, leading to a state of 'comfortableness' which destroys the competitive ethic. His view of the primary aims of privatisation were: an increase in economic efficiency through change in ownership and increased market influence, resulting in a reduction of misallocation of resources and monopoly positions; reduced influence of the trade unions; reduction in the PSBR; enhanced motivational freedom and increased share ownership. Saul (1994) extended those aims to include benefit to the economy, the consumer and the employee with allocation of shares to distinguish between owners and workers. In his proposal for the
privatisation of the electricity supply industry, the Secretary of State for Energy (1988) put more of a customer focus on the benefits of privatisation: customers driving decisions; promotion of competition; regulation to protect the customer; security and safety of supply maintained; customers with new rights and companies with the freedom to manage their own commercial affairs. In a recent review of the implementation of Thatcherism, Rhodes and Marsh (Richardson 1994) have identified what appears to be the seven regularly mentioned aims for privatisation shown in Table 2.

Veljanovski (1989) supports the success of privatisation, but suggests deficiencies exist, for example the failure to maximise competition where state monopolies had been sold intact. He argues that the government has sacrificed the goal of greater competition for short-term considerations, with too much reliance on regulation.

Table 2. Seven Aims of Privatisation

| 1. To reduce government involvement in industry. |
| 2. To improve efficiency in both the privatised companies and what remained of the public sector. |
| 3. To reduce the Public Sector Borrowing Requirement. |
| 4. To widen share ownership. |
| 5. To encourage employee share ownership. |
| 6. To ease problems in public sector wage bargaining by weakening the unions. |
| 7. To gain political advantage. |

2.14 Performance of Privatised Companies

It appears that the majority of organisations privatised have generally seen an increase in performance, although the reasons for such an increase is not clear. As mentioned earlier Dunsire et al. (1990) tested the theory that changes in ownership improved performance by examining ten public sector organisations which had undergone status change in the last twenty years, using an analysis of performance in productivity, employment and finance against change in status, competition and internal management. The performance of BT in the 10 years since privatisation has improved in all areas except Research and Development and investment expenditure, with the impact of increasing competition having a positive influence on that performance (Lawrence, 1993). Martin and Parker (1995) looked at eleven British companies during the 1980’s and in a bid to avoid the problem of post privatisation ‘shake-out’ and ‘riding’ on the 1980’s boom considered the performance over a period of five time periods. They concluded that it was difficult to sustain the hypothesis that private ownership is unequivocally more efficient than nationalisation. It is apparent from this study that each company may have been privatised in a different environment and therefore the impact of differing factors including competition and legislation, customer preferences and pre-privatisation history may have varying impacts on performance. Combining economic with organisational theory, Parker (1995a) argues that economists should look into the ‘black box’ of the organisation for a full explanation of company performance. When testing the economic theory that performance should improve as organisations move into the private sector and ‘vice versa’, Parker provides empirical evidence that some companies behaved as predicted, and some did not. Where performance improved, changes in the internal environment were detected, whilst conversely, in companies where performance change did not take place as predicted, few or no changes in the internal environment could be found. This suggests that the successful companies are those that adapt their internal environment (Table 3) to suit their external environment. This was further recognised by Parker, noting that the privatisation of British Airways was announced by the government in 1980, but delayed until 1987, yet internal changes in structure, accounting and reporting procedures, non core activities sold off and new working practices all reflected significant improvements in performance in the early 1980’s.

Parker (1994b) further argues that it is not just the interaction of ownership (profit demanding shareholders) and competition (increased due to deregulation), but also the mechanism in the internal environment of the organisation with pressures, leading to internal restructuring etc. that produces the improvement in performance. Of the organisations studied all became more profitable (mainly in the run up to privatisation), half brought in new management (mostly prior to privatisation), the role of the Trade Unions was reduced in part (though as part of a longer term trend), some had developed flatter structures and many had been involved in global expansion and acquisition. British Telecom was considered as having been previously protected from competition whilst evidence existed that similar changes had happened to companies remaining in the public sector such as the Post Office. It appears, therefore, that other factors, such as technological change, recession, employment legislation and organisational changes affecting all parts of the economy, could have an influence.

Table 3. Elements of the internal environment (Parker 1995a)

<table>
<thead>
<tr>
<th>Elements</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Introduction of outsiders as change agents Removal of middle layers</td>
</tr>
<tr>
<td>Objectives</td>
<td>Focused on profitability Increased marketing function Investment justified in payback terms</td>
</tr>
<tr>
<td>Organisational Structure</td>
<td>From U-Form to M-Form More local management autonomy</td>
</tr>
<tr>
<td>Nature and Location of Business</td>
<td>Geographical expansion Acquisition Disposal of non-core activities</td>
</tr>
<tr>
<td>Labour</td>
<td>Less Collective Bargaining Job reductions Performance related pay</td>
</tr>
<tr>
<td>Communications and Reporting Systems</td>
<td>More effective management systems</td>
</tr>
</tbody>
</table>

The new privatised monopolies were accompanied by a regulatory regime to balance the interests of consumers with those of the industry (Parker 1996), the aim being to replicate the results that the competitive market would achieve in the way of prices, profits and service quality. Regulation is carried out via direct intervention by the government or independent agencies. Indirect regulation is usually in the form of specified rates of return or the UK adopted method of price cap. By 1995 there were over 70 telephone companies operating in the UK, although BT still supplied over 90% of domestic users. In the electricity market, all those using more than 100kWh can choose. British Gas have already lost 84% of their market for large industrial users and in 1996-98 domestic consumers will be given the right to choose suppliers.

2.15 Impact of Privatisation on Suppliers

Dell (1985) identifies the technical and commercial opportunities of privatisation in the water industry, citing targets to introduce private contractors with more work being put out to tender. With the increased efficiency and production benefits arising from greater freedom of choice. The report by the Secretary of State for Energy into Privatisation of the Electricity Industry (1988) details the benefits of privatisation as being the promotion of competition within the electricity market, customers having a
greater say in decisions with new rights, greater freedom for the management to manage the commercial affairs without interference, security and safety of supply and regulation to protect the customers. Whilst the author briefly discusses the benefits of privatisation and its impact on competition, little consideration is given to the impact on buyer-supplier relationships. Monopoly suppliers to public corporations such as GEC, were clearly aware of the threat of potential competing suppliers to liberalised Telecommunications and Electricity industries (Steel and Herald, 1984), though concerns were expressed over the ability of fragmented Central Electricity Generating Board (CEGB) to optimise allocation of fuel supply from British Coal. However, this was counterbalanced by the potential introduction of imports from foreign coal suppliers and thus the strengthening of negotiation position with British Coal. Cane (1966) in the study of the potential privatisation of the Post Office cites the benefits of the break up of the 'telephone ring' supply cartel and argues the need to reverse buyer inertia to encouraging the lack of competitive prices being passed onto the consumer. Cane concludes that the supposed benefits of the cartel: standardisation and pooling of technical information, programming of orders, export benefits and price reductions were weak and could be maintained in a competitive situation. He states that the most realistic objection to competition is that economies of scale in production would lead to one supplier gaining control of the supply market, although this could be avoided by limiting the number of purchases to suppliers or establishing rival suppliers. Parker (1986) advocates that privatisation will encourage further contracting out of services by competitive tender and thus reduce costs, citing examples where the government has had to intervene with Local Planning Authorities and Area Health Authorities where in house services were being favoured. Parker makes particular reference to BT's announcement in 1985 that they would buy 'cheap' and 'best' in attempt to reduce their reliance on poorly performing British Suppliers. The first major example of this the loss of GEC to a £100m order to a Swedish firm. Suppliers to public corporations are significantly dependent on Public Corporations (Harlow, 1983).

3. The Research

As discussed above, the purpose of this research is to find whether privatisation has had any direct, or indirect impact on the relationship between buying and supplying organisations. A number of theoretical or practical questions can be posed. There is little research for example, on business relationships in privatised companies or the public sector and very little on the impact of privatisation. For this purpose the case study approach has been adopted. The focus of the research is to identify whether there has been a significant change in Purchasing strategies in privatised organisations, and if so what other government legislation or initiatives may have influenced this change. To do this it is necessary to establish the extent to which purchasing strategy is seen as an integral part of the business strategy. This analysis includes the evolution, its form with respect to the supplier base, how it has changed since privatisation and its influence on supplier assessment. This must be supplemented by an understanding of employees' views and practices towards supplier relationships, as well as what benefit they hope to gain. Lastly, it is important to build an understanding of what barriers exist to introducing and conducting effective business relationships, and in particular the standards of professional purchasing expertise, skills and competencies and how they have changed, the impact of organisational culture, the view of the supplier and the customer and the impact of monopoly supply markets.

3.1 Methodology

A multi stage research methodology is being undertaken. First, a broad range of industries was selected from which a small sample was identified (focusing on three privatised companies). A range of factors will be considered, covering a broad spectrum of privatised companies but are specific enough to tackle the research questions on the gaps that exist above. In view of the time since privatisation, as well as the relatively recent introduction of theories and research on buyer-supplier relationships, it may be difficult to collect earlier evidence. A public corporation has been selected as a control case to compare and contrast with the case studies. Secondly a broad sweep literature review took place from which thirdly, the above research questions were identified and the case study questions formulated. The third part of the research will be to develop a model based on the findings and test it within the case study companies, from which the last stage, conclusions may be drawn.

3.2 The Sample Frame

The organisations selected (Table 4) are from the communications industry, the electricity industry and the water industry. Interviews were held with Directors/Heads of Purchasing to agree the scope of the study and to identify the number of businesses within the organisation in which purchasing was a significant factor and from which a number of interviewees could be selected. In addition to the meetings with Director/Head of Purchasing, semi-structured interviews were conducted with a Purchasing Manager, a Buyer, an internal customer and two suppliers from each business. All interviewees had some involvement in a buyer-supplier relationship. Each of the businesses was asked to provide a list of its six larger suppliers, representing a significant amount of their spend. From the list of the six large suppliers, two were randomly selected to be interviewed.

Table 4: The Four Case Study Companies

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Industry</th>
<th>Annual Purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Communications</td>
<td>£4.5 b</td>
</tr>
<tr>
<td>B</td>
<td>Electricity</td>
<td>£2.0 b</td>
</tr>
<tr>
<td>C</td>
<td>Water</td>
<td>£0.6 b</td>
</tr>
<tr>
<td>D</td>
<td>Communications</td>
<td>£1.3 b</td>
</tr>
</tbody>
</table>

3.3 The Research Instrument

The case studies were conducted on a semi-structured basis (Table 5 shows the main areas of discussion and source). The interview schedule was based on the review of the literature and expert interviews with practitioners designed primarily to summarise and test in as few questions as possible the perceived impact of privatisation. The schedule was then pre-tested with four selected professional interviewees, to identify whether the questions would be understood and whether the answers would give the required information. The prospective interviewees were contacted in advance and the interview schedule sent in advance with a covering letter and resume explaining the study aims and guaranteeing confidentiality.

A significant amount of the questions required a qualitative response with a more qualitative response on strategy development and supplier relationship and how things had changed since privatisation. All interviews were recorded, transcribed, verified by the interviewee and amended accordingly. Any relevant supporting data and documentation was collected as part of the research.
Europe and beyond. The results of the research will also be relevant to public sector managers working in the new agencies of central government and local authorities and will provide some useful insights for Universities and students. From the evidence found so far, it is possible to make some initial observations and conclusions.

Soon after privatisation the majority of case study companies re-organised towards a 'Profit Centre' type structure. The explanation given for this was to create 'local businesses' in an attempt to make individuals more accountable for performance. In some instances the purchasing function was broken up or fragmented amongst the profit centres. Business units were provided with full authority to procure, to a degree, in isolation from one another. In one instance a central focus for purchasing was retained and thus purchasing was able to promote the benefits of common systems and company supplier databases. Here some evidence exists, to show that with the development of a company perspective to purchasing. In the majority of the case studies purchasing now appears to represent a service unit supporting local business units, without their own strategy let alone any apparent contribution to the corporate business strategy. There appears to be some relationship to time, as the longer an organisation has been privatised the more the strategic position the purchasing function holds.

Evidence exists of a trend towards outsourcing in all of the case study companies. However, in all instances resource levels in both purchasing and other interested functions have been reduced through progressive 'down-sizing' exercises. Notably, one of the key aims of privatisation is seen to improve efficiency through a 'reduction of misallocation of resources' (Dick 1987). Training and development does not appear to support the drive towards increased productivity as it has remained at a similar level as before privatisation, though a marginal increase in quality of qualifications attained was observed. There is little evidence of training of purchasing staff in relationship development with suppliers. A number of suppliers to the case study companies expressed concern about 'overworking' and shortage of skills, competence and experience, not just within purchasing but also within other purchasing functions. The primary concern of the suppliers being that greater responsibility and scope was being asked of them in the performance of contracts, with little available support from employees of the client.

Significant evidence exists in the removal of bureaucratic procedures and methods towards a more flexible approach of conducting business with suppliers. This may be considered as being reflected in the aim to liberalise public corporations from statutory prohibitions and government intervention (Steal and Heald 1984; Parker 1986) in many instances managers and buyers were of the view that they had gained a change in status from that of a comfortable civil servant focused on providing a service to the public, to that of a commercial entrepreneur charged with improving profit to the shareholders of the company. Dick (1987) cited poor performance of public corporations due to amongst other things poor management, leading to a state of 'comfortableness' which destroys the commercial ethic. One of the benefits of privatisation was, in his view 'enhanced motivational freedom'. The prevalent view amongst those interviewed was that this could be best achieved through traditional purchasing methods such as competitive tendering. This may be reflected in one of the key aims of privatisation to promote competition in the market. Most viewed closer working relationships with suppliers as a beneficial way to conduct business, but little evidence of practice has been found. The mature case study companies were looking into and developing longer term close working relationships with suppliers and a marked trend to simple sourcing strategies have been observed in those instances. Only one of the case study companies maintain a company database of suppliers, and

### Table 5. Interview Schedule

<table>
<thead>
<tr>
<th>Subject</th>
<th>Areas of Discussion</th>
<th>Source</th>
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### 4. Early Findings and Conclusions

Managers in privatised companies face the task of having to reorientate their organisations away from public sector values and procedures towards private sector methods of operation. The research will provide knowledge about the approaches towards buyer and supplier relationships adopted in the studied companies. The research should also provide lessons to corporations yet to be privatised in the UK.
supplier selection is often based on the results of competitive tender exercises with little or no supplier development. Whilst some of the case study companies are advocating the use of best practice techniques in supplier management, few if any provided evidence of what they were 'preaching'. Purchasing people through their objectives, were being asked to focus on contributing to the annual profit of the business, and most measures of performance are orientated towards the degree of savings in price negotiated contracts with suppliers. Therefore a short term 'arms-length' perspective to suppliers appears to be being practised.

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A Perspective to Collaborative Supplier Relationships from Economic and Historical Theory

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Abstract
The paper examines the issues surrounding the debate on competition and cooperation. While government procurement guidelines in the U.K. still advocate the use of competition in all procurement transactions, a more collaborative approach towards relationships with suppliers is advocated in other sectors. This paper's premise is that cooperation was more natural a tendency in past centuries, than it is now. It identifies collaborative relationships which existed in the middle ages, and comparing these with collaborative relationships which are advocated today, identifying reasons for the different approaches.

1. Introduction

1.1 Background
This paper has evolved from research for a PhD being studied within the Centre for Research into Strategic Purchasing and Supply (CRiSPS) at the University of Bath, England. The thesis examines how effective relationships for supply can be developed by organisations which are governed by Public procurement policy guidelines and also required to comply with EC Legislation rules, both of which advocate a competitive approach to dealing with suppliers. These rules require organisations to procure goods and services in an 'open, fair and transparent way', which has been generally accepted to mean through competitive tendering, rather than through any form of collaboration. However, in other sectors, especially in private sector retailing and manufacturing, there has been an increasing emphasis on partnership sourcing and collaboration, which have been shown as leading to savings, increased market responsiveness, higher product or service quality and reduced lead times. (Partnership Sourcing, 1993; Macbeth and Ferguson 1994). The apparent paradox between these two approaches to supply is even more marked when the Public and Utilities sectors are under increasing pressures to drive down costs and create more effective market solutions - benefits which have been commonly associated with a more collaborative style of working with suppliers.

1.2 The Issues
Whilst Legislation and procurement policy requires Public sector and Utility organisations to drive cost effectiveness and value for money through competition, other sectors might advocate partnerships. This paradox was highlighted in research conducted with nine Utilities in the Netherlands, UK and USA (Ellis, 1995). While it is

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possible to achieve collaborative approaches within EC Legislation rules (Boekestein and Ellis, 1995) the research highlighted the fact that far from wishing to adopt a partnership approach towards relationships with suppliers, the organisations concerned preferred competition. The rationale for invoking competition was cited in many instances as a need to be ‘visible’ in external transactions and a need to demonstrate value for money, the implication being that collaborative relationships would not allow such visibility or demonstration. This raises the question of whether there is a most ‘effective’ way of dealing with suppliers today, is collaboration or competition the most appropriate approach to relationships with suppliers, or should a combination of the two be considered? If the latter, then why do the regulators and advisors of Public and Utility sector organisations still advise and require them to use competitive methods of supplier selection?

1.3 Research Questions
If collaboration is shown to be the most effective approach, as many institutions and organisations (including academia, consultancy and government bodies) now advise, why is there such reluctance from some sectors to adopt this approach? Is it because legislation limits the approaches to purchasing in Public and Utility organisations, by insisting on competitive tendering for most requirements, or is this a convenient excuse to adopt a more traditional and adversarial approach (i.e. competition)? Does today’s business environment foster competition or collaboration? Is there any historical evidence to indicate that the emphasis on collaboration and co-operation was more popular in past centuries than now? Is co-operation a natural or alien tendency in the 20th century and, if the latter, what are the barriers to achieving such co-operative relationships today?

1.4 Objectives of the paper
This paper seeks to link the development of modern economic theory with the continued acceptance of competition as the most effective procurement approach, in demonstrating value for money, as there is no economic model for co-operation. It also identifies and examines historical relationships which have clear parallels with today’s modern partnerships, and considers the effects which the general economic trends of capitalism and individualism have had on these relationships. As Cox (1995) argues, purchasing has had difficulties because it has no theoretical base and has ‘borrowed’ many theories from other disciplines. This paper seeks to find a grounding for co-operative behaviour in the theory and relationships which existed, before neo-classical economics had such a profound effect on commerce and industry.

2. Should we compete or co-operate today?
Elements of collaboration and partnership, which have been identified and accepted today by many academics and practitioners as ‘best practice’, are clearly difficult concepts for others to align with, some being more comfortable with competition. This raises the question of whether co-operation is an accepted concept in today’s environment when the atmosphere and emphasis, in many areas of business, is clearly on competition and confrontation.²

Kraus (1980) argues that competition is an integral part of society because most Western organisations utilise a hierarchical structure. Collaboration, on the other hand, is a ‘co-operative value based on shared power and authority’. It may therefore be difficult to achieve collaborative relationships because organisational structures are not conducive to establishing and maintaining such relationships.

The proposition that we are able to co-operate with each other becomes somewhat dubious in the light of a Coopers and Lybrand study from 1994 which identifies that 73% of middle market companies disagreed that they should operate partnerships with their customers, preferring instead to maintain adversarial commercial relationships.⁴

New and Ramsey (1995) highlight a dilemma between competition or collaboration, as to which is most effective, stressing that the neo-classical free market model is the only one yet devised which is able to cope with the large volume and high degree of product complexity, and the speed of change associated with a modern industrial society, but that this model can only operate efficiently through a high degree of competition. They summarise by saying that whilst the system requires a high degree of competition, companies will naturally want to co-operate and limit possibilities of new entrants.

The issue of collaboration or competition is well summarised by Hutton, 1995: “Men and women are social animals, but with conflicting demands and passions. They seek association with each other and value the esteem of others, they desire health and autonomy. They thrive on the stimulus of competition, they recognise the value of co-operation, the importance of security and the need for boundaries to individual actions.”

Purchasing professionals are responsible for spending a large proportion of a company’s total expenditure, often running into hundreds of thousands, if not millions of pounds. Invoking competition is often the easiest way of procuring company requirements because it is eminently justifiable, proves value for money and provides a visible audit trail. This is essential for all businesses, but is especially true of Public sector and Utility organisations because they are ultimately spending public money (and legislation requires that there is this visibility in transactions).

While competition is probably the best way to purchase goods and services where the buyer has leverage over suppliers, the assumption that competition is ‘best’ in all situations may not be correct. Leveraging arises in a market where there are many suppliers for similar products, and where the principles of free-market economics work most efficiently, by reaching a price which the market can naturally support. It could be argued that a ‘leverage’ situation would arise in an expanding economy, but that, in recessionary times, there will be fewer suppliers because the market will have contracted. In order to ensure supply of now scarce suppliers, companies may be more likely to develop collaborative ‘partnership’ type relationships with their suppliers.

The only economic model which has proven durability and flexibility in today’s fast changing consumer-oriented market, however, is the one in operation in the West today - free market economics. But there are other areas of the world where different principles dictate the approach, as seen in some Japanese organisations.

Many writers have focused on buyer / supplier relationships in Japan (Lamming, 1993, Hines, 1995, Womack and Jones, 1994), citing the degree of co-operation between buyers and suppliers and advocating an adoption of similar principles in the West. While Western economics has been based upon the neo-classical model of open competition, in Japan the differences in approach may not purely be cultural, but the involve use of different economic assumptions. Barratt-Brown (1984) argues that the Japanese model may have struck a balance between a market and planned economy, a private and public enterprise, so there is the balance between co-operation and competition. According to Barratt-Brown, the market has come across a

³ Kraus, 1980
⁴ Royal Society for the Encouragement of Arts, Manufactures and Commerce (RSA), 1995.
The advantage of the customer's ignorance and to know the right value of his commodities. Britain.

bargaining - they were the first people in the retail trade to set a fixed price on their base on the fundamental doctrine of free market economics and competition. Before arguably less co-operation with the 'world at large'.

goods.

moral, fraternity and charity. The Freemasons now form an extensive network in membership often by association or birth. There has always been a tradition of wealth as an end in itself.

made money, from the conviction that a good businessman was never to take "fraternal" was their definite irreproachable integrity coupled with a refusal to treat business and wealth as an end in itself.

The Quakers regarded business as a religious calling - not merely as a means to make money, from the conviction that a good businessman was never to take advantage of the customer's ignorance and to know the right value of his commodities. The "friends" refused to ask more than they intended to take and this put a stop to bargaining - they were the first people in the retail trade to set a fixed price on their goods.

Another organisation, the Freemasons, shrouded in secrecy today, has its roots in a guild organisation of the 15th and 16th Centuries. The working Mason's craft guild was a Roman Catholic trade guild for a few thousand skilled building workers in Britain. Over the last few centuries it has become an organisation for the gentry, with members commonly by association or birth. There has always been a tradition of "fraternal and beneficent relations" between members, with the stated aims being morality, fraternity and charity. The Freemasons now form an extensive network in the U.K. and there is certainly much co-operation between members, although arguably less co-operation with the 'world at large'.

U.K. Government policy on procurement was established in the 19th Century and based on the fundamental doctrine of free market economics and competition. Before the advent of free market economics, a number of models were used and the following sections look at the type of relationships which were typical of these times. The premise being that organisations centuries ago operated under a different set of economic assumptions and were able to co-operate much more effectively.

Commercial Relationships in the Middle Ages

Before the modern economic doctrine of competition was founded, different principles determined commercial relationships. Many cases through history have indicated that co-operation between various groups was more prevalent in the Middle Ages than in the Twentieth Century, perhaps because of mutual dependency, economics of scale, or, in other cases to reduce risks of sole trader. These are often cited as the reasons for developing partnerships and joint ventures today, but the differences in the attitudes towards co-operation were very different then. A moral code to trading had been developed by many and was probably the direct result of the greater role of the church in the Middle Ages. There was also a greater degree of regulation and protectionism - a direct result of the mercantilist politics of the day. Despite the obvious differences between the business environment in the early and middle ages, and that of the present day, there is still a great deal of commonality to be found in the ancient relationships, and those which business try to achieve today and categorise as partnerships. The next section looks at historical co-operative relationships through history.

3.1 Relationships in 12th-15th Century

3.1.1 The Influence of the Church

Throughout the feudal period, the Church had a great influence on business. Whereas today economic and business affairs are largely dictated by the state, in feudal times, before a central parliament had been established, the Church influenced how people conducted their business. They established a strict moral code which had a profound influence on relationships between people in the Middle Ages. Religion was often the factor which united people - Parish Guilds, for example, were unions of parishioners who were organised around churches for miscellaneous activities of mutual interest.

Business dealings were supposed to be controlled by a moral code that prohibited one man from profiting at the expense of another. The search for profit, which is often applauded today as the main driver behind capitalism, was held to be immoral. A man was entitled to charge neither more nor less than what was needed to enable him to pursue his calling in the state appropriate to that calling. As long as economic dealings were based on a system of personal relationships they all had an implied moral character.

Tawney (1926) wrote "There are limits and restrictions allowing economic interest to interfere with serious affairs. It is right for a man to seek such wealth as is necessary for a livelihood in his situation. To seek more is not enterprise but avarice - avarice is a 'deadly' sin. A man must be sure that he carries it on for the public's benefit, and that the profits that he takes are no more than the wages of his labour."

A chronology of relationships through history is described below, and where possible, the principles governing these relationships have been linked back to modern day literature on partnerships.

3.1.2 Feudalism

Feudalism was the socio economic system that preceded capitalism in Western Europe where peasant was protected by the lord of the manor, who in turn owed allegiance to, and was protected by, a higher overlord. This hierarchy ended eventually with the King. The strong protected the weak, but they did so at a high price. Custom and tradition are the keys to understanding medieval relationships - there was no strong central authority in the middle ages; the entire medieval structure was based on a system of mutual obligations and services up and down the hierarchy. There are some similarities between feudal relationships and what Kanter (1989a; 127) terms "Stakeholder Alliances" these are defined by a pre-existing interdependence. They are 'complementary coalitions' between a number of stakeholders in a business process who are involved in different stages of the value creation chain. Stakeholders are those groups on which an organisation depends - the people who can help it achieve its goals or can stop it dead in its tracks. In the feudal system, the peasant would have been dependent on the lord of the manor for food and shelter and the lord of the manor would depend on the peasant for farming of the land.
A modern day example which feudalism could be likened to is the relationship between a company and its banks and shareholders. Banks provide capital and short-term credit in return for the right to claim a share of the equity. The company aims to make profits which will enable repayment of loans or dividends to banks and shareholders. Companies have a dependence on banks and shareholders and would not be able to operate without their financing, but at the same time banks would not exist were it not for the companies which require finance.

3.1.3 Village Communities

In the twelfth century (and probably even before), little independent and self-sufficing groups were united in villages or in large households, where the continued subsistence of the group was the aim of economic activity. These would be organised into "jobbing" shops, although with little external trade at this time. Instead, produce was mostly for local use. In subsequent years, there would be successful attempts at organising the whole of industry and commerce of the country in the manner which would contribute most surely to the maintenance of national power through the guilds and the mercantile system dominated, which would dominate over private interests. Such a relationship is akin to another alliance proposed by Kanter (1989a: 125), the "Multi-Service Alliance". This is where a group of organisations with similar needs band together to create an entity to fill those needs for all of them. In most cases, tolls were established between villages to provide a source of income and a degree of trade protection, but in a few documented cases, neighbouring villages abandoned this practice in favour of co-operation.

3.1.4 Early Merchants

In the Twelfth and Thirteenth centuries, Merchants made advance purchases of lead, tin and coal from small miners, and gave advances of the lead to the foundries, pin makers and nailers etc. While little else is detailed about the exact relationship, there was a system of dependent relationship which existed between the three parties - the miners, the merchants and the working men. Sako (1992) identifies three types of trust: Competence, Contractual and Goodwill. The relationship described above would probably not have been contractual or even competence based - but would certainly have involved goodwill around. Sako argues that Goodwill will not exist unless there is an "Obligational Contractual Relationship" (OCR). Clearly there was mutual dependency between these parties - the merchant supported the miners and customers, but perhaps only because the merchant could not trade with them. One could also link such a relationship to the modern day supply chain (Lamming, 1993; Womack and Jones, 1994), but with a great deal more dependency - the merchant had an end product to sell, but knew that without supporting his suppliers, the product could not be made, he clearly acted as a middle man in the supply chain.

3.1.5 Guilds

Guild organisations were commonplace between 12th and 16th centuries. Originally they were formed as "community policemen", with the purpose of enforcing law and order. The most well known guilds were those which were organised to protect their member from outside competition. The merchant guild in a town prevented outsiders from conducting much business and discouraged competition between members of the guild.

The purpose of the guild was the regulation of work in such a fashion that the public might be well served and that trade might therefore flourish. Many of the regulations for craft guilds were intended to secure fair play between different craftsmen and to exclude unfair and dishonourable competition which could not be for the ultimate good of the trade. There was an assumption through most of the Middle Ages that competition was destructive, with the emphasis being very much on combining forces and pooling resources. The guild might be compared with a "Strategic Alliance", as defined by Mahon and Murray, 1993 and Stafford, 1994, defined as "A coalition of two or more organisations to achieve strategically significant goals and objectives". Kanter (1989a) advocates that companies become "PALS" which pooling resources with others, allying to exploit opportunities and linking systems in partnerships. Such an association was very much in evidence in the Middle Ages in the form of the guilds.

Towards the end of the Middle Ages, Guilds became inherently monopolistic creating barriers to entry for non-guild members etc. Whilst the relationship between members of the same guild was very co-operative, it was hostile to outsiders, in this way they could be likened to oligopolies where organisations within the same industry co-operate for the benefit of the industry as a whole, but sometimes to the detriment of the ultimate consumer. They will also prevent other organisations from entering the industry where possible, thus creating extensive barriers to entry.

3.1.6 Wool Industry

In Lancashire, the wool industry took advantages of the small scale nature of most of the industry, which operated mainly on a job shop basis. Work was put out to small family run businesses, similar to the way in which Bennett in Italy operates today. This relationship could also be likened to the concept of the lean enterprise, which is defined as a group of individuals, functions and legally separate but operationally synchronised companies. The group's mission is to collectively analyse and focus on a single stream so that it does everything involved in supplying a good or service in a way that provides maximum value to the customer.

Such relationships were similar to "Strategic Alliances" (Mahon and Murray, 1993; Stafford, 1994). They could also be compared to the concept of "Value Chain Partnerships" (Johnson and Lawrence 1988), which are a set of independent companies which work closely together to manage the flow of goods and services along the entire value chain. These relationships could also be aligned to Kanter's concept of PALS.

3.1.7 Joint Shipping Ventures

Groups of shippers formed periodically in the 15th Century in Newcastle and Lynn for trading expeditions to Iceland. So hazardous were these journeys that joint shipments of groups of merchants, sharing the costs of the cargo and its risks, were formed for each projected expedition. The sharing arrangements were apparently dissolved every time an expedition was completed and new partnerships were reformed for subsequent expeditions. There was much co-operation, with shippers unable to carry the risks of such a venture alone. Such relationships might today be termed as partnerships, or joint ventures, such that Bleake and Ernst (1991) would define as "Purposive strategic relationships between independent firms who share compatible goals, strive for mutual benefit and acknowledge a high level of mutual interdependence. They join efforts to achieve goals that each firm acting alone could not easily attain". Kanter, 1984, might term such a relationship an "Opportunistic Alliance", where two or more organisations join together to exploit an opportunity.

3.1.8 Conclusions

In the 15th Century, the medieval world of feudalism was under threat with the growth of the nation-states, who were anxious to reduce the power of the church,
things started to move faster than feudalism was able to keep pace with. The growth of commerce destroyed subsistence farming and caused agriculture to increasingly rely on the market. The revolution in commerce led to changes in demand for production and the emergence of merchant capitalists, whose profits were the product of monopoly and extortion. This would not have been permitted had the churches retained their power bases, but as they weakened, so too did the mutually dependent relations of the guilds. This was the advent of mercantilism.

3.2 Mercantilism (15th - 17th Century)

Mercantilism is generally referred to as the period in which there was a noticeable shift towards commercial capitalism. A special class of merchant-manufacturers appeared who employed semi-independent craftsmen, working from their homes. Monopoly was the primary way in which the rising nation-states sought to increase trade and to create new sources of revenue for themselves. The strong bonds of community spirit began to weaken.

3.2.1 Protectionism

In Tudor times, protection of infant industry was common-place - monopoly rights were granted but were often maintained long after they had fulfilled their original purpose. Regulation and protectionism was the first article in the Tudor economic creed and the Crown sought to apply on a national scale the control of economic activity formerly exercised by the guilds.

State intervention was an essential part of mercantilist doctrine. Those responsible for government accepted mercantilist notions and fashioned their policies accordingly. The mercantilists demanded a state strong enough to protect the trading interest and to break down the many medieval barriers to commercial expansion, but they were equally clear that the principle of regulation and restriction itself was an essential basis of that state.

3.2.2 Joint stock companies

Joint stock companies were frequently formed in the late middle ages. Merchants put capital into a common enterprise and either took it back with a share of the profits when the company wound up, or, if it carried on, drew a dividend proportionate to their investment. This enabled the merchants to pool their capital, reduce their risks and expand their knowledge of profit making opportunities. Such a relationship today might be called a "Strategic Alliance" as defined by Lorange, Roos and Simchi-Levi, 1992; Lewis, 1990, where firms co-operate out of a mutual need and share the risks to reach a common objective. Without a mutual need can companies have the same objective, but each reaches this objective on its own. If they do not share significant risks they cannot expect mutual commitment.

The separation of thought from the dominance of the Church was conducive to the growth of mercantilism, but by the end of the seventeenth century, state regulation of economic life was breaking down. The decline of state intervention went hand in hand with the disappearance of monopoly and the growth of competition, which was reinforced by the growth of industrial production.

3.3 Summary of Relationships in the Middle Ages

In the Middle Ages, therefore, there existed many relationships which relied on mutual dependence and mutual obligation. Indeed, many of the systems in existence at that time were based on this social approach to relations with others. These relationships could be matched to some definitions on collaborative relationships which have been developed by various industrialists and academics, these are summarised in Table 1 below.

<table>
<thead>
<tr>
<th>Medieval relationship</th>
<th>Modern relationship</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feudal relationship</td>
<td>Stakeholder Alliances (Kanter, 1989)</td>
<td>Where mutual dependency but also an undertow of power - see perhaps a partnership with a single source supplier</td>
</tr>
<tr>
<td>Village Communities</td>
<td>Multi-service alliances</td>
<td>Worked together for the benefit of the community</td>
</tr>
<tr>
<td>Early Merchants</td>
<td>Lean enterprise / supply chain.</td>
<td>Mutual dependency</td>
</tr>
<tr>
<td>Woold Industry</td>
<td>Bennetton supplier arrangement - networks of small family-run businesses.</td>
<td>Mutual dependency, working for common goal - end customer requirements</td>
</tr>
<tr>
<td>Joint Shipping Ventures</td>
<td>Monopolies. Nationalistic purchasing - EC rules militate against</td>
<td>Very nationalistic / protectionist</td>
</tr>
<tr>
<td>Protectionism</td>
<td>Cartels</td>
<td>Nationalistic behaviour as promoted by mercantilists</td>
</tr>
<tr>
<td>Joint Stock Companies</td>
<td>Strategic Alliances (Lorange, Roos and Simchi-Levi, 1992; Lewis, 1990)</td>
<td>Jointed together for synergy - benefits could not be achieved alone</td>
</tr>
</tbody>
</table>

Certainly a sense of mutual obligation, and also the role of the church ensured that there was a moral approach to business transactions. Towards the end of the Middle Ages, this sense of mutual or moral obligation towards other members of the community began to change.

4. The Move towards Capitalism

Even whilst mercantilism was at the height of popularity, opinion was divided. Mercantilists argued for protection of domestic trade and self sufficiency and Capitalists argued for competition. These opinions were often reflected in literature of the day. The fable of the bees in 17211 was one such controversial piece. Central to the fable was the claim that corruption fraud and deceit were socially and economically beneficial. As the story unfolds, the elimination of these three vices and their replacement of traditional values results in the collapse of industry and trade.

In the 16th Century, there was unprecedented inflation, the main cause of which was attributed to the massive expansion in population in Europe, which almost

10 Most historians agree that the Middle Ages refers to a period between 5 and 15 AD.

doubled between 1420 and 1620. The knock-on effect was a massive increase in demand, leading to an expansion in cross border trade, as people demanded more than the local market could supply. This increase in demand led industry to invest and re-invest, while the government encouraged trade through protecting new industry and also by becoming a giant customer itself.

Although long before the accepted onset of Capitalism, this era was the turning point for business and industry, with increasing emphasis on consumer focus and on larger enterprises and the moving away from "job shops" towards vertical integration. The gunpowder revolution of the 15th Century was possibly the first real case of competition. Cities demanded the sorts of arms and tactics which would result in a swift victory so that expenses could be reduced. This led to a free market in Europe encouraged merchants and inventors to improve their wares to win contracts.

5. Modern Economic Theory - a basis for competition

During the last quarter of the eighteenth century many events happened heralding a new era in economic and political organisation. Industrial capitalism is older than the industrial revolution; mercantilist policy began to wane sometime before the end of the 18th century. Economic theory had acquired a new content and new methods long before Adam Smith had fully developed his theories. New forms of production, of social relations, of government and of social thought were fast developing.

Modern economic theory firmly supports the concept of competition. It is based on the basis of a competitive marketplace and supply and demand equilibrium - a 'perfectly competitive' market. Markets are assumed to work through voluntary exchanges between free individuals, each pursuing his or her private self-interest.

With the transition to industrial capitalism in the eighteenth century and therefore the growing complexity of the manufacturing process, the amount of capital required for industrial enterprise increased. Few craftsmen were capable of competing effectively, either against the cheaper production made possible by the greater use of capital equipment, or in markets wider than their immediate environment. If they did work on their own material, it was only to the order of the merchant, on whom they became increasingly dependant on. As the few tools they owned became out dated, they would succumb to the competitive security of being regular wage earners. This whole process created industrialists and wage earners, but also supplied the market for capitalist industry.

Adam Smith has always been generally accepted as being the 'father' of free market economics. Human conduct, according to Smith, was naturally actuated by six motives: self-love, sympathy, the desire to be free, a habit of labour and the propensity to truck, barter and exchange one thing for another. Given these codes of conduct, each man would pursue his interest, with the natural process of the free market gauging the costlier and more necessary motives - his own best interest. There were no restrictions on individual self-interest.

6. Barriers to collaborative relationships today

Macbeth and Ferguson, 1994, identify a number of factors which make it difficult to move towards a more collaborative approach to relationships with suppliers, these are social, attitudinal, organisational/managerial and procedural. While these barriers have been demonstrated as existing today, would they have existed in past centuries?

6.1 Social / Attitudinal

Perhaps co-operation is not a natural concept for some societies. Whilst we hear about the collaborative or co-operative style approach to business in Japan, cynics of the partnership type philosophy have claimed that cultural differences would make partnerships difficult in Western Countries. This is supported by a recent report by the

12 Perry, 1993:260
13 Kennedy, 1988
14 Smith, A (1776) Wealth of Nations

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Eindhoven University of Technology
The Netherlands
Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA), which stated that the U.K. culture more supports adversarial rivalry than genuine competitiveness, identifying this approach to be very inefficient and maintaining that the U.K.'s appetite for confrontation and conflict is wasteful. In Feudal times, however, the attitude was very much one of collaboration and co-operation. The Church encouraged and fostered co-operation in business. Co-operation was prevalent between similar businesses which now might be in competition, such as guilds, or between organisations in the same supply chain, such as the wool industry.

6.2 Organisational / Managerial
Some organisations may be more predisposed to co-operation than others. For example, Quaker companies are still in existence today and it would be interesting to see whether their co-operative foundations are still reflected in the way that they interact with their suppliers today. Does the company ethos reflect its history? Some individuals are more comfortable with the concept of co-operation than others, but in Western society, we are constantly taught to compete, from school age onwards - for sports days, for exam results, for jobs and performance in those jobs. If, as the RSA report contended, the UK has an adversarial culture, it is easy to see that relationships which demand a more open and co-operative style of management might be difficult to realise. The hierarchy structure which is now common in companies was developed during the industrial revolution and was functional in a society where skills were not widely distributed and knowledge was not shared by a diverse and heterogeneous population. Svent-Gyargi, 1970

6.3 Procedural
Some organisations are bound by procedures which encourage competition, rather than co-operation. The recent UK Government White Paper entitled "Setting New Standards: A Strategy for Government Procurement" (1995) advocates competition as the best method of procurement when spending tax payers money. "Competition will remain the cornerstone of government procurement policy. It is important not only as an aid to the achievement of value for money, but also because it provides fair access to work paid for by tax payers." In previous centuries, this would not have been such a problem, there was less formality, but increased complexity in business transactions has led to an increase in formality, where written contracts are required and the need for an audit trail for many transactions requires that they be recorded.

7. Conclusions
Much of today's purchasing literature concentrates on developing closer relationships with suppliers, modern business theory extends this ethos of co-operation further. There is some reluctance to adopt co-operative approaches towards business in certain sectors and this paper has indicated that such an attitude may have, predominantly, originated from the 18th century principles of free market economics. History has shown that trade was more predisposed to co-operation before the advent of free market economics, indeed, communities worked together much more for mutual benefit.

Adam Smith advocated and proposed free trade because he believed it would facilitate economical expansion and growth. Mercantilist policies, which were based on protectionism and nationalism, he believed, would restrict growth. In times of expansion, where there are many buyers and suppliers (most likely in times of expansion), competition and leverage is very appropriate, but in recessionary times, this may not be the case. Perhaps, therefore, Smith's theory will only function effectively in times of expansion. Today there is a world-wide recession, which has been particularly harsh in the West, and companies are looking towards co-operation as a way of securing supplies.

There are elements in today's environment which create difficulties when trying to establish a more co-operative business climate. There are also many differences between modern day business and medieval transactions which naturally makes any comparison contentious. Business operates on a much larger scale than in past centuries, it is more sophisticated, technologically advanced and serves an increasingly wiser and more demanding customer. There are also barriers to partnerships which have existed long after the reasons for their introduction have passed. The formalisation and hierarchical structure of companies (Kraus, 1980), the tradition of competition in society generally, are all factors which make it difficult to create a co-operative atmosphere. As already intimated, the ethos of competition and the free market may not be appropriate in times of recession, a more appropriate approach being co-operation.

If this assumption is correct, then a new economic model needs to be developed which encourages the development of co-operative relationships, while ensuring value for money and visibility of transactions. It will also call into question the theoretical basis for the rules on public procurement established by the EC commission and the UK Government. The rules requiring a competitive approach to purchasing may have been developed when the economy was growing, but now it is contracting, a new basis for regulation should be established.

As Hutton (1995) summarises so well: "The problem for the capitalist economy is that the competitive principle upon which it is founded makes it hard to achieve and to sustain the gains from commitment. Successful capitalism demands a fusion of co-operation and competition."

References

17 RSA, 1995
18 In Kraus, 1980
19 Government White Paper, 1995
The Forrester Effect Revisited

Demand amplification and customer-supplier communication within UK fast moving consumer goods supply chains

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t-Lean Enterprise Research Centre, Cardiff Business School, University of Wales, 67
Park Place, Cardiff, CF1 3AS, UK

Abstract

The paper presents the findings of the authors’ research into the nature of Demand Amplification (The Forrester effect) within UK Fast Moving Consumer Goods (FMCG) supply chains. The research was conducted as part of the Supply Chain Development Programme (SCDP) and draws on the experiences of organisations from the retailing, food, detergent and petro-chemical sectors. The paper reviews classical demand amplification theory and places it within the context of the modern UK FMCG industry. The paper goes on to present empirical data which suggests that demand amplification is a significant sub-optimising factor within the studied supply chains; acting to effect a reduction in the effectiveness of the supply chain in its capacity to meet the requirements of the final consumer in terms of cost and service.

1. Introduction

The work presented within this paper describes the findings of the pilot phase of the Supply Chain Development Programme’s ‘Demand Amplification’ (Forrester Effect) research project. The Supply Chain Development Programme (SCDP) is a joint initiative on behalf of the Lean Enterprise Research Centre (University of Wales); the Centre for Research in Strategic Purchasing and Supply (University of Bath); and nineteen major UK and Multi-National industrial sponsors drawn from the Automotive, Electronics, Public Service, Retail and Fast Moving Consumer Goods sectors. The programme’s aim is to assist the organisations to become World Class in the management and operation of their supply chains, and to disseminate research findings to the wider academic and practitioner community. The Demand Amplification research project was instituted as a response to concerns expressed on behalf of a number of SCDP’s industrial sponsors operating in the UK’s Fast Moving Consumer Goods (FMCG) sector.

The United Kingdom FMCG industry has been at the forefront of the movement to increase competitive advantage by developing collaborative relationships between manufacturers and retailers (The ‘Forrester Effect’). This ‘Demand Amplification’, widely referred to as the ‘Forrester effect’ means that minor fluctuations in retail sales can be amplified into major fluctuations in the subsequent orders placed on suppliers. Where it occurs, the Forrester Effect results in manufacturers expending great effort to maintain service levels under conditions of demand amplification placed on them by their customers. This process generates costs which must ultimately be borne by the consumer and which act to the detriment of the entire value stream. However where the Forrester effect exists demand fluctuations are caused by the idiosyncrasies of the supply chain rather than the requirements of the final consumer.

The objective of the project was to ascertain whether or not demand amplification (The Forrester Effect) was present within the supply chains of the organisations participating in the research. The remainder of this paper will provide a basis for the response to that objective. The paper will review classical Systems Dynamics and Demand Amplification theory and place it within the context of the modern United Kingdom FMCG sector. Evidence in the form of empirical data will be presented which suggests that demand amplification is present in the supply chains under study. The paper will go on to consider the implications this conclusion holds for the policy of deriving competitive advantage from the optimisation of supply chain processes.

2. Demand amplification: the Forrester Effect

[The ... system ... will respond to random disturbances by fluctuating at a speed determined by the characteristics of the system itself.

Forrester 1958 p.45]

The ‘Systems Dynamics’ work of Jay W. Forrester needs little introduction. Jay Forrester was a mathematician who was interested in the subject of ‘Information feedback control loops’. These exist wherever the external environment affects a decision which will itself effect the original environment. The analogy Forrester himself used in his 1958 Harvard Business Review paper to illustrate the nature of feedback control loops came from the automotive world: “The information control loop extends from steering wheel, to auto, to street, to eye, to hand, and back to steering wheel.”

For Forrester, a supply chain could be understood as an information feedback control loop on a far grander scale, where information generated in the external environment (retail sales for example) generates decisions within the supply chain (orders on suppliers, inventory levels etc) which in turn would influence the external environment. Indeed in describing supply chains as information feedback control loops Forrester has probably given the best definition of a supply chain to date. To return to the analogy of driving the automobile, imagine that the driver is blindfolded consumer has been increased. Initiatives such as quick response have succeeded in reducing the amount of inventory held within the supply chain whilst service levels to the retailer and the consumer have been retained. However the improvement in the flow of goods from supplier to customer is to a large extent dependant on the effectiveness of the flow of information moving in the opposite direction, that is from the consumer to the retailer and on to the manufacturer.

A particular danger in this regard has been highlighted by Jay W. Forrester (Industrial Dynamics 1961). Supply chains appear to possess the intrinsic capacity to distort the flow of information as it crosses functional and organisational boundaries. This ‘Demand Amplification’, widely referred to as the ‘Forrester effect’ means that minor fluctuations in retail sales can be amplified into major fluctuations in the subsequent orders placed on suppliers. Where it occurs, the Forrester Effect results in manufacturers expending great effort to maintain service levels under conditions of demand amplification placed on them by their customers. This process generates costs which must ultimately be borne by the consumer and which act to the detriment of the entire value stream. However where the Forrester effect exists demand fluctuations are caused by the idiosyncrasies of the supply chain rather than the requirements of the final consumer.
and is reliant on instructions from a front seat companion. Now imagine that the companion is only able to look through the rear window. That is a supply chain! Forrester’s methodology involved modelling the behaviour of supply chains on the newly available computer technology of his day. By making assumptions as to the manner in which supply chain organisations exchanged information and used exchanged information as the basis for decision making, Forrester was able to trace the impact of that information exchange and use on such factors as order levels, inventory, availability and production. For Forrester there were three types of systems information which were required before effective simulation could take place. They were: Organisational (supply chain) Structure, that is the customer and supplier organisations which comprise the supply chain; Delays in Decisions and Actions, with particular regard to the flow of information & goods; and Policy on Purchasing Orders and Inventories, i.e. the policies which dictate order-places and inventory levels at each point in the supply chain.

The results of Forrester’s simulation experiments was the identification of a significant number of Amplification (which became known as the Forrester effect) as information was passed along the supply chain from customer to supplier. Random variations in retail sales led to extreme and erratic fluctuations in inventory, orders and availability levels within the supply chain. Forrester posited that the rate and magnitude of these erratic oscillations was driven not by changes in the market place but by the specific supply chain structures which regulated the exchange of information, which in turn controlled the flow of goods. These oscillations in demand could be caused by random fluctuations in consumer demand, or by single step increases. For example Forrester demonstrated that a 10% increase in retail sales could cause factory production to oscillate by +40 to -3% while unfilled orders at the factory were held to be oscillated by +52 and -46%. It was found that despite the fact that retail sales never exceeded factory capacity, as a result of demand amplification the supply chain under simulation was unable to meet consumer demand. However it was also determined that demand amplification could even be generated when retail sales were effectively stable, again as a result of the systems control structures which governed the use of information within the supply chain. Whatever the causes of the Forrester effects are, the results are clear. Organisations within the supply chain invest time and resource in satisfying the artificial requirements of the supply chain rather than the genuine needs of the final consumer. Thus the Forrester effect reduces supply chain effectiveness and increases supply chain costs, and therefore decreases the competitive power of the supply chain in the marketplace.

3. The UK fast moving consumer goods industry

The difficulties associated with the manufacturing of automobiles is well documented by authors such as Womack, Jones and Roos (1990), however, the management and orchestration of a supply chain focused on the production of a single product seem almost insignificant to the dynamism and complexity of Fast Moving Consumer Goods (FMCG) retailing in the United Kingdom. This sector is ‘World Class’ in almost every performance metric governing the industry, and far from slowing, the industry and its legion of suppliers are increasing the differential between the UK and the rest of the world at an unprecedented rate (Coopers & Lybrand 1995). The major advances achieved by British retailers has covered all aspects of supply chain management, business processes and a direct attempt to combat the dysfunction associated with the Forrester effect. From the placing of forecast orders to the flow replenishment of goods to the stores. This systems perspective to increasing supply chain efficiency has been fuelled by both domestic recession and intense competition within the marketplace. The British retailing market consists of a population of 28,587 outlets (1992 figures) that has fallen by over 40% since 1984 in the wake of strong domestic competition, acquisitions by the major retailers and the process of supply chain streamlining. The current structure of the retail industry can be defined with reference to at least five distinct type of commercial organisation.

The most significant are the Major Supermarket and hypermarket retailers. These companies offer a very broad range of products to the consumer and represent the major form of shopping in the United Kingdom. This shopping format is seen as the leader in consumer-retailer developments. This aspect of British food retailing is also the barometer for the entire industry: The Discounters that vend a smaller range of product lines at very low prices and operate without consideration to factors outside of availability and price. Essentially these companies operate on purchase economies and are known in the market as ‘pile it high and sell it cheap’ organisations: The Convenience shopping and petrol station forecourt outlets are a major source of growth in the market and essentially stock a very limited number of product lines that are typically the ‘essential’ purchases by the consumer. Their attraction is the geographical proximity to the customer and often represent distress or ‘top up’ purchases with the main shopping conducted at one of the supermarket chains: The Warehouse clubs are a North American import to the United Kingdom and use a membership card to use their facilities. These companies operate by selling a large range of products in bulk format and tend to prefer cash sales to credit facilities. These shopping outlets are a modern phenomena and have failed to make a major impact on the domestic market. As a result of the economic depression they have also tended to compete amongst themselves rather than attract business from any of the other sectors: Organisations such as niche shops, regional stores and factory outlets. These a very insignificant element of the market and follow strategies by the major supermarkets rather than attempting any direct competition.

Despite the numerous segments one can differentiate within the FMCG sector, the bulk of consumer purchases take place within the supermarket segment. Each of the major retailers (often referred to as the “pile it high, sell it cheap” organisations: The average of four million customers every week (Author’s personal communication, Asda Purchasing and Supplier Development manager, 1994) in a UK population of 55 million. The rate of change in the industry has been furious and during the period from the 1970s to the 1980s major investments have been made to streamline the process of procuring and supplying products to the consumer. The development of new ‘Just In Time’ working practices. These initiatives have reinforced the current retailers strategies of “time based” competitive advantage and the cost effective movement of products from a wide supply base to satisfy the consumer. Within this dominant segment, customer service, loyalty and retention are the most critical element of British retailing strategy.

Although the market is large and diverse, it is dominated by some eight major supermarket chains owning well over one hundred stores each, indeed, the top three retailers account for over one thousand stores in the UK alone without including the many foreign interests of the companies. These companies accounting for less than 80% of the total sales volume in the market but over 70% of the total industry sales volume. It is these companies that are shaping the future trading and supply chain management strategies. This elite of retailing corporations includes the retailers, Tesco, J Sainsbury and Asda, who are seen as industry leaders and trend setters. The other UK businesses tend to follow rather than dictate change.

In order to fully appreciate the supply chain complexity and potential disruption of the Forrester effect faced by a major retailer in the United Kingdom, it is best to
provide a case study. The identity of the organization will not be divulged but will be referred to as ‘Dover’. Dover Limited, is one of the dominant and leading retailers in the market. It purchases products from over 2000 vendors and supports a store network of over four hundred stores. In the late 1970s the company was managed as a bureaucratic, and predominately manual ordering system, best guessing customer demand by forecast and relaying this information to the vendors using the postal service. This system was driven entirely by each individual store manager, who acted in isolation from all other store managers. Under this regime, sales representatives would visit the store at regular intervals to collect orders and place them on the manufacturing facilities of the vendor. However, changes in the expectations and demands of customers placed increasing pressure on the system to be reviewed. Indeed, the inadequacies of the system had become a drain on corporate funds and embodied high levels of waste.

By 1980, the company faced losses in market share and a poor public image with customers. The result of these inefficiencies and dysfunctions regarding supply chain integration and control created an unprecedented situation to centralise all decision-making at a corporate level. During a period when the other major multiples were still in the process of decentralising control to the store level, at this point in time, each store offered around 5000 individual products to the consumer, and some of the more ‘fast moving’ stores were receiving up to fifty deliveries from vendors each day, serviced from 22 regional warehouses owned by the company. The complexity and fragility of this system meant that average levels of product availability rarely surpassed 92% for the store manager. (The annualised volume for Dover was 50 million cases of product across the entire chain of stores).

The strategic response of the company to centralise the management and information processing, flows within the system represented a direct attempt to orchestrate the supply base. The objective was to therefore decrease the operational costs of managing a system of many nodes and linkages, increase stock management efficiency, decrease stock levels, guarantee lead times, eliminate delays in the system and integrate supplier management practices to a central hub. As a result, Dover recruited and developed the professionalism of staff within the areas of commercial trading, stock management and buying, locating them together in the corporate Head Office near London. In parallel, information technology and systems were introduced to facilitate more accurate and in-time relevant management decisions to be made. It was envisaged that this information platform would be shared with the vendors at some future stage of supply chain control via the medium of Electronic Data Interchange (EDI). Following the establishment of protocols which attempted to immunise the system from massive fluctuations in demand most stores received produce twice a day. Also 10 vendors, selected by a Pareto analysis, had joined the information system with Dover and were trading purchase order and forecast information. By 1983, 400 vendors had joined this system. To demonstrate the changes created by this approach, Asda, a main competitor to Dover, operates only 250 stores and generates around 10,000 orders, and 60,000 invoices a week from a relatively similar vendor base. Dover had managed in this time to handle 93% of all purchases centrally, halved all corporate

stock volumes nationally and increased the number of products offered to the customer to around 16,000 items per store. In order to complete the management of information logistics throughout the system, hand held computers were installed within the stores to allow the timely exchange of stock held to support consumer demand and allow the company to automate the stock control and replenishment cycles.

To demonstrate this transformation, and profitable outcome of managing the supply chain, Table 1 (overleaf) presents the comparative performance of the retailer:

<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>STOCK TURNOVER</td>
<td>13</td>
<td>32</td>
</tr>
<tr>
<td>SERVICE LEVEL</td>
<td>92%</td>
<td>98.5%</td>
</tr>
<tr>
<td>SALES</td>
<td>£2.0 billion</td>
<td>£7.6 billion</td>
</tr>
<tr>
<td>STOCK COVERAGE</td>
<td>around 21 days</td>
<td>12.79 days</td>
</tr>
<tr>
<td>WAREHOUSES</td>
<td>Decentralised</td>
<td>Centralised</td>
</tr>
<tr>
<td>ORDER PROCESSING</td>
<td>Manual</td>
<td>Fax</td>
</tr>
<tr>
<td>ORDER PLACEMENT TO GOODS RECEIVED TIME</td>
<td>1 week</td>
<td>24 hours</td>
</tr>
<tr>
<td>CENTRAL DISTRIBUTION</td>
<td>50 million cases</td>
<td>475 million cases</td>
</tr>
</tbody>
</table>

By the 1990s, the company had enacted many more strategies to combat sources of dysfunction within the supply chain and created a large differential in performance of the retailer against the closest competition in the British High Street. Today, all stores have been equipped with scanning devices that read bar-coded information from products are relayed to the central office, where it is aggregated and transmitted to the vendors, allowing manufacturers to produce goods to the actual consumer sales rather than conservative approximations and the vagaries of forecast information. This benefits of this system can be seen in Table 2 that reveals the considerable smaller amount of stock serving this large chain of stores:

<table>
<thead>
<tr>
<th>Table 2. Number of stock days held (1994)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOOD RETAILER</td>
</tr>
<tr>
<td>TESCO</td>
</tr>
<tr>
<td>SAINSBURY</td>
</tr>
<tr>
<td>ASDA</td>
</tr>
<tr>
<td>ARGYLL</td>
</tr>
<tr>
<td>CO-OP</td>
</tr>
</tbody>
</table>

To place these figures with comparable statistics from America, the best performing retail holds an average of 43.65 days stock at any one time (Kurt Salmons 1994). Today, Dover employs around 80,000 people to service around ten million customers that visit the stores each week. This pre-eminence has allowed Dover to orchestrate and professionalise areas of demand management that have represented traditional problem areas such as promotions management and the seasonality of individual products (the company spends a average of £26 million per annum supporting promotional advertising of products). It has also recently launched customer ‘value-
The theory of Demand Amplification as posited by Forrester is founded on the premise that supply chains possess the intrinsic capacity to distort information flows. So, relatively minor fluctuations in retail sales may be amplified into major fluctuations in the order pattern placed on suppliers. Under certain circumstances, an erratic order pattern may even be generated from a completely stable retail sales profile. If Demand Amplification (the Forrester effect) were to exist in FMCG supply chains then one would expect a reduction of the effectiveness of the supply chain in its capacity to meet the requirements of the final consumer in terms of cost and service. However, several factors make it wise to merely assume that the Forrester effect does operate within modern FMCG supply chains.

In the first instance much of the original research conducted by Jay Forrester involved simulation rather than empirical test. In the second, much of the original work was conducted in the late 1950’s. Since then developments in the field of information technology have transformed the inter and intra firm exchange of information and questions are therefore raised regarding the original assumptions which underpin the Forrester effect. Thirdly, almost forty years have elapsed since the publication of Forrester’s ideas (see the Harvard Business Review July-August 1958). Therefore, organisations, particularly progressive organisations such as those typically found in the United Kingdom’s FMCG industry have had almost forty years to design demand amplification out of their key supply chain business processes.

Against this background, SCDP sponsors and researchers felt that a pilot project should be conducted to ascertain the existence or otherwise of the Forrester effect within the modern FMCG sector and the relative need for a more comprehensive Forrester project which would encompass researching the causal factors of demand amplification and the development of inter-firm strategies designed to counter the impact of demand amplification and optimise the effectiveness of the supply chain.

The pilot project involved one retailer and a number of FMCG suppliers to the retailer. The suppliers were to chosen to represent different aspects of FMCG activity, supplying a series of food and cleaning products. The identity of the contributing organisations will remain confidential, however each are significant and respected organisations within their respective sectors. For each supplier two SKU’s were chosen and data for an eighteen month period obtained which compared on a daily basis. The two variables captured were:

- Retail sales
- Orders placed on suppliers by the retailer

Clearly the collection of several other variables would have been desirable. For example: Store inventory; Store orders on Regional Distribution Centre: Regional Distribution Centre inventory; Manufacturer’s Finished Goods Inventory; and the Manufacturer’s production order bank/schedule. However, the objective of the pilot project was to prove the existence or otherwise of the Forrester effect within the study supply chains. The most direct and rapid way of achieving this objective was to compare Retail Sales against Orders Placed on the Supplier.

5. Research findings

The research findings presented forthwith in figures 2 to 5 are unambiguous. The pilot project clearly identified the presence of Demand Amplification (the Forrester Effect) within the studied supply chains. Figure 2 compares the standard deviation of Retail Sales with the standard deviation of Orders on Suppliers for four SKU’s. While the standard deviation for Retail Sales are not significant, ranging from 6.42 to 13.52, the standard deviation for Orders on Suppliers are significantly greater extending from a minima of 10.31 to a maxima of 32.5. Even for product A, which shows the least amplification, the standard deviation of Orders on Suppliers (10.31) is almost twice as great as the standard deviation of Retail Sales (6.42).

![Figure 2. Standard deviation of demand](image)

Figures 3, 4 & 5 present a graphical illustration of this Demand Amplification. Again we can see that the time series profile of Orders on Suppliers are far more erratic than
the equivalent Retail Sales, even where the figures for Retail Sales display pronounced peaks due not so much to Seasonal Demand but to promotional activity within the retail store. Not only are the profiles of Orders on Suppliers more erratic week on week than retail sales, they move above and below the trend line of retail sales apparently at random. These Forrester diagrams clearly show that demand at the retail level and at the supplier level are clearly dissociated (to a significant extent) and that fluctuations in demand are amplified at the Retailer-Supplier interface. Therefore the primary objective of the pilot project, to establish the presence or otherwise of Demand Amplification, has been achieved, and the Forrester Effect clearly identified.

6. Limitations of the research
The research findings are limited in several regards. In the first instance data was captured for particular Stock Keeping Units (SKU's). These SKU's should be considered illustrative of the wider product range rather than representative. Secondly the research adopted a 'dyadic' perspective. That is data was captured from a relationship between one supplier and one customer. Of course the suppliers cited within this study receive order information from a number of customers. Therefore the data presented within this paper does not represent the aggregate demand placed on supplier organisations, but merely a subset of that demand which originates within an important but nevertheless single customer.

Despite these caveats, the authors believe that the research findings presented within this paper possess an integrity which would be unwise to ignore. The findings tend to suggest that Demand Amplification does exist within the SKU's studied. While in the absence of further empirical study it is difficult to infer with statistical certainty that other SKU's within study relationships exhibit the same characteristics, the research team have not been made aware of any reason why the behaviour of the study SKU's could be expected to deviate from that of the wider SKU population.

7. Discussion
What are the implications of the research? The research team believes that the findings presented within this paper have serious implications not only for the UK FMCG organisations who contributed to the study but to FMCG organisations outside the UK environment and indeed to organisations in unrelated industries irrespective of trading location. It should be remembered that the organisations who contributed to these research findings are without exception effective, efficient and dedicated organisations who are committed to developing the competitive advantage of their organisations and supply chains and who can look back on a record of outstanding performance, continuous process improvement and commercial success.
Increasingly, organisations from many industrial sectors and geographic regions are viewing their supply chains as a potential source of competitive advantage. This awareness manifests itself in a number of ways; for example, measuring the performance and the capability of suppliers; conducting supplier development where appropriate and possible; and attempting to foster long-term relationships founded on collaboration and mutual benefit, rather than competition allied with adversarialism. Much of the impetus for this paradigm shift derives from Womack and Jones' work on Lean Production (1990), which emphasises the need to view the supply chain as the prime determinant of competitiveness rather than the single organisation.

Embracing the supply chain philosophy requires organisations to seek to optimise their supply chains as a whole, rather than individual components of the chain. There is evidence that numerous Western Business organisations have derived significant competitive advantage from developing their supply chains in just such a manner, including the (World Class) organisations who contributed to the study presented within this paper. However, we would argue that much of the improvement activities within this process have focused on the flow of goods from Supplier to Customer rather than the equally or even more important flow of information from the customer to the supplier.

Consequently, Information Exchange remains dedicated to the needs and conveniences of the individual organisation which transmits the data rather than the needs of the supply chain as a whole. The result is the persistence of idiosyncrasies such as the Forrester effect, which holds major and adverse consequences for the performance of the supply chain. To return to the supply chain philosophy, individual organisations within the supply chain collaborate in order to place a final product before the consumer. The competitive performance of the entire supply chain is judged by the products ability to satisfy the needs of that consumer. The central aspect of the Forrester Effect that we would wish to concentrate on within this context is that it acts upon the chain to create additional needs of consumers, rather than the needs of suppliers. To quote Forrester (1958, p45): "[The] ... "System...will respond to random disturbances by fluctuating at a speed determined by the characteristics of the system itself."

This means that supplier organisations within the supply chain will commit resources and invest a great deal of time and effort to meet performance criteria which, rather than reflecting the actual needs of the final consumer are artificially generated by the distorting influence of the information exchange systems of the supply chain itself. The result of such unfocused effort will be to reduce supply chain effectiveness in meeting the needs of the final consumer (and only those needs) and to increase supply chain cost as manufacturers and retailers order, produce, store, transport and distribute products that the consumer does not want, at the expense of those that s/he does.

The clear implication of these findings for organisations intent on optimising the performance of their supply chains is the need to concentrate attention on the quality of the information flowing along the supply chain from the final consumer to the original manufacturer. The aim at all times should be to maximise the quality and speed at which point of sale information is transmitted in order that the effectiveness of supply chain decision making can be facilitated.

8. Conclusion
The work presented within this paper describes the findings of the pilot phase of the Supply Chain Development Programme's 'Forrester' research project. The objective of the project was to ascertain whether demand amplification (the Forrester Effect) existed within present day UK FMCG supply chains. To satisfy this objective we have reviewed the classical Systems Dynamics literature, placed that body of knowledge within the context of the present day UK FMCG sector and the paradigm shift toward collaborative inter-firm relationships and the need to optimise the performance of the supply chain in order to maximise competitive performance.

The empirical data submitted within the body of the text demonstrates that demand amplification is indeed an aspect of the studied supply chains and that technological advancements within the Information Technology field have not invalidated Jay Forrester's original Systems Dynamics work. The applicability and relevance of these findings to the FMCG industry outside the United Kingdom and indeed to other industries is reinforced due to the high (World Class) performance levels achieved by the exemplar supply chains and the background of their sustained and significant process improvements.

The paper has represented demand amplification as a significant sub-optimising factor within supply chains acting to effect a reduction in the effectiveness of the supply chain in its capacity to meet the requirements of the final consumer in terms of cost and service. This erosion in competitiveness is induced by the supply chain striving to meet targets which reflect requirements artificially generated by the supply chain rather than those which represent the genuine needs of the consumer. The paper does not proceed to discuss the detailed causes of demand amplification and the possible inter-firm strategies available to address those causes as these areas are the basis of ongoing research within the Supply Chain Development Programme. Nevertheless, the research team feels that for those organisations which accept that the supply chain holds the key to competitive performance, the removal of demand amplification will prove a key enabling mechanism for the optimisation of supply chain capability and performance.

In order to achieve this objective, organisations will have to focus on the quality of information flowing along the supply chain from the final consumer to the original suppliers as they already focus on the quality of the flow of goods which moves along the supply chain in the opposite direction, from the supplier through the retailer to the final consumer. The final message of this paper should surely be that the quality of that information flow is of fundamental importance to the optimisation of supply chain performance.

References


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**Marketing equals Purchasing — Customer and Supplier Redefined**

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**Abstract**

Purchasing and marketing have always had their own specific focus. Purchasing focuses on suppliers, whereas marketing is directed towards customers. Can suppliers and customers, however, always easily be distinguished as different categories of external counterparts of a firm? We argue that this is not the case, especially when looking at the additional benefits or services that both the 'supplier' and the 'customer' can provide to their counterparty. It is our strong belief that in many long-term relationships suppliers can be treated as customers, while customers can be seen as suppliers. Dealing with these diffuse roles of external counterparts in more conscious manner increases the value of relationships for the firm, but has important implications for purchasing and marketing management. Purchasing becomes marketing, and marketing becomes purchasing.

1. Introduction

Long-term relationships or partnerships are gaining widespread attention in both the marketing and the purchasing literature. In the purchasing literature, examples are given of organisations developing partnerships with their suppliers (Lamming, 1993; Carlisle and Parker, 1989), while the industrial marketing literature describes cases of organisations treating their customers as partners (Anderson and Narus, 1991). This increased interest in partnerships, both in academic research and business practice, is one effect of the larger paradigm shift that has been taking place regarding inter-firm relationships: from arms-length, spot-market transactions to more permanent relationships.

Although much of the current research is describing this paradigm-shift as being a recent trend, long-term relationships between firms do not seem to be something new (Hultxanson, 1982). Additionally, much of the available literature romanticises partnerships as the solution to all kinds of inter-organisational problems, but serious doubts can be raised regarding the universal usefulness and applicability of such partnerships (Van Weele, 1995; Karnath and Liker, 1994).

Our concern, however, lies not so much with the appropriateness and 'date of birth' of long-term relationships as such, but rather with the names of the partners involved: 'customer' versus 'supplier'. Implicit in most literature, is a clear distinction between customer and supplier. Usually, supplier-customer relationships are defined on the basis of in which direction the streams of product, information and money flow. We argue that the services exchanged by both parties within the relationship can be much more important than the actual product and money that are being transferred. By analysing these service streams, a much more complicated pattern emerges than is...
usually associated with supplier-customer relations. This often leads to a totally different perception of the relation and balance between a supplier and a customer. We believe that the traditional kind of thinking about supplier-customer relationships is one of the important road blocks to the development of successful inter-firm relationships.

2. Customers and Suppliers: Buying and Selling
Definitions of 'customer' are expected to be found in the marketing literature. However, although Kotler and Armstrong (Kotler, 1988) give a definition of customer, they do not give a definition of customer. In their terms, marketing is the human activity directed at satisfying needs and wants through exchange processes. In their elucidation they may make sure that the most important elements of this definition are exchange processes and demand. The customer demand is satisfied only if he is able and willing to pay for it. Correspondingly, in Longman's Dictionary of Contemporary English (Longman, 1987) selling is defined as ... to give or pass (property or goods) to someone else in exchange for money. This someone must be the customer, who according to the underlying implicit definitions is ... a person or an organisation who is able and willing to pay someone for satisfying one or more of his needs.

Van Weele (Van Weele, 1994) defines purchasing as: 'obtaining from external sources all goods and services which are necessary for running, maintaining and managing the company's primary and support activities at the most favourable conditions.' (page 9).

Scheuing (1989, p.4) describes purchasing as 'the acquisition of needed goods and services at optimum cost from competent, reliable sources'. And, 'It consists of both the act of and functional responsibility for securing necessary inputs from outside sources'. (op. cit., p. 5).

One of the few definitions of supplier (or vendor) is given in Aljian's Purchasing Handbook: '... an outside supplier of raw materials, supplies and equipment or services that are needed in the operation of an organisation' (Farell, 1982). Apparently, the process of supplying and vending (i.e. selling) are key characteristics of the supplier role.

Longman's Dictionary defines selling as ' ... to give or pass (property of goods) to someone else in exchange for money' (Longman, 1987). The customer can be found downstream the flow of products (by which we also mean services), whereas the supplier is positioned upstream. Money flows in the opposite direction to the products being transferred.

A typical example of this type of is the reference model for the automotive industry of the ESPRIT II project 2277 CMSO (Computer integrated manufacturing for Multi-Supplier Operations) (Goedersen et al., 1990; Schneider et al., 1994). The elements of logistic chains in the CMSO reference model are individual organisations linked together by inter organisational communication processes. Important aspects of models like the CMSO-model are the division of each function into buy, produce/store and sell, and thinking in upstream suppliers and downstream customers.

Figure 1. The CMSO reference model for automotive supply chains

These type of models have been applied in many industries by many companies. Traditionally, production 'columns' existed of bilateral buyer-supplier relationships, or 'dyads'. Every supplier only needed to be concerned with his direct customer, and vice versa. This almost exclusive focus of mainstream research (in the field of industrial marketing and purchasing) on bilateral relationships has increasingly given way to a more holistic view of business markets, leading to a situation nowadays where we are flooded with concepts like 'Value Chains' and 'Networks', to the point of becoming dogmas or orthodoxies (New and Ramsay, 1995).

The problem, however, is that these concepts — as they are most often used — still presuppose unambiguous definitions of what makes a supplier, and what makes a customer. Although supply chains are defined as having extensive information flows back and forth, goods and services are still flowing in only one direction: from supplier to customer. This notion of 'one-way traffic' is, in our opinion, hard to reconcile with concepts like 'chain' and 'network', as these words imply a more complex flow of goods and services. One group of researchers that has been trying to stay away from the idea of neatly defined customer and supplier roles, is the IMP group (Axelsson and Easton; 1992; Håkansson and Snehota, 1995).

3. From External Counterparts to Internal Functions
One of the main criticisms the IMP group voiced in the early 1980s, concerned the separation that had occurred in analysing either the process of industrial purchasing or of industrial marketing. According to them, the tasks of buyers and sellers in industrial markets were quite similar (Håkansson, 1982). The criticism was mainly aimed at fellow-researchers, but also at management practice.
Internal functions responsible for external relationships are in most organisations still organised according to the traditional 'either/or' model of external counterparts: either customer or supplier. Following this distinction between different groups of external counterparts, clear distinctions are made within organisations between the internal functions of marketing and purchasing. On one side of the company, we find Marketing and Sales, operating on output markets, and dealing with customers. Purchasing, operating on input markets, and dealing with suppliers, is situated on the other side of the company. Both Kraljic (1983) and Keough (1992), for example, speak in terms of purchasing as the opposite of sales. Relationships are formed, be it partnerships or not, by the customer's purchasing function in the case of suppliers, and by the supplier's sales function in the case of customers.

Within each function, several departments co-operate to perform that function. It is seldomly so that only the marketing department is the sole responsible for customers, and the purchasing department is the sole responsible for suppliers. The purchasing manager co-ordinates the purchasing activities, but this does not necessarily imply that these activities should be carried out by his department.

For example, management might be involved in make-or-buy decisions, and engineering is probably having contacts with suppliers regarding the design of new products: these activities are also part of the purchasing function. Even straight buying often takes place without the intervention of the purchasing department. A similar argument holds for marketing. Nevertheless, it is still true that in practice the department with the corresponding name fulfils most of the purchasing or marketing tasks and is held responsible for it. Our objections, however, are related to the fact that the purchasing and marketing functions are nearly always strongly separated, based on the notion that such a separation is always possible.

A counter-argument could be raised by pointing to the increasing emphasis on cross-functional coordination in general as a means of sustaining the basic processes of engineering. Cross-functional collaboration in general as a means of sustaining the basic processes of engineering is probably having contacts with suppliers regarding the design of new department with the corresponding name fulfils most of the purchasing or marketing function in the case of suppliers, and by the supplier's sales function in the case of customers.

4. Inter-firm Relationships

Over the last decade, manufacturers have 'gone back to core businesses', which resulted in the outsourcing of all activities they no longer considered of strategic importance to their market position. Womack, Roos and Jones make clear that in the early 1980s the vertically integrated western car manufacturers, such as General Motors and Volkswagen, had burdened themselves with non-controllable organisations in which a large number of non-comparable activities had to be co-ordinated (Womack et al., 1990). This was not only true for the car manufacturer itself, but also for the kind of other companies found themselves doing things that did not distinguish their products from that of their competitors. Industry wide, organisations started therefore to pay specialists for carrying out their non-core activities.

Services like catering, cleaning and maintenance were outsourced industry wide: adding no value to the final product and only facilitating the manufacturing process. These are the most obviously not-competitive edge related activities. However, value adding activities have increasingly been outsourced to a large extent too. This has lead to the situation where now, in many industries, over 70% of the value of the final product is added by others than the manufacturer of the final product (Cavaino, 1991). Key components and/or sub-assemblies that were previously manufactured in-house, are now bought from suppliers.

This increased outsourcing and vertical disintegration, and especially the changed nature of the activities that are being outsourced, has changed supplier relationships dramatically: increasingly, customers can not rely on arm's-length relationships any longer, but need more co-operative, long-term relationships. This changing nature of supplier relationships has in some cases been accompanied by an increase in the assets being exchanged: suppliers are providing certain extra services (in the broadest sense) at no charge, and customers are offering certain services to suppliers.

These additional services are in some cases equally or even more important than the actual product that is being exchanged. As a result, purchasing and selling in long-term relationships become different activities than in market transactions. This is a point that the aforementioned IMP group has been stressing too. Partly based on the resource dependency view of the firm (Pfeffer and Salancik, 1978) they have been analysing the mutual exchange of assets or resources in great detail (Håkansson and Snehota, 1995).

5. The Motives for Establishing Long-term Relationships

It might be useful to classify the types of relationships with respect to the emphasis the exchange partners place on a) the actual product versus the money that is exchanged, and b) the other 'services' that are being transferred. In other words: what is being considered (perceived) by each party in the relationships as being the most important reason to establish or maintain a relationship with a specific counterpart. Following the definition of (Kotler, 1994), we use the term 'actual product' to describe a specific solution of a buyer need or problem (be it in the form of a product or service) including physical aspects like packaging, quality and styling.

The 'other services' that can accompany the exchange of the actual product fall partly into Kotler's category of the 'augmented product': for example, deliveries, guarantees, maintenance and repairs. These additional services can either be provided for free, or paid for separately, and promoted and sold as separate products (Anderson and Narus, 1995). Additionally, some of the 'other services' can have a less 'instantaneous' character, like the access a customer can get to certain resources the supplier has: for example, image, technological expertise, or other relationships with sub-suppliers or competitors of the customer.

In order to achieve performance leaps in managing the supply chain, the traditional functional blinkers of R&D, Manufacturing, Marketing and Finance needed to be broken down. For this, new supply chain managers - visionaries, strategists - were needed. Fisons is now at the stage where it has removed its marketing director, and it has moved the manufacturing director report to the director of purchasing and supply.

Ultimately, the strategic purchasers will become business managers applying the skills learned at the input end to the whole supply chain.
Hence, unlike Kotler, we do not limit the provision of these additional services to the supplier; the customer can offer particular services to the supplier as well. A simple example is the testing the functioning of the supplier's components in a final product, and giving feedback on the results, so that the supplier can improve its products.

We can then draw a continuum for each relationship partner: at the one end, the basic product or the money that can be got out of the transaction is the primary reason to engage in an exchange with that specific counterpart, while at the other end, the additional services are the most important reason to deal with the other actor. The diagram in figure 2 puts against each other the supplier’s motives and the customer’s motives (we will use the traditional terms for the moment) for setting up and maintaining a relationship, resulting in four different combinations of these motives. In our opinion, these four categories of inter-firm relations need to be managed differently.

![Relationship reasoning diagram](image)

**Figure 2. Relationship reasoning diagram**

- **Lower-left quadrant:** the customer focuses on the actual product that is at the centre of the transaction, while the supplier focuses on the money he can get out of this transaction. These are the relationships where the typical purchasing and sales roles can be found. Purchasing is only concerned with the core product (which can also be a service), and not with other possible benefits it can achieve by doing business with this supplier. The sales function of the supplier is only interested in the customer as a monetary resource, and not in any other possible advantages of doing business with that customer.

- **Lower-right quadrant:** the customer is more interested in the other things the particular supplier can offer than in the actual product or service that is transferred. In this relationship, the customer is willing to pay more for exactly the same actual product that he could get somewhere else for a lower price. Purchasing, therefore, evaluates more than only the price/performance ratio of the core product. Additional services provided by the supplier during the relationship, e.g. his service network or his capability to take back and recycle used components, are in these cases more important.

Since the supplier is still focused on the money involved, its sales function remains traditionally oriented. This is the case when a supplier has at least several comparable customers, and it is of no interest to the supplier to which customers he sells (assuming that they each pay the same price), because none of them provides him with special benefits.

An example is the relationship between a plastics component manufacturer and a supplier of granulates. The component manufacturer is interested to maintain a relationship with the supplier, because this supplier is one of the granulate producers that is approved by the final customer (an automobile manufacturer); the granulate itself, however, is not especially cheap or technically superior. The supplier has no special interest in dealing with this customer, as it has a lot of almost identical customers.

- **Upper-left quadrant:** the customer can be evaluating the product/performance ratio only, while the supplier wants to do business with the customer because of the additional services or advantages the customer offers (e.g. access to the customer’s knowledge or being associated with the customer’s name). The supplier will be willing to accept lower profits per transaction. This is the category, for example, into which ‘lead-user’ relationships fall: the supplier selects particular customers to do business with based on the consideration whether it can learn a lot from the customer’s experience with the product it sells (Anderson and Narus, 1991).

One example is the relationship between a truck manufacturer and a supplier of engine components. The truck manufacturer is interested in maintaining a relation with the component producer, mainly because this supplier is considered to be delivering high-quality products. The supplier is interested in maintaining a relationship with the truck manufacturer — despite its relatively small size — because it provides quick and candid feedback regarding the performance of the supplier’s components in the truck engine. This feedback is particularly interesting because this truck producer — unlike some other customers — still manufactures its own engines.

- **Upper-right quadrant:** both the customer and the supplier place more emphasis on the additional services and benefits the counterpart can offer than on the actual product or money that is exchanged. Therefore, we name these relationships ‘symmetrical’: both organisations use each other for selling their own product.

It is not unthinkable that there is no transaction at all between the two organisations: a common customer might be involved as a third counterpart. There is no typical purchasing, nor a typical sales function carried out in setting up or maintaining the relationship. Complementarity of products and knowledge is the most important driver for this type of relationships.

An example is the co-operation between Kwik-Fit, a chain of car-maintenance garages, and Dexcom, a Scottish provider of mobile telephone subscriptions. Both in the UK and the Netherlands, Dexcom offers free mobile telephones to Kwik-fit customers when they spend above a certain limit (provided they subscribe for a new connection). Dexcom has chosen Kwik-fit as a business partner, because it forms it very good distribution channel (in the Netherlands, it has some 145 outlets). Kwik-fit has probably chosen to do business with Dexcom, because they expect it will attract additional customers to their garages (Anonymous, 1996). Here we see two companies that — in the traditional sense — can be called a supplier (Dexcom) and
a customer (Kwikfit), but which actually do not exchange a product, but provide each other a special service.

6. Implications: Purchasing must Become Marketing and Vice Versa

Setting up and maintaining relationships is in many cases something else than adjusting the supplier's product to the customer's requirements. It might be equally or even more important for the customer to adjust his additional services to the supplier's requirements. Using the model from the previous chapter, the two organisations involved can both be supplier as well as customer.

In practice the roles of customer and supplier are strictly divided among the two organisations. The organisation that is seen as the supplier carries out marketing and sales activities as a matter of course. Within the presumed supplier's organisation the sales department is held responsible for setting up and maintaining the relationship. Within the so-called customer's organisation the purchasing department is given responsibility for the relationship and consequently takes up purchasing and supply activities.

The sales function misses certain knowledge, skills and tools that are considered part of the purchasing function. If the customer has supplier characteristics and vice versa, sales must be capable of performing activities analogous to those typically considered part of the purchasing function, like supplier selection and performance evaluation. Nevertheless, the additional services of different customers must be compared and evaluated.

On the other hand, purchasing does not enhance sales capabilities like marketing and promotion. A customer can however be required to make clear to potential suppliers why his additional services add value to the suppliers' processes. An important consequence of this type of thinking is that the fact that purchasing is all of a sudden confronted with competitors. The customer must position itself in relation to other customers and must convince potential suppliers to sell their products to him. This requires marketing skills, although they are generally not considered part of purchasing.

7. Conclusions

The model presented in this paper suggests that instead of having the purchasing function deal with a supplier, and the marketing function deal with a customer, it seems more appropriate to consider the supplier to be a customer too, while the customer should partly be regarded a supplier. This has implications for industrial marketing, as well as for purchasing. We believe that for many relationships, relationship management functions need to be defined. These new functions will have to be a mixture of existing purchasing and sales functions. Suppliers will have to select the best customers, while customers will have to convince the most attractive suppliers.

References


1 These marketing skills are not to be confused with the notion 'Reverse Marketing', described by Leenders and Blenkhorn (1988) and by Biemans and Brand. (1995). In our view, the phrase 'reverse marketing' - as used by these authors - only implies that purchasing should be proactive, and use tools analogous to the ones used in marketing. This is different from our statement 'purchasing becomes marketing', which implies that purchasing should market its own company as an interesting customer to suppliers.
Federal Organisation of Purchasing

A reverse thrust organisation

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Abstract

This paper is based on original research investigating the application of the federal concept as an alternative means of organising the purchasing and supply function. The research began with a literature review spanning the areas of political science, organisational development and purchasing strategy. A number of fundamental federal characteristics identified from the literature review provide the foundations for a new conceptual model of Federal Organisation of Purchasing (FOP) developed during the course of the research. In support of the theoretical underpinnings, interviews were conducted with strategic purchasing and supply practitioners. The results of these interviews on FOP have been collated and are discussed in the paper.

1. Introduction

Companies are currently faced with increasing demands placed on them by customers. Organisations are experiencing an increase in competition, coupled with the emergence of the 'intelligent customer' who expects more for less and places value for money and quality issues over brand loyalty. Lamming (1995) describes the customer of today as "more sophisticated, better informed, and harder to please" (Lamming, 1995:36). This has meant that companies must strive for any potential competitive advantage over their rivals, in order to maintain market share and win custom.

Changes in economic conditions have led to a review of traditional organisations, and the development of 'new' company structures which may be viewed as organic (Starkey & McKinlay, 1998). The 'new' organisation looks to be more entrepreneurial and aims to achieve a higher level of customer satisfaction. There has been a shift in organisational strategy from being concerned with cost and volume, to an emphasis on value to the customer. To fulfill these customer expectations, organisations have sought competitive strength from developing skills and improving customer response times, as well as providing better customer service levels (Ditcher, 1991).

Organisations are faced with an increasing degree of uncertainty due to the dynamic and competitive nature of their external environment. These conditions have had an impact on the types of corporate strategy followed. Companies have looked to expand globally and this is reflected in the amount of scholarly attention given to network concepts and the study of multinational corporations (Marschon, 1994). Vertical integration and wholly owned businesses are increasingly seen as features of the past, as they have proven to be both costly and of high risk (Handy, 1992). All this has led to changes in organisation structure which have become more complex in nature.

The desire for companies to gain the best of both worlds, in order to realise the benefits of being both large and small, seems a contradiction in terms. Even though large organisations can gain through economies of scale, investing greater amounts in
research and development, and relying less on external expertise, being big also has its drawbacks. There are desirable aspects often missing from large organisations such as greater flexibility and greater customer focus and orientation, as well as environments that encourage creative and innovative thinking.

Starkey & McKinlay (1988) recognised the need for organisations to become leaner and more flexible in both strategy and structure. Strategic flexibility may involve a change to a new market, or the use of new technology. In contrast, structural flexibility is concerned with combining or creating new departments, or perhaps with removing departmental boundaries.

A strategy of global growth has been employed by a number of companies trying to expand and penetrate new markets. This has introduced a number of dilemmas associated with the co-ordination of geographically dispersed assets and capabilities. Also, due to technological advancements and the ability to dispense information electronically, a new challenge is faced by organisations of how to 'control' dispersed decision making. This issue is faced by multinational organisations, who have adopted a number of new structural forms. Marschan (1994) lists these as:

- heterarchic (Hedlund, 1986).
- transnational (Bartlett & Ghoshal, 1989).
- multifocal (Doz, 1986).

One corporate strategy that may be employed, and is characteristic of a number of multinational companies is 'portfolio management'. This is where companies look for diversification and have experienced growth through the acquisition of smaller companies (Vijzak, 1994).

Historically, organisations have been viewed as vertical structures with decision making at top levels, driving control, responsibilities, and resources downwards. In contrast, organisations can now be viewed as a portfolio of processes requiring horizontal management systems, which cross both departmental boundaries and vertical functional barriers (Ghoshal & Bartlett, 1995).

Regardless of the strategic approach taken to organise companies, there appears to be consensus among authors investigating structural forms of multinational organisations, that the efficiency of these forms is reliant on intra-organisational relationships (Marschan, 1994). Organisations are faced with the problem of balancing central control whilst maintaining responsiveness to local needs (Blackwell, Bizet, Child, & Hensley, 1992).

2. Why federalism in purchasing?

Dynamic economic conditions have led to a review of traditional organisations, with a move towards new leadership styles, company cultures and organisational structures. This has had an impact on the functional level of an organisation, such as the purchasing and supply function.

There has been a move towards decentralisation of the purchasing activities. One of the main drivers behind this change is the need for purchasing decisions to be made by the people who best understand them and are closest to the problem. This shift has been accompanied by the general trends of organisations towards 'independent profit centres with decentralised responsibilities' (Gadde & Hakansson, 1994/95).

It is the view of Ellram & Carr (1994) that purchasing cannot impact on organisational profitability unless it acts strategically. However, Cammish & Kenough (1991) believe that without a cross functional approach towards strategy formulation, and the development of the correct attitude in all business functions, purchasing will not be considered strategically.

Several general themes have evolved from the literature covering the changing role of purchasing. These summarised below:

- Purchasing is well placed to initiate cross-functional collaborative approaches to strategy formulation (Cox, 1995; Cammish & Kenough, 1991; Womack & Jones, 1994).
- The strategic role of purchasing is separate from the day to day operations, which are concerned with doing purchasing better (Spekman, 1985; Rupprecht & Bernard, 1983).
- New organisational structures have meant the reorganisation of purchasing structures. There has been a move towards decentralisation and employee empowerment (Gadde & Hakansson, 1994; Cammish & Kenough, 1991).
- Strategy formulation should not just be driven by the product market, but should also consider supply market factors (Farmer, 1978; Spekman, 1981).
- A strategic purchasing function is considered as a pre-requisite for the purchasing function to influence corporate strategy (Ellram & Carr, 1994; Spekman, 1981).

The two traditional structures of centralised and decentralised purchasing functions have apparently been found to be unsatisfactory. Centralised functions have been large, unresponsive and bureaucratic, whilst decentralised functions have exhibited low critical mass, low environmental levels and poor communication across units. This has led to the introduction of new purchasing structures such as the Centre Led Action Network (CLAN) (Cammish & Kenough, 1991; Russill, 1991 & 1993).

Our research has focused on the development of a new form for the purchasing and supply area which has consequently led to the development of the concept of Federal Organisation of Purchasing (FOP) as an alternative functional form. The political science environment has used a federalist approach to solve a number of dilemmas similar to those faced by managers in business organisations. Senates and intergovernmental relationships use federalism as a process of control.

Recently, because of company strategies such as growth through acquisition and policies of devolution, there have been several instances of federations of businesses evolving (Lloyd & Phillips, 1994). Similar developments in political history have encouraged federalism. Centralist federalism has emerged through the necessity of states seeking greater union in defence of external or internal threats (King, 1982). Decentralist federalism has evolved where the centre has become too powerful. This has been associated with policy innovations and decentralisation with efficiency and rationalisation (Gagnon, 1993). A federalist balance is evident where there is no dominance of either unity or diversity.

Handy (1992), discusses how federalism ideology and a federalist approach to an organisation may be appropriate to deal with a number of business paradoxes, associated with the governance of complex organisations.

It is from research into organisational development and strategy, political science and purchasing and supply areas, that the conceptual model of FOP has been developed. Organisational change has undoubtedly impacted on functional operations. As companies have changed, functional departments have also evolved. The purchasing function has changed from being administrative to more proactive and strategic (Ellram & Carr, 1994). This has meant a review of processes and development of supply chain concepts, which require cross-functional focus on
strategy formulation and new ways of measuring purchasing efficiency (Camashish & Keough, 1991).

The idea of extending the federal concept as a means of tackling current business dilemmas, was put forward by Handy (1992; 1989; 1985), and also mentioned in a paper by Jennings (1993). In our research, the literature search started by establishing an understanding of what is meant by federalism in the political science field, and how it has been applied to organisational structure.

To gain a basic understanding of federation and federalism the following dictionary definitions are provided:

"Federalism can be defined as a constitutional device for securing the decentralisation of authority within a state by regulating the distribution of power on a territorial basis." (Riff, 1987:107)

"Federation. The act of forming a political unity under a federal government, and hence the unity thereby formed." (Scranton, 1982:170)

Although the above definitions refer to state, they can be translated into organisation.

3. The five principles of federal organisation of purchasing

In order to develop a conceptual model of FOP, points from the literature pertaining to organisation structure and development were extended to the functional level of purchasing and supply. This is in line with Stanley (1993) who maintains that organisation form can be extended to the analysis of functional form, regarding the function as a sub-unit of the organisation. Taking this into account, Handy's (1992) five principles: subsidiarity, interdependence, twin citizenship, separation of power and common law and language, associated with federal organisations, provide the underpinnings for the conceptual model of FOP.

3.1 Subsidiarity

Subsidiarity is regarded as the state where power resides at the lowest possible point, or "A higher order body should not take unto itself responsibilities which properly belong to a lower order body" (Handy, 1992:64). In the context of purchasing power within FOP, the power resides with the purchasing functions within the business units, and not with the central core.

Subsidiarity requires that employees take responsibility for their actions. The concept is thus similar to that of 'empowerment', but differs because the power has not been delegated: it is assumed to reside at the lowest point. It follows that where subsidiarity exists, power can not be removed, except by agreement of the federal units (Handy, 1992).

Effective use of subsidiarity might enable local purchasing managers to improve control of their area. This may allow:

- decisions to be made quickly without the need for bureaucratic procedures.
- decisions to be made by employees with expertise and knowledge of the local environment.
- employees to take responsibility for their actions, as they are accountable for the outcome of the decisions made.

3.2 Interdependence

Management of the interrelationships between business units, and in particular between the purchasing units, is important to sustain FOP. If relationships are not developed and maintained, the federal system is put into jeopardy and risks fragmentation (Handy, 1992; Dikshit, 1975). The purchasing units have to feel they are gaining some sort of benefit from being a member of FOP, otherwise purchasing units will break away from the union. FOP may be considered as a 'club': associated to the membership is some sort of benefit. If this does not hold true, the purchasing units disband and the 'club' ceases to exist.

If the departments in a business organisation rely on one another because of shared facilities or services, relationships are automatically built and interdependence created. In purchasing, relationships may be formed by setting up global contracts covering a number of business unit needs and by sharing information on common suppliers and markets.

3.3 Common law and language

A common law and language of communication are required in order to maintain uniform and standard working conditions. These also encourage interdependence, by clearly stating and continually monitoring relationships and conduct. The main implication for a company is the need for documentation of company standards in the form of procedures, rules and regulations. Handy (1992) discusses the requirements for 'real time' data, intelligence and information in order that decision points may be identified. This may be provided by a universally integrated IT system.

For the purchasing function, an integrated information system may provide access to information on the break-down of corporate spend: by supplier, business group, or classification of goods or services purchased, supplier information and appraisal systems, contract details, a code of ethics etc.

Policy and procedures laid down in purchasing and supply manuals may provide the 'common law' and basic guidelines to procurement areas, maintaining corporate standards and providing guidance.

3.4 Separation of power

Handy perceives a federal organisation as possessing its power within its devolved states with the centre acting as co-ordinator. On the same lines as Handy, Gagnon (1993), sees the centre's power being diffused by each of the autonomous units.

The ultimate aim of the FOP concept is for business units to generate ideas from which they are able to develop their own strategies, either individually or collectively, if the situation lends itself to a collaborative approach. The centre's involvement is limited to the requirements identified by the purchasing units. It is perceived that in a 'true' federal system where the power resides with the units, the formulation of strategy is the responsibility of the units and the role of the purchasing centre is essentially one of monitoring purchasing best practice, co-ordination and the provision of resources as and when required. This is in line with Handy's description of a federal organisation being "reverse thrust", with the power residing at business unit level pushing upwards onto the centre (Handy, 1989).

The balance of power, or power relationship, between the centre and the purchasing units, influences the roles and responsibilities of the centre and the business units. If the units possess most of the power, then the role of the centre is
essentially one of co-ordination and the supply of services or extra resources as required by the units. The business units in this situation are responsible not only for operational and tactical purchasing but also strategy formulation. In situations where the power still resides on balance, with the centre, formulation and development of purchasing strategy remain the responsibility of the centre.

Handy sees the federalist approach responding to the dilemmas of the separation of power by "balancing power among those in the centre of the organisation, those in the centres of expertise, and those in the centre of the action, the operating businesses" (Handy, 1992:61).

3.5 Twin citizenship
It is imperative that the correct type of culture exists within the federal system: the purchasing units should all 'think federally'. This means recognising what Handy (1992) terms 'dual citizenship' and encourage what Friedrich (1968) calls the 'federal spirit'.

In essence there has to be loyalty to the corporate whole, whilst maintaining diversity within each of the business units. Practically this may require local sacrifices being made, to ensure the company as a whole benefits.

Heads of purchasing units require the skills to build an innovative and creative learning environment. They must also be able to express the views of their purchasing functions within the business units and act as an agent when involved with corporate purchasing matters.

The model of FOP may therefore be considered as complex, requiring a carefully planned network of interrelationships, a delicately arranged balance of power between the purchasing centre and purchasing units, and a strong 'dual' culture.

3.6 The FOP concept
The FOP concept consists of a number of purchasing units positioned in autonomous business units, supported by a small purchasing central core. There is only a professional relationship between the federal purchasing units and the central core. The units have a reporting line to the business unit heads, not to the centre.

The business units are considered autonomous, in that they are profit centres and responsible not only for their own budgets. The purchasing functions within the business units are interrelated in some way, either through shared facilities, or common activities.

Finally, the activities carried out at the purchasing centre and units are separate, with the units generating the strategic thinking and driving the 'reverse thrust' concept.

4. Research methodology
The research expectations were to investigate and build the FOP conceptual model through the exploration of literature and perspectives from purchasing strategists.

Semi-structured interviews were chosen as the technique for collecting primary data for this research. The companies and participants were not randomly selected but chosen because of their willingness to be involved in this research. In total, ten purchasing strategists agreed to take part in the semi-structured interviews. The representatives were from different companies, covering a number of market sectors.

To ensure consistency of replies, the participants chosen were of similar positions in their respective companies — either top management or directorial levels. This enabled a direct comparison of responses to be made.

The field work investigation focused on the following three questions:

Question 1: Are there any structures similar to the FOP concept already in existence?
Question 2: How does the concept of FOP differ from other conventional structures?
Question 3: What are perceived to be the main benefits and potential barriers to implementing such a concept?

5. Research results
5.1 Background information to the companies
All ten companies included in the pilot study are classed as significantly large, based on the following facts:

- All have a sales turnover exceeding £800m.
- All have an annual expenditure exceeding £500m.
- All but two currently employ over 20,000 people. The two exceptions employed between 10,000 and 17,000 people (still a significant number).

The companies included in this pilot study represented the following range of market sectors:

- Energy and Water Supply Industries
- Metal Goods, Engineering and Vehicles Industries
- Transport and Communication
- Banking, Finance, Insurance, Business Services
- Other Services

Half of the companies are geographically located world-wide; the other half are essentially city based in the UK. They represent a mix of private and public organisations: seven from the private sector and three public sector organisations.

5.2 Comparison of organisation and purchasing function structures
While the principal value of interview-based data is qualitative in its nature, the structured questions contained in this survey enabled us to establish some basic dimensions to the views and experiences which might hold relevance for FOP.

In response to a question regarding organisation structure, only one interviewee regard his company as having strong encouragement, co-operation and co-ordination from corporate headquarters. None of the participants viewed their company structure as stand-alone divisions with no co-ordination or co-operation provided by headquarters. The remaining nine companies were regarded as exhibiting a range of structures between these two extremes (see Figure 1).
As shown in Figure 2, the companies that exhibited strong corporate guidance, cooperation and coordination also had purchasing departments which were either centralized, devolved and controlled, or devolved and enabled.

The six companies which exhibited little central coordination and cooperation from headquarters, described their purchasing structures as one of the following: Centre Led Action Network (CLAN); a network of stand-alone autonomous units; a hybrid of the two devolved structures — "united but independent", devolved and enabled, or federal-like (see Figure 2 on the following page).

It was interesting to note that the company with strong encouragement, cooperation and coordination from corporate headquarters, was also the only company that had maintained a centralized purchasing structure.

Five of the ten companies said they did expect structural change to take place in the near future, but those which said no further major structural changes were planned did anticipate some level of minor change. These changes were foreseen in the area of role definition, which one participant felt would be affected by increasing levels of employee competency and educational qualification.

From the investigation of current purchasing and organizational structures, it became evident that a number of companies resemble the FOP concept, to varying degrees. Eight out of the ten participants felt that their purchasing structures matched the description of FOP in some way. Out of these eight, four identified a strong resemblance to the description. However, none of the companies considered themselves as federal. The characteristics common both to organizations and the FOP concept appear to have evolved over time, as the companies themselves have evolved, rather than as the result of a conscious strategy to develop a federal structure. The following characteristics were evident in a number of companies:

- Purchasing departments were found to be positioned in business units, reporting to heads of the business units.
- There were a number of companies that had centers of purchasing and supply taking a "passive" role, i.e. they worked on behalf of the units rather than controlling the units.
- Power, in terms of purchasing spend and budgetary responsibilities, resided at business unit level in a number of companies.

5.3 Involvement of purchasing in influencing corporate strategy

In response to a question relating to the level of involvement that the purchasing department had in influencing corporate strategy, eight out of the ten interviewees felt...
they had 'above average' influence over corporate strategy. This was indicated by allocating a score above 3 on a scale of 1 to 5.

![Purchasing Influence on Corporate Strategy](image)

**Figure 3. Purchasing influence on corporate strategy**

Within the ten companies interviewed, six of the heads of purchasing reported directly to a company board member. These six companies were included in the eight that felt they had considerable involvement in influencing corporate strategy. The anomalies arose in two situations. In the first, the purchasing structure was centralised. In the second, the organisation had no board of directors.

Four of the participants also felt that purchasing's influence on corporate strategy increased in line with growing professionalism of purchasing staff. These participants felt that by placing higher quality of purchasing staff in key positions led to these employees influencing decisions. Accordingly, training of staff was considered important in these firms.

### 5.4 Characteristics of FOP

Even though several federal characteristics were present in some of the purchasing departments, none exactly matched all five of Handy's principles. It is easier to understand why none of the companies was considered to be 'federal', by focusing on the differences from FOP rather than similarities. In other words, it is illuminating to analyse which characteristics are unique to the conceptual model of FOP and were not present in the companies involved in the study.

The underlying characteristic that separates the conceptual model of FOP from the companies' existing purchasing and supply structures could be broadly explained by the umbrella term 'culture'. A federal culture is unique in that subsidiarity exists and employees have dual identities: a corporate image exists as well as a local loyalty. Even though some companies had delegated responsibilities to the business units, in these situations there was usually some degree of control exercised by the centre. In two situations, the centres had been developed after the business units were set up. Here, the centres were clearly working for the units, which had the power to disband the centre if no added value or benefits were generated from it.

In the majority of situations, strategy was developed at the centre and not at purchasing unit level. In these situations there was a general reluctance to allow the purchasing units to formulate strategy because 'the centre knows best', or the units were not considered competent to carry out this role. One manager concluded that the centre was better positioned to consider the overall company benefits whereas the purchasing units' views were restricted, with priority given to local and not corporate benefits. Ideally, a truly federal system should initiate strategy at business unit level if it is felt that this is the best level to perform this task. The process of deciding at what level tasks are carried out should include all federal members. However, in most of the companies interviewed, this decision process appeared to be controlled by the centre, with the business units exercising little influence.

The FOP concept places greater emphasis on the importance of effective horizontal communication channels than on the traditional vertical links, in the form of a network of relationships. Federal purchasing units approach strategy formulation collaboratively, where value can be added to the organisation as a whole, and call upon the centre as and when required. Initially, a number of companies seemed to be similar to the conceptual model of FOP in this respect. However, they were later classified as not federal because there was little evidence of collaborative approaches across business unit boundaries. It is important to note, however, that these conclusions have been made based on research with senior managers situated at the centres of purchasing and supply structures. It is possible that the devolved units could be informally communicating horizontally, without the centre knowing.

A federal system uses consensus decision making, resulting in a democratic outcome, to ensure that all sectors views are represented. This did not appear to be widespread practice across the companies examined. While a number of companies did involve business units in decision making, generally the decision-making process was controlled or greatly influenced by the centre.

### 5.5 Advantages and disadvantages of FOP

Through the interviews it became clear that although participants had identified a number of advantages which FOP might provide, the purchasing strategists remained sceptical of applying such a complex system in practice. Many advantages and disadvantages identified by practitioners are common to a number of established purchasing and supply structures. However, a number may be seen to be unique to FOP:

- **FOP is unique in that it can be 'big and small' at the same time. In other words the purchasing units have a large critical mass collectively but maintain diversity at the smaller business unit level. This provides the potential to achieve synergistic advantages collaboratively, whilst maintaining flexibility within units. It is estimated that unit cost reductions of up to 10% are achievable as a result of purchasing synergy due to 'co-ordination of activities, exchange of information, and concentration of buying power' (Vizjak, 1994:30).**

- **FOP requires a balance of complex relationships between the purchasing units, as well as between the purchasing units and the central core. The federal system relies on these relationships for its existence, as break-away units could damage a federal system. One interviewee used the analogy of a house of cards to describe the importance of interrelationships.**

  "If one card is removed from a house of cards then the house collapses: the same is true of a federal system."
The FOP structure is 'reverse thrust', with the purchasing units providing the energy underpinning strategy formulation. Theoretically, strategy developed in this way should be more focused on the customer and external environmental conditions, because the people providing the information are better positioned to understand the markets and customer needs. This should provide the means to develop better purchasing strategy. The idea of subsidiarity and Handy's 'reverse thrust' were not felt practical by three of interviewees, because of reasons associated with the following issues:
- central 'loss of control';
- a base level of competency exhibited by employees in the business units;
- the centre being better positioned to consider the 'whole picture'.

A number of interviewees recognised that benefits could be gained by consensus decision making reflected in the democratic nature of FOP. However, a number were sceptical about the length of time required to reach a decision. The following view was aired:

"Building consensus is lengthy but once parties have bought in to the decision, rapid changes and benefits are found. In the end you gain long-term commitment and a decision that suits all, as needs are highlighted, noted, and acted upon."

Finally, it should be noted that the federal concept is not generally intended to lead to a rigid, static structure. It is more usually viewed in terms of a philosophy, dynamic in nature, so that as situations change, so should FOP. This dynamic nature is inherent in political federal ideology, which regards federalism as a process. The interrelationships may provide the means to maintain this characteristic, equipping companies with a mechanism to implement change, as and when required.

6. Emerging issues and themes
A diagrammatic representation of FOP is shown in Figure 4. What follows, below is a summary of the major issues which emerged from the discussions held with the purchasing strategists, combined with knowledge gained from the literature:

- Practitioners appeared to believe that FOP could only be implemented if the corporate structure was federal in nature;
- FOP has to be carefully implemented due to its complex network of carefully balanced relationships. The major issues to be considered during any kind of implementation of FOP are: power, control, culture, communication, and competency of employees;
- The structure of an organisation is considered as an enabler: corporate strategy driving structure, and structure enabling strategic thinking;
- FOP is not seen as a means of improving the status of purchasing within the organisation; the structure itself is not believed to be an issue. However, the quality of purchasing employees selected is considered critical for a complex strategy such as FOP to be successful;
- A number of potential advantages and barriers were associated with the FOP concept in relation to improvements in synergy, flexibility, customer focus, innovation, and control.

In addition to the above major issues, the following themes emerged from the interviews:

The results suggested a strong association between the reporting channels of heads of procurement and the level of influence that purchasing departments have on corporate strategy. The more direct the report to the company board, the greater the influence the purchasing function has on corporate strategy;

The role of purchasing has changed and will continue to change in the future. It was commonly felt by the purchasing strategists that in the current dynamic environment the structure of the purchasing department is considered an important ingredient in ensuring that the purchasing function is flexible and that it is able to meet changing demands and roles.

Purchasing is viewed by a number of strategists as becoming process driven and therefore requiring cross-functional group approaches. One participant felt that purchasing was undergoing a change from 'operational management' towards 'supply market management' - a move from 'trying to do purchasing better', to the development of corporate strategy to encompass management of the supply market.

This indicates the need for effective horizontal cross functional communication, which does not seem to be catered for in traditional structures.

FOP differs from the Centre Led Action Network (CLAN) concept in at least two ways. Firstly, it is not simply a purchasing structure, but rather an organisational culture, or philosophy. Secondly, in contrast to CLAN, the purchasing centre of FOP does not direct the energy to the units - instead, the purchasing units direct energy to the centre. This is Handy's "reverse thrust" in application. In fact, FOP could be considered as a Locally Led Action Network (LLAN). The FOP concept draws on the strengths of both the traditional centralised and decentralised purchasing structures, by uniquely organising the function through a network of relationships.

Some aspects of FOP were identified as being present in a number of existing purchasing structures covered in this pilot study. FOP is more than a structure, however, and one of the ways it is distinguished from other traditional structures, such as centralised, devolved, or network, is by its culture. Handy states that: "federalism is not so much a political structure of system as it is a way of life" (Handy, 1992:60).

It is our conclusion that culture is developed by the competence of the people employed; it is the way they think and act, which enables effective upward as well as horizontal communication. Other unique characteristics that were identified in FOP included: the balance of power and control; the relationships between the centre and business units and between individual business units; the idea that initiatives are generated at business unit level; and the dynamic nature of federalism, which is considered as a process rather than a static structure.

It may be argued that a truly federal system maintains all five principles of subsidiarity, interdependence, twin citizenship, separation of powers, and common law and language as identified by Handy. Even though a number of interviewees could identify certain characteristics of FOP within their own organisations, none was considered as being federal.
7. Reflections on research

In the purchasing and supply function there is potential to co-ordinate activities where synergy can be achieved and value can be added. This means taking advantage of the large critical mass of the collective units, whilst maintaining flexibility and diversity at business unit level. It is our belief that the FOP concept is able to support these requirements.

It has been accepted that functional structures encourage vertical systems concerned with optimising local activities. However, it is not certain that the result of optimising locally will lead to a global optimum, and it is because of this that vertical barriers should be broken and horizontal communication encouraged. This research project did not address how this may be achieved. However, we believe that by optimising locally will lead to a global optimum, and it is because of this that vertical concerns with optimising large critical mass of the collective units, whilst maintaining flexibility and diversity at business unit level.

As organisations become more complex they require organisational structures of greater complexity in order to co-ordinate and control people, systems, and decision processes. The purchasing and supply function is not isolated; it interacts with a number of other functions. It is therefore well positioned to consider the company as a whole.

References


Internal Markets' and the Purchasing Function
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Abstract
This paper identifies conceptual and theoretical issues with regard to the nature of 'internal markets' in both public and private sectors, with particular reference to developments within the United Kingdom. The current era is one in which changes in approaches with regard to organisational structures, policies and procedures, as well as managerial and leadership styles, have occurred in response to pressures to improve efficiency and effectiveness. In this context, the use of internal markets and the choice of intraorganisational exchanges between quasi-independent units are part of the portfolio of mechanisms for controlling and coordinating the flows of goods and services in supply chains. The paper adopts the view that it is apposite to assess the current state of relevant ideas and practices and to examine the implications for the development of the purchasing profession and for IPSERA itself.

Keywords: Internal strategy, contributions of purchasing to corporate strategy, the future of purchasing as a department, internal markets.

1. Introduction

1.1 The growing importance of internal markets

"My concern is to see further benefit from the reforms. Above all the focus must be on purchasing - shrewd, skilful, intelligent responsible purchasing."


Readers, who are unaware that the reforms, mentioned above, are to do with the National Health Service (N.H.S) in the United Kingdom, may be mistaken in believing that the purchasing process alluded to in the quotation is to be interpreted in the orthodox way and, therefore, seen to be concerned with sourcing supplies from external vendors. Such an interpretation, however, would not be correct. The reforms, however, are those detailed in "Working for Patients" (Department of Health, 1989) and brought about by the National Health Service and Community Care Act, 1990. Virginia Bottomley's comments, thus, applies to the "purchasing" role in contracting for health services from "providers" mainly within the National Health Service. In other words, it highlights the importance of the creation and use of "internal markets", and the need for Health Authorities and Fundholder General Practitioners act as purchasers within them. Total spend in the purchase of healthcare services is currently about £40 billion per year. The purchase of other welfare services by other parts of the public sector within the United Kingdom may be achieved also by the separation of "purchasers" or
complex, internal supply networks, which frequently take on a global shape and some of the key relevant issues relating to central government level, similar moves to devolve responsibility for the provision of services are reflected in the growth of contract management, as implemented via "service level agreements," in line with "Next Steps" policies. (See, for example, Greer, (1994).) The paper takes the view that the traditional purchasing profession, and its associated body of knowledge (and IPSE RA), has given full recognition to these developments, which are part of the general changes taking place with regard to the management and provision of public services. Attention has tended to be drawn, as far as the NHS is concerned, to the purchasing tasks related to the acquisition of support goods and services from outside suppliers, rather than the purchase of the main services for patients from internal providers. It may also be noted that, as Glennister and Le Grand (1995) point out, the use of "quasi-markets" or "market type mechanisms" is not peculiar to the United Kingdom, but also, can be found in other European countries.

Whilst only the public sector has been mentioned so far, it is appropriate to bring private sector organisations into the picture at this point. The use of what can be regarded as internal markets, involving trade between quasi-independent units (divisions) within the same overall firm or between subsidiary companies, has been covered by the topic labelled "intra-company" purchasing. In more recent times added emphasis has been given to the need for internal "micro-enterprises" to develop a keener customer focus in serving their internal purchaser units. The emergence of complex, internal supply networks, which frequently take on a global shape and stretch across national borders, is a further manifestation of the fact that coordination and control of supplies is being achieved, not only through large, hierarchical, bureaucratic structures, but also, through contractual mechanisms between separate units which possess a greater degree of autonomy. Thus, there now appears to be a growing convergence between the public and private sectors in the use of the practice of inter-unit exchanges within nominally the same organisation. It is recognised, of course, that some firms are reducing the scale of internal flows of goods and services as a result of sourcing strategies - processes of de-integration from an ownership standpoint.

A major implication of the developments which have been introduced in the previous paragraph is that there is a growing number of people becoming involved in the setting up, implementation and monitoring of such internal exchange arrangements. It, therefore, appears to be a field in which the academic world and professional bodies need to work closely with practitioners, as intermediaries. In increasing the level of understanding of the processes, skills and expertise involved in and in helping to disseminate findings through the usual avenues of teaching, consultancy and publications. There may be scope for the professional bodies to embark on a wider group of personnel than has been the case in the past. It is the purpose of this paper to open up the field for further discussion and to attempt to identify and explore some of the important relevant issues.

1.2 Issues to be raised

Within the confines of this paper, it will be possible only to identify in a brief manner some of the key relevant issues relating to "internal markets." It is hoped that this may provide a platform to start an ongoing debate, both within and outside the conference. The following is a list of the aspects to be covered in the remainder of the paper:

(a) The background to the organisational changes that are taking place in both public and private sectors.

It is useful to focus attention on the background to the organisational changes, in order to identify some of the pressures which are stimulating the search for new ways of coping with the eternal dilemma of finding an appropriate balance between "specialisation" (differentiation) and "coordination" (integration) of activities within and between organisations. An appreciation of this strategic context pinpoints the drivers influencing purchasing developments. In the case of the N.H.S., it can be made that the shape of its organisational structure continues to evolve, partly due to the need to adapt to the practical problems in trying to implement the reforms for the purchase of services imposed by central government. Private sector firms, likewise, continue to introduce changes, as attention is drawn to the need to improve efficiency and effectiveness in coordinating activities in national, regional and / or global intra-organisational networks. In addition, the hoped for benefits of the changes in both sectors can be given attention.

(b) The theoretical nature of "internal markets."

The topic of "internal markets" is not lacking with regard to customary problems of the attribution of different labels, different definitions, different contractual approaches and different patterns of behaviour. Other terms, such as "quasi-markets", "social markets", and "managed markets," are to be found, for instance. The main theoretical difficulties are similar to those associated with the choice of forms of control and coordination of the production of goods or services, as suggested by current debates based on "mindsets" which locate options between the extremes of "markets" and "hierarchies". Questions of choice between these two polar options of governance structures have not received much attention in the past within the context of economics. But, since, for example, Richardson's article (Richardson, 1972), the practical and theoretical possibilities of intermediate positions have provided a rich source for researchers and writers to explore. As far as purchasing and supply is concerned, the middle ground has been taken up by concern for "partnerships" between independent organisations. Partnerships are seen to have their own merits (and disadvantages?) in avoiding the deficiencies of both "markets" and "hierarchies."

Less attention has been given, however, to variations to the basic, unified hierarchical structure - variations which exist under the same umbrella of ownership, in the last analysis, but which are characterised by a degree of autonomy.

It will be argued in this paper that treating "intra-organisational exchanges" as a point, close to a pure hierarchy, on the continuum of possibilities between "markets" and "hierarchies" is not helpful, even though the paper's author is mindful of the fact that he made reference to such a scheme in a previous work (Saunders, 1994, p.221). Just as cooperative or collaborative approaches between independent organisations appear to offer ways of overcoming the shortcomings of short term, competitive trading practices in "markets", so experiences of trying to operate in a similar fashion in "internal markets" have demonstrated similar lessons. Arrangements may need to be embedded in longer term strategic perspectives and closer working relationships involving "partnership" characteristics may be necessary to achieve improved performance and sensible directions of development.

An alternative perspective of all the options for the coordination of the different stages of operations in supply chains is to perceive two parallel continuums, with one depicting the various options in relation to exchange links between independent organisations and another identifying the options with regard to linkages of intra-
organisational nature - from "internal markets" to "hierarchy," including "intra-organisational partnerships."

(c) Roles and skill requirements of "intra-organisational purchasers"

Consideration will be given to the role and skill requirements of those concerned with operating processes related to the establishment and implementation of supply arrangements. It will be maintained that there are few major differences in the skills and expertise needed to manage both competitive market processes and partnering arrangements on an intra-as opposed to inter-organisational basis.

2. Internal Markets and Background Developments

To begin with, attention will be directed towards the private sector.

2.1 Private sector pressures and changes

In order to appreciate and understand issues with regard to exchange arrangements of an intra-organisational kind, it will be first necessary to identify the general problems which have confronted companies and the approaches for their resolution which they have adopted. Also, the policies which have been adopted with regard to external suppliers, as well as the difficulties associated with their implementation, help to throw light on the possibilities and problems in coping with intra-organisational arrangements, which lie outside the realm of control by immediate unified hierarchical management structures.

Only a brief sketch of the circumstances which have contributed to major changes in the way in which firms are managed, in Europe and North America in particular, will need to be provided here. On the one hand, the nature of competition in the supply of goods and services has intensified as a result of innovations, introduced especially by Japanese firms in the first instance. Subsequently, both the firms in the "tiger" nations and others in Europe and North America have responded by a combination of emulation and adaptation, so adding further fuel to the pace of developments. The need to confront growing regional, if not global, competition is typical of the majority of firms. At the same time, changes in the character of customer demand, on the other hand, partly affected by changes in the opportunities on the supply side, have had an impact on firms as well. Firms have had to become more responsive to calls for customized products, greater product reliability, shorter leadtimes, more flexible service and a faster rate of new product introductions - all at lower cost. The result of such pressures has been an apparently endless stream of management initiatives to improve both capabilities and performance in pursuit of a "competitive edge" or, to put it another way, to achieve "world class standards."

Managers have been bombarded with advice as to how to become, for example, "lean," "agile," "market driven" or "high performance," by following programmes encompassed by such acronyms as JIT, TQM and BPR, all of which comprise, not only of lists of methods and techniques, but, also, of new or revised managerial philosophies. Changes, of either a "continuous improvement" nature or of a more radical "breakthrough" or "transformative" kind, have had their effect through the alteration of organisational landscapes, modus operandi, job structures and skill requirements of firms. The desire to manage, often "downsized" or "rightsized," businesses via less rigid and flatter hierarchies, has also contributed to closer working relationships between individuals. People interface with each other across increasingly blurred functional and corporate boundaries. The view has gained ground that strategies, based on large, vertically integrated, firms, are less likely to be viable,

because of the difficulties of being able to build up adequate capabilities and resources to be efficient and to have and sustain competitive advantage at each stage of operation in the supply chains under their direct ownership. However, patterns with regard to the scope of ownership have changed, firms have found new ways to extend influence and perhaps to gain "de facto" control, by developing joint planning approaches and long-term collaborative arrangements. The expanding role of "Purchasing," helping to participate in the formation and management of production networks, or "extended enterprises" consisting of independent organisations, has occupied the central position in the development of the field in recent years.

When managing change programmes, however, leaders have had to try and cope with conflicting pressures. Stock market influences appear to impose requirements for short-term results, especially in a recession, but firms, in responding to them, often through more traditional adversarial approaches, may be forced to jeopardise the success of more fundamental reforms, which frequently require cooperative efforts over a longer period. It can be argued that this is why many improvement initiatives lead to failure and disillusionment, followed by management's search for the next fashionable idea, in the hope that it will be an instant panacea. Whether lack of success is due to a weakness in the idea being followed, or, to a poorly managed and halfhearted implementation programme may not be clear, although it is tempting for managers involved in proceedings to point to the former cause. It would seem that the dilemma of balancing short-term versus long-term interests might have an impact on the behaviour of those involved in the adoption and operation of partnering approaches between independent buyer and vendor companies. The question arises as to how far the pursuit of "mutual" goals is a practical possibility for independent partner companies.

2.1.3 Intra-company purchasing

It it against the background of these more general developments of companies that attention can be brought to bear on intra-organisational purchasing practices. Different policies may be applied, as pointed out in textbooks, such as that by R. Bailey, Farmer, Jessop and Jones, (1994, p. 138-140), which gives examples from some purchasing manuals. For the most part, discussions of policies can be related to three issues, namely, various sourcing approaches leading to contracts for internal transactions, pricing mechanisms and problems with the performance of the supplier unit.

Sourcing approaches

Amongst the possible approaches to be used by the purchaser are the following:

(a) Use of the internal supplier may be mandatory - keep the business in the company and retain the cash flow.

(b) Sourcing competitively, by comparing the in-house supplier with external possibilities - keep the supplier in line with conditions in the external market. Outsourcing is retained as a possibility.

(c) Competition may exist between more than one internal unit - permitting the purchaser to make the final selection

Pricing mechanisms

Generally, one of the following approaches may be adopted:

(a) A cost-plus approach as the basis of determining the transfer price of the in-house supplier.

(b) The use of competitive bids or quotations from selected potential suppliers, both in-house and external, to establish the best offer.
(c) The transfer price may be agreed via negotiating processes.

It may be noted, however, that the transfer price issue may be more complicated in the case of the movement of goods between different countries, as the problem of integration within larger firms. Different tax regimes and duty levies in different countries have to be borne in mind to determine appropriate price levels.

Problems for the internal purchaser

Poor performance by the supplier unit, in terms of quality, delivery, and pricing, may have to be suffered by the purchaser, though clearly the policies mentioned in the two previous sections lead to different power relationships. The greater the "de facto" power of the supplier unit, the greater is the risk of the customer unit subsidising the inefficiencies of the supplier unit, and, thereby, suffering a loss in its own competitive capability.

For the most part, it might be said that the policies are mostly concerned with arms length related relationships, rather than with long term collaborative dealings. However, newer approaches have been emerging, partly as a result of the development of information technology.

2.1.2 More recent developments

Whilst most of the early work was concerned about the development and application of computer systems, and the consequences of multi-site integration within the firm, some progress is being made in building systems which model internal networks, with the aim of improving control, not only of the capacity of individual manufacturing units, but also, of the logistics of inter-site movements. Decisions to allocate orders to particular locations may involve choosing among alternatives, and they need to take into account cost differences. Such models can also be used for simulation purposes in the analysis of short term operational requirements, but also, of investigations of capital investment opportunities. Questions can be examined in relation to the need to expand the network and to the problem of where extra resources should be located. Such design approaches for supply chain management also demonstrate the need for multi-functional inputs. They can include both external and internal network nodes.

(See, for example, H. L. Lee and C. Billington, 1995.)

This wider, systemic view transcends both functional and organisational boundaries and opens up opportunities to optimise the development and operation of the network as a whole, with the potential to increase both efficiency and effectiveness in serving end customers. As an approach, it is far removed from the simple, yet probably less effective practices, of more conventional perspectives of "internal markets."

2.2 Public sector pressures and changes

Whilst the reasons for changes in public sector organisations in the United Kingdom might be different, the impact of such changes has not been so different to those in the private sector. The pursuit of goals, such as improved efficiency and effectiveness - greater value for money - in the provision of services, has led to major organisational changes and new management policies and approaches. Public sectors in other countries have also been involved in similar attention, though the same pattern of changes has not always been adopted. Nevertheless, it can be argued that the gulf between public sector and private sector practices, which used to be more apparent, has now been narrowed considerably. As already indicated in the Introduction, methods for the organisation and management of the provision of services have undergone radical changes. Before commencing discussion of these, however, appreciation of them is enhanced by understanding the reasons for their introduction.

2.2.1 Concerns about the public sector

Within the United Kingdom, the continuous rule for seventeen years of the present Conservative Party has allowed it to put into effect an extensive programme of reforms. Whether these can be characterised as a detailed and coherent strategy from the beginning or, whether reforms were introduced in a piecemeal basis is debatable. In hindsight, it is possible to detect the main characteristics which seem to shape the overall programme and which appear to reflect a degree of coherence in what some might describe as an "emergent" strategy. These will be identified shortly, but only after indicating some of the motivating "drivers" for change.

2.2.2 Drivers for change

It may be helpful to simply indicate some of the drivers for change in this paper, but, clearly, it is both impossible and unnecessary to give full justice to what are, after all, both complex and controversial issues. The following points can be included:

(a) There has been a continuing concern for both the absolute and relative size of expenditure by the public sector. Reservations about the size of the "non-market" sector and the supposed burden this imposes on the private sector, (see, for example, Bacon and Eltis, 1978), have encouraged support for policies which give both greater control and curtailment of public spending. Greater control of expenditure is seen to offer prospects of ensuring that better value for money can be obtained. Curtailment of total expenditure is deemed, by supporters of the type of views advocated by Eltis and Bacon, to be necessary to prevent capital starvation in the private sector and to call a halt to further increases. In the light of an expected growth in demand for services, arising especially as a result of the demographic change in the form of an increase in the proportion of elderly, retired people in the population, there is a fear that rises in public sector expenditure will become unbearable. The reforms which affect purchasing practices, however, arise more in relation to the way in which resources are spent, though increases in efficiency in this regard may reduce or slow down the need for higher total expenditure.

(b) In addition to the economic arguments that have been mentioned, ideological support, which demonstrates a preference for private sector firms and an encouragement for "enterprise" capitalism and which is strongly rooted in Tory philosophy, plays a part in promoting the reforms. This point requires no further comment in this paper. More as an aside, though, it could be noted that, in so far as this philosophy fosters support for small businesses as sources of innovation and as creators of new job opportunities, some doubt is now being brought to bear on the reality of such a perspective. Work in America, by Harrison (1994), puts forward the view that many small firms only succeed as a result of being enveloped into production networks, in which larger firms act as the main architects, through collaborative purchasing approaches.

(c) There has also been concern within government that the quality of the services received by their consumers is often deficient and left room for improvement. Variations in the level of services in different parts of the country were also seen to be a weakness.
2.2.3 The nature of the changes

The changes introduced into the public sector might be said to represent the application of a business culture and a "new public management" approach, so that a more traditional, paternalistic and bureaucratic approach towards public administration has been diluted considerably, if not totally eradicated. In place of large, centralised hierarchical planning structures, decisions regarding technical and productive efficiency are intended to be taken by providers in response to incentive signals from the purchasers in the marketplace. The scope of the public sector has been cut back as well. The main planks or themes in the reform programme, most of which have a bearing on purchasing issues, are as follows:

(a) Privatisation - selling assets to the private sector
(b) Competition - in purchasing from either internal or external markets, or from both considered simultaneously, via the use of contracting processes.
(c) Management - the application of enterprise in seeking alternative choices and generating innovatory possibilities.
(d) Delegation - devolution of more authority and responsibility to smaller units
(e) Service quality - the enhancement of the quality of service provision, and to move away from a producer oriented perspective, influenced by technical specialists, to standards designed to meet customer/consumer requirements.
(f) Curtailment of trade union powers - to give greater recognition of the rights of individual employees and to allow more freedom for the establishment of local terms and conditions.

2.2.4 Purchasing and internal markets

A major manifestation of the application of the themes identified in the previous section has been the introduction of quasi-independent providers or even independent providers of services under contract to other parts of the public sector organisations, where the latter take on a "primarily enabling" role, on the purchasing side. Thus, there is a clearer separation of the "purchaser" / "client" function from the "provider" / "contractor" role, compared to processes embodied within a large monolithic, hierarchical structure.

Reforms for the provision of primary and secondary health care and community care services represent the largest, and, perhaps, most controversial example of the introduction of purchaser and provider activities. One difficulty, in accounting for developments in this field, is that there is still instability in the current position. The organisational map of the N.H.S. continues to evolve as changes in the status and structure of the constituent elements are still in process. The balance of importance between district health authorities, on the one hand, and general practice fundholders, on the other hand, as purchasers, has moved in favour of the latter. This point, added to that of mergers between different health authorities, and the future demise of regional health authorities has led to changes in the nature of the purchaser role. Indeed, as a result, separate purchasing roles are beginning to emerge. The placing of contracts for the provision of specific services, commercial work, is one type of activity, and longer term planning and commissioning of services linked to a strategic point of view represents another. The first role is being adopted mainly by practitioner fundholders and the latter role by health authorities or emerging "commissioning" authorities. On the provider side, too, an evolutionary picture reveals the the growth to a position of almost total dominance of the "Trusts", semi-autonomous bodies, possessing their own boards and management teams, as the number of directly managed units within health authorities has diminished.

It must be seen, therefore, that any discussion of the nature of "internal markets" in the N.H.S. has to recognise both the current fluidity of the situation and also the fact that there is variety in the adaptations which have been made in different parts of the country in response to carrying out the initial reforms and subsequent guidelines which have emerged since 1990.

It can be pointed out that on the traditional purchasing side of the N.H.S., a quasi-independent, N.H.S. Supplies Authority has been set up, to coordinate supplies and exploit the advantages of centralisation. However, the Trusts can decide whether they wish to purchase such a supply service and will enter into a service contract with the Authority, as provider, if they so wish. (The traditional purchasing work is here defined as that which is concerned with the acquisition of support goods and services consumed by providers in the provision of their services to patients in accordance with the contracts let by purchasers on behalf of such patients.)

Other examples of a clearer bifurcation of roles between purchaser and provider are in to be found in the acquisition of community care services, as well as in local authority and central government. In the case of local government, internal service organisations are more increasingly likely to have to compete with external sources, as compulsory competitive tendering are extended to cover a wider range of services than those identified in the 1980s. "Next Steps" agencies in central government, on the other hand, are likely to enter into service agreements without being exposed to outside forces. The common feature here, however, is that contracts or service agreements are used to specify service requirements and as a basis for monitoring standards of performance.

3. Theoretical Aspects of Internal Markets'

It can be discerned from previous comments that there are variations in the way that internal exchanges of goods or services between quasi-independent organisations are managed. References to the the concepts of markets and competition conjure up certain images of how these exchanges are or should be controlled. Such constructions also imply thoughts about the value and performance outcomes of market and competitive approaches. It might be said that advocates of the reforms are predisposed to the belief that the signals, especially with regard to prices, which are generated by markets, create more effective incentives for providers to improve performance than those likely to arise in administrative bureaucracies.

The following quotation is indicative of views in relation to the public sector:

"Some services will always be provided in the public sector...Competition is as important for such services which could be provided by either the private sector or the public sector...Managers in central and local government and the NHS have to account for their performance against financial and quality targets. This responsibility requires them to look for the best deal for the users of the services, whether the task is done in-house or brought in from outside." (HM Treasury, 1991, and as included in Ovretveit, 1995, p.24.)

The nature of internal markets has, therefore, been the subject of debate, both amongst practitioners and amongst academics and authors, as illustrated by the following:

Ferlie, Cairncross and Pettigrew, 1993
Glenister and Le Grand, 1995
Le Grand and Bartlett, 1993
Ovretveit, 1995

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Eindhoven University of Technology
The Netherlands
A starting point for the analysis of internal markets seems to lie with the move from control via management hierarchy to control via markets - from the "visible hand" to the "invisible" hand. However, it will be seen that opportunities for "handshaking" and the direction of discussions comparing the ideas with regard to exchanges with legally independent vendors and a recognition of the drawbacks of spot purchases in atomistic markets. To begin with, attention can be focused on economic models of markets, although, once again, only a brief outline of some of the main strands of thinking can be covered here.

3.1 Economic models and competitive markets
The extent to which formal market theories have influenced the thinking of reformers is, of course, unclear. Nevertheless, ideas about the structure of markets, arising from within both classical and neo-classical traditions, as well as from the structure - conduct - performance school of industrial economists, have helped to suggest that competition between rival suppliers will produce lower prices and better deals. To some extent, there is a discrepancy between the kind of competition reflected in models of perfect competition and the more active competition in the minds of more pragmatically minded business people. Competitive behaviour within the perspective of the latter is closer to the "imperfect" models of mainstream economics.

Several suggested weaknesses in the relevance and validity of formal economics models can be mentioned. Most critics draw attention to the gulf between the assumptions of the models and the conditions to be found in reality. The apparent "rationality" of decisionmakers having complete knowledge of all alternatives and an ability to evaluate them in accordance with clearcut and uncontroversial criteria, does not appear to be applicable to circumstances which arise in businesses. For example, when the NHS' internal market reforms were introduced, there was a severe shortage of information about the costs of specific healthcare procedures in treating patients within the provider units. Even more serious, perhaps, was the lack of any commonly agreed basis on which to classify "products." These problems made contracting processes for specific services difficult to introduce for both purchasers and providers - hence a heavy reliance on "block contracts." In addition, "purchasers" had no clear basis on which to assess the healthcare requirements of the populations for which they had been delegated responsibility to acquire services for. Conditions of great uncertainty colour the circumstances in which operations have to be conducted.

A further difficulty when trying to apply market models arises in relation to the identification of boundaries to the internal markets. Not only are there problems of "product" definitions, there are also difficulties in perceiving the geographical limits within which potential "providers" and patients can be located. How far, in other words, might patients (and their visitors) be expected to travel for treatment? There may be differences with regard to, say, emergency versus elective treatments. The difficulties have been compounded by the fact that the boundaries of the Health Authorities and the dispersion of provider units, at the outset, did not necessarily match the distribution of patient populations. The extent to which realistic alternative providers exist, for purchasers to choose from, varies in different parts of the country. Organisational adjustments have partly been influenced by attempts to overcome these problems, but political pressures have also played a part in the outcomes.

The last comment allows the point to be made that economic models do not reflect the full range of behavioural variables and the social nature of interactions between representatives of both purchase and provider bodies cannot be accommodated. It may be argued that the choices of decisionmakers are not determined completely by either formal or informal networks and that there should be scope for the inclusion of factors, such as individual ingenuity and interpersonal influences.

Another possible flaw in many market models is the concern for equilibrium approaches and the difficulties in accommodating innovation and change, conditions which have become more widespread in recent years. The static world of standard, homogeneous products, produced by suppliers using the same methods, seems again to be far removed from the experiences of practitioners. Problems of managing change and coping with economies of scale and scope, require long term perspectives and strategic investments. "Spot trading" in simple products, except perhaps in the marginal cases of "extra contract referrals," seems to be an inappropriate mechanism for both providers and purchasers in internal markets. Longer term contracts and closer collaboration between purchasers and providers offer themselves as practices to overcome the deficiencies of internal markets, just as partnering processes, it is advocated, can improve the effectiveness and efficiency of supply arrangements between independent buyers and vendors. Whether "transaction cost economics" is an adequate extension of traditional economics approaches is debatable. It can be argued that it is still too close to the assumptions of the classical and neo-classical models and that it does not encompass fully the interactive nature of the partnering processes.

3.2 Collaborative approaches
Forms of collaboration, as a basis on which to improve the coordination of the supply of goods and services, can be developed in a number of directions to overcome the weaknesses of simpler market trading practices. On the one hand, purchasers and providers can work more closely together to improve the basis for contracting and to develop longer term, strategic views of requirements to more closely match the emerging needs of client populations. Developments with regard to improvements in the quality of services, closer cost control and the management of capacity can be fostered by closer interactions and better understanding of situations.

Cooperation between different purchasers may also provide closer coordination of the acquisition of the required goods and services. Within the NHS, collaboration between different purchasers (health authorities and general practitioners) may help to coordinate the development and planning of both primary and secondary care services. Similarly, cooperation can improve the provision of total care plans for patients which require services from different providers. Lastly, a more holistic perspective can foster the development of better health amongst the population and not just better treatment of those who need care treatments. In other words, promotions for better health can give an emphasis to prevention of ill health in the first place. The pursuit of the overall goal of the health of the nation and the increase in the value for money of total expenditure requires more than just more efficient hospitals or community services.

3.3 The purchasing portfolio
The conclusion of this section is that the purchase and provision of services which require arrangements between quasi-independent organisations cannot be managed only through simple internal markets. Within the purchasing portfolio of approaches is a range of possibilities, as indicated by the following:

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Peck and Spurgeon, 1993
Ranade, 1995
Tilley, 1993

University of Technology
Eindhoven University of Technology
The Netherlands
shorter term contract management activities. In addition to these can be covered by the following headings:–

- Technical knowledge - concerning specification of the products and services to
- Business and commercial knowledge - to understand issues with regard to the intermediary between the customer and the provider - similar to purchasers

4. Knowledge and Skills

4.1 Roles

If the conclusion of the previous section, regarding the purchasing portfolio for intraorganisational exchanges, is accepted, then the range of skills and knowledge required by practitioners will bear a resemblance to those found useful in applying progressive, pro-active purchasing strategies and tactics in relation to bought-out supplies. The distinction between public sector and private sector contexts for the location of such purchasing activities is less significant nowadays. Roles to be filled vary from the higher level strategic planning to cover future requirements to the shorter term contract management activities. In addition to these purchasing competences, an ability to understand the processes used by providers are important. In addition, however, it is equally vital that the needs of customers can be accurately and sensitively determined. Such a role requires the ability to act as a “broker,” as an intermediary between the customer and the provider - similar to purchasers in retailing firms, who need to be close to marketing and merchandising operations.

4.2 Knowledge and skill requirements

Briefly, it might be said that competency in the field under discussion in the paper can be covered by the following headings:

(a) Technical knowledge - concerning specification of the products and services to ensure the needs of customers are met, together with comprehension of the technology of provider processes to manage quality, delivery and cost and an ability to collaborate in the development of innovations to improve performance and to introduce new possibilities.

(b) Business and commercial knowledge - to understand issues with regard to the management of provider processes and to undertake the tasks involved in managing relationships with both providers and customers and in the administration of contracting processes.

(c) Interpersonal skills - in order to interact with all the relevant parties, social skills with regard to leadership, communication, negotiation and group working need to be used, especially in managing relationships across functional and authority boundaries.

4.3 Staff development

Unless competence is established on the “purchaser” side, power and influence in the formation of agreements and initiative in the shaping of future developments may well fall into the hands of the providers, with the possible loss in the level and quality of service for the customers/consumers. Staffing policies, with regard to recruitment, career development and training, as well as the development of organisational structures and methods, are crucial to the formation of effective “voices” on behalf of the recipients of the services which are contracted for.

As far as public sector organisations in the United Kingdom are concerned, many of the newer purchasing roles with regard to “internal markets” are being developed and staffed by people outside the “normal” purchasing field. It seems an appropriate time to establish links between the new and the older spheres of activity. From the point of view of the delegates at this IPSERA Conference it might be possible to find opportunities to become involved in the usual support activities of research, teaching and training.

5. Conclusion

The current era is one of transition for both public and private sector organisations. How far changes have yet to go with regard to ideas about how to manage affairs in a changing world is hard to estimate, and only in the years to come will future historians be able to evaluate the full extent of them. “New orthodoxies” have not yet solidified, but old established mindsets are seen to have less solid foundations. This paper has attempted to capture some of the characteristics of an evolving picture with regard to the topic of internal markets, though even such a label may not be suitable to embrace some of the processes out of which exchange arrangements can emerge. The nature of the paper has been exploratory and has only touched on some of the issues. The intention has been to raise questions and to identify issues that need to be opened up in more detail.

References


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 spot contracts Long Term Contracts Partnering

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EDI in Purchasing

Interpersonal and inter-functional cooperation
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Abstract

We report the preliminary results of an investigation of ten Times 1000 companies using EDI in the purchasing function, focussing solely on organisations which have implemented EDI for two or more years. We conclude on the necessity of further restructuring work roles and tasks at the levels of the individual and department/function for operational and strategic benefits of EDI technology to be realised.

Keywords: Electronic Data Interchange, Purchasing, Cooperation, Interpersonal, Interfunctional, Power

1. EDI: operational and strategic benefits

Electronic Data Interchange (EDI) is an inter-organisational system (Kaufmann, 1966; Venkatraman, 1991) which has been used to improve commercial relationships both upstream and downstream in the supply chain, for example, car manufacturers have used EDI to better manage and integrate with their suppliers (Reekers and Smithson, 1994; Webster, 1995) and wholesalers have implemented EDI as a first mover advantage, in anticipation of moves by manufacturers (O'Callaghan, 1995).

Andersen and Krcmar's (1995) case studies of EDI in European organisations report the benefits of EDI include reduced document handling, improved business relationships and better service to customers. Two major strategic reasons for introducing EDI they found are to improve competitiveness and reduce lead times.

The overall gain obtained from EDI implementation according to the research has frequently fallen short of the technology's capability. Reekers (1994) concludes his empirical research produces scant evidence companies link EDI to their internal business processes neither are they integrating EDI with their corporate strategy. He identifies the variety of EDI standards as a major obstacle to achieving higher level strategic benefits. The plethora of EDI standards and its negative influence on the wider diffusion of EDI has been explained by Webster (1995) as an understandable political outcome of competition between organisations. Case study research by Damsgaard and Lyytinen (1994, 1995) of EDI diffusion identifies competition between organisations as conditions under which uptake of EDI can occur ranging from patterns of 'direct pushing and execution of power, over indirect hooking in of customers to win-win situations of mutual benefits.' Their analysis of EDI diffusion is at the organisational, industry and environmental levels and by comparing the role and influence of the state in Hong Kong and Singapore for stimulating use of EDI, they conclude in favour of the coordinating influence of proactive state intervention rather than non-interventionist policies.

Consistent with Reekers' research, Andersen and Krcmar's (1995) case studies on EDI conclude that operational benefits have in general been more frequently
realised than strategic benefits. The authors propose EDI has an influence on individuals' work practices in most companies, impacts on departments in about half of cases and on the organisation in a third of cases.

2. EDI in purchasing

The results of a US survey study of purchasing executives conducted by the US National Association of Purchasing Management (1994) found respondents approved of those control practices that enhance their own power and disliked those which constrained their freedom. Their preference was for structure, clarity of roles and a clear chain of command, and decentralisation of the procurement function was seen as undesirable.

Only a minority of companies using EDI have obtained improved customer loyalty or increased sales directly as a benefit of the technology and most major benefits after the early implementation have been in improving internal operations and external communications. The evidence of strategic and operational benefit gained from the implementation of EDI in purchasing, however, can be substantial. Ramon O'Callaghan's case study of Alcatel Bell (1995) found strategic and operational benefits were achieved in the company by the dramatic improvements in its European procurement function. This has had business payoff enabling the company to be more flexible and meet customer needs with shorter lead times. Alcatel Bell's procurement function has spread across different countries and found that the centralisation brought about by EDI has increased its bargaining power with suppliers and reduced its purchasing costs. The purchasing department has been reduced in manpower from 12 persons in 1986 to only 3 in 1992.

"Job content had also changed substantially. Previously, there had been larger variations in workload, more repetitive work and less control of own work situation. Today the employees can concentrate much more on problem solving. Furthermore the new position of an EDI administrator had been created." (Andersen and Krcmar, 1995, p.313)

3. Inter-personal and inter-functional cooperation under EDI

Our research acknowledges the constraints and opportunities created by the wider political context of EDI and focuses on the potentially more tractable issues of management and organisation within companies which have been using EDI in purchasing. It aims to assess to what extent the strategic and operational benefits obtainable from using EDI have been consistently realised because companies aren't reorganising work radically enough either for individuals or between departments/functions.

We report the results of a pilot survey and interview study on the implementation of EDI in purchasing to understand how far long-term use (two years or more) of EDI technology is concurrent with intra-organisational change at the first two - individual and department - of the three levels described by Andersen and Krcmar (1995). Individuals' work practices (work tasks and roles) and their interpersonal relationships are investigated, particularly, the distribution of power between individuals and departments. Previous research has found that introduction of new technology can be used as an occasion for altering work roles, tasks and in the longer term, the distribution of power within the organisation (Barley, 1986; Stamper, 1987; Finnington, 1992).

Our exploratory survey attempts to replicate the 1994 US study on a small sample of UK companies which have implemented EDI for two or more years. The survey items required respondents to rate statements on a five point Likert scale indicating their agreement or disagreement. The replication study is contained in section one of the questionnaire and section two includes seven items on sources of interpersonal power drawn from the management literature (Handy, 1993; Guirdham, 1992).

4. Sample and Method

In early 1995, we circulated a survey to directors or managers of companies that had introduced EDI as a means of trading or exchanging information with customers and suppliers. We subsequently eliminated returns from companies that had implemented EDI less than two years ago on the grounds that they had as yet insufficient time to experience its long-term benefits and influence on individuals and departments/functions. There were eleven participating organisations in the study, ten from the TIMES 1000. The companies in the sample were from a range of industries: Energy and Water (1); Minerals and Chemicals (3); Vehicles (3); other manufacturing (4).

Three research questions are investigated, the first two by exploratory survey and all three by interview:

RQ 1: Individuals in the purchasing function favour work methods and organisation which increase their power (self-seeking behaviour)

RQ 2: Implementation of EDI changes individuals' work tasks and interpersonal interaction with employees, suppliers, customers and other stakeholders (by reducing routine administration and increasing opportunity for more meaningful interpersonal contact)

RQ 3: Implementation of EDI provides occasion for restructuring work relationships and roles altering the distribution of power within the organisation.

5. Survey results

A summary of the results of the survey is presented in the appendix to this paper. The sample is small and the survey results should be interpreted by the reader as descriptive findings which although generalisable to the purchasing context further research will have to be conducted in the future on a larger sample. The main results were that EDI improves purchasing executives sources of power and reduces routine administrative workloads providing opportunity for more meaningful interpersonal contact inside and outside the organisation.

Research question one:
Respondents agreed that EDI gives purchasing executives improved: ability to apply sanctions; ability to give valued resources (e.g. budgets, contracts) and access to inside information.

Research question two:
Respondents agreed that EDI changes individuals' work tasks and interpersonal interaction with employees, customers and other stakeholders (by reducing routine administration and increasing opportunity for more meaningful interpersonal contact)
In section one, the response to the first five questions (1-5) on management structure and control show respondents did not feel strongly about the influence of EDI except for being in agreement that it has a tendency to “encourage people to put everything down in writing.” The next five questions (6-10) on internal cooperation and entrepreneurialism show that respondents felt EDI does not render employees hidebound by rank nor make them afraid to take risks nor take a lot of time to get things done, however, they did not feel strongly either way about the role of the technology in stimulating people to do more for the internal customer nor did they feel it had much influence on preventing individuals from acting territorially (“protect their turf”). The following five statements (11-15) on empowerment and participative management showed that respondents felt EDI does “enable people to strive to increase value to customers”, but that this surprisingly was not coupled with rapid response or management approach. The statements on people’s pride in quick action, reliance on self-directed teams and leadership were rated in the mid-point on the scale.

We were unsurprised by their disagreement with the statement that EDI “places great reliance on oral communication”.

The response to the last three questions (16-18) on work atmosphere (innovation, creativity, cooperation) was interesting with respondents saying that EDI encourages new ways of working and gets functions to cooperate to do the job better. We need to be cautious when interpreting the last statement (encourage functions to cooperate to do the job better”) because this statement was responded to more positively than statements eight and ten which were on the same topic and both given mid-point ratings.

The seven questions on sources of interpersonal power revealed that purchasing executives found EDI improved their ability to apply sanctions, to give valued resources and provide access to inside information. EDI was not felt to influence status and formal position directly, nor improve experience and knowledge nor access to a wider network of people. It was felt that EDI does not influence personal relationships.

The results of our UK survey are similar to the US study in that EDI does not limit authority to rank, does not make people afraid to take risks, is not too time consuming, enables people to strive to increase value to customers and encourages people to try new ways of working. EDI also enables functions to cooperate to do the job better although technology and procedures cannot themselves alone stimulate people to do more for the internal customer nor prevent people from acting territorially. Here motivation to do more still must come from the company culture and management.

6. Interview results

Comminging in December 1995, we are interviewing the same survey respondents to ascertain in more detail the influence of EDI technology within their organisation. We are conducting, on the views and opinions of three stakeholders: purchasing managers and where possible their managing director and managing directors of key supplier firms. This will enable us to obtain information from these perspectives, primarily, the employees working within purchasing and supplemented by people with overall management responsibility internally and externally.

The interviews are ongoing and are aiming to the time of writing and some factual details have been altered in the quotations to maintain the confidentiality of the participating companies.

Purchasing executives are using EDI to increase their power inside the organisation by implementing system developments in ways that cross over into the activities of other functions, for example, accounts. They are most proactive about extensions to the system which increase their involvement and responsibility both internal and external to the organisation. The EDI system can be used to raise the profile of purchasing amongst other groups in the organisation, for example, drives to standardise purchasing arrangements amongst employees such as engineers who may not traditionally have always used purchasing to obtain materials. The EDI system frees up purchasing executives time by reducing their administrative workload thus giving them more time to concentrate on other activities.

6.1 RQ1: Individuals in the purchasing function favour work methods and organisation which increase their power (self-seeking behaviour)

Some of the most dramatic examples of the purchasing executive: increasing power actually had little to do directly with the use of EDI technology and centered more on the ability to gain influence over other employees by quickly resolving specific problems they had with external suppliers. Once the improved speed and efficiency of the EDI system has been achieved it establishes new norms and expectations within the organisation which may prompt reconsideration of forecasting and master scheduling and alter standard approaches to lead times and buffer stock levels. So, to increase the power and influence of the function the purchasing executive has to seek out new improvements over and above new norms. In our study, the reported attempts by the purchasing executive to increase the function’s power and influence by better serving the internal customer seemed to be of benefit to the organisation although this sometimes crossed with the decision making autonomy traditionally accorded to other functions.

I know from a personal point of view, that some of the older engineers were set in, when I first started with the company, sure and want to have seen products by now come in. Because they were on allocations from the manufacturer and we weren’t high on the list. And the comment that was made at one time was well we won’t be able to get them for another three years. I actually got them delivered the next day.

(purchasing manager)

6.2 RQ2: Implementation of EDI changes individuals’ work tasks and interpersonal interaction with employees, suppliers, customers and other stakeholders (by reducing routine administration and increasing opportunity for more meaningful interpersonal contact)

The extent EDI reduces administrative workload depends on how extensively the tasks are automated ranging from forecasting and ordering to receiving goods and payment and on the efficiency and quality of the system. One purchasing manager found half a day every two weeks was saved simply by reductions in paperwork for ordering and considerably more time can be saved at the routine clerical level when document administration systems for dispatch, invoicing and payment are streamlined.

As has been reported elsewhere, interviewers reported suppliers could be reluctant to use EDI but also the managing directors of supplier firms who how implemented EDI similarly recounted having experienced reluctance from other customers or suppliers. The main reasons for resistance to EDI were on competitive grounds and the extent of its usage in the industry, for example, EDI is used more often by semiconductor component supplier firms than in other sectors of the electronics industry.
The biggest problem I think occurred was actually encouraging suppliers to go into the EDI systems. One of our suppliers, in its sales literature actually puts out that it's been doing EDI. And they were probably the last company to go on. ... But when it came down to it, dare I say it in here, it was actually a threat that made them go in the end. "You go on to EDI - cause we deal with a hundred line items with you, every 2 weeks or we will change to another supplier." ... (purchasing manager)

6.3 RQ3: Implementation of EDI provides occasion for restructuring work relationships and roles altering the distribution of power within the organisation.

The implementation of EDI places greater onus on planning particularly accurate forecasting so that suppliers don't find themselves carrying unnecessary stock or unable to supply goods. In so far as planning and coordination is the responsibility of purchasing, the distribution of power can move in their favour. We encountered some evidence of purchasing being more proactive than other functions in extending EDI applications.

'And nobody wanted to use EDI, and it's been an unbelievably uphill struggle for Jack to get the resources to go to EDI. ... Before, everybody said, "Well, why change? ... We're making a profit. ... Why should we use EDI?" ... And that's definitely the response from the accounts side. In fact, the supervisor actually said, "Well, what do I do with the stuff I've got. You know, how do we, what do we do with them with EDI." (purchasing manager)

7. EDI diffusion

Premkumar, Ramamurthy and Sree Nilakanta (1994) have conducted survey research of the implementation of EDI by 201 firms in the United States and they argue that it has dramatically changed the manner in which interorganizational transactions are conducted especially business practices in the sales and purchase/mechanising functions. They observe that although EDI has brought benefits such as reduced costs, faster turnaround, better customer service and, in some companies, strategic advantage, overall, firms appear to have had mixed success. Not much empirical research has been conducted specifically on the diffusion of EDI and recently Premkumar et al. (1994) have investigated the relationship between EDI diffusion and various innovation characteristics commonly cited in the literature on innovation (Tornatzky and Klein, 1982). Premkumar et al. (1994) divide EDI diffusion into four attributes - adaptation, internal diffusion, external diffusion and implementation success - and innovation into seven independent variables: complexity, technical compatibility, organizational compatibility, relative advantage, costs, communicability and elapsed time. Using multivariate regression analyses they found the most common predictors for three out of the four attributes of diffusion to be costs and technical compatibility, and for two of the attributes: relative advantage and duration. O'Callaghan, Kaufmann and Konsynski (1992) similarly found relative advantage and technical compatibility were related to adoption of EDI.

Premkumar et al. (1994) found firms initiate EDI in the purchase area more so than in the sales area which tends to be driven by initiatives from partners and they propose that power and dependency relationships favouring purchasing are to an extent instrumental in making the purchasing department more proactive with its suppliers generally more dependent than sales' customers. Their research did not explore the reasons for the limited integration of EDI with, for example, internal IS applications ('technical compatibility') and they propose future research examines the factors inhibiting the diffusion of EDI internally within the organisation which is important according to the authors due to the low explanatory power of some existing diffusion models and because we need to better understand the different perceptions of EDI's 'relative advantage' held in purchasing and other functions within the organisation.

The results of our research support that diffusion of EDI must be considered within the context of the broader business environment and the goals of competing organisations rather than by application of ideal models. Models that implicitly assume a trajectory towards total interorganizational connectivity as in the concept of a scale ranging from zero to full participation focus on the inter-organisational system rather than the business goals and benefits. Recently, many manufacturers have been seeking to reduce costs and their number of suppliers and therefore simple models of diffusion tell us little about how EDI is serving their strategic and operational goals where for instance it can be a deliberate policy to restrict the number of suppliers trading through EDI. Having said this we don't wish to deny that there seem to be missed or delayed opportunities in implementation of EDI which could be realised in the organisation with increased adaptation, management participation and control and technology transfer.

8. Conclusion

An acclaimed benefit of EDI, amongst others mentioned in the research literature, is it gives purchasing and other employees more time to concentrate on problem solving because they spend less in routine administration (document reconciliation, error checking). However, the results of this exploratory survey and interview study show that better problem solving and other wider strategic and operational benefits are hindered firstly by organisations failing to achieve sufficient cooperation between business functions, and secondly, due to the interpersonal limitations of EDI technology, purchasing executives have to be encouraged to improve their interpersonal relationships and be more proactive in gaining new knowledge and experience.

9. The way forward

EDI technology is full of promise but unable to deliver without a higher degree of cooperation across boundaries than has been the norm. The growth of EDI has flourished in insufficient cooperation across boundaries between: nations, industries, companies, functions, teams and individuals. Top management support helps to achieve planned operational gains because EDI is a politically sensitive technology system. Strategic benefits are not very evident in the research literature on EDI, but there are surely opportunities open to companies willing to confront the issues within and external to the organisation, particularly, attaining improved levels of coordination between functions and better relationships with key suppliers and customers.

References


Table 1: 'EDI two years after implementation' - UK survey (1995)

section one

Two years after the initial implementation, EDI:

1. Makes the chain of command clearer
2. Creates more layers of management
3. Routes all purchasing through central purchasing
4. Encourages people to follow policies and procedures
5. Encourages people to put everything down in writing

section two

Two years after the initial implementation, EDI:

16. Encourages people to try new ways of working
17. Creates more fun at work
18. Encourages functions to cooperate to do the job better

Appendices
Interaction and EDI

Developing multi-media on-screen tools for customer/supplier collaborative working

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Abstract

This paper aims to describe research into the potential business value of using multi-media communication technology to provide 'on-screen collaborative working' between customers and suppliers within the European automobile industry. The paper's scope includes the theoretical framework for the SMAC/TEAM projects, the methodology and structure of the projects, findings from interviews, user discussion groups and a business value survey of potential users, the progress of the projects to date and planned future developments. The main conclusions of the research are that potential users anticipate substantial benefits in a range of areas arising from the use of the technology.

1. Introduction

One of the most critical economic parameters in today's automotive industry is time to market. An example of the detrimental effects of delay is Ford's loss of over £1 b in profit alone by being one year late in the introduction of the Sierra model in Europe [Holberton 1991, Nichols, 1990, pp.5-26]. One major European car manufacturer has estimated that a one day delay in the launch of a new model will result in a loss of £100,000 in sales revenue for a replacement vehicle, and £1.0 M for a vehicle penetrating a new market. In general terms, a product that is 6 months late in a product life of 5 years can lose up to a third of its total recoverable profit [Lammers, 1993, Smith, 1988, pp.62-66, Nichols, 1990]. The reasons for delays in the design to manufacture process can include inefficient component specification and selection methods, and inefficient utilisation of specialist expertise.

World class automotive manufacturing is currently based on the team working philosophies developed and proven by the Japanese in the mid to late 1980's. In this approach, responsibility for the design and manufacture of components is devested to a network of suppliers rather than being undertaken in-house [Womack et al, 1990]. In this scenario, the manufacturers work in close collaboration with suppliers to specify, select and modify components, resulting in an increase in the logistical complexity of the process. The techniques used for this type of interaction are currently inefficient owing to their reliance on the co-location of personnel and the primarily paper based nature of the communication.

In a typical five year product development cycle of a major European automotive manufacturer, the first two years are spent establishing the economic feasibility of the proposed vehicle. This involves extensive liaison between the manufacturer and suppliers. Making this process more efficient would provide three major impacts:

- a win-win scenario
- supply chain security
- close working relationships (arms around vs arms-length)
- a route to faster technological development
- ability to extend Total Continuous Improvement (TCI) culture to critical suppliers
- improved profit contribution (or reduced profit exposure)

Close customer/supplier collaboration can therefore be seen to play an important role in helping to achieve increased overall supply network competitiveness, enhanced quality, customer satisfaction and to unlocking the potential of integrated product development.

Hines [1993] identified a number of problems with the well known 'Value Chain' model developed by Michael Porter in the mid 1980's (see Figure 1). The main weakness of the model lay in it's predominance of profit margin over end customer's...
needs, it's lack of integration between internal functions within an organisation and also between different value chains within the system, and lastly, the wrong functions being highlighted as important both in the primary and secondary activities.

As a result, Hines developed the concept of "the Integrated Materials Value Pipeline (IMVP)" as shown in Figure 1.

**Figure 1.** Porter's value chain Source: Porter (1985).

As a result, Hines developed the concept of "the Integrated Materials Value Pipeline (IMVP)" as shown in Figure 2.

**Figure 2.** The integrated materials value pipeline Source: Hines (1993).

In his model, there are a number of noteworthy features which form the foundation of the arguments supporting and highlighting the need for the advanced computing and communications facilities developed within the SMAC/TEAM projects and described later in this paper. These are:

1. The model points in the opposite direction to the Porter chain i.e. it points away from the consumer because the value required and price acceptable is translated back to the supply network of firms by active discussion with the consumer.

2. In the IMVP model, there is one large flow pointing from consumer to raw material source as opposed to a series of linked chains as in the Porter value chain system. In the IMVP model, "the primary functions of each of the separate firms must act together as a unified team with the traditional arms length barriers broken down. In addition, members of the secondary or support functions act as unified teams right along the pipeline."

3. The IMVP model has different primary activity and secondary activity functions to those of the Porter model. Hines highlights the primary functions of marketing (value, volume, place & timing) together with materials (flow), engineering, quality, R&D and design as important. "The integrated team (with members from the different firms in the network) works together to jointly define the value required of the product at each stage of it's transition from raw material to consumption in each of the member firms. In this realm, the team's purpose is a relentless search for continuous improvement in the cost base by joint value analysis and value engineering."

4. "The secondary activities include Activity based costing, HRM, training, education, Total Quality Management (TQM), Electronic Data Interchange (EDI) and profit. These functions, which operate in an integrated way across the network, should be seen as the facilitators that allow the primary functions to operate and should apply equally across supply chains as within them.

It is thus identified that Electronic Data Interchange (EDI) is a major facilitator in drawing network members closer together to enable quick and accurate responses to consumer requirements back through the supply chain. It is in this context that the advanced computing and communications facilities of the SMAC/TEAM projects described below have been developed as tools to facilitate improved communication and passage/exchange of information between European automobile manufacturers and suppliers at all stages in the design and manufacture of a new vehicle.

3. The SMAC and TEAM projects — an overview

SMAC stands for Suppliers and Manufacturers in Automotive Collaboration, and it's successor project, TEAM stands for 'Team-based European Automotive Manufacturing'. They are both part of a research programme funded by the EC as a pump priming exercise to facilitate closer collaboration between European automotive component suppliers, manufacturers and tool makers, and are a part of the "Advanced Communications in Europe" initiative. Both projects are 8 man year research projects to encourage the development of advanced communication and decision support tools for the automotive industry. They are owned and driven by a consortium of 14 European partners consisting of volume car manufacturers, automotive component suppliers, IT product developers and suppliers, telecommunications network operators, suppliers of telecommunications equipment, and research institutions, and are led and managed by the Rover car company.
The purpose of SMAC and TEAM are to exploit new high speed telecommunications technology and facilitate the passage and exchange of information at all stages in the design of a new vehicle. The technology operates on diverse computer systems, and is therefore easy to implement on the existing system platforms in use amongst designers in the automotive industry. The system consists of 3 major components:

1. Video conferencing software and shared whiteboard application (which allows 'virtual meetings' to be held without the participants leaving their working premises)
2. A product library
3. A high speed data transfer capability

The product library is a distinguishing feature of these projects. It is seen as an engineering data repository for all the components that are made by a given supplier. This information could include functional descriptions of products, environmental and legal constraints, CAD data, colour pictures, video and sound tracks, prices and general supplier information. Data will be entered into this library by component suppliers, and accessed by engineering, purchasing and other staff employed by manufacturers and toolmakers.

4. Project objectives
The objectives of the SMAC/TEAM projects are:

- To facilitate and promote collaboration and concurrent engineering between European automotive manufacturers and component suppliers, thus reducing product development times and costs.
- To assess the cultural and organisational impact of the SMAC/TEAM technology, including attitudes, working practices and management commitment/support/future plans.
- To disseminate and exploit the results of the projects within the European Design and Manufacturing Industry, and to support the European Automotive Industry in an increasingly competitive world market.

4.1 Project aims
By improving computing and communications facilities, SMAC/TEAM aims to support concurrent engineering, reduce time to market and the costs of quality, and enable better use of existing designs. Enabling a reduction in the time to market should allow greater flexibility in responding to customer needs without reducing overall product quality and reliability.

By using SMAC/TEAM to strengthen relationships with, and commitment from, first tier suppliers, and synchronising suppliers activities with manufacturers product development programmes, the lead time for long lead time items (e.g. facias) can be effectively reduced. This will reduce the time needed to develop new products, and provide a competitive advantage by providing superior products at lower costs, thus hastening the return on the investment needed to develop a new vehicle.

SMAC/TEAM's product library, shared whiteboard facility, video conferencing and data transfer capability should reduce the need for engineers to travel extensively for meetings, and thus considerable savings in time and effort are anticipated to be achieved. This in turn should improve communication, reduce engineering problems, and improve the speed and effectiveness of the resolution of those engineering problems that do occur.

SMAC/TEAM should also facilitate the easier re-use of existing automotive designs and components, make better use of existing design experience and help organisations learn from past experience. In addition, by using SMAC/TEAM technology to provide data on component costs and prices, robust values can be obtained early in the development process, helping to minimise unit costs.

4.2 Project Structure
The SMAC/TEAM projects have been structured into three main work packages:

1. System development and integration of the component technologies
2. System evaluation by engineering, purchasing and other staff employed by the automotive manufacturers and component suppliers in the partnership
3. Technology transfer and contribution to the EC's advanced communications programme

The projects began with the development, integration and testing of the technological applications, including the product library containing details of automotive components. This was followed by the development of several representative user scenarios, to illustrate and evaluate SMAC/TEAM technology in a work place setting. The results of the first set of evaluations (cited below) are being used to refine the user scenarios and technological applications, and to pilot the final evaluation.

The SMAC/TEAM technology will be disseminated to the European automotive industry by means of demonstrations, conference presentations and publications in professional journals. The technology transfer includes the definition and evaluation of the potential market for SMAC/TEAM technology, and the development of a business case to highlight its commercial value.

4.3 Current status
Since the commencement of the project, the following activities have been completed:

- hardware & software tools are now developed and working successfully
- demonstration workshops & feedback sessions have been conducted with potential users
- potential user feedback has been collected via:
  - discussion sessions
  - business value questionnaire
  - one to one interviews

4.4 Results
The extent to which SMAC/TEAM technology will provide benefits to customers and suppliers has been assessed by means of a survey of potential users within the European automotive industry. Functional and Project Managers (responsible for, or involved in the design of, new vehicles) were invited to attend a presentation and demonstration of the SMAC/TEAM concept and software. Attendees were then asked to rate the value / effect of SMAC/TEAM technology against a number of specific criteria via the completion of personally administered "SMAC Business Value Questionnaires". The results of this survey reveals the following information:
SMAC Business Value Questionnaire Results (sample size = 42):

Q1. At each stage in the design process, to what extent do you think SMAC/TEAM will affect information exchange with EXTERNAL suppliers or customers?

Impact of SMAC/TEAM on effectiveness of information exchange with EXTERNAL suppliers/customers

Figure 3. Impact on the effectiveness of information exchange with external suppliers and customers

At concept stage  small improvement
At feasibility stage  small improvement
At detailed design stage  large improvement
At initial volume production  small improvement
On-going problem solving  large improvement

Q2. At each stage in the design process, to what extent do you think SMAC/TEAM will affect information exchange with INTERNAL suppliers or customers (e.g. Purchasing, other departments etc.)?

Impact of SMAC/TEAM on effectiveness of information exchange with INTERNAL suppliers/customers

Figure 4. Impact on the effectiveness of information exchange with internal suppliers and customers

At concept stage  small improvement
At feasibility stage  small improvement
At detailed design stage  large improvement
At initial volume production  small improvement
On-going problem solving  large improvement

Q3. What effect do you think SMAC/TEAM will have on the overall design process - in terms of cost, time, quality?

Cost  small improvement
Time  very large improvement
Quality  large improvement

Q4. Assuming it is robust, do you think it would be worthwhile introducing SMAC/TEAM into your part of the organisation now?

no consensus
Q5. To what extent will SMAC/TEAM affect communication and data exchange between concurrent projects within your organisation (i.e. cross-project fertilisation)?

At concept stage positive effect
At feasibility stage positive effect
At detailed design stage very positive effect
At initial volume production neutral effect
On-going problem solving positive effect

Q6. To what extent will SMAC/TEAM alter communication and information sharing within a project - thus helping project team members to work more effectively?

At concept stage positive effect
At feasibility stage very positive effect
At detailed design stage very positive effect
At initial volume production very positive effect
On-going problem solving very positive effect

Q7. To what extent will SMAC/TEAM alter a project manager’s ability to manage his/her project?

improve

Q8. At each stage in a project, what effect will SMAC/TEAM have on the number of design changes?

At concept stage slight increase
At feasibility stage slight increase
At detailed design stage slight increase
At initial volume production no consensus
On-going problem solving no consensus

Q9. To what extent would SMAC/TEAM aid the creation of standard design modules, and the re-use of designs?

greatly assist

Q10. What impact will SMAC/TEAM have on the design management process?

slightly assist

Q11. At each stage in the development process, to what extent would SMAC/TEAM require a change in the nature of the relationship with suppliers?

At concept stage much closer
At feasibility stage much closer
At detailed design stage much closer
At initial volume production much closer
On-going problem solving much closer

Q12. What impact will the following SMAC/TEAM technologies have on the overall design process?

Product library: very positive
Sharing CAD/CAM (and other) applications: very positive
Video conferencing: positive
Shared whiteboard: very very positive
Decision support/minute taking tool: very positive

Q13. When communicating with your customers and suppliers, what level of trust is necessary to effectively use each of the following SMAC/TEAM technologies?

Product library: very high
Sharing CAD/CAM (and other) applications: very high
Video conferencing: neutral
Shared whiteboard: high
Decision support/minute taking tool: medium

Q14. How easy would it be to introduce SMAC/TEAM into your existing working practices?

slightly difficult

5. Conclusions

The work completed to date, the results of the Business Value Questionnaire, the results of the discussion sessions and the feedback from the one-to-one interviews allow the following conclusions to be drawn at this stage of the project:

- The technical hardware and software aspects are now robust and working effectively.
- The speed of data transmission is limited by the slowest section of telephone line between remote sites. Hence, when connecting to locations using “old” telephone lines, speed is limited.
Potential users anticipate benefits arising from the technology as follows:

- improved ease, speed, accuracy & quality of data transmission and communication between remote sites and within sites
- improved effectiveness of information exchange with external and internal suppliers and customers, especially at the detailed design stage of a vehicle's development
- improved effectiveness of the design process, especially with respect to time and quality
- a positive effect on communication and data exchange between concurrent projects (i.e., cross project fertilisation) especially at the detailed design stage of a vehicle's development
- a very positive effect on communication and information sharing within a project at all stages except the concept stage
- improvement in the project manager's ability to manage his/her project
- great assistance towards the creation of standard design modules, and the re-use of designs
- slight assistance towards the change management process
- The SMAC/TEAM technologies of product library, sharing CAD/CAM (and other) applications, video conferencing, shared whiteboard and decision support/minute taking tools should all have a positive effect on the overall design process, especially the shared whiteboard facility

Potential users anticipate drawbacks arising from use of the SMAC/TEAM technology in the following areas:

- introduction of SMAC/TEAM technologies into existing working practices is predicted to pose some difficulties
- slight increase in the number of design changes in the early stages of a vehicle's development cycle

Other implications of the SMAC/TEAM technology highlighted by potential users are:

- The use of SMAC/TEAM technology will require a change in the nature of the relationship with suppliers/customers towards being much closer at all stages in a vehicle's development cycle.
- a very high level of trust with customers and suppliers will be necessary to effectively use the product library and sharing of CAD/CAM (and other) applications facilities
- reduced travel & meeting costs are predicted to occur
- high levels of internal usage (where usage of system is effectively free once installed) are predicted to occur
- the need for controls over indiscriminate external usage is predicted to occur, especially where "high cost" international telecoms routes are used
- the enormity and power of the system is now starting to be recognised by enlightened potential users

S.1 Future developments
Implementation of the SMAC/TEAM technology by users is likely to be phased, with on-screen data transfer of product library information and use of the shared whiteboard application coming first, followed by video conferencing later when ATM telecom lines are more widespread.

The new follow on project to SMAC called TEAM received funding from the EC in September 1995. This project is placing more emphasis on 2nd & 3rd tier supplier's use of the technology up and down their respective individual supply chains.

Field trials are planned to take place on a number of 'live' projects at various locations in Europe during 1996/7.

References


Partnerships among Finnish Manufacturers

Case study on the development of supplier structure and supplier-customer relationships

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Abstract
This paper discusses the development of supplier networks and supplier-customer relationships among Finnish manufacturers from both a practical and a theoretical point of view. The study approaches the issues associated with the supplier-customer relationship from the perspective of the OEM and the suppliers simultaneously. A real-life case is also presented. The purpose of this paper is to add to the body of knowledge of intercompany relationships and to point to additional issues for further discussion. The findings of the study show that there has been a significant shift towards stable, commitment-based customer-supplier relationships among Finnish manufacturers operating in a production environment characterised by low product volumes and a high demand for flexibility. The supplier structure identified could be described as a horizontal network rather than as hierarchical tiers. The findings presented emphasise the importance of integrated research and development projects and the sharing of strategic information in order to achieve real partnerships. The management of the material and information flow both in the network and within companies appears to be essential for the success of partnerships.

Key words: partnerships, subcontracting, supplier structure

1. Introduction

Over the past several years, there has been a significant shift in the way many companies approach the supplier-customer relationships. Today, the concept of customer-supplier partnerships is being adopted at an increasing rate by US and European, including Finnish, companies. Along with the just-in-time concept this "new" philosophy of supplier-customer interorganizational relationships based on the Japanese subcontracting system, which is especially used in automobile industry and has been widely documented (see Smittka, 1989, Sato, 1984, Nakamura, 1984, Blenhorn and Noori, 1990, Womack et. al. 1991, p. 146). There is close coordination and communication between the Original Equipment Manufacturer (OEM, "parent firm") and the first-tier suppliers ("primary subcontractors"). In the Japanese model the first-tier suppliers have been given responsibility for product development, systems undertakings and JIT deliveries. These suppliers are each highly specialised in production and development in their own component area. Second-tier suppliers are smaller, have less expertise, generally specialise in a narrower range of products, and work with production and/or processing. Third-tier suppliers are even less sophisticated in terms of competence and activities (Gaddie and Håkkanson, 1993, p. 44). The Japanese subcontracting system the supplier associations have been central for both sharing information and the diffusion and administration of system-wide management techniques among suppliers on the lower tiers (Smittka, 1989, p. 150).

Lamming (1993, pp. 186-190) argues that the terms "first tier" and "second tier" could be used to indicate the degree of influence the supplier exerts on the supplier chain, rather than some fixed position in a hierarchy. Thus, first-tier suppliers are ones that integrate systems for direct supply to the OEM or have a significant technical influence on the OEM while supplying indirectly. Lamming also points out that the tiers in the industry represented by the post-Japanese model are not quasi-ownership tiers, nor are they fixed company classifications. They are groupings formed by collaboration for specific supply purposes. Companies may be first and second tier at the same time, even relative to the same customer. Lamming emphasises the responsibilities of first-tier suppliers, which are research and development, management of subcontractors, true just-in-time supply, customer-dedicated staff and responsibility for warranty. In both the Japanese and the post-Japanese supplier structure there are not only vertical relationships, but also strong and more common horizontal formal and informal relationships between the suppliers, linking through technology and product development, joint ventures, etc. (Lamming, 1993, p.180, Hines, 1995).
A distinct trend towards a substantial reduction of the number of suppliers has been recognised among Western automobile and other companies during the past decade (Cadee and Halkias, 1993 p. 41-42, Lindberg and Trygg, 1991). There are three ways in which the OEM can reduce the number of suppliers. Firstly, they can align suppliers by assigning whole components to a first-tier supplier. Secondly, the OEMs can cut the number of suppliers by reducing the parts count in components. Thirdly, there are single-source parts which previously had two or three suppliers. OEMs go to single-sourcing (one supplier per product or product type) to get longer production runs of a single component and to avoid duplication of tooling (Womack et al. 1991 p. 158). Apart from single-sourcing, two other approaches - dual sourcing and network sourcing - have also been presented in the literature. Dual sourcing is used when one supplier is unable to provide all the volume required, the variety required or the delivery needs (Lamming, 1993, p. 171). In the network sourcing system, more than one source is used per product type, with only one used for a single product or code number (Hines, 1995, p.19).

2. Methodology and research environment

2.1 Methodology

The findings described in this paper are based on studies on subcontracting systems and strategies of subcontracting manufacturers conducted since 1988. The term “subcontracting” is used to refer to the supply of customised semifabricated products (parts, components, units) or services. The first research project was carried out in 1988-1991. The ongoing follow-up study focuses on the issues of development of the supplier structure based on the long-term partnerships.

The case study methodology has been used. In earlier research (Lehtinen, 1992), the business and purchasing strategies and relationships of 16 subcontractors and 8 OEMs were studied using multiple methods, such as personal interviews, quantitative data and questionnaire surveys. The companies studied formed supplier chains; i.e. there were business relationships between the OEMs and the subcontractors. In present study, the companies studied formed a supplier network of OEMs, and both vertical and horizontal relationships were studied. Most of the OEMs and subcontractors participating in the study had also taken part in the earlier research, providing an excellent possibility to study the development of partnerships in the long run. The approach of the study is both practical and theoretical. The findings presented in this paper, which is a review of the present research, are not yet based on the empirical data, but on personal experience and interviews.

2.2 Research environment

The Finnish manufacturing companies studied are operating in industrial markets characterised by customised final products, small orders and low repetitive production. Even though the final products, such as industrial machinery, telecommunications and industrial automation systems, are customised, the components manufactured by the subcontractors could be standard ones, including a wide range of options and variants. Both the final products and the subcontracted components are usually made to order, and very small stocks are kept by the subcontractors.

The subcontractors studied were small and medium-sized companies operating on home markets, which means a rather limited customer base. In the late 1980s, the subcontractors’ profitability in Finnish manufacturing industry was rather poor on an average compared to the OEMs, which was a result of high investment costs compared to productivity. While the demand in metal industry decreased during the recession in the early 1990s, the markets of electrical and electronics industry have rapidly grown - the production volume of the industry has doubled during the 1990s.

3. Findings of the study

3.1 Development of supplier structure

In the development of the supplier structure, three distinctive stages were identified. At the first stage, the OEM reduced the number of suppliers by assigning subassemblies to certain suppliers, which became first-tier suppliers or system suppliers, as they are called in Finland. The number of suppliers was also cut by using fewer suppliers per product type, i.e. by moving from network sourcing to single sourcing. Especially in electronics, the change of the product structure towards more standardised modules has reduced the number of subcontracted parts, and the number of suppliers has therefore also decreased. In some cases an in-house manufacturing unit changed to be a subcontracting-based manufacturer and adopted the role of a first-tier supplier. Typically, the material flow changed before the contract based structure emerged; i.e. either material flow or information flow in the supplier chain of an OEM was not convergent with the contract-based structure. At the second stage, the first-tier suppliers took responsibility for coordinating the inbound material flow from the lower level suppliers. At the third stage, the structure of the supplier chain became more stable and the subcontractors took a more active role in the product development process.

The subcontractors studied have quite a large customer base, even though more than 20% of the customers, i.e. 3-6 customers for first-tier suppliers, usually bring over 80% of the sales. The common rule that one customer or supplier should not contribute more than 25% of the purchases or sales is well known. Thus, the subcontractor is usually a “member” of several supplier networks.

On the basis of the present findings, the importance of the purchasing function - the ability to supply parts and materials as well as to cooperate with other companies - appears to have increased among the subcontractors. Especially in electronics industry, the first-tier suppliers have rapidly grown along with their OEMs and taken responsibility over sub- and final assembly. In spite of that, the supplier structure can be described as a stable horizontal network consisting of heterogeneous, independent manufacturing companies making up the value chain for manufacturing the final products (Figure 2). This structure resembles more the model described by Lamming than the Japanese structure (Figure 1), although the role of a first-tier supplier in both logistics and product research may be of lesser importance than suggested by Lamming.
3.2 Adoption of the partnership model
The development of the supplier structure has not been possible without simultaneous changes in the supplier-customer relationships. The study shows that long-term relationships have always been relatively common among companies, even though the contracts for supply have been of short term. Furthermore, in spite of network sourcing, single sourcing has also been quite common in order to obtain lower tooling and set-up costs as well as a secure and reliable source. The changed issue in customer-supplier relationships is the increased interdependence between partners. Subcontractors try to serve as well as possible the main partners, while the stable customer base enables them to plan their business in the long run. On the other hand, subcontractors are aware of how costly it is for the customers to change long-term suppliers, especially in a situation where the domestic supplier markets are limited. The reasons why domestic or local suppliers have been preferred are not based on delivery aspects, but rather on cultural factors. Cooperation and problem-solving have been easier when both parties speak the same language and are able to visit each others’ factories during one day. Furthermore, the interdependence has grown, because the volume and importance of out-sourcing has increased.

The reasons causing a weakening or breaking up of long-term relationships are usually changes in the demand of an OEM or the manufacturing strategy of a supplier. It is seldom that any operational or personal problem has broken down a settled relationship. In practice, if a part manufacturer invests in a new machine, the capacity is first offered to the main customer. If the main customer is not able to allocate the capacity beforehand, it is offered to other customers. Afterwards, the first customer can not claim the capacity for itself, because it has already been allocated to others for a long time.

The study also showed that the subcontractors’ role in the product development process used to be insignificant, although the involvement of the suppliers in the production preparation stage has increased. The cooperation between the customer and the supplier has mostly concentrated on maintaining the product quality and keeping the delivery schedules. Furthermore, the informal cooperation between non-competing subcontractors, with similar size and business cultures, has become more common as a consequence of the consolidation of the network structure.

3.2.1 Main problems perceived by OEMs and suppliers
The main problems perceived by OEMs and subcontractors have been related to delivery performance. The OEMs are most concerned about the suppliers’ ability to deliver in time, while the subcontractors consider the short delivery lead times and unpredictable order changes most problematic. This situation is due to many factors. Firstly, small subcontractors without inventories often find it very difficult to purchase components and materials on a short notice, particularly from big multinational companies. Secondly, there is little or no experience of purchasing management in the subcontracting firms. Thirdly, the suppliers seldom get reliable, real-time information from the OEMs about the orders at hand or the marketing situation in the long run.

The findings emphasize the importance of information sharing and good communication between the OEM and the suppliers. In order to achieve better delivery performance, the material flow and capacity of the supplier chain should be planned and controlled closely by the OEM and/or the first-tier supplier.

3.3 Partnership between an OEM and a first-tier supplier: a case example
This case study describes the relationship between an OEM and a new first-tier supplier from the customer’s point of view. The focus of interest was to compare the supplier policy with the partnership model discussed previously. This case analysis
deals with the relationship between Nokia Telecommunications (OEM) and the Scanfil Oulu factory (supplier) in 1992. The Access Systems Division of Nokia Telecommunications has a production unit in Haukipudas, near Oulu. The Haukipudas factory manufactures transmission products which are customized systems used, for example, in telephony networks, cellular networks, and private networks of railways and utilities. The supplier, Scanfil, is one of the leading Finnish mechanics subcontractors for electronics industry. In 1992, Scanfil had two factories at Siervi and Oulu. The Oulu factory was started in 1990, and it has a FMS automated production line and surface treatment lines. The business relationship between the Haukipudas factory and Scanfil had started in 1985.

The case analysis was divided in three parts: 1) the purchasing strategy and policy of the Haukipudas factory (OEM) was analysed, 2) the contacts and information flow between the parties was examined and 3) the supply chain and material flow of the most important subassembly were studied.

3.3.1 Purchasing strategy
The purchasing organisation of the Haukipudas factory was situated mainly in Espoo, near Helsinki. The purchasing unit was responsible for contracts, supplier selection and evaluation. The duties of the logistics unit consisted of logistics development and sourcing. The production planning and quality divisions were situated in Haukipudas. The quality division was responsible for the development of the suppliers' quality and also participated in the suppliers quality audits.

The purchasing strategy was defined by the purchasing manager and the director of the Haukipudas factory. The suppliers were divided into three categories; 1) The main suppliers were able to supply systems and repetitive parts. A close partnership with these suppliers was established. 2) The secondary suppliers were specialized in parts or standard components. Single sourcing was used in the categories 1. and 2., while dual sourcing was always used in category 3.

Contract policy
The supply contracts were agreed on yearly. In these contracts the unit price was defined on the basis of a yearly forecast of volume. If the supplier had to keep extra buffer stock, compensation was paid by the OEM.

Pricing policy
The price level of a new supplied item was first defined by tenders. After the supplier had been selected, the company had to present the full cost structure of the item. Total manufacturing costs were calculated as a sum of the costs of out-sourced material, production costs divided by manufacturing steps and profit. The costs of special tools were paid separately. The price was checked yearly, changes in the out-sourced materials costs or the production volume also had an influence on the price. Target costing was not used, even though suppliers were favoured if they were able to reduce the price. The principle of sharing the profit (Womack et. al., 1991 p. 150) achieved through continual improvements was unfamiliar to the company.

Suppliers' involvement in product development
Earlier, the suppliers were only involved in the product development at a late stage. In addition to this some compensation was paid to the subcontractors for spending time to work on the development process. In the early 1990's, the suppliers' personnel could take part in product development meetings after the beginning of the process. The practice of integrated product development was not adopted by the OEM, because the supplier could not be 100% sure of getting the contract after the product development project had been completed.

3.3.2 Contacts between parties
The contacts could be divided in terms of daily, weekly, monthly and yearly shared information. Information about delivery calls was exchanged daily. If some quality problems were found, the quality personnel of the OEM informed the supplier weekly. A monthly meeting was held between the purchasers and the manager of the supplier factory. Some meetings could also be held concerning new product developments. Contract negotiations were arranged individually and the executive managers of the companies also met. Some of the shop-floor workers were advised by the OEM's quality personnel concerning quality matters, but no shared education was organised. There was no "supplier association of Nokia", but a "suppliers day" for the main suppliers was arranged once a year.

In these contacts the OEM was the "pushy" partner and direct horizontal contracts were promoted. An interesting issue with regard to information flow is the different organisation structure and size of the OEM and the supplier. The Scanfil Oulu factory had a very "lean" organisation including only a few managers and no supervisory staff. In practice, only a few persons in the factory had actual contacts with the OEM. If only a limited number of personnel in the companies have direct contacts with each other, it is crucially important to decide how the information flow is managed internally in the companies. Thus, in what way is the supplier able to get market information from the OEM's marketing department? How could the workers of the supplier advise the design engineer of the OEM on the manufacturability of parts? How are joint development projects organised?

3.3.3 Material flow in the supplier chain
At the third stage of the study the material flow of the main supplied subassembly system was analysed. Earlier, this subassembly was assembled in the OEM's factory and the circuit board assembly was also made in-house (see Figure 3). After the Scanfil Oulu factory was started, the production of this subassembly was transferred to the supplier. The supplier chain and delivery lot sizes are presented in Figure 4.

![Figure 3. Supplier chain before changing over to system delivery](image-url)
The Scanfil Oulu factory delivered the system to the Haukipudas factory pre-packaged. In the OEM's factory, only quality checks were made before the subassembly was shipped as part of the final product to the customer.

The supplier chain consisted of three tiers of suppliers. The first-tier supplier, Scanfil Oulu, "inherited" most of the part suppliers from the OEM, although Scanfil could freely award the deliveries to new part suppliers. Most of the lower level suppliers also delivered directly to the OEM; the circuit board manufacturer, for example, was also a very important first-tier supplier to the OEM. The contacts between the first-tier supplier and the other suppliers were insignificant.

The production volume of the subassembly system varied yearly; the maximum level was less than 5000 pieces, including six different versions. The delivery practice of the OEM was based on an MRP system, the delivery lead time given to the supplier was 2-3 weeks and the lot size was constant. The system was manufactured on the basis of orders in the supplier's factory. The supplied parts were considered as C items and were ordered in large quantities.

The analyses of process steps and the interviews of employees confirmed the assumption that the pricing policy based on the yearly volume was unrealistic from the production point of view. The system did not encourage the supplier to make improvements. The production costs were also quite independent of the yearly volume, because the batch sizes were constant. Furthermore, the manufacturability of the system was already decided by the OEM at the product development stage, and the employees were unable to make improvements, that could have reduced the production costs to a significant extent. Both target costing and joint product development projects were found to be useful tools in achieving product cost reductions.

The bottle-neck of the supplier chain was the material flow between the first-tier supplier and the electronics parts manufacturers. Delivery delays were caused by the difficulties of the motherboard manufacturer to supply PC boards on time. The first-tier supplier also lacked experience of managing the ordering system based on visual control. These problems were hardly identified by the OEM.

When the total lead time of the subassembly from the beginning of production to the delivery to final customers was analysed, it turned out, that the subassembly was stored in the inventory of the OEM for a very long time. It was obvious that not enough attention was paid to scheduling. By reducing lead times, considerable financial benefits could be achieved in the short run. The JIT delivery concept could also be applied to the process. Though the first-tier supplier could be responsible for the material flow, a direct information flow would be required between the OEM and the electronics parts manufacturers in order to manage delivery and variant changes.

4. Conclusions and discussion

The present findings show that there has been a significant shift towards stable, commitment-based customer-supplier relationships among the Finnish OEMs and suppliers. The supplier structure in a production environment characterized by low repetitiveness, a wide variety of products and customised design can be described as a horizontal network, similar to a team of players with different skills and experiences rather than as hierarchical tiers surrounding an OEM. There may be several best practices of creating supplier networks, depending on the nature of the products and the stage of development of the suppliers. In the future, the suppliers might themselves set up small networks partnering with selected OEMs. In order to achieve a prompt response to the final customers' demand the managerial focus should be on issues concerning the material and information flow in the network and within the companies. As a consequence of the new supplier structure the purchasing function has become more important among small and medium-sized subcontracting firms. Shared education and other mutual development projects are needed between an OEM and the supplier team as means to overcome the problems in purchasing and production management.

In spite of long-term relationships and openness between customers and suppliers, partnerships involving integrated research and development, development projects and mutual sharing of strategic visions appear to be rare. The emphasis in the development of supplier relationships towards real strategic partnership should be both on improving effectiveness at the shop-floor level and on strengthening the cooperation at the top management level. Shared new product development projects involving all the strategically important players of the network are of utmost importance not only to achieve lower production costs, but to consolidate the trust and informal cooperation between the parties.
Since then, many of the report's recommendations have been partially, or fully enacted, and whether certain proposals should be supported at all. The root-cause of this is the nature and extent of these difficulties are widely recognised and publicised, but there is not quite so much agreement about the solutions to the problems specified; fragmentation and self-interest remain the order of the day, with individual parties pulling in different directions.

There appears to be little disagreement amongst those involved in the UK construction industry that it is suffering from a number of major problems, including low productivity, low profitability, a fragmented structure, and an adversarial culture. The nature and extent of these difficulties are widely recognised and publicised, but there is not quite so much agreement about the solutions to the problems specified; fragmentation and self-interest remain the order of the day, with individual parties pulling in different directions.

There is growing evidence, however, that the fragmented, self-interested and adversarial culture of the industry itself persists. The different parties involved in the construction process still disagree about which of the recommendations should be enacted, and whether certain proposals should be supported at all. The root-cause of this is, we contend, that Latham managed to treat the symptoms rather than the fundamental problem - the structure of the industry itself.

This paper outlines the main recommendations of the Latham Report, questions its ability to resolve the problems it specifies, and suggests that lasting change will only occur when the important issue of industry structure is recognised and transformed. A methodology for achieving this is outlined.

Latham as Half-Way House

A structural approach to best practice in construction management

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Abstract

This paper discusses the limitations behind the current thinking for reforming the UK construction industry, and suggests an alternative view based on the fundamental research being carried out by the CSPM into Relational Competence and Strategic Procurement Management.

Key Words: Latham, construction management, industry structure, intelligent clients, process spend, relational competence analysis, fit-for-purpose relationships

1. Introduction

There appears to be little disagreement amongst those involved in the UK construction industry that it is suffering from a number of major problems, including low productivity, low profitability, a fragmented structure, and an adversarial culture. The nature and extent of these difficulties are widely recognised and publicised, but there is not quite so much agreement about the solutions to the problems specified; fragmentation and self-interest remain the order of the day, with individual parties pulling in different directions.

There is growing evidence, however, that the fragmented, self-interested and adversarial culture of the industry itself persists. The different parties involved in the construction process still disagree about which of the recommendations should be enacted, and whether certain proposals should be supported at all. The root-cause of this is, we contend, that Latham managed to treat the symptoms rather than the fundamental problem - the structure of the industry itself.

This paper outlines the main recommendations of the Latham Report, questions its ability to resolve the problems it specifies, and suggests that lasting change will only occur when the important issue of industry structure is recognised and transformed. A methodology for achieving this is outlined.
2. Impact of the Latham Report: Treating Symptoms not Causes

Sir Michael Latham was commissioned, jointly by the UK government and the construction industry, to conduct a review of procurement and contractual arrangements in the UK. The chief aim of the review was to formulate recommendations addressing the problems faced by the industry, and to assist clients in obtaining high quality projects, through better performance and fairness to all.

The final report, entitled 'Constructing the Team', was published in 1994 and is widely seen as a catalyst for much-needed change in the UK industry. Considering the importance and severity of the issues involved, the review was certainly overdue.

2.1 Latham's Recommendations

Sir Michael produced thirty main recommendations, with over fifty separate tasks to bring about the desired improvements. To implement these, eleven working groups were established, under the guidance of the Construction Industry Board (CIB). A twelfth group was more recently established to consider the use of 'partnering' for construction works.

In his foreword, Latham stated that some recommendations were radical, and that participants in the construction process could react in three ways: essentially, they could ignore them (at their peril), pick out the sections that suited them best, or enact the whole package. He has since warned against 'cherry-picking', and highlighted the need for the enactment of all recommendations to resolve the closely interlocked issues.

The Latham recommendations were presented under the following headings:

**To Clients (public and private sector)**

- The creation of a construction clients' forum to represent the fragmented and widely dispersed private sector clients.
- Government to become a 'best practice' client, to bring about value for money and encouraging continuous improvements in productivity.
- The production of a Construction Strategy Code of Practice, to assist clients (especially lay clients) in achieving value for money in satisfying their construction needs.
- The publication of a checklist guide to briefing, to help the client adequately define his needs.
- The introduction of a mechanism for the selection and appointment of consultants, considering quality as well as price.

**To Industry**

- To reduce costs by 30% in real terms, by the year 2000.
- Improvement of tendering arrangements through the use of registration systems, and consideration of long-term value for money.
- To devise a joint code of practice for the selection of sub-contractors, to ensure good practice, long-term value for money, and fair treatment.
- Improvement of training and education, in line with recent studies, including the JACNET Report and the CIC Report 'Crossing Boundaries'.
- To carry out a co-ordinated equal opportunities programme, initially improving the poor levels of recruitment in the construction industry.

2.2 Commitment from the Industry?

The question arises, however, as to how well the industry has received the Report and its recommendations, and whether Latham's initiatives will result in universal support. In short, will these worthy recommendations be enacted and change the industry, or will the various factions in the industry support only those recommendations that suit their own interests, and drift into conflict over the remainder? If the latter occurs, surely we are 'back to square one'.

Regarding Contracts

- To develop standard contract documentation, based on thirteen principles believed to fulfill the needs of a modern contract. The New Engineering Contract (the second edition is now titled 'The Engineering & Construction Contract') was recommended as largely embodying these principles.
- The production of a complete standard family of interlocking documents, to ensure good practice and reduce the need for 'bespoke'.
- To change the structure of the contract writing committees (JCT and CCSJC) and improve client and sub-contractor representation.

**On Legislation**

- To legislate against unfair contract conditions and to underpin trust accounts and adjudication.
- Legislation to reform the law on liability, in order to clarify responsibilities of participants in construction projects when matters go awry.
- Legislate mandatory ten-year latent defects insurance for commercial, industrial and retail construction. This would afford customer protection.

Other recommendations include: consultation with the process plant industry, production of a checklist for design responsibilities, the co-ordination and evaluation of information, a clearer definition of roles and responsibilities for project managers, co-ordinated activities, further research into the effectiveness of BS 5750 (Quality Assurance) on site performance, and the need for advice on partnering in the public sector.

Latham has worked tirelessly, with great commitment and stamina, in his crusade to improve the UK construction industry. As Chairman of the Construction Industry Board, he has attended many workshops, seminars and conferences and meetings to motivate the industry and maintain the momentum for change. He has also been lobbying strongly, in his personal capacity, for the necessary supporting legislation to be enacted.

3. The eleven working groups, the consultation document for legislation on fair construction contracts. Apart from the omission of proposals to legislate against non-standard forms of contract containing 'unfair' clauses, and for the provision of trust funds.
The group that stands to benefit most from the fair contracts legislation is the specialist/trades contractor sector, whose members presently suffer widespread mistreatment. The Construction Liaison Group, representing this faction of the industry, claimed that the Federation of Civil Engineering Contractors was only willing to accept proposals which benefited main contractors. CLG President, Tony Merricks, called for a "broader, less sectoral view" for the Latham Review to work.

Agreement between organisations in the same segment of the industry has also been problematic. For instance, differing responses were given by major contractors on the DoE's proposals for fair contracts.

A major survey of construction clients, consultants, contractors and specialist/trade contractors was recently undertaken by the authors, in order to establish common perceptions of the industry's problems, what the various parties are doing in the light of the Latham Report, and the problems, successes and limitations encountered. The survey coverage was approximately 100 organisations in each category. All participants were asked for their perceptions on how well each faction had received the report and its recommendations. Figure 1, below, summarises the findings from this question.

Analysis of the above chart gives a further insight into the situation. The client respondents, who were mainly in the private sector, believe that they have received the Report quite favourably, but not quite as well as main contractors. They would also appear to be under the apprehension that consultants and sub-contractors have a moderate appreciation of Latham. The consultants also had the perception that the Report was well received by main contractors, and a belief that client and their own organisations were fairly indifferent. Interestingly enough, only 19% of consultant respondents felt that sub-contractors had welcomed the Report. In contrast, the main contractors felt that it was reasonably well received by private clients, sub-contractors and themselves, but not at all well by consulting firms. At the time of writing, the views of the specialists are still being processed.

So, what does this mismatch in perceptions tell us? It would appear that each section of the industry is not able to agree on how the others feel about the Latham Report, and that no single faction can be considered to be fully behind the total package of improvements.

Concern over the ability of the industry to accept necessary change was expressed in the recent survey conducted by Pilat UK on behalf of National Power. The survey aimed to provide an insight into the attitudes and concerns of the industry following the publication of the Latham Report. Issues were considered in terms of: change in approach, teamwork, selection of contractors, a modern contract, payment and pricing. The perceptions of importance and performance on each issue were established at site level and senior management level. In the comments on results, the fear was expressed that the amount of cynicism and vested interests in the industry would not allow real change to take place. It was considered, however, that larger 'blue chip' clients would be the only players with enough resources and influence to effect change.

2.3 Limitations
The authors would contend that while the various recommendations put forward in the Latham Report may have merits in their own right, the review will not succeed in bringing about the desired sustainable changes to the construction industry if the present industry structure remains intact. Each recommendation may, or may not, provide a solution to a particular problem. For example, legislation on 'fair' contracts may improve the speed of payment to subcontractors. Those with vested interests have debated the relative benefits of this proposal, and will probably continue to do so. Most of the proposed improvements would appear to offer beneficial, and in some cases, improved practices for the various stages of the construction process. Thus, however, misses the point. The recommendations treat a set of symptoms, the fundamental cause of the industry's problems stems from the fragmented and dysfunctional structure.

What Latham has essentially done is to consult the industry over its problems, and ask what each interest group feels is necessary to effect improvement. He has then had to amalgamate the various view points and formulate a consensus package for recovery. It was then hoped that all of the self-interest groups would then agree to the enactment of the programme of recommendations and 'construct the team'. Would it be considered realistic for those same fragmented groupings to go along with this?

Concern over the approach employed by Latham was recently put forward by McDermott and Quinn.7 They felt that the methodology lacked a theoretical view, which would result in the problems faced by the industry being wrongly specified and only half-stated. McDermott and Quinn aimed to marry a conceptual framework to the process of the Latham Review, offering an institutional development approach. Their major criticisms were that Latham concentrated on the issues identified by the vested interests in the industry, and that the consensus approach from within may have
failed, even before implementation had begun. Further work would be required to create a strategic framework for policy to develop in tandem with strong institutions, which would operate for the general good.

The evidence suggests that the process behind the Review was fundamentally flawed, and that the proposals for improvement will not gain the necessary consensus to provide successful implementation. Until the functional barriers can be broken down, and the industry becomes integrated and product and customer-focused, there can be little in the way of lasting improvement. That is not to say that the Report does not serve any purpose and should be discarded; it has at least raised awareness of the industry’s problems and the need for improvement. An agenda has been set, and there is now a need for extending the depth of thought to tackle the fundamental problem of industry structure. What is the nature of the existing industry structure and what approach can be adopted to manage it more effectively?

3. The Construction Industry Structure in Context

For the purpose of clarification for a non-construction audience, it is necessary to put the industry and its structure into context. The construction industry may be defined as operations including: building, civil engineering and specialist contracting, as well as other activities where the major element of work is building, civil engineering, or the installation of products and systems, either in buildings or in association with civil engineering works.∗

There is no doubt that construction is a key activity in any economy; it influences, and is influenced by, the gross domestic product (GDP) of that nation. The UK construction industry currently provides 5.4% of the country’s GDP, excluding materials and supplies from other industries. The total volume of all construction work in 1995 is valued at almost £13,000 million each quarter, with the total market divided almost equally between repair/maintenance and new work. Although it is fair to say that construction’s share in net output has been in decline since the early 1970s, when its proportion of the GNP was at 6.6%, the sector remains an important part of the UK economy.

The structure of the construction industry may be considered in terms of demand and supply. On the demand side the total construction market may be segmented by the type of work required. To give an indication of the relative sizes of these segments, Table 1 (below) illustrates the value of work carried out in each sector for the years 1989 to 1993, and Table 2 indicates the proportions of work in each of these markets in 1994.

Table 1: All Agencies: Value of Construction Output By Type of Work.∗∗

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<td>New Housing</td>
<td>33.9%</td>
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<td>33.7%</td>
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<td>33.5%</td>
<td>33.4%</td>
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<tr>
<td>Private New Housing</td>
<td>33.8%</td>
<td>33.8%</td>
<td>33.7%</td>
<td>33.6%</td>
<td>33.5%</td>
<td>33.4%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>10.4%</td>
<td>10.4%</td>
<td>10.4%</td>
<td>10.4%</td>
<td>10.4%</td>
<td>10.4%</td>
</tr>
<tr>
<td>Public Building</td>
<td>8.9%</td>
<td>8.9%</td>
<td>8.9%</td>
<td>8.9%</td>
<td>8.9%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Private Industrial</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Public Housing R &amp; M</td>
<td>12.1%</td>
<td>12.1%</td>
<td>12.1%</td>
<td>12.1%</td>
<td>12.1%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Other Public R &amp; M</td>
<td>10.5%</td>
<td>10.5%</td>
<td>10.5%</td>
<td>10.5%</td>
<td>10.5%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Other Private R &amp; M</td>
<td>10.9%</td>
<td>10.9%</td>
<td>10.9%</td>
<td>10.9%</td>
<td>10.9%</td>
<td>10.9%</td>
</tr>
</tbody>
</table>

One current trend to note is the gradually increasing share of the market in the repair and maintenance sectors. This may be simply explained by the economic influence of the recession; many clients for construction have reduced their capital investment in major construction works, opting to repair and maintain existing facilities instead.

The supply side of the UK industry is extremely fragmented. The various professionals serving the industry are represented by a number of separate bodies, each looking after the interests of its individual members. These are predominately the Chartered Institute of Building (CIOB), Institution of Civil Engineers (ICE), Royal Institute of British Architects (RIBA), and the Royal Institution of Chartered Surveyors (RICS). It should also be noted that the services industry is represented by the likes of the Chartered Institute of Building Services Engineers (CIBSE), the Institution of Mechanical Engineers (IMechE), and the Institution of Electrical Engineers (IEE). Consulting firms may also represented by their membership of the Association of Consulting Engineers (ACE).

The contracting component of the supply side of the industry is no less fragmented. Although main contractors are represented by the Federation of Civil Engineering Contractors (FCEC) and the Building Employers Confederation (BEC), there is a plethora of bodies looking after the interests of the specialists and separate trades contractors.

As figure 2 (below) indicates, virtually fifty per-cent of all firms carrying out construction work in the UK during 1994 were sole traders, and these carried out almost ten percent of the total value of work in the sector.

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The largest one percent of firms account for 26.8% of the total work load, while almost 95% of the firms employ seven people or less, but still carry out over 30% of the total work. This illustrates the current polarised situation in the construction industry, with small firms carrying out a sizeable proportion of the total work load. A comparison with those in other countries? Table 3 gives an international comparison of productivity for construction in the UK, USA, Japan, France, West Germany and Italy. The relative values indicate that the UK construction industry was 50% more productive in 1992, than it was in 1980. Over the same period, productivity increased by slightly over 30% in France and Japan, and by 17% and 8% respectively in Germany (West) and Italy. On the face of it, a great improvement.

Table 3: International Productivity Comparison for Construction.

<table>
<thead>
<tr>
<th>Year</th>
<th>UK</th>
<th>USA</th>
<th>Japan</th>
<th>France</th>
<th>W.Germany</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1991</td>
<td>97</td>
<td>94</td>
<td>105</td>
<td>102</td>
<td>97</td>
<td>99</td>
</tr>
<tr>
<td>1992</td>
<td>110</td>
<td>97</td>
<td>104</td>
<td>104</td>
<td>98</td>
<td>95</td>
</tr>
<tr>
<td>1993</td>
<td>117</td>
<td>99</td>
<td>97</td>
<td>105</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1994</td>
<td>120</td>
<td>95</td>
<td>100</td>
<td>110</td>
<td>103</td>
<td>98</td>
</tr>
<tr>
<td>1995</td>
<td>121</td>
<td>94</td>
<td>104</td>
<td>113</td>
<td>102</td>
<td>100</td>
</tr>
<tr>
<td>1996</td>
<td>127</td>
<td>95</td>
<td>107</td>
<td>116</td>
<td>105</td>
<td>102</td>
</tr>
<tr>
<td>1997</td>
<td>137</td>
<td>94</td>
<td>120</td>
<td>117</td>
<td>105</td>
<td>104</td>
</tr>
<tr>
<td>1998</td>
<td>142</td>
<td>N/A</td>
<td>128</td>
<td>124</td>
<td>107</td>
<td>107</td>
</tr>
<tr>
<td>1999</td>
<td>139</td>
<td>N/A</td>
<td>120</td>
<td>127</td>
<td>110</td>
<td>112</td>
</tr>
<tr>
<td>2000</td>
<td>141</td>
<td>N/A</td>
<td>133</td>
<td>127</td>
<td>119</td>
<td>112</td>
</tr>
<tr>
<td>2001</td>
<td>139</td>
<td>N/A</td>
<td>132</td>
<td>128</td>
<td>112</td>
<td>110</td>
</tr>
<tr>
<td>2002</td>
<td>150</td>
<td>N/A</td>
<td>131</td>
<td>132</td>
<td>117</td>
<td>108</td>
</tr>
</tbody>
</table>

* Productivity has been calculated by dividing the construction industry's net contribution to the GDP at constant prices by the total number of persons working in the construction industry. Index based on 1980 = 100.

Cost comparisons for various types of development, however, indicate UK costs to be fairly expensive compared with other countries, although Germany appears to be a consistently expensive place for construction.

The report by WS Atkins, known as the "Secteur Report", produced a table of comparisons of estimated costs for a selection of hypothetical projects. The methodology for calculating costs was subjective to national interpretation, and may not be absolutely comparable, but still gives an indication of estimated output costs. Table 4 (below) indicates a summary of this data.

Table 4: Construction Cost Indicators, 1990.

<table>
<thead>
<tr>
<th>Country</th>
<th>Buildings Market Rate at PPP</th>
<th>Buildings Market Rate at PPP</th>
<th>Public Works Market Rate at PPP</th>
<th>Public Works Market Rate at PPP</th>
<th>TOTAL Market Rate at PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Netherlands</td>
<td>105</td>
<td>105</td>
<td>87</td>
<td>86</td>
<td>191</td>
</tr>
<tr>
<td>Italy</td>
<td>94</td>
<td>97</td>
<td>79</td>
<td>62</td>
<td>199</td>
</tr>
<tr>
<td>Germany</td>
<td>97</td>
<td>96</td>
<td>75</td>
<td>74</td>
<td>170</td>
</tr>
<tr>
<td>France</td>
<td>81</td>
<td>101</td>
<td>54</td>
<td>67</td>
<td>168</td>
</tr>
<tr>
<td>EC Median</td>
<td>82</td>
<td>98</td>
<td>75</td>
<td>79</td>
<td>177</td>
</tr>
<tr>
<td>Japan</td>
<td>86</td>
<td>77</td>
<td>98</td>
<td>88</td>
<td>165</td>
</tr>
<tr>
<td>USA</td>
<td>73</td>
<td>108</td>
<td>76</td>
<td>112</td>
<td>220</td>
</tr>
</tbody>
</table>

Source: WS Atkins from OECD data.
UK benchmark = 100.

Average costs, measured relative to the UK, are converted using purchasing power parity rates to remove the influence of differentials between market exchange rates on the average price level between countries. The Atkins Report concluded that the large range of variations could be explained by the differences in national levels of specification and design codes, but none the less, that the UK is amongst the high cost countries. The United States appears to be rated as high cost also, but in reality achieves lower costs through simpler designs and standardisation.
3.1 Problems Facing the UK Construction Industry

The existing literature, covering the field of construction economics, tends to agree that productivity, value for money, and overall client satisfaction in the construction industry are fairly low compared with other industrial sectors, and that no single, simple factor is responsible. There would appear to be a range of common factors, however, that could contribute to the inefficiencies in construction.

The most commonly held views from the authors’ survey and current literature, regarding the industry’s problems, are summarised below. With the exception of the structure of the industry, problems are categorised in terms of the demand side and the supply side. There are, however, common issues which concern both sides.

3.2 Demand Issues

3.2.1 Low and Discontinuous Demand

The Atkins Report considers that construction’s share of the GDP in the EC is too low and has been in long-term decline. The reasons for this are given as financing problems and declining public investment, exacerbated by the current recession. The concern for this problem in the UK industry is echoed by Sir Michael Latham in his report ‘Constructing the Team’, especially over the role of government as a major procuer of construction projects. Interestingly enough, only 40% of survey respondents on the client side of the industry felt that this was a problem, whilst 93% of consultants and 73% of contractors agreed with this view.

The effects of low and cyclical demand for construction are described by Briscoe. He considers that when demand is low and falling, construction firms find it difficult to fully utilise their workforce. Some workers will not, therefore, be fully active for all the hours for which they are paid, and while the firm attempts to adjust its labour requirement accordingly, the process of transition takes time. During this period, the firm will inevitably have a lower productivity ratio.

Perhaps what Briscoe does not add at this point, is the tendency of firms in this state to become more “cut-throat” in their bid to obtain more work, and more adversarial in an attempt to recover costs through claims on existing contracts. Briscoe also states that when demand increases, firms will often prove slow in hiring new direct labour, and will attempt to meet their labour requirements through subcontracting. This is often seen as a problem in achieving the required levels of productivity. Labour and producing the continuity of expertise to bring about productivity increases. Further fragmentation results. The nature of client demand, therefore, appears to dictate the structure of the industry, which positions itself to meet that demand. Fundamentally, the demand side will require careful management, in order to avoid the induced fragmented industry structure, which in turn creates the adversarial culture. The authors feel that while Latham recognises the effects of cyclical demand, it does not fully address the issue and the need for clients to manage their demand more effectively. We will explore this fundamental point about the role of the ‘intelligent client’ more fully, later.

3.2.2 Frequent Changes in Specification

Latham also considers that too many changes are introduced when a scheme is already underway. This, it is argued, stems from an inadequate brief from the client to the consultant and / or contractor, which subsequently requires detailed changes in specifications as the client decides what it really wants. Changes then have serious implications for both cost and programme.

The NEDO Report ‘Faster Building for Commerce’ explains how this problem arises. Many commercial clients have to operate in a fast moving and competitive environment, which often requires the need for flexibility to react to changing business requirements. In such a case, the procurement route needs to reflect this need.

Variations are more usually associated with projects where traditional procurement routes and forms of contract have been employed. In these cases, Briscoe concluded that variations can provide a lucrative source of profit for the contractor and inevitably slow up the construction process. He also feels that they are often used to justify slow building, and are particularly prevalent on large public sector contracts.

Surprisingly, only 15% of survey respondents found that changes in specification proved a problem. The client group was slightly higher at 20%, but still lower than would be expected. This could perhaps be explained by the fact that many client respondents are using a range of flexible procurement routes, and not just traditional (single or two-stage) tendering procedures.

3.2.3 Inappropriate Selection Criteria

"There is hardly anything in this world that some men cannot sell a little cheaper and make a little worse. Those who consider price only are this man’s lawful prey"

John Ruskin, Sesame and Lilies (1865)

Wise words from Ruskin, yet it is only recently that construction clients, particularly those in the public sector, have truly opened their eyes to the fact that value for money will not necessarily be secured by competition for lowest bid price alone. Public accountability was often the reason given for awarding a contract to the contractor with the lowest tender bid price, with quality seen as a ‘given’, covered by the specifications and contract. Latham confirms the prevalence of this approach, despite a letter in evidence to the review from Michael Howard, the then Secretary of State for the Environment, suggesting otherwise. Other public bodies concurred that the former was the case, as did the Federation of Civil Engineering Contractors in their discussion document ‘Competition, Quality and Value’.

Latham considered the problem of achieving quality and value for money in the appointment of both professional consultants and contractors. He refers to a survey carried out by the ACE on its membership in 1994. The essential findings were that virtually all respondents were bidding low to maintain cash flow, and then having to provide a lower standard of service in terms of: consideration of design alternatives, design quality, and a resistance to changes introduced by the client. The results in many cases were claims for additional fees, less trust between client and consultant, less investment in training and development, and higher capital costs of construction and operation. Latham also considered the similar problems experienced in the appointment of contractors, and the multitude of costly and burdensome prequalification and tendering procedures.

Although this factor was not originally included in the authors’ survey of the industry, many respondents commented that inappropriate selection criteria are an industry-wide problem.

3.2.4 Inappropriate Allocation of Risk

Latham recognises that no construction project is risk-free, and that risk may be managed, minimised, shared, transferred, or accepted - but not ignored. Latham also analyses the various distributions of risk under the standard forms of contract and, in broad terms, how the client may assess it in advance. What is not addressed, however, is the issue of unfair allocation of risk. The FCEC argues that the client might make an unfair allocation of risk, in an attempt to reduce its own burden, either by imposing risks upon the contractor that are best carried by the client, or by not providing for proper reimbursement of risks carried by the contractor. This appears to be fuelled by
3.3 Supply Issues

3.3.1 Poor Quality
WS Atkins considers that quality is one of the largest problems in the EC construction industry, and that quality has two dimensions: the level of performance specifications/design merit and then the compliance with these requirements, specifications and designs. Atkins states that there is a general belief that both aspects need to be improved in order to raise the quality of our built environment, reduce life-cycle costs, reduce the costs of defects, and to enhance the image and investment potential for construction.

Latham also states that clients will commission projects which contribute to their business objectives, and lists a number of criteria which would assist in achieving these, including quality-related issues such as: free from defects on completion, fit for purpose, supported by widespread guarantees and satisfactory durability. The report then quotes evidence from Slough Estates plc of construction industry performance compared with the car industry. In all cases the car industry was perceived in a more favourable light. Issues concerning cost and time were also included in this evidence. Latham argues that although such criticism may be harsh and may be challenged by industry if clients have such perceptions, then they must be listened to. The report also considers that barriers to entry in general contracting are too low, with no qualifications, experience and virtually no capital necessary. Although market forces eventually remove incompetent firms, in the interim they are a threat to responsible firms, bad for consumers and damaging to the quality and reputation of the industry. Latham does not directly mention the need for consumers to be able to appraise tenders with respect to their quality and calibre of site management they are buying for their projects, and to be wary of 'lean sourcing'.

3.3.2 Inefficient Methods of Construction
Briscoe writes that industrialised building methods are much more widely used in other countries, while traditional methods, especially in the house-building sector, remain a preference in the U.K. Latham quotes evidence from large client organisations, such as Lipton plc, Starhope and McDonalds Restaurants Ltd., stating that both the use of fabrication and modularisation techniques are used in construction industry. Essentially, the separation of design responsibilities and the lack of continuity in the development of design would eventually cause disruption on site. Many projects were also criticised for the lack of concern for the practical aspects of construction; designers appeared to lose sight of buildability. These problems would seem to typify the fragmented design responsibilities associated with the structure of the U.K. construction industry.

Latham tackles the issue of design integration, but recommends the formulation of a design check list to facilitate the co-ordination of the various design responsibilities. This may or may not work in practice, and its success may be linked to the ability of the project manager concerned, but it does not really address the lack of process focus caused by the fragmented industry structure.

3.3.3 Poor Public Image
The construction industry has a poor reputation, with both its clients and the public at large. Latham considers this problem and the industry's resultant lack of ability to attract and retain high calibre personnel in its firms. It also addresses the problem of equal opportunities in construction, especially concerning the employment of women. Atkins states that it is necessary to improve quality, productivity and efficiency for the industry must attract and retain competent people. This is felt to be an increasingly important issue, as construction is often seen as poorly paid, dangerous, unhealthy, unpleasant, with poor job security and uncertain working hours.

The report concludes that design is an influence on the efficiency of construction in two ways: firstly the co-ordination of design affecting the coherence of design information, and secondly in terms of buildability. Essentially, the separation of design responsibilities and the lack of continuity in the development of design would eventually cause disruption on site. Many projects were also criticised for the lack of concern for the practical aspects of construction; designers appeared to lose sight of buildability. These problems would seem to typify the fragmented design responsibilities associated with the structure of the U.K. construction industry.

Latham tackles the issue of design integration, but recommends the formulation of a design check list to facilitate the co-ordination of the various design responsibilities. This may or may not work in practice, and its success is likely to be linked to the ability of the project manager concerned, but it does not really address the lack of process focus caused by the fragmented industry structure.

3.4 Common Issues

3.4.1 Poor Management
Briscoe recognises that while many other factors contribute to low productivity, some firms are able to achieve a greater output per man than others. This, he contends, is due to the quality of construction management across the firm: from director / senior management down to project manager / site agent level. Good management at a senior level will lead a firm to organise its structure and systems in the achievement of higher productivity. At site level, good management will ensure that materials are promptly delivered to site, that sub-contractors are scheduled properly, performance is closely monitored, direct labour is suitably motivated, and so on. Briscoe believes that such quality in the construction industry is highly variable.

The NEDO report also considered the relationship between success on site and 'strong' management teams. It underlined the need for managers to be able to assess their tenders with respect to the quality and calibre of site management they are buying for their projects, and to be wary of 'lean sourcing'.

A successful project, however, does not just depend on the effective management of the supply side. The client also needs to take some responsibility. The IEE report states that the contracting side of the industry often fails to appreciate the need for customers to be able to assess their tenders with respect to the quality and calibre of site management they are buying for their projects, and to be wary of 'lean sourcing'.

3.4.2 Inadequate Investment
Both Latham and WS Atkins consider the problems associated with inadequate investment in training, research and development, and the impact on quality in the industry. Atkins states that the levels of skills on construction sites has declined in recent years, partly due to the availability of cheap, unskilled, immigrant and temporary labour, which creates a disincentive to invest in training and skilled labour. The report states that improvement in training in most EC countries is required.

Regarding research and development, Latham quotes evidence from a CIC working party discussion document, which expresses the views of the UK spending on construction research and its dissemination is substantially below that judged necessary by a succession of authoritative studies. The report further considered views on the fragmented approach, the lack of co-ordination, and the barriers to effective dissemination and realisation of tangible benefits.
Atkins explains why investment is low in the EC, compared with the likes of Japan. The level is low partly as a result of the structural characteristics of the industry, with many small firms, volatile markets creating short term attitudes, low profitability because of cut-throat competition, and fragmented industry interest groups.

Again, the inference is that the industry structure dictates the attitudes of its participants, which leads to the symptomatic problems described.

3.4.3 Adversarial Culture
The adversarial nature of the UK construction industry has been a recognised problem for many years. The authors' survey confirmed the view that even the industry sees itself as adversarial. In fact, this was seen as the most important problem, with 88% of the total respondents in agreement. The Chartered Institute of Purchasing and Supply, in its submission to the Latham Review, stated that present adversarial practices were to the disadvantage of clients and discouraged the adoption of the best modern procurement processes, which would achieve better value for money and enhanced product quality. Avoidable disputes, and the events that lead up to them, divert management attention from constructive work, and therefore reduce productivity and increase costs.

We feel that this problem is prevalent at all levels in the construction supply chain, and that the primary causes of the problem are: a lack of a clear contract strategy, inadequate selection and adjudication of tenderers, traditional forms of contract, the culture, which reinforces the attitudes to the problems, which further perpetuates the adversarial nature of the industry. The vicious circle continues.

3.4.4 Fragmented Industry Structure
The CIPS report summarises the nature of the fragmented industry structure. It contends that numerous recessions since the Second World War have forced contractors to shed their craftsmen, so that many of the 'main contractors' no longer undertake work directly. This has led to the greater use of labour only sub-contracting, buying-in of materials, and hiring of plant. Other sections of work may be subcontracted wholesale.

The shortage of work during recession causes contractors to submit lower prices, which forces their own procurement processes to be price (rather than quality) sensitive. Labour only sub-contractors engage workers for specific contracts, with little or no training. Other investment is further limited.

Sub-contractors may also further sub-contract work. Architects/engineers may employ consultants for further packages of their own work. Each layer in the construction supply chain passes on the risks and adds further points of tension and conflict, which can increase costs and reduce efficiency.

The NEDO report also addresses the problem of industry structure, and argues that the proliferation of organisations and specialisms has agitated the existing problems of co-ordination, communication, motivation and control. The industry is fragmented in terms of the separate businesses, but also the diversity of professions and trades. Employees in the construction process owe their allegiance to their employers, rather than the customer or the management for a particular project. This highlights the view that the present structure causes a lack of product focus.

The whole structure would appear to be fragmented, dysfunctional, and laden with 'no value-added costs'. Our recent survey does not, however, support this view. Only 53% of all respondents felt that a fragmented structure created a problem in the UK. This would be expected, however, as the view of the establishment is more likely to be in favour of retaining the status quo.

Latham does not really address this issue. Furthermore, it would appear that the initiatives which are proposed to improve the situation are a response to the existing situation, without taking the opportunity to consider what would be an ideal structure. The authors believe that this is fundamental to all of the problems in the industry, and should have been explored. This criticism is discussed in greater detail below.

4. Towards a Structural Resolution: The Intelligent Client as Driver
Latham was absolutely right when he stated that 'Clients are at the core of the process and their needs must be met by the industry.' The subtlety has been missed, however, regarding the linkage between client behaviour and industry structure.

In determining their construction spend each client effectively weighs up his various needs for construction and other investment, against the short term economic conditions in which he has to operate. Traditionally, this set of disparate clients, aided by various professional advisers, has packaged-up its construction work in a seemingly endless line of one-off projects, with a managed competition on each occasion to determine who will carry out the work. This behaviour has given rise to procurement strategies that are short term and reactive, which create the cyclical and fragmented demand for construction work. The rest of the industry's participants then align themselves to meet this demand. Contractors are not able to dictate how the industry is configured, they can only respond to what is asked of them. The fundamental problem here is, of course, that construction is not normally seen as a 'core competence' for most of the major clients in industry. It is generally seen as a residual or, at best, complementary business requirement and since it is not a primary process, it is often treated as a commodity spend. The starting point, therefore, has to be with clients and improving the effectiveness of their procurement spend, in such a way as to impact beneficially on the structure of the industry.

4.1 Strategic Procurement Management: The Relational Competence Approach
The first point to make is that clients who only have a short-term need for construction procurement will not be 'intelligent clients'. Intelligent clients can only be created from first focusing on those who have a regular 'process', rather than 'commodity' spend in construction. Thankfully, there are a great many clients in the UK who have a regular requirement for construction work of a similar value and content, i.e. 'process spend'. The problem occurs, however, with those clients who do not appreciate that they have a process spend, procuring their construction work in an unstructured manner. Their awareness needs to be raised concerning the potential benefits available to their businesses, as well as the construction industry at large.

Historical procurement procedures aside, it does not necessarily follow that every construction requirement has to be individually tendered for; works of a similar value, frequency and character should be dealt with more strategically. By considering the total client portfolio for construction work, it is possible to apply strategic procurement techniques to create greater value for money, whilst achieving greater long-term control over cost and quality. The intelligent client needs to understand his total business drivers, how his construction needs relate to these, and what 'fit-for-purpose' supply relationships will produce the best results. It is essential for clients to fully
understand what is truly fit for their purpose, and not merely apply historical or
faddish procedures without questioning their suitability. The inappropriate use
of procurement practices will result in the organisation incurring excessive costs or losing
competitive advantage.

4.2 Partnering?
For those with a process spend, there is certainly a possibility for longer-term, closer
relationships. This is true for organisations in both the private and public sectors,
subject to the various EC procurement regulations. It would seem, however, that many
in the industry believe that ‘partnering’ provides the answer to the question of which
relationship type should be used in the procurement of construction works.

Bennett and Jeyes, in their report ‘Trusting the Team’, consider that partnering can be
based on a single project (project partnering) or on a long-term commitment
(strategic partnering). The implication is that a partnering arrangement can be applied
to all situations. There are clearly demonstrable benefits to be gained from operating
within a partnering philosophy, but the question needs to be asked as to its suitability
for all circumstances. For instance, would a client organisation really desire a
partnering arrangement for a non-strategic item, or where costs outweigh the benefits,
or where he may be exposed to the dangers of single-sourcing? In some situations it
may not be commercially advantageous to enter into such an agreement. It should not
be a case of asking ‘where can we use partnering?’, but more appropriately ‘what
relational approach would best satisfy our business needs?’. The concept of partnering,
while embodying many important aspects of good management, would appear to be a
misunderstood and misguided technique in construction at this present time. The
danger is that if inappropriately applied, partnering may suffer the same fate as other
fad, such as ‘JIT’, ‘TQM’, etc.

4.3 Fit-for-Purpose Relationships
Clients should not necessarily decide, however, on one type of relationship to satisfy
all of their procurement requirements; they should determine a suitable strategy to
derive an optimum portfolio of supply relationships to satisfy their business needs.
The approach to supplier sourcing decisions suggested by the authors seeks to meet
this requirement for an organisation’s various supply and value chains, and is called
Relational Competence Analysis (RCA).

RCA is founded on the theory of the firm, and is based on the idea that the key to
business success is always generated by the ability of the firm to maintain control
(power) over the various business processes (supply and value chains) which impose
costs on the organisation. Cox considers a ‘step-ladder’ of internal/external
contractual relationships, ranging from ‘adversarial leverage’ at the commodity end of
procurement to strategic alliances and internal contracts at the strategic (process) end.

Figure 3: A Step-ladder of External and Internal Contractual Relationships.

The placing of a particular relationship on the step-ladder is determined by the degree
to which firms can operate at relative arms length in their external contractual
relationships, as against their desire to vertically integrate the production of goods or
services internally. At the same time, the position of a relationship on the step-ladder
is also differentiated in terms of the relative degree of power between participants, and
the relative ownership which partners to external contracts have in the eventual goods
or services which are produced from the contractual relationship.

Thus, where market competences are not core or complementary to an organisation’s
business process, assets will be of low specificity, and there are likely to be several, if
not many, potential suppliers. The more the competences approximate to core
activities (higher asset specificity), then the greater the likelihood that external
relationships may lead to merger and acquisition, or very close single-sourced
negotiated contracts. In adopting such an approach, organisations will be able to select
the combination of relationship types that create optimal supply chains, providing
the greatest efficiency of transactions and increasing competitive advantage and profit
making ability.

This approach is currently being developed by the University of Birmingham for
application across all industrial sectors, including construction. The methodology is
common to all procurement situations, although the outcomes derived will be specific
to the particular circumstances. The general approach can be outlined by five
elementary steps, although in reality issues will be complex, requiring a range of tools
and techniques to assist in analysis and strategy formulation.

1. It is firstly necessary to understand the client’s business needs and drivers, and
fully appreciate the market in which he operates. This is absolutely fundamental
in establishing how efficient construction can assist the client in achieving
business success.
II. An assessment then has to be made as to what construction requirements the client has in pursuing his business, and what drives these. The construction needs should be aligned with the business process for synergistic benefits to be achieved.

III. The client should then segment his various construction needs to produce a procurement portfolio, grouping items together by such criteria as: value of spend, frequency of requirement, impact on business case, and product and supply market characteristics. By grouping like items together, the client is able to achieve a more effective approach to managing his procurement spend.

IV. Various decision-making techniques should then be employed to determine the optimum range of fit-for-purpose relationship types for effective and efficient procurement.

V. Finally, it is necessary to produce a prioritised action plan, focused on client requirements and competences. A programme for change management should be included to facilitate successful introduction of proposals.

The potential benefits to the organisation employing such an approach are many and include: a greater control over the supply and value chains which impose costs on the organisation; and a mechanism for on-going cost reduction and continuous improvement in the quality of goods and services received. In achieving such advantages for an organisation, it is necessary to consider the likely impact on the industry and its structure.

4.4 Industry Structure

By employing RCA, the implication is that some clients will be able to adopt a process management approach in the procurement of their construction needs, while others will still be faced with a commodity spend situation. Firms should ideally combine an optimum arrangement of the two, that best satisfies their particular situation. While the effect of commodity spend will be to require contractors to become more customer focused, as clients achieve a greater control over the supply market, the real benefits to the industry will become apparent through the effect of an increase in process spend.

The authors believe that the industry structure for process spend would be an induced quasi-vertically integrated supply chain, somewhat reminiscent of the Japanese keiretsus, but not as tightly interlocked. Figure 4 (below) indicates this situation diagrammatically.

The intelligent client would need to incorporate a cross-functional 'Portfolio Management' team to proactively manage the competences of specialist consultants and alliance contractors. A phased introduction would ensue, as the client would initially install the first tier of suppliers (contractors). Then, as the benefits of RCA become apparent, the process could be applied to the second tier (specialists), and eventually down to the suppliers. The process could be further hastened by the proactive involvement of the client, in securing effective arrangements for the whole supply chain. The client would only be interested in retaining such arrangements for as long as his business objectives are being met, and so appropriate and effective performance measures would need to be applied to ensure long-term success.

The overall effect would be to create a pool of contracting firms with a relatively stable demand for their services and, consequently, a reasonably secure income. Fragmentation would be reduced, as once the various parties are installed in such a structure, it is in the interests of all concerned to work together and focus on the process of satisfying the client's needs; functional and organisational barriers would be eroded in striving to achieve common goals.

The social issue concerning the conditions of employment for construction workers would also be addressed. With effective demand management, it will be possible for more clients to adopt a process spend, which will then create a greater certainty of employment for workers involved in such a structure. This would enhance motivation, all things being equal, and give employees a greater feeling of responsibility, as it will be in their interests to produce continued good work and satisfy the ultimate client.
5. Conclusions and Recommendations

The authors believe that Latham, although well intentioned, was essentially flawed; it treated the industry's symptoms, without addressing the fundamental problem of the fragmented industry structure. The review, unsurprisingly, missed this point, as it relied on consulting those with vested interests in retaining the status quo, and hoped that the fragmented parties would then form a consensus approach to enacting the full package of recommendations. There is growing evidence in support of the authors' view that the review will not succeed, as it has become apparent that the recommendations in the construction process can not agree on what, or how the recommendations should be enacted.

Most of the industry's problems in fact stem from the fragmented and dysfunctional structure, and if lasting improvements are to be achieved, this issue must be fully addressed. Other beneficial practices, such as those recommended by Latham, could then follow.

Major clients are those best placed to have a beneficial impact on the industry structure. Their actions and procurement practices substantially influence the nature of the supply market, which aligns itself to satisfy the client requirements. Clients should, therefore, improve the efficiency and effectiveness of their procurement spend, and address the fundamental question of whether to employ a 'project' or 'process' procurement strategy.

By adopting the approach of Relational Competence Analysis, clients can determine their optimum portfolio of supply relationships. Process clients should then realise the benefits of process spend: greater control over their supply/value chains, on-going cost reduction, and improved quality. With more effective demand management, the industry should also benefit. A greater process spend would create a pool of contracting firms with a regular work load and, as the benefits become apparent to such firms, quasi-vertically integrated supply chain structures would be induced. The resulting stability would provide greater client satisfaction, and allow better resource planning for organisations at all tiers within the industry.

The authors believe that RCA offers a more robust and principled approach to construction management than trying to get the existing players to enact a set of improvements that would merely fine-tune the existing industry structure.

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The Purchasing of On-Going Services

How to define the purchasing function in a service context
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Abstract
The aim of this paper is to analyse aspects of defining the purchasing function for on-going services. The analysis is based on theory and empirical studies of purchasing technical on-going services in municipalities in Sweden, England and Germany. It is argued that the purchasing function can be defined from different perspectives: as a bundle of actors, as a configuration of competencies and activities, as a frame of interfaces, as different managerial dimensions and as a part of an institutional system. The complexity of relationships, the need for continuous communication, and the need for interaction with the service-user are special aspects of purchasing that need to be considered.

Keywords: purchasing function, services, municipalities, complexity, contract management

1. Introduction
In this paper the aim is to analyse and discuss the purchasing function in buying services, more specifically on-going technical services in a municipality context. Most descriptions of the functions and processes in purchasing are based on the manufacturing industry. Services have some peculiar features, which can be assumed to have implications for the purchasing function. Some of the most important of these characteristics are the difficulty of specifying the service, the high degree of uncertainty in the delivery conditions, the need of interaction with the end user and the fact that the delivery-process often is performed in many dispersed locations.

The municipal context also creates some special conditions for purchasing, as for instance the importance of laws and regulations, the political decision-making, the budget-related income-context, the connection to a geographical area and the balancing of conflicting goals as a main purpose (Stewart, 1985). The topic will in the first part of this paper be discussed from a theoretical perspective, based on theories about service management, purchasing and transactions cost-theories. In the second part of the paper an analysis of empirical material is presented. The empirical material is based on interviews concerning purchasing of highway maintenance, parks maintenance, refuse collection and maintenance of water and sewerage nets in municipalities in Sweden, England and Germany.

2. Increased contracting out of services
2.1 The development in the local government sector
There is an increase of contracting out services in local government all over the world. In Sweden the total proportion of municipal services contracted out, in relation to turnover, is still not very large. In 1991 it was around 5-10%, exclusive construction projects. In technical services the proportion is higher, around 25%, due to a long tradition in building and construction-related services to utilise resources by using contracting arrangements. In a study of 40 authorities 1992, the proportion contracting out was 35% for Highway maintenance services, and 13% for Parks maintenance services. For Refuse collection about 65% of the Swedish municipalities use external contractors. For Water and Sewerage services there are only a small proportion contracted out.

The same trend of increased outsourcing can be found in the local government sector in other countries. In England a compulsory system of competitive tendering (CCT) is imposed on local government by the central government. For Highway maintenance and construction works it has been mandatory since 1980, and for Building cleaning, Catering, Refuse collection, Grounds maintenance, Vehicle maintenance and Leisure services since 1988. From 1992 there is an extension to professional services, as e.g. legal services, personnel services, architects etc. The average of services contracted out in the municipalities has increased to around 35%. Building cleaning and Refuse collection are contracted out in a higher degree, around 50%. (Municipal Journal, 1993).

In Germany there has not been the same kind of central policy for competitive tendering, but there is some tendency towards increased contracting out in technical services (Bryntse, 1993). The most frequent use of contracting out is found in Building cleaning and Refuse collection, where about 50% of the services is run by private contractors. Germany has however since long a tradition of external sourcing in other forms, by using different co-operative solutions between municipalities, private companies and voluntary organisations.

In Sweden and England the development of contracting out has been accompanied by a reorganisation in many municipalities, by splitting the service departments into a purchaser/client unit and a provider/contractor unit, using internal market-mechanisms. The same organisational trend has not (yet?) developed in German municipalities.

2.2 A need for contract management skills
Different kinds of problems have been identified in the contracting out of local government services:

"Government investigators as well as academic researchers have also documented significant problems arising from contractor-government relationships including goldplating, over specification, over regulation, inability to shift contractors, conflict of interest, reduced services, low-bid introductory offers followed by large cost increases and ambiguous definition of contractor performance." ... "contracting out is no panacea for inadequate government organization capacity. Its expanded or even continued use at a high level requires government organisations that can manage the interdependencies with an array of private, non-profit, quasi-governmental and other government organisations."

(Wise, 1990)
Since the contract-relationships in services to a high degree are long-term and complex, the need of skills in management of contract-relationships is becoming apparent. According to Clarke and Stewart (1988) it is required:

"skills in contract management, networking skills across a range of organisations, organisational understanding of those with whom the authority has to work with, negotiation skills with different types of organisations, and building relationships for multi-organisational teams."

2.3 Contracting out of services in the private sector
The tendency of increased outsourcing of services can also be found in the private sector. There is a general trend of contracting out support services as cleaning, catering, security, etc. The trend of outsourcing and deregulation in the service sector (transport, finance, etc.) is one explanation to the increase.

Miles and Snow (1986) also characterise the increased use of joint ventures, subcontracting and licensing activities as a development of a new organisational form, especially relevant to service industries:

"As the United States continues to become more of a service-economy, the case of textbook publishing (and many other examples) may well suggest the pattern by which other labor-intensive industries move toward the dynamic network model. The rationale for 'people' and service businesses to adapt to this structure is clear. The dynamic network is far more flexible than any previous form, it can accommodate a vast amount of complexity while maximizing specialized competence and it provides much more effective use of human resources that otherwise have to be accumulated, allocated and maintained by a single organisation". ... "The logic of the dynamic network model indicates that this flexibility can be achieved largely through vertical disaggregation."

2.4 The dispersed character of purchasing services
The total volume of service purchasing is dispersed on many different types of purchases, e.g., transports, building cleaning, facilities management, insurance, hiring consultants, computer services, hotel bookings, etc. American studies have also shown that the major part of services purchased is not handled by a purchasing department, Other departments that commonly is responsible for purchasing services is the marketing department, the production department and the finance department. When all the small purchasing volumes are summarized, the total expenditure on purchasing of services in a company can however amount to up to 50% of the purchasing volume (Fesmor and Bal, 1985).

3. What is special about services?
3.1 Theories about service production
Literature on characteristics for service production and service management generally emphasizes that the production of services are characterized by:

- Intangibility and not possible to transport
- Production and consumption at the same time, absence of inventory buffer
- Difficulties in controlling quality
- Multi unit organisations, dispersed production
- Difficulties in measuring output

- Involvement of the customer in the production
- High degree of personal resources in the production

According to my interpretation, those characteristic conditions of service production have implications for the purchasing of on-going services. It should hereby once again be emphasized that services are a heterogeneous category (Gadde and Hakansson, 1994) in a range from standardised, repetitive services as hotel bookings, to unique and complex one-time purchases, as for instance hiring of consultants. The conditions for these different types of purchases can vary considerably, but many have some features in common.

The services are delivered/produced 'in the field', many times in interaction with the customers. There is no need of considering inventory-sizes or just-in-time purchasing, since the services cannot be stored. Instead there can be a special importance of timing and flexibility to adjust resources to sessions, peak time in days, or to deal with unexpected needs.

Since the user/customer is often involved in the service delivery, there is more need to include customer aspects in the purchasing of services. The user affect the conditions of the service delivery, e.g., how much litter is thrown in a parking lot, users perception of the service is also an important part of the quality judgement. Another aspect is that continuity is a quality aspect of many personal services, e.g., in elderly care.

Measuring the quality of delivery is a complex issue in many services. It is difficult to define clear-cut specifications, and you cannot measure the number of defect products as you can with goods. Instead there is a need to reach mutual understanding of the important characteristics and qualities of the service, which has to be made by continuous communication and trust-building activities. The need to make adjustments and interpretations during the contracting period, calls for efficient forms of communication and interaction. The difficulty of specifying quality also affect the possibility to enforce sanctions. How can, e.g., a bad delivery from a legal adviser be defined? Because of the investments in communication that are necessary to create an understanding it can be expected that long-term relationships with contractors are preferred.

Since the service many times is performed at many different locations, there is also a special problem in how to organize the monitoring. The dispersion also implicates that dependence on local knowledge is a critical issue in many services, as in the case of for example maintenance of water and sewerage nets and grass-cutting. This have implications for the choice of providers, there is often a need for a close relationship to suppliers with a local base.

Because of these peculiarities one could expect some special features also in the organising of the purchasing function of services.
One explanation can be that the volumes and content of services have not been of strategic importance for companies. It has mainly concerned support services and the volumes have been small and dispersed.

In the recent years there has however been an increase of literature on the subject. (Demer and Gibelman, Graw and Maples, Faes, Faeron and Bales) The issue has also been commented in books about industrial purchasing and in literature on purchasing for the government sector (Gadde and Håkansson, van Weele, etc.). Some of the characteristics mentioned in the literature on service purchasing is that it is more complex and less standardised than purchasing goods. There is also a need to consider regulations for taxation, health and safety, etc. because of the large proportion of personnel involved. Some other conclusions concerning purchasing services are (Graw and Maples, 1994; van Weele 1994):

- There is more need for written specifications of the content of the purchase.
- Taking references and judging the qualities of the contractor is more important.
- Special procedures need to be designed to avoid and deal with problems in the service delivery.
- It often takes voluminous administration and communication during the contract period to deal with variation and unforeseen events.
- There are often long-term relationships with the contractors of services, because of the need to invest in mutual understanding.
- The issues of make or buy are more controversial in purchasing services, since it is involving a large proportion of personnel.

The situational context of buying services could also be compared with what is called relational contracting by Williamson (1986) and MacNeil (1978). There is a high degree of uncertainty, there are properties involved which are difficult to measure and there is a monitoring problem in the contract situation, which according to Williamson calls for third-party solutions, trust-building and evolvement of an atmosphere of common culture and norms.

4. Results from empirical studies

4.1 Introduction

In this section some results of empirical studies of contracts in four technical service areas will be presented. The material is based on interviews in municipalities in Sweden of different size. Some comparative studies have also been made in England and Germany. The study encompasses about 70 interviews, mainly with purchasing/client officers, but also with politicians and central actors (researchers, municipal associations, etc.). The aim of the study was to develop a framework of general components of contract management of services and to use it for analysing differences in practice in different services and national contexts. According to the results of the empirical studies, I argue that the purchasing function can be defined from different perspectives.

4.2 An actor-perspective on the purchasing function

One perspective on the purchasing function is the question of who is involved during the process. My empirical studies show that a bundle of different actors are involved in different stages of the purchasing process (see Figure 1).

![Figure 1. Different actors involved in the purchasing process](image1.png)

This picture differs from the traditional picture of the purchaser and the contractor being the only actors in a contract relationship.

4.3 An interface perspective on the purchasing function

The purchasing function could also be defined by the different interfaces it is communicating through (see Figure 2).

![Figure 2. The different interfaces of the purchasing function](image2.png)

An interpretation of Figure 2 is that communication and translation is an important part of purchasing. Venkatesan (1992) argues for the important distinction between producing in-house and controlling the design. He argues for the need of "the architectural knowledge", which he defines as:
4.4 An activity- and competence-oriented perspective of the purchasing function

In this section a more detailed description of the different activities in the purchasing function will be presented, together with the competencies that are perceived to be important for each of them.

4.4.1 General sourcing policy and contract policy

There are two different policy-elements affecting the purchasing function. One is the sourcing policy, with the general decisions of make or buy. The other is the service-specific contract policy which often is labeled as the "packaging of the contract". This means how to combine different services, activities and functions into contracts in order to stimulate competition and make the contracts easy to manage, by minimising the transaction costs.

In the six municipalities in my study the sourcing policy and the make or buy decisions was dealt with in a complex pattern between politicians and officials representing different stakes of interests. Apart from the economic calculations, the strategy of make or buy is concerning the controversial issue of keeping the in-house staff or to fire them. In all authorities this has been an extremely delicate and conflict-laden issue and there has been a complex interaction between the top management of the authorities, the management of the purchasing function and the management of the in-house provider organisations in most of the cases of contracting out. In these discussions the politicians were also highly involved.

The strategy of packaging the contract seems to be handled by the managers of the purchasing/client functions. In a large city it was handled by a special 'commercial' department. An important competence of this function is the knowledge of the market situation and the market structure.

4.4.2 Service specification

The service specification contains information about quantities and norms of qualities. The quantities are mostly based on detailed information about surface-areas, length of streets, number of real estate properties, number of trees that need maintenance, number of service users, etc. Concerning the norms of qualities there is a discussion whether to write strictly detailed contract specifications, with descriptions of input resources (e.g. staff competence, type of equipment), and the exact activities that has to be performed, or to specify it in a functional way, by describing the output and the outcome. In grass cutting the first way can be exemplified by specifying the number of times per month the grass shall be cut, and with what kind of equipment. An output oriented definition is instead to define minimum and maximum heights of the grass or to show demonstration surfaces of how the outcome shall look. The most common solutions seem to be a combination of different ways to explain the essence of the service. Several of the purchasing officers emphasised the importance of transferring knowledge of how the work used to be done.

The important competence for this activity is deep knowledge of the characteristics of the service, interpretation of the local policy and the government budget, and to be able to communicate this to the contractor. The most common formal competence for the officers in this position turned out to be an engineering exam combined with several years of experience in the service, as a manager or a construction engineer. The most important thing is to know the service, the contract management skills are more easy to attain on the job, was a common view.

In one of the authorities, the specification task was organised as a project, with several different departments of the authority represented. There were officers from the finance department, corporate strategy, personnel, legal and the actual service department. These representatives of different perspectives discussed jointly and agreed upon the specifications for the contract. When the specification was made the project group was resolved and the responsibility for managing the contract was transformed to a purchasing/client officer. If there was a renewal situation the group could be gathered again to evaluate the contract.

In most municipalities, the service specialists were the main contact in the relationships with the contractors.

4.4.3 Commercial regulation of the contract

This part often included the handling of tendering procedures and was mainly organised as a support function in the authorities. One solution was to delegate it to the controller function or the legal department of the authority. More common solutions were to consult other departments, where the officers have experience of commercial issues, e.g., the construction department, or to use external consultants. There were also many staff training programs about contract law, negotiation-techniques etc. Purchasing officers in some smaller authorities relied on their own knowledge and the use of standard contracts.

The function was naturally more developed in larger authorities, with larger volumes of contracts to handle. In one of the large cities the contract expertise function was organised as the main interface to the contractor and combined with the monitoring function. These officers were also service specialists, but focused on contract and negotiation aspects.

The scale and importance of the legal and commercial aspects is depending on how far the standardisation of the contractual matters are developed within each service. In the technical services the use of established standard contracts from the construction industry are widespread and appreciated by both parties. "The frame of the relation is very clear, there is not much need to discuss the terms and conditions", was the opinion of one of the interviewed.

Another aspect of the commercial regulation is the use of open agreements, where the general conditions and a work-rate is defined, but not the specific task or the volume of the contract. These were sometimes designed by a central purchasing department in the municipalities.

The competencies that was stressed for this function was commercial thinking, knowledge about contracting laws, knowledge about laws and regulations for public purchasing, and negotiation-skills.

4.4.4 Monitoring

Monitoring is a major part of the management of contracts for services. A survey by the Audit Commission in 48 English authorities 1992 showed that the monitoring costs were about 50-60% of the costs of the client/purchasing function and about 1-6% of the total annual turnover of the services (Audit Commission, 1993). The proportion of...
costs varied between different services, with the highest in Vehicle maintenance, Building maintenance and Building Cleaning. According to the analysis by the Audit Commission, the use of detailed monitoring mainly varies with:

- the approach of monitoring by the authority;
- the degree of uncertainty in the service; and
- the possibilities of involving the customer in the monitoring.

In my interviews with the municipalities in Sweden, I found different ways of organising the monitoring function and different assignments of resources to it. At one extreme there is a great reliance on the service users, for example in Refuse collection, where you can be quite sure to hear from the customer if the garbage has not been collected as usual. Most of the authorities also had some sort of systematic complaint procedures and different kinds of user surveys for evaluation. Some of the municipalities argued that it was the responsibility of the contractor to monitor the services. There were also examples of demanding an ISO-certification of the contractors.

On the other end of the scale there can be strictly organised inspections several times a week. In the larger cities the monitoring function seemed to be performed by a specially assigned officer or department.

One problem is that there is also a time dimension in the monitoring for, e.g., maintenance of highways and parks maintenance. The result of a mistreatment of plants, maybe not will show until after several years and the lack of proper maintenance of streets, sewers or bridges will end up in larger problems several years later.

The special competence for monitoring is good knowledge about what is agreed upon in the contract and a good knowledge of the service and the potential problems of it. In Street cleansing the crucial knowledge can be of how and where the greatest problems of litter are. In one London-authority in England the monitoring staff in the Street cleansing service was organised in geographical districts, where they got experience of where the problems might occur and hence concentrated the inspections on those areas. The role of the monitors was in this case also expanded to take a wider responsibility of their areas, including different activities of influencing the behaviour of the public to reduce the litter thrown in the streets. The monitoring officer in this case had frequent contacts with the staff of the contractor.

One aspect of monitoring is the choice of approach by the buying organisation. It can vary according to what degree the contract-agreements are monitored by the written details of the contract or more according to the current situation. One purchasing officer in England said that "it is extremely important to specify the contract in detail, but when that is finished I put it in my desk drawer and keep it there". The message was that the contract should not be the reference point for the evaluation of performance, which was also argued by MacNeil (1978), who suggested that in long-term relationships characterised by high uncertainty, it is more relevant to evaluate the performance according to the entire relationship as a reference-point. This means that there can be a certain acceptance of errors if they are corrected and if the supplier-relationship as a whole is judged as valuable and important.

4.4.5 Management control
An aspect of the delivery control is also the procedures for payments and the procedures for sanctions, if the performance does not meet the requirements. This is commonly a task for the client/purchaser and it is often carried out at regular meetings with the representatives of the contractor. These meetings also functions as an arena of early problem-solving, adjustments of the specifications and planning. The structure of the meetings were in the Swedish municipalities based on a common practice in the construction industry, using a quite formal setting with chaired meetings and written minutes.

The approval for payment are based on the reports from the monitoring officer and/or signed reports from the contractor. In England it was rather common with sanction clauses in the contract, and they were frequently used, when the performance did not meet the specified standard. 10-15% of the payment was withdrawn according to previous agreements in the contract. In Germany the purchasing officers in one authority argued that the best sanction was not to pay at all until the work was done completely. In Sweden sanctions were not specified in the contracts or used in the same degree.

In the tasks of management control is also included the economic reporting to the top management and to the politicians in the service committees.

4.4.6 Computer support and file-administration
One important feature of the administration of contracted out services seems to be the computer support. One example is the need to communicate the quantities and locations of the objects to be served in the contract. This is done through new developed techniques of CAD (Computer Aided Design), printing defined maps of geographical areas for grounds maintenance or for defining the amount and locations of sewer nets. These computer techniques makes it possible to decrease the need of local knowledge by the contractor, which is one main obstacle of contracting out. One problem is however the costs for updating of the data bases, which could be labelled as transaction costs.

The special competence in these functions seems to be computer-competence and experience in handling data bases. This function is commonly organised as a separate support function, in the same department or in a different department.

4.4.7 Administration of fees
Another specific and service-related task is to manage the administration of fees to the customers of individual services, e.g., in refuse collection. Sometimes this task was delegated to the contractor.

4.4.8 Regulative tasks
In some of the technical services there were also regulative tasks of mandatory requirements. These were often performed by the service specialist, since it is not allowed to contract out these issues.

4.4.9 A summary of the activities in the purchasing function
A summary of the identified activities in the purchasing function is presented in Figure 3.
Figure 3. Activities involved in the management of contracted services.

The figure shows the complexity of the function, where many activities are interrelated. The activities are also continuously performed, which makes a sequential representation less appropriate.

The activities were distributed on different sets of roles in each of the municipalities. In the small, most of the tasks were performed by one person. In the large cities there was a tendency of hierarchy with new professions and carrier-paths. A general manager of the service normally had the role of the ‘buyer’, and responsible for the business relationship. This includes dealing with the more important agreements and conflict solving. A service-specialist normally had the role of a contract-manager, ‘the buyer’s representative’ who was responsible for the fulfilment of the contract-agreements. In large cities there were also a separate ‘monitoring officer’-role and in one city a separate ‘specification-officer’-role. These findings align with the suggestions of Graw and Maples (1994), concerning a contract management team for the purchasing function.

4.5 A management perspective of the purchasing function

The activities that has been identified in the purchasing function can be interpreted as covering five different management-dimensions:

- A commercial dimension — the management of the business relationship
- A production dimension — the management of the service and the contract
- A marketing dimension — the management of the relationships to the citizens and to the service users
- A coordination dimension — the management of integration with other activities
- A strategic dimension — the management of policy

The five dimensions are based on a management perspective, which can be motivated by the emphasised need to handle different relationships in the purchasing of services. I would especially like to emphasise three aspects. First, the need to acknowledge customer/marketing aspects and the interaction with the customer. Second, the need to coordinate external contracted activities with internal activities. And third, the need to view the external contracts as instruments for policy/strategy-implementation.

4.6 An institutional perspective of the purchasing function

Finally in this analysis I will argue that there is an institutional aspect of the defining of the purchasing function. The purchasing function could be seen as a part of an institutional system (see Figure 4). Many of the conditions set out in the contracts are according to standards pursued and agreed by industry associations, governments, professional associations etc. Since there is a special need of common understanding in the service area, because of the intangible properties and the difficult to measure results and outputs, the institutional aspect can be argued to be of special importance.

Figure 4. An institutional perspective on the purchasing function
These types of sources of institutional influences could be found in all three countries in my study, but the relative importance of each type varied. In England the development is very much governed by the central government, and there are central directives even for the lengths of the contracts to be used by the municipalities. In Sweden there is more of experimenting and imitation between municipalities, and associations, and not the least consultants, play an important role. In Germany there is a long tradition of central, cooperative bodies of purchasing organisations and supplier organisations, which define common standards concerning terms and conditions, and also norms of specification of services.

The EC-directives of public procurement and their interpretation is a quite interesting issue in itself. The approach differs considerably between the three countries of my study. In Sweden the state could be labelled as anxiety and a dominant concern to comply with the regulations. In England the municipalities are already since long used to be governed by some distant regulator and not very upset about it. The German municipalities does not seem to be bothered at all by the EC-directives. They are in a higher degree committed to ruling by 'common sense' and a local strategy for the contracting out.

A specific feature of Great Britain is that the municipalities in average are much larger than in any other country in Europe. The municipalities in other countries are in average quite small and do not reach the volume levels of the EC-directives. The implication of this is, according to my interpretation, that the EC-directives mainly are applicable to the municipalities of Great Britain.

5. Conclusions

On the basis of the analysis presented in this paper I argue for the possibility to define the purchasing function from different perspectives. These perspectives are:

- an actor perspective
- an activity and competence (role) perspective
- an interface perspective
- a management perspective
- an institutional perspective

In the process of purchasing services there is a need to combine corporate policy competencies, service-specific competencies, commercial and legal competencies, monitoring competencies and administrative competencies. These competencies are attached to separate roles, according to the specialisation logic of management of contracts and the specific situational setting (e.g., the size of the organisation and the type of service). The main actor seems to be a service specialist as the purchaser, who is complemented with a traditional purchaser or a legal specialist and some times a specialized monitoring function. It is important to emphasise the active role of the service-user. The special aspects of purchasing municipal on-going services can be summarised as the complexity with different actors involved and the need to handle issues through communication and regular meetings during the whole contract period. Several different dimensions also need to be managed continuously. There is a special need to consider the interaction with the service consumers and citizens in the contract management.

References

On a Renewed Acquaintance

Purchasing meets Operations Research

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Abstract

In this paper the application of methods and techniques from Operations Research in Purchasing Management is discussed. Traditionally, Operations Research has focused on developing models for supporting operational purchasing decisions, e.g., models for determining the optimal order quantity. Despite the increasing immateriality and complexity of many decisions in the initial phases of the purchasing process, e.g., supplier selection and make-or-buy decisions, the number of available models for supporting these decisions in an adequate manner, is surprisingly low. The significant developments, however, both in Purchasing Management and in Operations Research very much justify setting up a renewed acquaintance. In this paper initial purchasing is described in terms of properties relevant to the development of formal models for decision support. Based on this description, consisting of a set of desired properties, existing models for purchasing are evaluated. Discrepancies between desired and actual properties are identified and several possibilities follow for reducing these discrepancies through the application of methods from Operations Research that so far have not been used in Purchasing Management.

1. Introduction

The purchasing function is increasingly seen as a strategic issue in organizations. This applies to industrial as well as service and government organizations. Many decisions concerning initial purchasing (e.g., make-or-buy and sourcing decisions) are consequently considered to be of great strategic importance. At the same time, the nature of many of these decisions is more and more perceived as unstructured and complex. Put together, this would plead for special attention for the way these decisions are reached and justified and therefore suggests the use of models and systems in support of the decision makers. Besides, the EC directives on public procurement clearly urge Utilities and Government organizations to adopt more systematic and transparent procurement practices. However, the expected professionalization of initial purchasing decision making is far not common practice. Decision support systems and information systems are mainly directed at supporting routine operational purchasing decisions (e.g., order-size) and administrative activities. Also in the literature, a lot of attention is given to models that have been developed for initial purchasing decisions are based on rather simplistic perceptions of decision making processes and don't seem to address the complex and unstructured nature and context of present-day purchasing decision making. For example, one of the consequences of a strategic approach towards purchasing is the need to integrate purchasing decision making in overall corporate decision making. Many initial purchasing decisions are interrelated with other decision areas such as marketing, finance, production, research and development. This interrelated aspect is also physically reflected by the deployment of cross-functional decision making teams. However, many of the available models don't take into account these and other aspects. In section 2 of this paper a framework is presented which is based on general decision theory. This framework can be used to describe the various levels of complexity in decision making situations. In section 3 the application of this framework to initial purchasing is described. The point of departure is that specific configurations of decision making characteristics, in general as well as in purchasing, ask for specific decision-model properties. In section 4 the available decision models in the purchasing and Operations Research literature are analyzed in order to determine the extent to which the various - from a purchasing point of view - relevant properties are present in these models. This analysis and evaluation will indicate possible shortcomings of existing models and reveal gaps between required and available properties. In section 5 of this paper, specific fields and approaches within Operations Research are pointed out that may overcome the shortcomings of present-day purchasing decision models and may close the existing gaps. Finally, conclusions and an outline of further research follow in section 6.

2. Decision making: a framework for analysis

2.1 Views on decision making

Based upon literature search carried out, it can be concluded that there exist many definitions and interpretations of the term decision and decision making. However, a distinction can be made between the classical decision theory and the descriptive or factual decision theory. In Silver's (1991) terminology, the classical approach is referred to as the outcome-view on decision making (what is the decision?) whereas the descriptive approach is more concerned with how the decision is reached, and is therefore referred to as the process-view on decision making. According to the classical decision theory, a decision can be characterized by the following elements:

- a set of alternatives;
- a set of states;
- a set of outcomes; and
- a goal or utility function

An outcome is the result of the choice for a particular alternative given a particular state. A goal function is used to order the outcomes to their desirability. Essentially, making a decision comes down to finding and choosing the alternative that yields the highest value of the goal function (optimizing) or does not attain certain norms (satisficing) given the actual state. The classical decision theory considers a decision to be an act of rational choice and assumes all information given e.g. the alternatives and the states. However, other approaches towards decision making have been developed suggesting a more complex reality in decision making (Zimmermann, 1985; Rosenhead, 1989). First, classical decision theory either ignores uncertainty completely or considers uncertainty only with respect to the happening of certain events i.e. states. In addition, the interpretation of uncertainty may not always be appropriate. Apart from uncertainty in a stochastic sense, imperfect information can also imply that because of their vague character, elements of a decision themselves cannot be defined as precise as assumed in the outcome-view on decision making. Second, the classical model must be extended if interrelated decisions are to be considered or if several conflicting goals must be taken into account. Instead of considering one single criterion
decision making process (i.e. intelligence and design phases) becomes more important. In this respect, Silver sums up the following possible forms of support:

- fuller and better exploration of alternatives
- earlier and better detection of problems and opportunities
- coping with multiple or undefined objectives
- more explicit treatment of risk and uncertainty
- reducing systematic cognitive biases
- communication, coordination and enhancing consistency
- structuring the decision making process

2.3 A framework for analysis

Based upon the foregoing, a framework for analyzing decision making processes has been developed. The need for such a framework in order to describe decision making in purchasing from a decision support point of view stems from the fact that the literature on organizational buying behavior that already exists, does not primarily aim at developing normative, formal models. Therefore, what is needed first is a general framework that subsequently can be used to describe initial purchasing as a decision making process in terms of properties that are appropriate for the evaluation and development of normative models. Naturally, the existing literature on organizational buying behavior can then be positioned in this framework. The general framework for analyzing decision making is depicted in Table 1.

Table 1. A general framework for analysis of decision making

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Classic model</th>
<th>Extended model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept of decision</td>
<td>isolated problem, optimization: one best solution</td>
<td>problem interrelated with other problems</td>
</tr>
<tr>
<td>Decision maker</td>
<td>single actor or consensus assumed</td>
<td>several actors, possible conflict</td>
</tr>
<tr>
<td>Concept of uncertainty</td>
<td>deterministic: perfect information stochastic: uncertainty with respect to the happening of events or outcomes</td>
<td>imprecision: one or more elements of a decision cannot be defined or evaluated precisely</td>
</tr>
<tr>
<td>Focus of decision support</td>
<td>outcome view: efficient search for optimal solution</td>
<td>&quot;process view&quot;: defining the problem, generating alternatives, ordering and selecting of alternatives</td>
</tr>
</tbody>
</table>

With this framework, decision making in purchasing can be analyzed, not so much with the intention to derive one general model of purchasing decision making that holds for every situation but primarily to investigate the degree to which - configurations of - extensions of the classic model of decision making seem to be appropriate in purchasing. These configurations of extensions in turn indicate the desired properties of useful models for supporting the decision making process in initial purchasing.
3. Application of the framework

Taking sourcing decisions as a prominent area within initial purchasing, the framework is now used to describe initial purchasing decision making in terms of properties relevant to the development and evaluation of formal models.

3.1 Criteria in purchasing decision making

Decision making on purchasing issues often consists of evaluating alternatives with regard to more than one criterion. For example in the case of supplier selection, a number of factors has to be considered, such as price, quality and on-time delivery. Vendor selection decisions are complicated by the fact that various criteria must be considered in the decision making process (Webber et al., 1991). The criteria may have qualitative as well as quantitative dimensions. A strategic approach towards purchasing may further emphasize the need to consider multiple criteria. In the case of strategic supplier selection, Ellram (1990) for example stresses the need to not only consider traditional criteria such as price and quality but also more longer term and qualitative criteria such as 'strategic fit' and 'assessment of future manufacturing capabilities'. More examples of the use of several criteria in the decision making process on supplier selection can be found in Dickson (1966), Dempsey (1978), Brand (1992), Desarbo et al. (1995), Hutt and Speh (1991), Powers (1991), Webster (1991) and Shipley et al. (1991). The classifications of criteria as suggested by these authors are summarized in Table 2.

Table 2. Classifications of criteria in supplier selection

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ellram (1990)</td>
<td>Traditional criteria</td>
<td>price, delivery, quality</td>
</tr>
<tr>
<td></td>
<td>Additional criteria</td>
<td>trust, management attitude, strategic fit</td>
</tr>
<tr>
<td>Shipley et al. (1991)</td>
<td>Economic, rational criteria</td>
<td>Price, delivery, quality</td>
</tr>
<tr>
<td></td>
<td>Relationship criteria</td>
<td>response to complaints, reputation, personal relationship</td>
</tr>
<tr>
<td>Desarbo et al. (1995)</td>
<td>Economic, cost based criteria</td>
<td>Price, operating costs, maintenance costs</td>
</tr>
<tr>
<td></td>
<td>Non-economic criteria</td>
<td>Vendor cooperation, references, past experience</td>
</tr>
<tr>
<td></td>
<td>Emotional, non-economic criteria</td>
<td>Status, incentives</td>
</tr>
</tbody>
</table>

From the results of the literature search we conclude that in supplier selection several criteria are being considered. Among these criteria are qualitative as well as quantitative factors.

3.2 Concept of the decision

In this subsection we first look at the existence of interrelated decision structures in initial purchasing. Interrelated decisions are likely to be present in purchasing. A single buying decision cannot be isolated and evaluated alone (Kingsman, 1985). Once the decision to buy has been made, often a number of decision stages follow (see for example Van Weele, 1988). Typically, a buying decision is made in order to create a set of acceptable suppliers. In the stages that follow, this set is further reduced until a final supplier is eventually selected. The question how many suppliers should be selected, raises the interrelated question how the purchase order quantity could be allocated best to the (potential) suppliers if two or more suppliers have been or are to be selected. In addition to initial purchasing decisions being interrelated with operational purchasing decisions, these initial purchasing decisions may also be interrelated with decisions in other functional areas, especially with purchasing's increasing strategic importance. Lee (1972) describes three examples in which initial purchasing decisions clearly interrelate with decisions in other areas such as production planning, capacity planning and financial planning. Decisions as to make or buy a specific component or to select a particular supplier can often not be seen as being mutually exclusive from decisions concerning a company's future technology and marketing strategies. This is illustrated in Figure 1.

Figure 1. Example of interrelated decision structures

In the ideal situation, interrelated decisions should be treated simultaneously and in a coordinated manner in order to avoid suboptimal decisions. However, in practice this may often not be the case, for example because of difference in timing of decision making in the interrelated decision areas. Another property that was identified in the general framework was the type of decision rule: compensatory decision rules leading to an optimal solution or non-compensatory rules aimed at finding one or more
acceptable solutions. From the literature search it can be concluded that in purchasing
the classic concept of 'optimality' may not always be the most appropriate model. For
example in Kingsman (1985): "The (purchasing, auth.) problems are often complex and
it is difficult to define a precise optimality criterion". Following the literature on
organizational buying behavior it seems more appropriate to assume that in initial
purchasing decision making several types of decision rules are being used. Chambers
(1983) states: "...the individual will in all likelihood employ some type of choice model,
e.g. compensatory or non-compensatory, to select a vendor or suppliers" Brand (1992)
reports on empirical research which suggests that in purchasing both compensatory as
well as non-compensatory rules are used. Factors that influence the type of rules are
for example: time pressure, the extent to which the situation is perceived as new, the
number of criteria and the number of supplier to choose from. The combination of compensatory and non-compensatory decision rules in vendor selection processes is
also reported by Naudé (1994).

3.3 The decision maker
We now look at the decision making unit in initial purchasing processes. The overall
conclusion that can be drawn from the literature search is that many purchasing
decisions are taken or at least influenced by several actors (see for example Van Weele,
1988; Choffray and Lilien, 1978). Webster and Wind (1972) describe organizational
buying as a complex process of problem solving in which many individuals with
varying backgrounds are involved. These actors may have different objectives. In
addition, contrary to popular belief, many industrial buying decisions are not solely
in the hands of purchasing agents (Sheith, 1973). Especially in the case of non-production
items and services, decision making is often scattered throughout the whole
organization (see De Boer and Telgen, 1995). Chambers (1983) states that: "...the vendor
selection process in many organizations is accomplished via group decision making.
The issue then becomes one of determining how buying process participants with
differing perspectives reach a consensus". Disagreement and conflict seem to be
extensive in organizational buying (O'Shaugnessy, 1977).

3.4 Concept of uncertainty
In practice, decision making is often hampered by imperfect information. This is also
true for purchasing (Ribbers, 1980; Tullious et al., 1991). The general concept of
uncertainty is thought of to be relevant when looking at purchasing decisions because
of interdependencies of functional areas within a firm, the technical sophistication of
many industrial products and other complexities of the organizational buying process
(Farmer, 1973, 1974; Webster, 1979). Purchasing is more and more confronted with
reduced predictability of the quantitative and qualitative demand (Van Stekelenborg,
1994). An increasing number of purchasing decisions can be characterized as dynamic
and unstructured. situations are changing rapidly or are uncertain and decision
variables are difficult or impossible to quantify (Cook, 1992). Apart from uncertainty in
a stochastic sense, imperfect information also demonstrates itself as imprecision. For
many purchases it is highly unlikely that point estimates of expected values can be
made with a high degree of accuracy (Thompson, 1990). Hakansson et al. (1975)
identify three types of uncertainty that industrial purchasers are confronted with:

1. need uncertainty; being the ease or difficulty encountered in specifying and
measuring product uses and characteristics.
2. market uncertainty; being not only the (in)stability of the market place but also the
degree of difficulty in comparing the characteristics of the potential suppliers.
3. transaction uncertainty; being the degree of difficulty encountered in delivering
the product to the purchaser.

Clearly, the need and market uncertainty indicate the presence of imprecision rather
than stochastic uncertainty. The general conclusion from the literature search is that all
possible forms of uncertainty and especially imprecision may be present in initial
purchasing decision making.

3.5 Complexity put into perspective
From the foregoing we can conclude that initial purchasing decision making may
involve several and different types of criteria, interrelated decision structures,
combinations of different decision rules, group decision making and various forms
of uncertainty. However, the presence of each of these properties and therefore the
complexity will vary from one situation to another and is also dependent on how the
decision makers perceive the situation. This is reflected in several typologies of
purchasing situations that have been developed, for example the taxonomy suggested
by Dunn (1993) in which six different buying decision approaches are derived on the
basis of an extensive empirical study among manufacturing, service and public
administration organizations (see also Table 3, on the next page). In this taxonomy it is
clear that purchasing decisions situations differ in terms of both importance and
complexity. Furthermore it is clear that especially in situations of high importance
and high complexity (i.e. judgmental new task, complex modified rebuy and strategic
task) decision makers employ a moderate to high level of search for information and
use of analytical techniques.

4. Evaluation of existing models
In this subsection, the results are presented of the investigation of the existing models
from Operations Research that have been developed for purchasing and more
specifically supplier selection. As pointed out earlier on this paper is concerned with
initial purchasing decisions. Therefore, formal models for supporting operational
purchasing decisions are not treated here. Furthermore, as this paper aims at
providing formal models for decision support, possible descriptive or conceptual
models that are not specifically aimed at supporting decision making in formal way,
are not evaluated either.

4.1 Application of the framework to existing models
By means of an extensive literature search, both in journals and textbooks on
purchasing and Operations Research, an overview of existing formal models has been
developed. The various models were evaluated in terms of the properties of the
framework. Furthermore, the existing models were grouped according to the
underlying general Operations Research technique. The results of the literature search
are presented in Table 4.
Table 3. Taxonomy of buying decision approaches (Dunn, 1993)

<table>
<thead>
<tr>
<th>Description of buying decision approaches</th>
<th>Casual</th>
<th>Routine, low priority</th>
<th>Simple, modified rebuy</th>
<th>Judgemental new task</th>
<th>Complex, modified rebuy</th>
<th>Strategic new task</th>
</tr>
</thead>
<tbody>
<tr>
<td>purchase importance</td>
<td>minor importance</td>
<td>somewhat important</td>
<td>quite important</td>
<td>quite important</td>
<td>extremely important</td>
<td>extremely important</td>
</tr>
<tr>
<td>task uncertainty</td>
<td>little uncertainty</td>
<td>moderately uncertain</td>
<td>little uncertainty</td>
<td>great amount of uncertainty</td>
<td>little uncertainty</td>
<td>moderately uncertain</td>
</tr>
<tr>
<td>extensiveness of choice set</td>
<td>much choice</td>
<td>much choice</td>
<td>narrow set of choices</td>
<td>narrow set of choices</td>
<td>narrow set of choices</td>
<td>narrow set of choices</td>
</tr>
<tr>
<td>buying power</td>
<td>little or no power</td>
<td>moderate power</td>
<td>moderate power</td>
<td>moderate power</td>
<td>strong power</td>
<td>strong power</td>
</tr>
<tr>
<td>search for information</td>
<td>no search made</td>
<td>little effort at searching</td>
<td>moderate amount of search</td>
<td>moderate amount of search</td>
<td>high level of search</td>
<td>high level of search</td>
</tr>
<tr>
<td>use of analytical techniques</td>
<td>no analysis performed</td>
<td>moderate level of analysis</td>
<td>moderate level of analysis</td>
<td>moderate level of analysis</td>
<td>great deal of analysis</td>
<td>great deal of analysis</td>
</tr>
<tr>
<td>proactive focus</td>
<td>no attention to proactive issues</td>
<td>superficial consideration of proactive focus</td>
<td>high level of proactive focus</td>
<td>moderate proactive focus</td>
<td>high level of proactive focus</td>
<td>proactive issues dominate purchase</td>
</tr>
<tr>
<td>procedural control</td>
<td>simply transmit the order</td>
<td>follow standard procedures</td>
<td>follow standard procedures</td>
<td>following procedures</td>
<td>little reliance on established procedures</td>
<td>little reliance on established procedures</td>
</tr>
</tbody>
</table>

Table 4. Overview of existing models for supplier selection

<table>
<thead>
<tr>
<th>Category</th>
<th>Problem formulation</th>
<th>Criteria</th>
<th>Decision structure</th>
<th>Decision rule</th>
<th>Decision maker</th>
<th>Concept of uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost ratio/Financial Analysis</td>
<td>not addressed</td>
<td>one dimensional</td>
<td>isolated</td>
<td>optimizing</td>
<td>single</td>
<td>deterministic</td>
</tr>
<tr>
<td>Categorisation model</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>choice not formalised</td>
<td>single</td>
<td>deterministic</td>
</tr>
<tr>
<td>Linear weighing (a)</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single</td>
<td>deterministic</td>
</tr>
<tr>
<td>Linear weighing (b)</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory &amp; non-compensatory</td>
<td>single</td>
<td>determinisitic</td>
</tr>
<tr>
<td>Linear weighing (c)</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single</td>
<td>stochastic</td>
</tr>
<tr>
<td>Linear weighing (d)</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>selection</td>
<td>compensatory</td>
<td>single</td>
<td>deterministic</td>
</tr>
<tr>
<td>Linear weighing (e)</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single</td>
<td>imprecise</td>
</tr>
<tr>
<td>Linear weighing (f)</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single</td>
<td>imprecise</td>
</tr>
<tr>
<td>Weighted product method</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single</td>
<td>imprecise</td>
</tr>
<tr>
<td>Mathematical programming</td>
<td>not addressed</td>
<td>multi-dimensional</td>
<td>selection</td>
<td>optimising and non-compensatory</td>
<td>single</td>
<td>deterministic</td>
</tr>
<tr>
<td>Decision tree</td>
<td>not addressed</td>
<td>one dimensional</td>
<td>isolated</td>
<td>optimizing</td>
<td>single</td>
<td>stochastic</td>
</tr>
<tr>
<td>Cluster Analysis</td>
<td>can be used to group alternatives</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single</td>
<td>deterministic</td>
</tr>
</tbody>
</table>

4.1.1 Cost-ratio models
Cost-ratio models (see Stevens, 1978; Zenz, 1981; Lee and Dobler, 1977) are quantitative, cost-based models in which additional procurement costs are associated with a particular supplier. For example, for a particular supplier the costs related to inspection, delivery and service are expressed as a percentage of the total value of goods that are purchased from that supplier. In terms of our frame work, cost-ratio models fully comply with the basic model of a decision.

4.1.2 Categorisation methods
Basically, categorisation models (see Stevens, 1978; Zenz, 1981; Lee and Dobler, 1977) are qualitative models. Based on historical data and experience current suppliers are
evaluated on a set of criteria. These evaluations consist of qualifying, the performance suppliers with respect to a criterion either as 'positive', 'negative' or 'neutral'. Clearly, both quantitative and qualitative criteria may be used. In that respect, a somewhat extended model of a decision is used, however, the ultimate choice between alternatives is not formalized.

4.1.3 Linear weighting models

A large number of models originates from the linear weighting principle (also often referred to as weighted point plans). Examples of the general version (a) can be found in Baily and Farmer (1990), Stevens (1978), Zenz (1981) and Lee and Dohler (1977). The principal idea is to assign numerical scores to a set of quantitative and/or qualitative criteria, express the relative importance of every criterion in numerical terms and subsequently determine the composite performance index by multiplying each score with its numerical weight and adding up all the resulting products. The general version of the linear weighted model is based on the basic model of a decision in that several multidimensional criteria can be incorporated. However, a few other versions take into account some properties of the extended model of a decision. Willets (1973) suggests a linear weighted model that allows for the inclusion of non-compensatory decision rules by introducing minimum scores on one or more criteria (version b). Williams (1984) describes several alternative linear weighting models (version c). In one of these alternative models, the stochastic character of many purchasing decisions is recognized by incorporating perceived risk. Gregory (1986) and Heinritz et al. (1991) link the results of a linear weighting model with the question how to allocate the purchase volume (version d).

Thompson (1990; 1991) argues that the precise character of the general linear weighting model constitutes a major limitation for the practical use of this model. Thompson's version (version e), the Vendor Profile Analysis, enables the decision maker to express the uncertainty concerning the supplier's performance by means of the Monte Carlo simulation technique. For each criterion, the decision maker specifies a range in which the supplier's performance is expected to fall, instead of a point estimate. In a second application, Thompson introduces the so-called Thurstone Case V technique. Using this model, it is not necessary for the decision maker to formulate point estimates of weighting factors and scores. Instead, the decision maker ranks order the relative importance of evaluative criteria and then rank order the projected performance of suppliers on these criteria. The Thurstone model can then be used to derive numeric scores and weighting factors. In order to deal with subjective and imprecise elements of a decision more systematically, Narasimhan (1983) and Nydick and Hill (1992) propose and demonstrate the use of the Analytic Hierarchy Process (Saaty, 1980) in a linear weighting model (version f). In the AHP approach, first evaluative criteria are specified. By constructing a hierarchy of criteria and possible subcriteria, a systematic approach is offered to the phase of problem definition in the supplier selection process. The relative importance of the criteria is then established by means of a pairwise comparison. Third, the technique of pairwise comparison is used to obtain the relative importance of the potential suppliers with respect to the criteria. Finally, as a result of these steps, the overall ranking of suppliers can be obtained.

4.1.4 Weighted product method

Similar to Narasimhan (1983) and Nydick & Hill (1992), Yoon and Nadimitha (1993) propose a model that covers both the need for supporting the phase of problem formulation and dealing with imprecision. First, a hierarchy of criteria is constructed. In the weighted product method, contrary to the linear weighting model, attribute ratings for each supplier are multiplied and attribute weights become exponents. A positive power is used for benefit attributes and a negative power is employed for cost attributes. Furthermore, in order to accommodate imprecise data, ratings are expressed in ranges instead of only a point estimate.

4.1.5 Decision tree

The decision tree models as applied to purchasing by Soukup (1987) are built upon the basic model of a decision, however they do enable the decision maker to express stochastic uncertainty with respect to the occurrence of specific relevant events. The decision maker must identify possible scenarios, assess the probabilities of the different outcomes and accordingly select the option resulting in the lowest expected cost. A similar decision analysis approach in which probabilities are assigned to different outcomes, can be found in the works of England and Leenders (1975).

4.1.6 Mathematical programming

The mathematical programming models e.g. Linear Programming, Dynamic Programming, that have been applied to purchasing all capture two properties of the extended model of a decision: multi-dimensional criteria and an interrelated decision structure where the selection of the suppliers is considered simultaneously with the allocation of the purchase volume to these suppliers.

Bufla & Jackson (1983) present a Goal Programming model that can be used to schedule purchases from a mix of vendors over a defined planning horizon. The model combines two sets of factors: (1) criteria such as price, quality, service and delivery which are often used in weighted point models and (2) specific buying firm characteristics such as materials requirements and safety stock levels. The objective function is a mathematical statement of various goals and priorities, including minimum quality and acceptance rates and excess holding costs. Narasimhan & Stoyoff (1986) describe a mixed integer programming model which can be used to determine the optimal set of suppliers and volume allocation, given certain characteristics of the supply structure. The objective function is to minimize the sum of shipment and penalty costs. Penalty costs are associated with inefficient use of vendor production facilities. Pan (1989) presents a linear programming model which selects the optimal combinations of suppliers and purchase quantities. The objective function minimizes the total purchasing costs, given minimum levels concerning quality, lead time and service. Similar models that only differ in terms of the specific programming and solution finding technique can be found in Turner (1988), Chaudry et al. (1993), Sharma et al. (1989), Weber and Current (1993), Bender et al. (1985) and Gaballa (1974). It should be noted however that although multiple criteria are considered in these models, these criteria all have a quantitative character. Furthermore, the mathematical programming models for supplier selection are all deterministic.

4.1.7 Cluster analysis

Hinkley et al. (1969) demonstrate the use of cluster analysis in the grouping of suppliers with respect to several criteria. This model may prove to be especially useful in situations where a large number of suppliers is available for selection. Suppliers can be preclassified when there is no external criterion for grouping them into smaller subsets. The clustering procedure identifies natural groupings in the set of suppliers and can thereby also support the identification of criteria that may be used for further selection.

4.1.8 Conclusions

From the results of the literature search on existing models from Operations Research for initial purchasing the following conclusions can be drawn. Put together, the models capture some of the properties of initial purchasing decision making as identified in the framework in section 2. Especially the need to incorporate several multidimensional criteria is well recognized, be it to various degrees: many models...
only use quantitative criteria. Other properties, e.g. imprecision are barely present. Most models rely heavily on the basic model of a decision. None of the models found incorporates all of the properties of the extended model. As pointed out in section 3.5 not all initial purchasing decisions will be perceived as forms of the extended model of a decision and not all of the properties of such an extended model will necessarily manifest themselves simultaneously. Nevertheless, considering the increasing importance as well as the increasing complexity of many contemporary initial purchasing decisions, it is somewhat surprising that the following properties have gained so little attention as they appear to be so typical for initial purchasing decisions:

1. Interrelatedness of decisions; not only within the area of purchasing but also interrelatedness with other functional areas.
2. Non-compensatory decision rules in combination with compensatory, optimizing decision rules.
3. Several decision makers with varying opinions.
4. Incomplete data, imprecise criteria and uncertainty.

In addition, the support in the phase of problem definition (see section 2) clearly is an underdeveloped area in the case of purchasing. Only three out of all models pay attention to this important issue: both the AHP models and the weighted product method start the decision process with systematically structuring the problem by explicitly formulating a hierarchy of goals and criteria. Furthermore, the model using cluster analysis (Hinkle et al., 1969) can be regarded as a supportive model in the pre-choice phases as it assists the decision maker with grouping the available alternatives.

5. Other possible contributions from Operations Research

In this subsection the preliminary results are presented from the research on other methods and techniques from Operations Research that may be used to support decision making in initial purchasing. Similar to the previous section, the possible properties of initial purchasing decision making constitute the starting points for evaluation. From the review of existing models it has become clear that most of the models to a large extent resemble the basic model of a decision. Considering the often much more complicated nature of initial purchasing decisions, as became clear in the analysis using the framework, it seems that in the search of useful generic models from Operations Research we should try to identify models that to a larger extent cover the properties that existing models lack. So far, several approaches and methods within Operations Research have been identified that may prove more successful in meeting the required properties. An overview of these approaches and methods is in presented in Table 5.

### Table 5. Overview of possible approaches for initial purchasing decisions

<table>
<thead>
<tr>
<th>Category</th>
<th>Problem formulation</th>
<th>Criteria</th>
<th>Decision structure</th>
<th>Decision maker</th>
<th>Concept of uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytic Hierarchy Process (AHP)</td>
<td>hierarchy of goal, criteria</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single; extensions to group positive; imprecision</td>
</tr>
<tr>
<td>Simple Multi Attribute Rating Technique (SMART)</td>
<td>structure for whole process, including identification of alternatives and criteria</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory; special treatment of comparing qualitative benefits with costs</td>
<td>single; extensions to group positive; imprecision; sensitivity analysis</td>
</tr>
<tr>
<td>Outranking methods (ELECTRE)</td>
<td>not specifically addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>non-compensatory; incomparability accepted</td>
<td>single; imprecision</td>
</tr>
<tr>
<td>Multi Attribute Utility Theory (MAUT)</td>
<td>not specifically addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>compensatory</td>
<td>single; deterministic and stochastic</td>
</tr>
<tr>
<td>Fuzzy Sets</td>
<td>not specifically addressed</td>
<td>multi-dimensional</td>
<td>isolated</td>
<td>depending on application</td>
<td>depending on application; imprecision</td>
</tr>
</tbody>
</table>

The first four approaches indicated in Table 5, AHP, SMART, MAUT and ELECTRE can all be regarded as part of the group of Multiple Criteria Decision Making approaches within Operations Research. The results of the literature search on existing models (see section 4.1) suggest that apart from two articles on AHP and several articles on Mathematical Programming, none of the approaches from Table 5 has yet been applied to initial purchasing decisions. This is somewhat surprising, especially as these approaches to a large extent seem to incorporate properties of initial purchasing decision making.

Although the AHP method already has been suggested for supporting initial purchasing decisions (see section 4.1.3) further research may lead to wider range of useful applications of this method in purchasing. For example, among the type of problems to which AHP can be applied are risk assessment and conflict resolution (Saaty and Vargas, 1982). Both are problems that have not been covered explicitly in the existing AHP-based models for purchasing.

Another possible approach for further investigation is the Simple Multi-Attribute Rating Technique (Goodwin and Wright, 1991). This approach clearly emphasizes the whole decision making process from identification of the decision maker(s), alternatives and criteria to making a provisional decision and performing a sensitivity analysis. Furthermore, properties of purchasing decision making such as group decision making and dealing with imprecision (e.g. through structured techniques for establishing weighting factors and sensitivity analysis) are taken into account. Multi-Attribute Utility Theory (see Winston, 1991) clearly addresses the aspect of several different criteria. Utility functions are introduced to deal with this multi-dimensional...
aspect. Deterministic as well as stochastic models have been developed within this approach.

However, AHP, SMART and MAUT all use compensatory decision rules in which a bad score of an alternative on a specific criterion can be compensated by good scores on other criteria. A class of models within Multiple Criteria Decision Making that uses non-compensatory decision rules are the so-called 'outranking' models (Vincke, 1992). In outranking models incomparability is accepted. Imprecision with respect to the decision maker's preferences can be taken into account. Therefore, outranking models can be very useful if the decision maker feels unable to formulate precise preferences or if utility functions are difficult to define or if there is not (yet) enough information to make detailed comparisons of all alternatives for example in the early stages of a supplier selection process. This makes outranking models a promising area for further research on possible applications in purchasing. The latter also applies to Fuzzy Set theory (see for example Zimmermann, 1986). Yager (1988) argues that multiple criteria decision making is an important area for application of Fuzzy Sets. Fuzzy Sets offer a wide range of possibilities to deal with imprecision, e.g. vague preferences or the absence of sharply defined criteria (Zadeh, 1965) and may therefore thus provide appropriate models for supporting initial purchasing decisions.

6. Conclusions and further research

Research on the application of methods and techniques from Operations Research in purchasing shows that many of the existing formal models for supporting initial purchasing decisions do not fully address some of the typical complexities in initial purchasing. After analysis of these complexities we identified five approaches within Operations Research that seem more appropriate for supporting these complex decisions in purchasing. Further research and possible development of these approaches into formal models for purchasing may reduce the gap between desired and actual properties of the available formal models for purchasing. Naturally, there may be many more approaches within Operations Research that could be added to the five approaches mentioned in this paper. For example, the author is currently investigating approaches within Operations Research for structuring the early phases of a decision making process, i.e. problem formulation, and formal approaches for dealing with interrelated decision structures. Furthermore, in conjunction with other researchers at the School of Management Studies, the author is currently applying the ideas and concepts from non-compensatory outranking models in the development of an outranking model for supplier selection.

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Training for Quality

Improving standards in public purchasing through education

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Abstract

This paper sets out to show a close correlation between the improving purchasing standards of the public sector in Northern Ireland and the aim of the Government Purchasing Service to improve procurement quality through the means of, inter alia, education. The paper outlines the new training initiatives by the Government Purchasing Service developed by the University of Ulster. Contract notices published in the Official Journal of the European Communities are studied to provide evidence that the number and quality of contract notices have improved over the period 1988 - 1995, reflecting an overall improvement in purchasing standards.

Keywords: Education, training, standards, government purchasing, EU Public Procurement Directives, compliance.

1. Introduction

The development across government of professionalism in all aspects of purchasing and supply is one of the Central Unit of Purchasing's (CUP) prime objectives. The CUP reported to the Government yearly from 1986 on the importance of training for professional expertise. A certificate of Competence was launched by the Central Unit of Purchasing in 1990, providing a framework for professional training and career development. The 1992 progress report to the Government acknowledged that Northern Ireland Ministers had been particularly supportive of the move to greater professionalism in purchasing and supply. This support resulted in the graduate and post-graduate programmes jointly developed with the University of Ulster which showed what can be achieved where senior management is committed to change supported by Ministers (HM Treasury, 1992, p.14).

These courses developed by the University will be briefly outlined together with the changes introduced during 1995 by the Government Purchasing Service in Northern Ireland (GPS) regarding education and training needs for purchasing staff. Evidence provided from a major research project conducted by the University of Ulster of contract notices published in the Official Journal of the European Communities will also be submitted to conclude that there is a close correlation between the provision of education for purchasing staff and improving purchasing standards.
2. New Training Strategies

2.1 Background to the New Training Initiatives

The Department of Trade and Industry (1994) report on the Public Procurement Directives (see appendix one) and their effect on Europe-wide trade indicates that the limited progress in the opening up of public sector markets in Europe can be partially attributed to the continuing ignorance on the part of the industry of the Directives and their effect. Mr Colin Maund, Managing Director, Achilles Information, at the Public Sector Purchasing Conference “Buying into the Future” (November 1994), expressed the view that while the Directives have not necessarily met all of their objectives, they have had a strategic effect, including what he described as an improvement in the status of purchasers. He continued by suggesting whilst it had added to the bureaucracy of buying, it was too early to be totally negative about the legislation. The initial trauma of coming to terms with the new legislation should be outweighed by the benefits of more open competition.

“Compliance with the Procurement Directives is not only a matter of legal obligation, but also of economic sense”. (O’Loan, 1992)

This view has been strengthened by the White Paper “Setting New Standards: A Strategy for Government Procurement” (HMSO, 1995), setting out the Government’s strategy for procurement and following the Government’s quest for improved efficiency and effectiveness. In the Foreword to the White Paper, the Rt. Hon Kenneth Clarke comments that Government procurement policies have brought immense benefits to the country, yet their full potential is still to be realised. The White Paper itself reinforces the Government’s view that effective public procurement strategies have a central role to play in the efficiency plans of the Government, and confirms that an integral part of such strategies is compliance with the EU Directives. Past problems that have confronted potential suppliers to the public sector, such as inadequate quality and incompleteness of information in the tender notices, resulting in a failure to satisfy either the needs of the tenderers or the requirements of EU Directives, highlight the need to create a more open procurement market. Providing equal opportunities for access and enhancing ability to participate in the whole procurement cycle requires the rapid and effective flow of information between all components of the supply chain. The relevance of the information and the necessity of publishing notices in good time, combined with the clarity of display of the information being sought, constitute major contributions towards the enhancement of the supply chain through the competitive tendering process.

“Compliance” information and compliance with the EU Directives are part of the strategy detailed in the May 1995 White Paper. The Government intends best practice procurement to be a central element in Department’s businesses at all management levels. Departments will seek to match the cost savings achieved by best practice private and public sector organisations and will collaborate to achieve value for money. There are eleven key elements that are outlined in the strategy, one of these elements being a step change in professionalism and skill development among officials with procurement responsibilities. Section 5 of the White Paper, “Professional Skills”, details how skills should be obtained and developed, recognising that,

“Organisations with best practice procurement processes are achieving much higher levels of skill development. There is a close correlation between successful procurement and the skill levels of staff. Departments vary widely in the depth and breadth of their procurement skills. Training programmes will take account of this variation but the overall aim will be to achieve skill levels that match the best in the world”. (HM Treasury, 1995, p.30)

The Government’s target is that 75% of staff in key permanent posts will have obtained a Certificate of Competence in purchasing or higher level professional qualifications by the end of 1996. The Certificate of Competence was launched by the CIPs in 1990, taking two years to obtain and acting as a stepping stone to full professional qualifications. Three years before the 1995 White Paper on purchasing, the GPS already had taken the lead in the UK as regards training and development of staff. In 1992, the total number of purchasing and supply staff holding professional qualifications from the Chartered Institute of Purchasing and Supply (CIPS) or equivalent bodies had risen from 40 to 80; significantly, 39 of the individuals were from the GPS.

2.2 Third Level Purchasing Education in Northern Ireland

Northern Ireland faces greater threats from, although has more opportunities to respond to, the requirements of government and EU policy. It is under threat because of the scale of public sector purchasing in Northern Ireland: 70% of public expenditure as opposed to a UK average of 65%, amounting to over £300 million annually. The consequences for NI industry of stronger competition could be disastrous; however, the small number of government departments and public agencies and their close links with each other and with industry provide an opportunity to respond to the threat more speedily and coherently than Whitehall. The courses developed by the University of Ulster were the main core of this response and were the first at university level in the UK which focus specifically on purchasing and supply management. The courses were proposed in 1989 and have operated from 1990. The courses have their origin in three main developments:

1. The concern of successive governments from 1976 onwards to ensure improved economy, efficiency and effectiveness in public expenditure. In parallel to these developments, legislation has been passed requiring local government and the health service to undertake competitive tendering (CCT) for many of the services they provide (Local Government Planning and Land Act 1980; DHSS Circular HC(85)15; Local Government Act 1988).
2. The Directives on public procurement from the European Union which are aimed at encouraging fair competition.
3. In response to all these developments, both the Whitehall and the NI Government Departments proposed a more professional approach to purchasing. Civil service purchasing had been a relatively low status function, with many of the staff in the area not receiving the training and specialist skills needed. The Institute of Purchasing and Supply is the main body, but their qualification was regarded as unsuited to the changing circumstances outlined above.

The courses consist of a Post-Graduate Certificate, a Post-Graduate Diploma and a Masters in Purchasing and Supply Management all utilised, inter alia, by staff from the public sector in Northern Ireland. Through the Industry Lead Body for Purchasing (PSLB), the Department of Public Administration and Legal Studies (now known as the School of Public Policy, Economics and Law) was funded to convert this course into a set of national vocational standards (NVQs) for purchasing. While the actual research and drafting of the standards was carried out by consultants from the University of Ulster and EDMC Management Consultants, each stage of the standards development was subject to close scrutiny from the PSLB.

2.3 GPS Training Arrangements

The GPS is committed to both the Government policy of ensuring that 75% of staff have a professional training by 1996 and to obtaining the Investors in People charter, an initiative sponsored by the Training and Employment Agency of Northern Ireland. The
target is to achieve ISO 9000 by April 1997. The strategy for training is defined in a Staff Development Manual, essential features being:

- identification of staff competencies for purchasing posts;
- self-assessment by staff against those target competencies;
- personal development plans to acquire competencies;
- NVQ based competencies where possible.

To enable this strategy to be carried out effectively, an agreement was reached between the GPS and the University of Ulster at Jordanstown in 1995. This agreement is for the provision of purchasing training and compliance monitoring services for GPS staff at the University of Ulster for the period 1 April 1995 until the end of the 1999/2000 academic year (30/09/2000). Under the agreement, the University provides the following training:

a. a new training programme called the Certificate in Management Practice (Purchasing and Supply) for GPS staff from April 1995;

b. provide degree training for those GPS staff who have successfully completed the above course;

c. provide Certificate, Diploma and Masters level training for GPS nominated staff.

The training approach is in line with the new NVQ standards.

2.4 Compliance Monitoring Services

In addition to the training arrangements, the University of Ulster also provides a purchasing compliance monitoring service for the GPS. This service is linked to the training arrangements, because as part of the service the University provides daily seminars or courses each year on EU Purchasing Legislation for staff from the GPS. The service is a result of a research project at the University of Ulster which has been in operation from 1992. The monitoring service provides four quarterly reports and one annual report per annum to the GPS. These reports are descriptive in nature, analyzing contract notices that are published in the Official Journal of the European Communities by Northern Ireland public sector contracting authorities and utilities. For the purposes of the reports to the GPS, the notices are analysed from a legal perspective, examining whether the notices comply with the relevant EU Public Purchasing legislation.

3. The Research Project on the Impact of Public Purchasing Directives on Northern Ireland

3.1 Background to the project

This project was set up in 1992, aiming to assess the economic and legal aspects of the implementation of the EU Purchasing Directives. A database of contracts from January 1988 to 1995 has been established for supply, works and service contracts let by public sector contracting authorities and utilities. The database has formed the basis for the analysis. Although the project analysed economic aspects of the legislation, for the purposes of this paper only legal issues relevant to improving standards will be analysed.

As mentioned above, from 1993 the GPS requested that the University of Ulster prepare quarterly and annual reports on the NI public sector and utilities notices which appear in the Supplement to the Official Journal of the European Communities. Notices analysed include prior and periodic information notices, invitations to tender and contract award notices. The notices follow the model formats, appended to all the Procurement Directives. The information is also available through Tenders Electronic Daily (TED). From 1995, TED has been available through national gateways, the gateway in the UK known as Contest Tenders. This database is updated on a daily basis and is the on-line version of the Supplement to the Official Journal. The database, however, provides much of the important legal information for monitoring purposes in codes at the beginning of each contract notice. These codes contain such information as the date of dispatch of the notice, the name of the contracting authority, the type of the contract notice, and the type of award procedure used in the contract notice. The codes were updated in 1995 to include the Common Procurement Vocabulary (CPV) system of coding. This replaces the TED codes based on the 1970 version of the EU's activity classification (NACE) and results in a more precise analysis relating to the nature of the contract.

The GPS requested that the information contained in the reports is categorised according to the government department responsible for each contracting authority. This results in the ability to draw conclusions from the data relating to purchasing standards among government departments during a period of eight years. However, this report will examine the legal issues and standards in purchasing from a general perspective, looking at the NI public sector as a whole.

3.2 The Legal Issues Examined in the Project

A major focus in the project is the understanding of the Directives by those responsible for letting the contracts. In particular, issues of the correct application of the rules, aggregation of contracts and identification of entities are examined. In order to determine changing standards in purchasing, the following selected legal issues relating to the correct application of the rules will be examined:

a. the number of notices published in the Official Journal. All notices over precise monetary thresholds must be published with contract award notices detailing the outcome of these invitations to tender. Pre-information and periodic information notices must also be published in certain circumstances;

b. time limits that are laid down in the Directives relating to all contract notices;

c. missing information in the notices that should appear according to the Directives.

All these issues have been analysed over an eight year period, together with general issues of compliance. However, some of the data is only available for the period 1993-1995, as the GPS requested this extra information in the reports. This descriptive analysis will provide evidence to support the statement that education and training services provided to NI public sector staff has helped to result in an improvement in EU Public Purchasing requirements in Northern Ireland, reflecting an overall improvement in standards in the NI Public sector.

3.3 The Quantity of Contract Notices

The number of contract notices published in the Official Journal gives an indication of levels of compliance by NI public sector contracting authorities and utilities. Of course, only works, supply and service contracts that are over the required monetary thresholds must be published in the Official Journal. The value of the thresholds differ according to the Directive and whether the public sector contracting authority is a GATT contracting authority. Thresholds are amended every two years; the next date of amendment is 1996 (please refer to appendix 2 for details of the thresholds). However, periodic and pre-information notices (PINs) must be published by contracting authorities in the following circumstances:
3.4 Time Limits

The time limits specified in the EU Directives for invitations to tender are as follows:

a. **Open procedure:** There must be at least 52 days between the despatch of a contract notice and the deadline for the receipt of tenders, or 36 days if a sufficiently specific prior information notice for works and services has been published. This time limit also applies to utilities.

b. **Restricted procedure:** At least 37 days must elapse between the despatch of a notice and the deadline for requests to participate. This may be reduced to 15 in cases of urgency. At least 40 days must be allowed between the date of a written invitation to tender and the deadline for the receipt of bids, or 10 days in the case of urgency. This limit can be reduced to 26 days for works and services if a PIN has been published.

c. For utilities, there shall be at least five weeks from the date of despatch of the notice and not less than twenty-two days from that date. There should also at a general rule be at least three weeks and not less than ten days between the date of despatch of the invitation to tender and the last date for the receipt of tenders, unless the contracting parties agree to a shorter period.

d. **Negotiated procedure:** At least 27 days must elapse between the despatch of the notice and the deadline for requests to participate where advertising is required.

<table>
<thead>
<tr>
<th>Table 2. Time Limits for Contract Notices not Followed: July 1988-September 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME LIMITS NOT FOLLOWED</strong></td>
</tr>
<tr>
<td>INVITATIONS TO TENDER</td>
</tr>
<tr>
<td>2019</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>CONTRACT AWARD NOTICES NOT AVAILABLE</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>22</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td><em>January-September 1995</em></td>
</tr>
</tbody>
</table>

It is clear from the data that the problems encountered with time limits have been substantially reduced. During the period 1988-1992, 369 out of 435 invitations to tender published by NL public sector contracting authorities and utilities did not follow the time limits; in 1994, this number had fallen to 21 out of 291 invitations to tender. In the past three years, even though the number of contract award published has risen, the number not following the time limit has been reduced from 22 to 9.

3.5 Missing Information

The EU Public Procurement Directives contain a broad range of rules which public bodies must follow, although much of the legislation remains unincorporated in the Directives. The model notices appended to the end of the Directives give a summarised version of what appears in the main text of the legislation. However, it should be noted that in general terms, any information can be omitted from contract award notices by the contracting authorities, but this omission must be justified.

It is clear from the analysis of the contract notices that mandatory information is, in certain cases, being omitted. This has proved not to be a problem with PINs, only with invitations to tender and, more specifically, with contract award notices.

a. **Invitations to tender**

The most common omissions in the invitations to tender were the specification of the award criteria for the contract and the date for the invitations to tender (in the case of the restricted procedure).
The above table shows a substantial reduction in the number of issues arising in the invitation to tender published over the eight year period. This reduction has been less marked in the last three years, as invitations to tender are now of a consistently high standard.

b. Contract award notices
As mentioned above at p.6, the main problem arising with the contract award notices was that contracting authorities and utilities were not publishing these contract notices. However, missing information in the notices which was required by law was also a considerable problem. As only 134 contract award notices were published over a four year period from 1988-1992, comparisons with recent data are not significant. However, all the information listed below was missing from many of the contract award notices published between 1988 and 1992. The missing information was as follows:

- The publication date of the original invitation to tender to which the contract award notices refer;
- The type of award procedure used (i.e., open, restricted, accelerated restricted or negotiated);
- The date when the contract was awarded;
- The value of the contract or a range of values;
- The address of the successful tenderer;
- The award criteria for the contract;
- The address of the successful tenderer.

Table 3. Information Missing from Invitations to Tender published 1988 - 1995

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AWARD CRITERIA</td>
<td>120</td>
<td>14</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>DATE OF I.T.</td>
<td>70</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL ISSUES</td>
<td>190</td>
<td>17</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

*January-September 1995

Although the number of omissions in the contract award notices increased in 1994, the number of contract award notices also increased by 55, so this is not significant. There has been an increase during 1995 of cases where the date of the original invitation to tender has not been stated in the notice. This does not cause as many problems as with

Table 4. Information missing in Contract award notices published 1993 - September 1995

<table>
<thead>
<tr>
<th>YEAR OF PUBLICATION</th>
<th>1993</th>
<th>1994</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF AWARDS</td>
<td>157</td>
<td>213</td>
<td>67</td>
</tr>
<tr>
<td>DATE OF ORIGINAL I.T.</td>
<td>17</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>TYPE OF AWARD PROCEDURE</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>DATE OF CONTRACT AWARD</td>
<td>18</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>VALUE</td>
<td>1</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>NUMBER OF SUCCESSFUL TENDERS</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AWARD CRITERIA</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ADDRESS OF SUCCESSFUL TENDERER</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL NUMBER OF OMISSIONS</td>
<td>41</td>
<td>47</td>
<td>30</td>
</tr>
</tbody>
</table>

*January-September 1995

The value of the contract was not indicated in 14 contract awards in 1994. However, as mentioned before, this information is likely to be a matter of commercial confidence, and could be justified accordingly. This has not really been an issue during 1995.

Information in relation to the successful tenderer has only been omitted in 5 cases over a three year period, 3 of these in 1993, therefore it is not regarded as an issue that needs to be seriously addressed.

The type of award procedure followed was not indicated in seven cases over the last three years. However, in the last two years all of the cases have been contract award notices for service contracts, issued by the same authorities. This situation has been rectified since April 1995.

There is a marked difference between issues arising in the invitations to tender and in the contract award notices. It may be submitted that the reason for this is the marked increase in the number of contracting authorities and utilities publishing contract notices, whereas invitations to tender have been published on a regular basis in the Official Journal. However, legal issues appearing, and omissions occurring, in the contract award notices are generally declining.

3.6 Other legal issues
As mentioned above, the overall standard of contract notices appearing in the Supplement to the Official Journal is improving. There are, however, isolated cases where correct procedures have not been followed. The Utilities Directive required utilities to advertise in a different format to other public sector contracting authorities, following different rules. However, in a few cases, it is not evident from the contract notices that the invitations to tender and contract award notices, appearing in the on-line database whether the contracting authority is a utility. For example, in the codes at the beginning of the contract notice, the type of awarding authority (known as "AA") in the codes is given as "AA=3", indicating that a local authority is advertising. The type of the authority should be given as "AA=4" which indicates that a utility is advertising. In addition to this, the notice is not laid out in the format required by the model notices appended to the Utilities Directive. Table 6 indicates the number of cases from 1993-1995 where correct procedure has not been followed. This has not continued to be a problem during 1995, as the utilities responsible have been fully informed of the situation by the GPS and altered the notices accordingly.

The Directives require contracting authorities and utilities to publish contract notices not exceeding a word limit of 650 words. This is obviously due to the amount of notices received by the Official Journal, currently around 2000 per week. Nonetheless, there have been cases, confined to the past three years, where this word limit has not been adhered to by NI public sector contracting authorities and utilities. Some contracting authorities, when determining the economic and financial standing required of suppliers, quote the Directives at length. This causes the notice to be more than 650 words. The situation could, however, be a result of an over-cautious approach to tendering, ensuring that all contingencies are covered. The White Paper "Setting New Standards" (HMT Treasury, 1995, p.13) proposes at para. 2.57 that,

"Tendering is burdensome and costly for suppliers. Departments will seek to ease these burdens, in particular by avoiding lengthy and over-prescriptive specifications of requirements, by not asking suppliers to provide information unless it is absolutely necessary..."
The above legislation must be read in accordance with paragraph 15(2) which provides,

Some contracting authorities had been requiring evidence of two or three years audited standing of suppliers. Paragraph 15(1) provides that a contracting authority shall only take into account any of the information listed in subsections (a)-(c). For example, paragraph 15(1)(b) and 15(1)(c) of the Public Services Contracts Regulations 1993 provide that the information should be,

"b) statement of accounts or extracts therefrom relating to the business of the services provider where publication of the statement is required under the law of the member State in which the service provider is established;

c) a statement of the overall turnover of the business of the service provider and the turnover is respect of the provision of the services of the type to be provided under the proposed services contract in the 3 previous financial years of the services provider."

The above legislation must be read in accordance with paragraph 15(2) which provides,

"(2) Where the information specified in paragraph (1) above is not appropriate in a particular case a contracting authority may require a service provider to provide other information to demonstrate the services provider's economic and financial standing"

Some contracting authorities had been requiring evidence of two or three years audited accounts from suppliers as evidence of economic and financial standing, evidence that many legal partnerships would not have available. Less than twenty such cases have occurred over the past three years, mostly in 1994, and the situation has been remedied during the course of 1995.

Other minor issues that have arisen in the contract notices include making references to English Law instead of the law of Northern Ireland and typing errors that have occurred in the notices; for example, in one particular contract award notice, the time period between the date of dispatch of the notice and the date of the contract award was -15 days. These issues occur infrequently.

3.7 Good Practice

The monitoring service for the GPS does not seek for errors alone in the notices; notices that contain elements of good practice are also reported. The majority of periodic and pre-information notices, invitations to tender and contract award notices are satisfactory and do not raise any legal issues. Indeed, useful extra information has been provided in some contract notices when contracting authorities are not legally required to do so.

Some of the notices are voluntarily advertised, showing contracting authorities' commitment to openness and transparency in EU procurement. Many of the invitations to tender for service contracts, advertised following the open procedure, provide in the "other information" section of the notice the final date for the receipt of tenders. This is not a requirement under the Public Service Contract Regulations 1994 and illustrates good procurement practice by the NI public sector.

4. Conclusions

The aim of this paper was to show a close correlation between the improving purchasing standards of the public sector in Northern Ireland and the aim of the GPS to improve quality through the means of, inter alia, education. New training initiatives by the GPS were outlined, together with evidence drawn from the research project on public procurement in Northern Ireland. Indicators of this increase in purchasing standards are as follows:

a) The GPS, in line with the Government's target to have 75% of staff in key procurement posts qualified to Certificate of Competence or higher level professional qualifications by the end of 1996, have actively encouraged staff to participate in courses held at the University of Ulster.

b) The monitoring service provided by the University of Ulster at Jordanstown to the GPS provides information on the number of issues that arise on a quarterly basis from EU contract notices published in the Official Journal. This information is disseminated to Departments, to inform staff of issues arising in their particular area, helping to ensure a higher standard of contract notice.

c) The main findings from the research project into the impact of EU Procurement Directives in Northern Ireland have shown an increase in the quantity of notices published by the NI public sector and utilities. The number of contract award notices has increased and the number of issues fallen have, in contrast to this, fallen considerably.

d) GPS purchasing teams have been established in Departments following the signing of Service Level Agreements with those Departments. They are responsible for establishing value for money, competitive supplies and services contracts and compliance. This will ensure future quality in purchasing by the public sector in Northern Ireland as key GPS purchasing staff have already been educated to third level standards at the University of Ulster.

Education alone does not ensure improvement in purchasing standards. Individual ability of staff members, ensuring the right person is employed to do the right job and, importantly, becoming accustomed to EU legislation all play major parts in improving standards. To help students on the postgraduate Purchasing and Supply Management courses at the University of Ulster become accustomed to the legislation, a systems learning package, "ELOPE", has been developed. The students explore the system on an individual basis, are then formed into groups and asked to complete a case study, and make a short presentation in their findings and recommendations. This methodology has helped to remove some of the mystique and suspicion surrounding the Directives, created open discussion, and the responses to the case study were found to be encouraging. This evolving procurement education in Northern Ireland, utilised by the NI public and private sector, will help to produce quality standards and help the GPS to achieve their aim of ISO 9000 by April 1997.
References


Appendix One
EU Public Procurement Directives

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EU Public Procurement Thresholds

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Risk Based Contract Management in the Public Sector

The pioneering approach developed by the UK's Employment Department

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Abstract

The Employment Department (now part of the DfEE) reacted to the challenge provided by market testing by devising a new, risk-based approach to contract management. The approach has been designed to systematically assess the risks presented by the procurement of business and office services, enabling the contract management team to manage risk more effectively. This paper will discuss the drivers behind the new approach, reveal the thinking behind it, and show evidence of its initial impact. The paper presents the concept of risk-based contract management, and is relevant beyond the confines of the DfEE.

1. Introduction

Since 1991 central government departments have been operating a policy known as market testing. Market testing is the process by which an activity currently performed within a department is subjected to external competition. It is the equivalent of make or buy decisions in the private sector. The aim of market testing has been stated as the promotion of fair and open competition so that departments and agencies can achieve the best value for money for the customer and taxpayer (Office of Public Service and Science, 1993, p1).

The former Employment Department (ED), which on July 5th 1995 merged with the former Department for Education to form the Department for Education and Employment (DfEE), has market tested a large number of its business and office support services, and, in common with many other departments of state, has found the transition to new cultures and methods of operation a major challenge. One of the chief concerns in the ED was to manage the new business risks that market testing presents. The former department responded by devising a new approach to contract management. This approach, which is now being further refined in the DfEE, has been designed to systematically assess the risks associated with contracts for the delivery of business and office services. This paper will discuss the drivers behind the new approach, reveal the thinking behind it, and show evidence of its initial impact. The paper will also comment on why the approach holds significance for the assessment and management of contractual risk in the public sector as a whole.

The paper refers to the ED when addressing actions prior to July 5th 1995, and to the DfEE when discussing actions either after that date or those planned for the future.

2. Drivers for Change at the Employment Department

The need for contract management arises from the many imperfections that exist in competitive markets. In conditions of perfect competition such management is not necessary. Perfect competition is a state whereby all suppliers are identical in terms of the goods or services they are offering: there are many suppliers in the market, so consequently no supplier has any influence over price; buyers in the market have perfect knowledge of market conditions; there are no barriers to supplier substitution; and, there are no barriers to the entry of the suppliers into the market. Under these circumstances the logical approach for purchasers and contract managers would be to operate a policy of adversarial leverage, focusing their resources on frequent tendering. With all the suppliers offering identical goods and services, the purchaser would be able to concentrate on finding the lowest price. Furthermore, with there being no barriers to transferring from one supplier to another, the purchaser would pursue a policy of offering only short-term contracts. This would strengthen the purchasers negotiating position, as the supplier would always be concerned about the impending contract renewal.

In the real world, however, supplier failure is commonplace and market conditions do not resemble those set out in economic models such as the one above. Most supply markets do not contain a large number of suppliers that can only be differentiated by price and, crucially, it is not always straightforward for an organisation to change suppliers. Under these circumstances it is clear that contract management must go beyond the contractual agreement and involve supplier development and risk management. As far as contract management in central government is concerned this need has been increased as a result of market testing, a policy initiated by the British Government in 1991, which has extended central government procurement into areas of business sensitive service provision.

2.1 Market Testing: Theory and Practice

The Conservative Government has long been committed to encouraging private companies to bid for public sector contracts; compulsory competitive tendering, for example, has existed in local authorities since 1980. Market testing has, however, for the first time taken private sector competition right to the very centre of government, and includes activities that were hitherto assumed to be the very essence of public service provision.

Market testing is based upon the simple premise that competition promotes efficiency. The Conservatives came into office in 1979 believing that the monopoly provision of public services by the state led to waste and inefficiency. Market testing seeks to reform this situation in central government by allowing private sector companies to bid against existing public sector providers in a competitive tendering process. The idea is that this process will produce one of two scenarios; either the private sector providers will have increased its efficiency, from the need to beat off the private sector competition, or the existing civil service provider will have been replaced by a necessarily more efficient private sector bidder. In either case it is argued that the service provider will produce better value for money. The Government summarises the advantages of its philosophy:
Market testing, as well as being based on competition, also touches upon core competence analysis. Increasingly private sector companies are reducing the number of functions that they perform. Companies analyse which of their functions are core to their business and outsource those that are not - to other businesses which have those functions as their core competencies. This has been particularly the case with business functions that require considerable investment, information systems, for example. Market testing is said to extend this rationale to the public sector.

The challenge to established practice, however, does not end there. Market testing is not merely designed to make Departments consider what they are best equipped to undertake, but is part of a process known as Competing for Quality which is designed to make Departments question whether certain services need to be undertaken at all. If it is decided that a function is no longer necessary, for whatever reason, then the Department is empowered to stop its provision.

Once this question has been resolved, the Department moves forward and selects those services it believes are suitable for privatisation, those which should continue to be provided by the public sector, and finally, those which it believes should be market tested. Market testing is, according to the 1991 White Paper, appropriate 'for those functions where the decision between contracting-out and continuing with in-house provision should be taken solely on value for money grounds.' (HM Treasury, 1991, p2)

Once services have been selected for market testing they begin the journey through a standard process. This process is relatively straightforward; this description was published by the Government in 1993:

"Market testing involves:
- Identifying the scope and nature of the activity to be considered for market testing including reorganising if appropriate;
- Establishing what level of service is necessary;
- Identifying baseline costs;
- Assessing the market;
- Developing a specification and outline contract/service level agreement (SLA) documents;
- Inviting interest from potential suppliers (though this is not a compulsory step - it is possible to go straight to competitive tender);
- Selecting a suitable list of bidders;
- Calling for bids from the selected participants;
- Evaluating competing bids from external providers and the in-house team;
- Awarding a contract or service level agreement;
- Monitoring the performance and cost of the operation on a continuous basis; and
- Retesting."

(Office of Public Service and Science, 1993, pp3-4)

Many people have expressed grave doubts about the virtues of market testing. Criticisms of the policy focus on issues of quality, accountability, security, probity and its implications for the long-term preservation of a cohesive civil service. Others believe that it is a long overdue attempt to introduce best practice management techniques and efficiency into complacent organisations. For those working in central government these arguments are not irrelevant, but take second place to the day to day need to adjust to the new realities.

2.2 Market Testing as a Driver for Change at the Employment Department

Between 1993 and 1995 the ED market tested 23 business and office support services, accounting for approximately £27 million of annual expenditure (at 1995/6 prices). These services included: typing; reprographics; transport services; security; estates maintenance; library services; postal services; records office; and, most significantly, information technology. 11 contracts with external providers and 12 Service Level Agreements with in-house providers resulted.

The main reason why market testing was a driver for change within the ED was that it involved the competitive tendering of business sensitive services. Prior to market testing most procurement in central government was of goods rather than services. With this type of procurement it did not matter that the Department adopted an policy of adversarial leverage and hands off management, as very little of the procurement was essential to the operation of the Department. Because support services were, by and large, supplied internally, there was no role for procurement or contract management. Control was exercised through the normal processes of line management. Market testing changed this situation both in the case of service contracts won by external suppliers, and in the case of contracts won by in-house teams. In-house teams have been evenly affected by market testing because central government departments have moved to a system of arms length control known as service level agreements, which have sought, as far as is practicable, to introduce a regime similar to that provided by external contracts. The need to protect the Department against the vagaries of imperfect markets increased significantly.

A contract involving the procurement of services, particularly business critical services, necessitates the management of the relationship throughout the whole of the contract. Services have to be continually provided so it is important that the supplier maintains the same high standards throughout the whole of the contract. A common feature of service provision is a mid-term decline. At the beginning of the contract the supplier tends to perform well in an initial 'honeymoon' period. This level of performance can then tail off, particularly if the supplier installs lower calibre managers once the contract has been secured. Performance usually recovers when the contract is close to renewal. The job of the contract manager is to ensure that this pattern does not occur by encouraging, and on other occasions cajoling, continual improvement.

Market testing has also had the effect of increasing innovation in service delivery. External contractors, in particular, are encouraged to use their expertise to reduce the cost of delivery and find new solutions to supply problems. New and innovative approaches, however, increase the level of risk that the department is exposed to, and increases the need for the contract to be carefully managed.

Finally, the need to adhere to EU and Gatt procedures for re-testing has introduced a degree of inflexibility which does not apply to one off procurements. Re-competition has, therefore, to be planned, or indeed, anticipated, if continuity of supply is to be preserved.
2.3 Other Drivers for Change at the Employment Department

The new contract management approach was not only driven by the introduction of market testing. The pressure of public expenditure cuts and the lack of experienced contract management resources also supported the case for change.

Although the market testing initiative was, to a large extent, driven by the need to cut public expenditure, this factor has been a significant driver in its own right. In an atmosphere of public sector stringency, contract management, both through the costs of its own operation, and through its importance for wider departmental spending, became an obvious target for reform. It was envisaged that the new approach would, firstly, improve the allocation of contract management resources, allowing contract management costs to be cut, and, secondly, improve the management of contracts, increasing their value for money, and reducing the number of damaging interruptions to supply.

The final driver for change was the aforementioned scarcity of contract management resources. The contract management team took the attitude that the civil service tradition of attempting to do all tasks equally well was no longer a realistic aim, and that the future lay in designing a system which would direct the majority of contract management resources towards the most significant risks. Indeed, where the risks to the Department were negligible and the market competitive, the intention was to take a "hands off" attitude, and empower the the provider or the end user to carry out some of the contract management functions themselves.

Overall, these drivers combined to make a powerful case for change, a case that was emphasised by the clear sub-optimality of the pre-1995 approach.

3. The Sub-optimality of the Employment Department's Previous Approach to Contract Management

Prior to market testing contract management in the ED largely concerned one of two areas. The first area concerned information technology and consultancy contracts. These contracts were managed as part of wider projects involving multi-disciplinary teams. Responsibility for developing management systems did not lie solely with the contract managers within the ED, and were, therefore, not wholly ED systems. The second area concerned the management of contracts for goods, usually goods which were not critical to the operation of the department. This area of contract management, to the extent that it was undertaken at all, was largely adversarial in nature, and not sensitive to the different circumstances that service contracts introduced.

The ED, which has subsequently been recognised as something of a leader in this field in Whitehall, came to the conclusion that these existing arrangements were inadequate for the new climate caused by market testing, and that the management of business critical contracts required a more professional and comprehensive approach. This was the first recognition of the need for explicit contract management systems, and the first formal definition of its scope. The ED's efforts included the recruitment and training of staff to fill the new contract management role, the establishment of new client-provider relationships, and the development of new contract specifications, which increasingly focused upon outputs and performance indicators, rather than inputs and delivery processes.

Although this partially addressed the inadequacy of pre-market testing contract management, the situation was still deficient in five respects. Firstly, the focus of the contract management team was poor. The key focal point for most contract managers was the service delivery budgets which often led to the neglect of quality issues and user concerns.

Secondly, the contract management approach was reactive rather than proactive; assessments of risk almost invariably came about only after a "crisis". At that time there was no systematic assessment of risk, which would have provided the department with the information necessary to predict and manage problems. The contract managers were concerned with dealing with problems, rather than trying to avoid or minimise them.

Thirdly, the reactive and rather ad hoc nature of the approach also made the allocation of contract management resources inefficient. The degree of attention the contract management team gave to a particular contract did not directly relate to the risks associated with that contract; instead it was in part determined by historical factors, such as which division had been responsible for the service in the past. Only to a limited extent did previous supply problems have some influence. Given the limited resources of the contract management team, this meant that many higher risk contracts were either unattended or under-resourced. There was very little conscious and rational decision-making at this time over the allocation of contract management resources.

Fourthly, what assessment of risk that did take place was rather intuitive. The assessments were based merely on the perceptions of the contract manager concerned, and not judged against any standardised criteria. This contributed to a lack of consistency in the assessment of risk, something that was exacerbated by the fact that the department was spread over three sites. Finally, the unstructured approach to contract management also meant a method of managing relationships that was at best unsystematic, and, at worst, totally absent. For example, the question of the suitability of certain relationships in certain circumstances was not addressed in a theoretical or open manner.

Despite the improvements, therefore, the approach was still reactive, intuitive and insular. As such it was in no way adequate to deal with the challenges presented by market testing, particularly the need to manage business sensitive service contracts.

4. Contract Management in the Public Sector: The Development of a Risk Based Model

In response to this situation, the contract management team developed a new approach to identifying, assessing and managing risk. The approach consists of two parts: a risk assessment methodology, which in turn informs a risk management strategy. The new approach to risk assessment is both strategic and pro-active. Each service is rated against pre-determined risk criteria to determine whether risk exists and, if so, to what extent. A scoring method is used to prioritise services in terms of their risk profile. Each of the risk criteria have been designed to measure a particular aspect of contract management, the context in which it is delivered, and the nature of the provider, greater and more systematic involvement of the user of services in monitoring and evaluating of performance, and, where appropriate, a more deliberate "hands off" approach to contract management.
4.1 The Aims of the Employment Department's Contract Management Approach

The ED's new approach to contract management, developed by a small team of senior managers, completely overhauled existing practice in the Department. Furthermore, the approach required end users in the Department to alter the way they thought about their role. Such changes were, in the short-term, disruptive to both individuals and the Department. As a result, the contract management team had to demonstrate that the benefits of the new approach would be significant, and, in the new climate presented by market testing, essential for the effective management of the Department's business and office services. To this end the contract managers set a number of initial aims which they felt, if fulfilled, would vindicate the upheaval they had caused. These aims were in a number of areas, many of them interdependent. They were: improvements in internal organisation; improvements in supplier relations; reduced exposure to risk; and direct cost savings.

Firstly, the contract management approach aimed to improve the internal organisation of service provision. This was to be achieved by improving contract management responses to supplier failure, both in terms of speed and problem resolution, and by making the Department less insular in its methods of service provision. Contract managers and users are now encouraged to take a wider perspective, with reference paid to both academic work on best practice and proven techniques employed by other organisations.

Secondly, the new approach also had the aim of improving relations between the Department and its suppliers. It was hoped that this would improve service provision and value for money. Thirdly, the approach aimed to reduce the Department's exposure to risk. The expectation of the contract managers was that the approach would lead to greater efficiency in service delivery arrangements, and greater reliability on the part of service providers, which would, in turn, lead to better value for money.

The final aim was for the new approach to deliver direct cost savings. This was expected to be achieved in three ways. Firstly, a more effective use of contract management resources was expected to allow a reduction in the size of that budget. Secondly, the improved procurement methods were expected to deliver lower transaction costs, primarily through better relationship management. Thirdly, a reduction in the number and severity of supply difficulties was expected to reduce the costs associated with problem resolution.

4.2 The Employment Department's Risk Assessment Criteria

In the first stage of the development of the risk assessment methodology the contract management team took an overall review of what their role was within the ED. The team decided that their role consisted of five obligations. These were: to protect public money by ensuring that the Department received value for money; to ensure quality services to the satisfaction of users, within prevailing budget constraints and standards specified in the contract or service level agreement; to maintain continuity in the supply of services; and, to avoid incidents which might damage the department and/or ministers. Clarifying the role of the contract management team was crucial as it provided the new approach with clear objectives.

With their role clarified, the contract managers were able to identify aspects of service delivery which had the potential to undermine these obligations. The team took the view that they needed to develop a pro-active risk assessment methodology, which would in turn inform a risk management strategy. The contract managers came to the conclusion that there were nine factors that needed to be included in this methodology. These were:

1. Risk of budget overrun
   This risk is, of course, self-explanatory. In the current climate of public expenditure cuts the DfEE like all other departments is concerned to avoid budget overruns.

2. Quality of service specification
   This is an extremely important aspect of contract management, as poor service specifications can lead to many other business risks, including costly misunderstandings between buyers and suppliers. The DfEE is keen to stress the importance of a tight definition of the service to be provided, with details on the output expected of the supplier, and the responsibilities of both buyer and supplier.

3. Risk of interruption to supply
   The third factor to be considered is the risk of interruptions to supply. The department felt it crucial that they should have an indication of the reliability of suppliers.

4. Impact of supplier failure on end user
   Following on from the previous criterion, the department also needs an understanding of the impact that any supplier failure might have on the end user in the Department. Services which were not generally business critical might nevertheless be crucial to some individual users.

5. Attractiveness of business to provider
   This criterion has been included to give the contract managers an indication of the degree of leverage they might have over their suppliers. The Department believes that the extent to which the supplier is dependent on the business provided by the DfEE should have an impact on the attitude it takes towards negotiation.

6. Value of contract
   This criterion is merely to rank the contracts in order of value, a necessary factor when considering the significance of risk. The criterion has an important link to the risk of budget overrun in that it quantifies the extent of potential budget control problems.

7. Difficulty of re-sourcing the business
   One of the key factors in determining the seriousness of business risk is the existence of alternative suppliers. If, in a particular supply market, there are a number of companies that could quickly and effectively fulfil the department's requirements for a service then the impact of supplier failure is likely to be limited. This criterion highlights the need for comprehensive market knowledge and an awareness of the costs of re-tendering.

Damage to the department arising from non-performance
   This criterion covers the impact of supplier failure not just on the end user, but on the Department as a whole. The contract managers are aware of the importance of avoiding incidents that may cause the department, and in particular ministers, embarrassment.

8. Quality of the relationship with the provider
   The contract managers want to know whether suppliers are flexible, the degree to which they are trusted, the degree to which they are customer focused, and the extent to which they are pro-active in voicing their concerns. This information will affect the attitude the contract managers will take to suppliers, and, where necessary, lead to the development of a formal relationship management strategy.

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4.3 Risk Assessment Methodology

The risk assessment criteria are employed in a series of seven charts. For each of the charts two of the risk criteria are paired. These pairings produce a series of risk scenarios that the contract management team feel most threaten their obligations to the Department. These seven scenarios are explained below:

Note: all seven of the risk assessment charts appear in the appendix.

Chart 1

In the first chart the 'risk of budget overrun' is paired with the 'quality of specification'. The rationale for this pairing is that if the specification of the service is poor, the contract manager may not have full knowledge of the extent of customer requirements, thus making budget control problematic. Furthermore, a poor specification could undermine the ability of the contract manager to control the activity and behaviour of the provider. This situation could also have cost implications, leading to a budget overrun. Equally, in a potential budget overrun situation the quality of the specification is a key factor in assisting sound management. If quality criteria are set and needs prioritised it should be relatively easy to lower quality thresholds or 'drop' lesser priorities to remain within budget.

Chart 2

The second chart is possibly the most revealing as it pairs the 'risk of interruption of supply' with the 'impact of supplier failure on the end user' within the Department. A service that offers a worst case scenario on this matrix presents the Department with a serious problem; the Department needs its key services to be supplied on a consistent basis. Therefore, analysis of chart 2 provides contract managers with an important insight on which to base relevant risk management action plans.

Chart 3

Chart 3 is of particular relevance to relationship management as it pairs the 'attractiveness of business to the provider' with the 'value of the contract'. These two criteria were paired as they provide an indication of the degree of leverage the department might have over the supplier. This is crucially important for the control of costs and is extremely interesting in light of the debate currently taking place over relationship management strategies. The department takes a contingent approach to relationship management, with its attitude towards its supplier depending on both the degree of attractiveness of its business to the provider, gauged in this matrix, and the importance of the service to the Department itself.

In the matrix there are three annual service value bands; less than £100,000, £100,000 to £200,000, and over £200,000. Whilst higher value contracts are, in most cases, more attractive to suppliers than lower value ones, the contract managers recognise that some services carry more 'prestige' than others. This has to be taken into account when the assessment is used to develop a relationship management plan.

Chart 4

The ability of the department to re-source should an existing supplier be unable to fulfill its obligations is another risk about which the contract managers must have detailed information. This risk is paired in chart 4 with the 'damage arising from non-performance by supplier'. Assessments from this pairing provide a very clear indication of the significance of the risk of a particular service. If a supplier from a difficult supply market (i.e. one with relatively few suppliers of acceptable quality) fails to perform then the problem is likely to be difficult to resolve. If this is combined with the Department being significantly damaged from the non-performance of a supplier, then the Department has what they refer to as a 'nightmare scenario'. It is, therefore, critical that the contract managers are aware, from the outset, which suppliers fall into this category so that robust contingency plans can be drawn up.

Relationships with such suppliers will also need to be managed particularly closely, and by a contract management team buttressed by considerable input from senior management.

Charts 5 and 6

The pairings of charts 5 and 6 present, in different combinations, the criteria considered by the contract managers to be the most important. Chart 5, which pairs the 'quality of relationship with provider' with the 'value of the contract', focuses on the issues of continuity of service, and where breakdowns in continuity might have the greatest impact on the Department. Chart 6, which features 'value of contract' and the 'risk of budget overrun', reveals those services which provide the main threat to departmental budgetary control.

Chart 7

The seventh and final chart introduces the Department's ninth risk criterion, the 'quality of relationship with provider'. This is, perhaps, the most subjective of the nine criteria. In this chart it is paired with the 'risk of budget overrun' on the basis that where a high quality relationship exists, or is developed, the contract manager is able to influence the supplier with greater flexibility, encouraging it to work in partnership with the Department. The greater understanding of the Department's requirements, brought by a closer relationship, would help ease the pressures on budget limits that are caused by either a poor understanding of departmental requirements or a supplier's inflexibility.

4.4 The Risk Assessment Process

The risk assessment tables were introduced through the undertaking of a comprehensive review of the Department's services procurement. All of those concerned with the provision of business and office services were presented with the tables, and invited to place the services for which they were responsible in the appropriate sections of the matrices. The contract managers also required those concerned to provide detailed justification for their placement. The team then assessed the submissions and, following further meetings to resolve disagreements and contradictions, produced a final set of completed charts. From the completed charts the contract management executive has been able to identify those suppliers and services that require attention, and also what particular attention is required. This is done in two ways. First, the scores featured on the charts are combined to provide an overall risk rating for each service. Second, the charts are taken separately and each service is assessed on each of the risk scenarios.

Two different approaches to using the charts have been adopted because, although the contract managers get an indication of the significance of the risk from the overall risk rating, their detailed risk management plan can only be drawn up from more detailed information on the individual risks. This can be illustrated using a hypothetical example.
The overall risk rating of the supplier in figure 1 informs the contract managers of the priority this service represents; it is the fifth riskiest contract. This overall indicator, however, gives them no information on the source or sources of that risk. This is acquired from an analysis of the individual risk charts.

<table>
<thead>
<tr>
<th>SLAC/Contract</th>
<th>Site</th>
<th>Weighted Results</th>
<th>Chart Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estates Maintenance Ltd</td>
<td>London</td>
<td>26</td>
<td>G0 E3 C6 C6 C6 E3</td>
</tr>
</tbody>
</table>

Armed with the breakdown, shown in figure 2, the contract managers are able to identify where problems are most likely to occur. In this instance the contract team are told that there is a very low risk of budget overrun, but, should Estates Maintenance Ltd be unable to fulfill its obligations, the Department would have a serious problem to deal with. This is because, as charts four and five reveal, there are difficulties over resourcing, with the impact of supplier failure being significant. Chart three also informs the team that they have very little leverage over Estates Maintenance Ltd. With this information the contract management team can formulate their risk management plan.

The two stage risk assessment provides the team with both a basic risk ranking and a detailed risk breakdown. With such information they are able to devise appropriate risk management action plans. The content of these action plans, which are drawn up for all services, not just those subjected to market testing, is discussed in the next section.

4.5 Risk Management Under the New Approach

The risk based approach to contract management has bound together a number of previously independent risk management initiatives into a single, coherent risk management strategy. The risk assessment tools have assisted this strategy in two ways. First, the charts, in highlighting those suppliers which represent the greatest level of risk, have assisted the contract management team in allocating contract management resources. Second, the fact that the department developed a range of risk assessment charts means that they are able to identify the specific risks that exist with a particular supplier. The department is now able to be pro-active in its risk management - it has a mechanism for identifying potential problems in advance, and for deciding upon and initiating remedial action. Therefore, not only does the department know the level of resources to allocate to a particular contract, it also knows exactly how to allocate those resources.

The risk management action plan the contract managers devise for each service contract can include any number of the following management initiatives: relationship management; user re-orientation; performance monitoring; contingency planning; market analysis; and budgetary control. The Department's general principles on these matters are discussed below.

4.5.1 Relationship Management

In the 1995 White Paper on procurement, Setting New Standards, the Government announced its view that the type of relationships central government departments should develop with its suppliers should be contingent on the nature of that service (HM Treasury, 1995, p37). Departments were urged not to adopt unnecessarily adversarial relationships with suppliers. The ED have sought to embrace the spirit of the paper and is currently developing its relationship management into a more sophisticated approach. The Department's previous approach to relationship management was, in too many cases, based upon adversarial relations, whatever the circumstances. No attention was given to the possibility that a relationship could be developed through collaboration.

Now that the Department has undertaken its risk assessment exercise it can judge the type of relationship most appropriate for each service, which as well as embracing the debate over co-operation and competition has focused upon four other choices: hands on or hands off contract management; active or passive contract management; open or formal relationships; and, single or multi-level relationships. Whilst a conscious choice of styles is recommended the Department recognises that a particular combination of styles is unlikely to remain valid for the whole of the contract period of a particular service; flexibility will be required to accommodate changing situations.

4.5.2 User Re-orientation

One of the most serious problems for the implementation of both the ED's new approach to contract management, and, indeed, Setting New Standards, is getting the message understood throughout the Department. Both of these new initiatives require a change in culture, and there is a need to win hearts and minds. For this reason the Department takes user education very seriously. After all, in the case of contract management the team are looking for end users to contribute to the actual process itself. Therefore, the contract management team will be discovering whether users understand their role within the new arrangements, and have the skills to carry out that role. Where the answer to these questions is 'no', the team are developing education programmes to rectify the situation.

4.5.3 Performance Monitoring

The risk assessment tools have allowed the contract management team to allocate their resources more effectively, and this is particularly the case with performance monitoring. For those services which have been assigned a low risk ranking the contract managers are looking reduce their involvement, and rely on the individual end users in the Department, and on supplier self-assessment. The emphasis that will be placed upon user monitoring highlights the previously stated importance of user education, and emphasises the cohesiveness of the contract management approach.

Contingency Planning

One of the main advantages of the new pro-active risk assessment methodology is that it has allowed the Department to develop robust contingency plans. The reactive nature of the previous approach made such planning problematic, which had the consequent effect of delaying problem solving. The situations that the Department is most concerned to guard against is supplier liquidation and the failure of suppliers to provide services to the required standards. In such circumstances the contingency plan will be dominated by the need to find an alternative supplier. The plan will also identify 'warning signs' that will help in the detection of problems.
The ED's new approach was only introduced in early 1995, and therefore, at this stage no significant improvements have been the case. This understanding was also reflected in the planning for, and contract of, negotiations. During the period concerned, identifiable savings or cost avoidance strategies represented over 15% of the overall contract value for that service. Equally as important, service continuity was preserved.

Finally, the new approach has had a positive effect on staff development. The strategic nature of the new approach has highlighted the contract management competencies required to manage effectively the risk within the Department. They include: the possession of professional knowledge, such as an understanding of contract law and the procurement process; relevant market knowledge; the possession of general management skills; negotiation skills; and, effective interpersonal skills. This ability to identify competencies has assisted the development of training programmes, the benefits of which will be seen in the professional performance of the Department in the years to come.

5. Initial Evidence of the Impact of the Employment Department's Approach to Contract Management

The ED's new approach was only introduced in early 1995, and therefore, at this stage it is not possible to provide reliable evidence of reduced transaction costs and higher quality service provision. The approach has, however, led to significant improvements in the internal organisation of the Department, an essential precursor to the more tangible gains expected in the future.

Firstly, the structured approach has been successful in facilitating a more efficient allocation of contract management resources. The approach has assisted the contract managers in prioritising their activities, which has allowed them to accommodate the pressures that have been placed upon their budget. For example, a number of end users of low risk services have already taken on responsibility for performance monitoring.

Secondly, the approach has been successful in demonstrating to the Department the nature of risk. It is exposed to in the provision of business and office services. As a result of the new approach, those responsible for high risk services are aware of the fact, and are able to act accordingly. Throughout the Department there is now a greater understanding of the realities of post-market testing Whitehall.

Thirdly, there is evidence that the new approach is assisting the contract managers develop more effective risk management action plans. Internal feedback from end users suggests that problems are being dealt with more effectively, and that contingency plans have prevented the Department from suffering damaging interruptions to supply. An early example, concerning one of the Department's major services, justifies this claim. The risk assessment exercise has enabled the contract management team to systematically assess and respond to the many changes experienced in respect of this service.

In the first stage, the initial risk assessment identified a greater level of risk than was previously acknowledged or, indeed, understood. As a result, additional resources were found to investigate these risks further, and over a period of about nine months the overall level of risk associated with the service increased, and a number of new risks were identified. The ability to understand the type and significance of the risks involved enabled the contract managers to prepare better informed and more effective contingency plans and operational responses than would otherwise have been the case. This understanding was also reflected in the planning for, and contract of, negotiations. During the period concerned, identifiable savings or cost avoidance strategies represented over 15% of the overall contract value for that service. Equally as important, service continuity was preserved.

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6. Conclusion: The Case for the Wider Application of the Employment Department's Approach to Contract Management

It is important to stress the iterative nature of this approach to contract management. In the years to come there will no doubt be evidence that will lead to the approach being modified; there is no end-state that the contract managers are aiming for. Nevertheless, the new approach has fundamentally reorganised the contract management function in the ED (now the DfEE). The Department has put in place a systematic risk assessment methodology, which informs a cohesive risk management strategy. This has been successful in improving awareness of risk, increasing the efficiency of contract management resource allocation, and highlighting the competencies required by the contract management team and end users in the Department. More tangible evidence of reduced transaction costs and increased supplier reliability is expected in the near future, an expectation justified by the example in the previous section.

The contract management team also believes that its new approach has a wider applicability within Whitehall. First, all departments are subject to the same drivers as the DfEE: primarily the ever intensifying search for public expenditure cuts and the need to reconsider the balance between internal provision and external purchase. Second, the department's approach is generic. Its risk assessment methodology covers risks that are common to all departments, and the risk management strategy covers functions that are equally prevalent. The need to base public sector contract management around risk has only been recognised in the past couple of years and the ED/DfEE is one of the first departments to offer a comprehensive approach. On this basis the methodology is offered as a positive contribution to the debate about how contract managers in central government should react to the new climate of the 1990s.

The wider applicability of approaches such as the one discussed in this paper has led to the establishment of a number of working groups in central government. These consist of representatives from departments and agencies across the whole of central government. There are seven working groups which are discussing supplier appraisal; contractual risk; TUPE; contractual documentation; the private finance initiative; contract incentivisation; and post contract award contract management. The DfEE is using these groups to publicise their ideas on contract management.

Although the new approach adopted by the ED/DfEE has already produced a number of positive results, there is perhaps a need to end the paper on a note of
caution. The traditional civil service philosophy of treating each task as if it were of equal importance is breaking down. Increasingly, civil servants are having to prioritise tasks, and concentrate resources where the risks to the operation of the department are the highest. Developments such as the DfEE's new contract management approach are accelerating this trend. The new philosophy is consciously akin to that pursued in the private sector. Yet public expectations of how government departments should operate are not the same as those they have for private sector organisations. Consequently, it will be interesting to note over the next few years the extent which economic gains, attributable to internal reforms such as the ED's approach, are overshadowed by adverse reaction to, surely inevitable, occasional mishaps which will be equally attributable to that reform.

References


Chart 1

<table>
<thead>
<tr>
<th>High i.e. overrun &gt; 5%</th>
<th>Risk of Budget Overrun</th>
<th>Medium i.e. overrun of 2-5%</th>
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Quality of Specification
Chart 2

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<tr>
<td>G</td>
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Impact of Supplier Failure on End User

- High Risk of Interruption to Supply
- Medium Impact of Supplier Failure on End User
- Low Value of Contract

Chart 3

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<th>High</th>
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<tbody>
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<td>F5</td>
</tr>
<tr>
<td>G</td>
<td>H</td>
<td>I6</td>
</tr>
</tbody>
</table>

- High Attractiveness of Business to Provider
- Medium Value of Contract
- Low Value of Contract

- Low i.e. up to £100k
- Medium i.e. £100 - £300k
- High i.e. over £300k

Value of Contract
### Chart 6

<table>
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<th>Value of Contract</th>
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<td>F5</td>
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<tr>
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<td>G</td>
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<td>I</td>
</tr>
<tr>
<td>Low i.e. up to £100k</td>
<td>Low i.e. overrun of under 2%</td>
<td>Medium i.e. overrun of 2-5%</td>
<td>High i.e. overrun of over 5%</td>
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</table>

**Risk of Budget Overrun**

### Chart 7

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<th>Risk of Budget Overrun</th>
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<th>C</th>
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<tr>
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<td>E3</td>
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<tr>
<td>Medium i.e. overrun of 2-5%</td>
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**Quality of Relationship with Provider**
Organisational Structure;

Keywords: National Health Service; Information Technology

1. Introduction

Abstract

The National Health Service (NHS) in England currently spends approximately £400 million per annum on Information Technology and related services. The increasing reliance of NHS organisations on computer systems to provide comprehensive management information and ensure effective medical administration of the rising number of patients every year means that competent expenditure of such a large proportion of the budget is strategically vital. In contrast to this, several major IT projects have, over the last fifteen years, become well-publicised “failures” at enormous cost to the Health Service and there is a perception of ineptitude in IT system procurement by the NHS. The NHS has undergone several major structural re-organisations since inception in 1948, with varying levels of impact. Currently 490 Individual NHS Trusts each have their own budgets, develop their own IT strategies and resource their own requirements, with little by way of obligatory practice other than an approval process for very high value projects. Inevitably the supplies function has been affected by the changes in the organisation as a whole, but has also undergone a number of specific substantial changes in its own operational structure and practices over the years. In terms of IT procurement as a specific process, various sets of official guidelines have been produced to assist purchasers over the years, but until now there has been no detailed consideration of the procurement methodologies/practices used by IT budget holders in acquiring the computer systems, nor of the purchasing support offered by the supplies function. This paper is an interim report on a wider project designed to examine how the structure of the NHS, and the subsequent structure of the supplies functions has altered over the years, and to establish what professional purchasing support has been made available to those responsible for IT procurement in the NHS. It charts the history of the NHS and its supply function in tandem with the growth in IT investment, examining the development of the current methodologies and the impact of Government policy. The history demonstrates the complexity of the organisation and the degree of impact on the issues raised by external influences such as politics. The development of IT procurement is set in this context.

Keywords: National Health Service; Information Technology; Procurement; Organisational Structure; Purchasing Processes

1. Introduction

The National Health Service in England is a unique service which attracts the keen attention of the public, the politicians and therefore the press. As a result, effective expenditure and investment is vital both to ensure continued service provision and to maintain the support of all interested parties. With an annual expenditure of £400 million per annum, Information Technology attracts a considerable amount of attention. The well-publicised “failure” of a number of major IT projects, albeit for a range of different controllable and uncontrollable reasons, in the last 15 years has raised a sensitivity among the ability of the NHS to procure and/or implement IT systems effectively.

This paper is an interim report on an MPhil project to examine the development of supplies as a support function within the NHS, and to trace the level of professional procurement methodology available for the effective purchase of IT systems or services.

The first stage of the research, summarised in this paper, was carried out by means of a range of archive research, literature, official reports, Acts of Parliament and minutes of meetings. In addition, semi-structured interviews were carried out with 10 senior members of the supplies function over the last 20 years. These were designed to gather personal insights on the structure, operation and development of the supplies function.

The history which emerges from this first stage is reported in this paper.

1.1 The creation of the National Health Service

The National Health Service in its present form was established on July 5th 1948. Although there have been several reorganisations of the overall structure since that time - due to both political and demographic changes - the basic concept of a tax-funded health service, available to all and free at the point of delivery, remains the same.

The original concept of a national health service, recognised by the Coalition Government in 1943, assumed a unified service providing an integrated health service to all citizens and based on management by local government. This embodied the various recommendations of the Dawson Report (1920), the Socialists Medical Association report in 1933 and the Beveridge report (1942) on social welfare services. In fact, the initial structure of the NHS, as conceived in 1948 and partially taken into national ownership and General Practitioners would be full-time salaried servants. The BMA was outraged at these proposals ... and withdrew from the discussions”

Eventually a three tiered service was introduced which separated the management and delivery of Primary (community and environmental services) from Acute services (hospital based) and Family Practitioner services (General Practitioners (GP's)).

As a result the supplies function for the support of these services was also disparate, concentrated mainly within the hospitals, each Hospital Management Committee (HMC) having its own Supplies Officer.

Three hundred and seventy two different supplies arrangements were therefore created for acute health provision, each reporting to their own Hospital Management Committee. In addition 134 Executive Councils governed the provision of Community Healthcare while 174 Local Authorities controlled the provision of Community Services. For hospital services, supply arrangements and purchasing power were limited to the requirements of the number of hospitals in any one HMC. In addition
there was little opportunity to allow the supplies function to develop specialist purchasing organisation public money is wasted because purchasing is

It is however clear from interviews that some Supplies Officers recognised the value of co-operation with other HMC's in order to increase economies of scale. There were, therefore, a number of contracts covering more than one HMC, for common items. In recognition of this unofficial practice, the Ministry of Health issued guidelines in 1949, covering inter-group relations. In addition, the Ministry of Public Buildings and Works started making available central contracts for relevant items. However there was no obligation at any stage for any HMC to either take part in inter-group-operation or to use any central contracts.

In 1954, the Bradbeer Committee report on the Internal Administration of Hospitals noted and recommended that the supplies function warranted a study in its own right. As a result the Messer report of the Committee on Hospital Supplies was published in 1958. This advocated joint arrangements between HMC's as a means of reducing unit costs, thus providing official support to the efforts by Supplies Officers.

Joint arrangements did, however, depend on several issues, including agreed specifications and standards, agreed requirements, commitment and inter-disciplinary co-ordination - for example between hospitals and users. As a result the use of joint agreements was not uniform across the country, and there were HMC's who had no part in any joint or central agreements.

2. Developing the supplies function — 1963-74

In 1963, the lack of uniformity of approach led to criticism by the Public Accounts Committee to Parliament of the wide range in prices paid across the country for similar goods. It also criticised the wide range in specifications for common user items on which it should be possible to set common standards. This latter criticism in particular led to the creation of the Ministry of Health Specifications Working Group which issued recommendations on specifications for various common user items such as Nurses Uniforms, laundry, operating tables and boiler oil.

This uncoordinated approach continued until 1966, when the Hunt Committee on Hospitals Supplies Organisation was charged with the task of reviewing the hospital supplies arrangements in England and Wales.

Among its recommendations was the concept of "supply areas", defined by some as recognition that supplies within the NHS is basically commercial in nature i.e. below a certain level of purchasing organisation public money is wasted because purchasing is fragmented and there are no economies of scale to be gained.

Changes as a result of the Hunt report were introduced during 1969 and constituted the first formal reorganisation of the supplies function. The HMC Supplies Officer post was abolished in favour of Area Supplies Officers relating to groups of hospitals for the purpose of supply arrangements. Regional Hospital Boards (operating at a level higher than HMC's) also appointed Regional Supplies Officers along with Regional Supply Boards. At national level, a Hospital Supply Branch was created within the Ministry of Health Supplies Division. In all some 90 new supplies Areas replaced the previous fragmented arrangements covering 372 different HMC's, and supply services became co-ordinated across three levels - National, Regional and Area.

Theoretically Area supplies functions were the lowest level of purchase, although the level of co-ordination achieved by the various areas did vary. However according to the Institute of Health Administrators by 1974 over half the supplies revenue expenditure was covered by National, Regional and Area agreements (22 per cent National and per cent Regional and Area).

A review of the "Hunt System" had been planned for 1970 but this was superseded by the wider implications of the NHS re-organisation.

3. The health service re-organisation — 1974-1982

For many of the previous years, there had been constant debate about the effectiveness of the structure of the NHS. The nationalisation of services presupposed that the provision of facilities across all geographic areas was equal prior to the reforms. In fact, some areas were vastly under resourced to deal with the sudden increase in patients requiring a health service now that payment was not an issue. A few local authorities had, in the course of funding via the Emergency Medical Service during the war, developed impressive acute hospital services, but aside from a few common services such as obstetrics, the provision of beds across the country was at best uneven.

In addition, the three tiered system placed heavy emphasis on the hospital services, but there was inadequate liaison with the other two aspects of healthcare, leading to poor services for the chronically ill or disabled.

The Forth Report in 1962 made what can be referred to as the first notable mention of a plan to unify the health service. It made the suggestion of a local NHS administration under Area Health Boards, stating:

"one administrative unit should become the focal point for all the medical service of a fixed area, and that doctors and other personnel in all branches of the Service should be under contract with this one authority."

In 1967 Kenneth Robinson, then Minister for Health, announced a "full and careful" examination of the administrative structure of the NHS, making it clear that he was looking not only to resolve the current issues but to create a structure to manage the organisation through the next 20 years.

The subsequent report, entitled "The Administrative Structure of Medical and Related Services in England and Wales" was published in 1968 and became known as the First Green Paper. The main proposal was the unification of health services under 40/50 Area Health Boards, replacing the 15 Regional Hospital Boards, 36 Boards of Governors, 336 Hospital Management Committees and 134 Executive Councils. The boundaries of these new bodies would coincide with those of Local Government.

Several issues relating to the structural review of Local Government prevented these proposals being taken further and eventually a revised Green Paper was issued in 1970 by the next Minister for Health, Richard Crossman. Entitled "The Future Structure of the National Health Service", it became known as the Second Green Paper.

The new scheme proposed more Area Health Authorities - ninety instead of the forty or fifty proposed in the First Green Paper - and also inserted Regional Health Councils between them and the Department of Health and Social Security (DHSS), designed to be responsible for hospital and specialist planning. The intention of the Minister was to publish a White Paper in the summer of 1970 allowing Bills to be put before Parliament in 1972 and therefore appointments to the new authorities to be complete for a take over in 1974.

Unfortunately this plan was interrupted by a General Election in June 1970 which did not return the Labour Government. Instead the Conservative Governments new
Secretary of State for Health, Sir Keith Joseph, waited almost one year before issuing a further Consultative Document (1972) to interested parties only, without actually publishing it.

In order to meet the original deadline of re-organisation by April 1974, 2 months consultation was allowed. Much of the Second Green Paper proposals were excluded from the Consultative Document but the main principles remained the same - namely:

a) Local Authority Health Services would be incorporated into the duties of the Area Health Authorities.

b) Health Authority and Local Authority boundaries would be matched.

A White Paper was published in August 1972, entitled “National Health Service Reorganisation: England”. In order to move the proposals into legislation, the National Health Service Reorganisation Bill was then issued in November 1972. The National Health Service Reorganisation Act was finally given Royal Assent on July 5th 1973, exactly 25 years after the inaugural day of the NHS.

The transition to the new structure took place with enforced haste in order to meet the goal of April 1974. Ninety new Area Health Authorities were created "each...servicing the same population within the same boundaries at its matching local authority" such that "formal divisions between health, education and the personal social services will be bridged by the arrangements for collaboration". Each Area served a population of between 0.25 and 1 million. Those with a larger population were subdivided into districts.

In fact despite the comprehensive nature of the changes, the reorganised NHS came into being with alterations in its structure already being planned since the Conservative Government had been replaced in February 1974, by a Labour Government who accepted that it was too late to actually stop the reforms but who had plans of their own. Proposals were set out in a Consultative Paper by Barbara Castle entitled “Democracy in the National Health Service (1974)”. Changes based on this document were planned for July 1975.

4. The implications of the 1974 reorganisation on supplies

This fundamental change to the structure of the NHS had a major impact on the development of the supplies function as a whole. Clearly the co-ordination of the health provision gave greater scope for co-ordination of purchasing activity and purchasing power.

The Area Health Authorities were created with sizes ranging from eight or nine hundred beds up to populations of ten or eleven thousand beds and did not always coincide with the supply areas which had been created in implementing the Hunt recommendations. Therefore the purchasing power of some was effectively reduced. Each of the 90 Area Health Authorities had the opportunity to establish its own supplies function within its structure, leading to the re-creation of more local level stores and one of the overall effects was an increase in variance in prices around the country, which had been a prime motivator for the Hunt enquiry in the first place.

In addition, the ability for each authority to decide how the supplies function would be organised meant that below national level, the structures varied from one Region to the next - and even between Areas in the same Region.

For example: Within Trent Regional Health Authority:

A) Sheffield Area Health Authority had only one area supplies function and no District level supplies functions were provided.

Meanwhile

B) Derby Area Health Authority had one Area supplies function AND three separate supplies functions at District level.

Interviews with individuals involved in the supplies function at this time indicate that the main challenge was viewed as “getting control over purchasing”. To quote a senior figure at Trent Regional Health Authority “everyone seemed to have an order book except the Supplies Officer”. It was common for individual functions such as Works, Laboratories, Theatres etc to hold an order book each and carry out much purchasing directly. The scope for professional purchasing support of projects was limited to the ability of the supplies professionals to gain involvement in any projects.

One reason for the appearance of more and more stores at Area and District level was the common belief in the maxim “control of stores = control of purchasing”. The focus of supplies functions at most levels was the stock-held items and common user non-stock products such as drugs. Various arrangements existed including District and Area stores, plus use of the “single commodity area” whereby one hospital held all the stores of a single commodity for every hospital in an Area.

The general result, concurred with by those interviewed, was that this period saw the creation of many small supplies “empires” created at all levels in an attempt to devolve best purchasing practice to the lowest levels in Areas and Districts.

5. The introduction of Information technology — 1970’s

At this point, the development of Information Technology was beginning to make an impact in the Health market, and investment was increasing. Discussions with those involved in purchasing during this period recall little or no involvement in these purchasing processes, beyond late consultation on the regulations for issuing tenders. The nature of the product at this stage in it’s development was both new and very complex. The understanding of the product and therefore the control of the project was vested very much in the technical departments. The range of products was restricted in general to mainframe computers, and the Government reputedly issued tacit guidelines to the public sector, based on a buy-British policy. By the mid 1970’s, the development of specific healthcare packages was increasing although these were principally in-house developments, mostly at regional level as the platforms were still mainframes and therefore too large to be considered at any other level.

Within one Region, much development work was carried out on a Patient Administration System, designed on a Data General mainframe. A senior figure within the Region recalls how the involvement of purchasing to acquire a new platform for the growing database resulted in the purchase of a Digital mainframe which entailed re-training everyone involved. This outcome stemmed not from the specific actions of the purchasing staff but from an inability to flexibly apply tender regulations which at that time required the contract to be awarded to the lowest bidder.

In addition, the infancy of the product market meant that the development of technical standards across manufacturers was only in formative stages. Investment in these products was a new activity and the ability to cost out Whole life Cost implications, had the concept been considered, was non-existent as there was no information on potential whole life costs.
The ability to develop purchasing procedures was hampered by an inability to develop standard specifications against which manufacturers could bid. In addition, much of the power was vested in the Regional Computer Centres where much of the development work was carried out.

With little opportunity to learn in a highly complex and fast developing product market, the supplies function was ill-placed to offer little more than advice on tender procedures. Even Terms and Conditions were limited to use of the Standard Terms and Conditions for the Purchase of Goods, or, more usually, the manufacturers own Terms - with amendments. The CCTA - the central government’s own IT purchasing department - did develop a highly complex and technical set of terms and conditions but these appear to have been viewed with trepidation by those interviewed.

6. Further development of the supplies function - 1976-82

Following the “Three Chairman’s Report” (1976) into relationships between the NHS and Department of Health and Social Security, which recommended further examination of the possibility of the NHS supply organisation undertaking some or all of the DHSS supply requirements on an agency basis.

A joint NHS/DHSS Steering Committee, chaired by the Permanent Under Secretary, examined three possibilities:

a) Disposal of DHSS Supply requirements among the Regional Health Authorities. For obvious reasons this was the preferred option of many at Regional level and below.

b) Creation of an separate supply agency taking over NHS and DHSS Supply functions.

c) Creation of a separate national policy making body (a Supply Board). This was viewed by many of those interviewed as a soft option.

The Committee determined that option C offered the best solution and the Supply Board Working Group was created, chaired by Brian Salmon, to examine the concept in detail. The group comprised 15 people from Regional staff through to professional representation down to users and Regional Supplies Officers. The Institute of Purchasing and Supply representative apparently described his involvement as “frustrating” in trying to get purchasing recognised as an important function. The ability to develop purchasing procedures was hampered by an inability to develop standard specifications against which manufacturers could bid. In addition, much of the power was vested in the Regional Computer Centres where much of the development work was carried out.

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According to Kember and McPherson (1994) by the end of the 1970's, the demand for new resources had continued to rise whilst the Government had become increasingly constrained by the economic legacies of the previous decade. In particular the increase in Public Expenditure during the early recession had created significant financial issues. It is a common irony that many of the problems facing the NHS were a result of previous successes which had increased the expectations of the Public.

That the NHS was facing problems was not disputed and, in 1979, a Royal Commission presented the conclusion of three years deliberations which had incorporated six specially commissioned studies. The terms of reference were "To consider, in the interests both of the patients and of those who work in the NHS, the best use and management of the financial and manpower resources of the National Health Service."

The main conclusion was that "we need not be ashamed of our health service and there are many aspects of which we can be justly proud". However there were criticisms of the management structure, saying there were "too many tiers, too many administrators of all disciplines, a failure to make swift decisions and a waste of money as a result".

Just as the Labour Government had been left with a re-organisation it could not avoid, so the Conservative Government which took power in 1979 was left with a Royal Commission it had not chosen. However, in December 1979, the Government accepted the basic criticisms and the majority of the recommendations, issuing a consultative paper based on the recommendations or the Commission report, entitled "Patients First".

The stated intention was to "streamline services in such a way as to avoid wholesale upheaval and to minimise turbulence". It aimed to tackle the problems through:

a) "Strengthening management arrangements at the local level with greater delegation of responsibility to those in the hospital and community services;"

b) Simplification of the structure of the service in England by the removal of the Area tier in most of the country and the establishment of District Health Authorities.

c) Simplification of the professional advisory machinery so that the views of clinical doctors, nurses and other professions would be heard by the Health authorities.

d) Simplification of the planning systems in such a way as to ensure that Regional plans were fully sensitive to District needs."

The timetable for change was set in 1980 with all reorganisation to be complete by April 1982. Inevitable delays in the decision making processes involved in the reorganisation led to a somewhat hasty transition, however the timetable was achieved and on April 1st 1982, the ninety Area Health Authorities were replaced by two hundred and one new District Health Authorities.

This new structure had serious implications on communication - the Department of Health (DoH) now had twice the authorities to deal with directly - as did each Regional Health Authority. The Regional Authorities faced the problem of Area based clinical services planning which now needed to reflect the requirements of twice the authorities while the DoH effectively saw a distancing of the chairmen of the key management influence in the NHS because maintaining effective contact with twice the number of individuals was difficult. As a result the contact with the Regional Chairmen was seen as even more influential.

One rapid consequence of the devolution to District level was the loss of economies of scale. While common sense prevailed in many instances, e.g. Ambulance Services which were generally managed by one district on behalf of a number of others, Districts were often anxious to develop the independence promised by the reorganisation. One classic area was the supply of goods. While some joint purchasing arrangements remained in place, where benefits were demonstrable, the greater development of District independence is a common theme highlighted by many of those interviewed for the purpose of this study. In fact control of stores was seen as control of purchasing and as a result, District level warehouses to hold stock levels were developed in many districts, notwithstanding the stores provisions at Regional level.

8. The structure of supplies — 1985-89

By 1985, the debate on the future of the Supply Council was gathering pace. Two main options - to extend or abolish - were under consideration. The Regions felt strongly that the national body should be abolished and lobbied Government accordingly. The Permanent Under Secretary agreed that the Supply Council was not working but felt that a national perspective was still required.

Elsewhere in Government in the late 1980's there were considerable cuts in civil service numbers, and the plans to increase self-government of the NHS were gathering pace. One view among interviewees was that the Department of Health (DoH) recognised this when it made a proposals for an NHS Procurement Directorate to become part of the DoH.

The new Procurement Directorate inherited the staff and structures of the Supply Council. The first step of the new Director of Purchasing was a three month period of consultation with all levels within the Regions, after which an action plan was developed. Dialogue with the Regional Supplies Officers became a priority but it soon became clear that while the Regions were prepared to listen and cooperate, they still wanted to retain their independence.

After considerable delay due to personnel changes and communication chain difficulties in the political arena, approval of the Action Plan was finally given in 1986, and the Fifteen Point Plan became an official statement on Supplies. In the interim time, the Regions had been developing ever more independent strategies, including the commissioning of Regional Distribution Centres, designed to replace the huge number of District level stores. In addition different information support systems were also being developed - again there was little strategic overview to co-ordinate this investment.

To gain support of the Regions for greater national co-ordination, the Procurement Directorate funded an independent report by external consultants. The Binder Hamlyn report suggested that the supplies function was basically a private business which required greater co-ordination and a common information system.

In spite of all of this, there was little progress to gain any form of co-ordination. Eventually the Procurement Directorate produced a recommendation for creating a supplies organisation independent of the Regional Health Authorities, based on six specific geographical areas in order to emphasise the independence from the fourteen Regions. Line management was identified as fundamental to the success of any attempt to co-ordinate supplies more effectively.

In the absence of any progress, and increasingly frustrated as a result, the National Director announced his intention to leave at the end of the original tenure, in 1990.

In fact the Regional Supplies Officers interviewed all agreed that while line management did not suit the Regional agendas, the disinclination to co-operate was, with hindsight, simply a delaying of inevitable.

The raised profile of the supplies function as a result of the efforts of Procurement Directorate, and the Reforms planned for 1991, meant that a detailed review of the structures was also inevitable. 
9. The 1990 reforms of the NHS

The Health Service has continually sought to improve its use of resources and gain improved value for money. Towards the end of the 1980s the Government issued its White paper “Working for Patients” (1989) and “Promoting Better Health” (1987). These were accompanied by the NHS and Community Care Act 1990 which established, for the first time, an internal market in healthcare. While not making the NHS a business, the intention was to make it more like business through the separation of the health service into “ purchasers” and “suppliers” of care. This separation has radically changed the structure of the NHS.

The rationale behind the introduction of an internal market in the health service is that the market mechanism, and particularly competition, should promote efficiency and reduce costs. In addition, the Government believes that delegating responsibility as closely as possible to the point of delivery of health care will raise the performance of all hospitals and General Practitioners.

Within any market there are those who buy and those who sell. The new structure of the Health Service sees a new role for the Regional and District Health Authorities. In addition to being providers of Family Health Service Authorities (FHSAs) and General Practitioners (GP’S) are integrated in the process creating a single unit responsible for implementing national policy at a local level.

On the purchasing side of the NHS there are District Health Authorities, FHSA’s and GP fundholders. The major change is that where in the past these bodies received funding to operate hospitals and community services within their boundaries, they are now funded and commissioned by the NHS Trust, which are self-governing organisations whose functions are to provide hospital and community services on a contractual basis to health purchasers. Trusts are managed internally or under the direction of the Trust Board, the Chairman of which is appointed by the Secretary of State for Health. There are currently 419 NHS trusts covering 95% of NHS provider organisations.

The original fourteen Regional Health Authorities are now reduced to eight and have been subsumed into Executive Outposts of the NHS Management Executive.

10. The structure of supplies — 1990-present day

The introduction of the new NHS reforms and the development of the “Purchaser - Provider” role through the various healthcare organisations led to a review by the NHS Executive, of Regional functions. The scope of Regions was diminishing rapidly and they were instructed to remove any non-core functions from regional level.

During the analysis of regional functions, supply services were generally identified as a non-core function. In general this led to one of two courses of action:

a) Devolution of the Regional Supply responsibilities to the District levels.

b) Creation of trading agencies for the specific purpose of supplying goods and services to the NHS for example on North West and in Trent Regions.

When these trading agencies began cross boundary trading and poaching business from neighbouring Regions, an element of competition between Regions was introduced and the situation became unstable.

The Procurement Directorate had observed this situation and proposed the need for greater national co-ordination, with a reduction in the Regional level control of the supplies function. The Directorate further identified the need to gather the Regional supplies staff under new geographical divisions with boundaries distinct from the

Regions so as to break the stronghold, and with a National Purchasing Directorate to provide co-ordination and strategic management.

Initially seven new divisions were proposed but this was altered to six to eliminate the potential for a direct connection between fourteen Regions and seven supply areas. The Department of Health and the NHS policy board considered the proposals and then asked the National Audit Office - Comptroller and Auditor General - to put forward their views on the current supplies situation and ways in which the advent of NHS Trusts could be met.

The report by the Comptroller and Auditor General from the National Audit Office - begun by acknowledging that “a lot of progress had been made in recent years towards more professional and efficient supplies services”. But this was qualified with “but the organisation needs to press home existing initiatives and to take new measures to stimulate better performance”.

In reference to the Regional supplies departments, the report offered the following comments:

“The National Health Service supplies organisations in Regions exhibit the following characteristics:

a) fragmented purchasing resulting in failure to maximise purchasing power
b) incomplete management information
c) insufficient senior management oversight and selective review of activities
d) diffused responsibility for control of operating costs
e) n customer-led range of supplies items available

These factors weaken control over purchasing and operating costs.”

In expanding on these comments in detail, the report specifically emphasised the need for the national government oversight of activities to achieve greater co-ordination of effective activity and to eliminate ineffective localised practices which were largely unchallenged. The report welcomed the proposal for a National Purchasing Unit as a means of achieving this, but on the whole it was viewed as “stimulating” by those interviewed.

A second report, by the Audit Commission, and issued at the same time, was commissioned by the NHS Management Executive. It proposed a strategic framework for the development of supplies in the NHS, with particular focus on warehousing and distribution. Six specific lines of action were recommended including building on the improvements made in recent years, establishing a role as supply chain managers on behalf of “NHS Customers”, streamlining the distribution chain, and creating fewer supplies organisations under national management.

As a result of these reports the Public Accounts Committee to Parliament in 1991, was particularly critical and the Chief Executive of the NHS, Duncan Nichol, was given a difficult time during the questioning.

The Policy Board of the NHS therefore gave the NISS supplies situation much thought during 1991 and eventually the national control of purchasing which had been denied both the Supply Council and the Procurement Directorate was mandatory with the creation of the NHS Supplies Authority, now known as NHS Supplies, in August 1991. The 14 Regional supplies organisations with over 35 stores and 3,000 staff were amalgamated into a single national organisation, with a National Director responsible for developing a comprehensive supply function to the NHS. October 1992 was the target date for transfer to the new arrangement.
As the primary aim was the continuity of a supplies service to the customer, the initial reorganisation created six geographical divisions, each containing the supplies staff of two or more of the old Regional supplies departments. This bears a striking resemblance to the six areas recommended by the Procurement Directorate in 1989, when examining how to break the Regional stronghold on the supplies function as a whole.

Each Division initially had autonomy in the development of its internal structures with regard to purchasing, logistics, and customer services, with consultative and strategic oversight from a national perspective. As the organisation developed longer term strategies, each of the functions has been gradually nationalised to offer the maximum capture of purchasing power as originally envisaged.

The latter part of 1995 saw the final stages of implementing this policy with regard to Purchasing. The national purchasing power of the NHS is captured by commodity or product area, with a national executive responsible for co-ordinating the efforts of directly managed staff, based around the country. Each product group will be strategically managed according to its individual market characteristics.

Information Technology is a product category identified within this structure with dedicated resource providing both strategic overview and specialist project purchasing support, using POISE (see later), to the whole NHS.

Ironically, having finally created the nationally co-ordinated approach to purchasing supplies for the NHS, with all its attendant potential benefits identified by successive reports over the years, the use of the service was NOT made mandatory for any part of the NHS. As a result, individual NHS Trusts are at liberty to ignore any or all of the supply arrangements available from NHS Supplies. As the success in exploiting the purchasing power lies in capturing the volume requirement of the NHS, giving individual trusts the ability to opt out and develop alternative arrangements on their own terms in conjunction with other trusts, seems to defeat some of the object. The success of future supply arrangements in the NHS will depend on the ability of the NHS Supplies to rise to the challenge to prove that national co-ordination does offer the best value for money.

11. IT procurement — 1987-1993

Despite the fact that significant amount of money had been invested in information technology since the late 1960s, the mid 1980s saw the majority of the development of guidance to assist NHS organisations in purchasing information technology. The first guidance was issued by the Computer Policy Committee and called “Guidance on Computer Hardware and Software Procurement”. However, interviews to date with those involved in the Supplies organisation reveal little or no awareness of the guidance. The interim conclusion is that while the guidance was available, it was a “paper distribution” with little by way of practical assistance to support the purchaser in the implementation of the guidance.

In 1987, the Information Management Group within the NHS Executive employed external consultants to adapt for the NHS the methodology which was being used by other central government departments. Known as BITGAS (Buying Information Technology Goods And Services), it was made available to the NHS and was aimed at replacing the original guidance.

Interestingly the introduction to the new BITGAS guidance made it clear that the new documentation was “not a rule book. Authorities are free to purchase computer and other IT systems in anyway they choose”.

Within the new documentation, the Information Management Group committed itself to examining the whole area of IT procurement procedures and “to establish ways in which authorities can buy IT Systems in more cost effective ways”. The aim was a complete set of notes covering guidance on writing the Operational Requirement (the main specification tool within BITGAS) and on negotiation skills - including post tender negotiation. In brief the process outlined in the guidance recommends:

a) Formation of a Project Steering Group including senior management from Administration, IT and user departments.
b) Production of the Operational Requirement. Aim is to present the potential supplier with an accurate profile of the Authorities system requirements together with relevant background data “so that the supplier is able to propose equipment and services which satisfy the requirements as closely as possible”.
c) Issue of EC Advert, Operational Requirement available to any supplier who expresses an interest, giving six weeks to respond with a proposed system.
d) Project Team analyse proposals and shortlist those best able to meet authority needs.
e) “Period of technical discussions with all shortlisted suppliers to clarify and understand the requirement and the proposals”.
f) Production of “Memorandum of Specification” which specifies precisely what the supplier will offer.
g) Issue of formal Invitation to Tender, evaluation of tenders against “Pre-determined criteria”.
h) Delivery and implementation, final testing and final payment.

BITGAS represented the first comprehensive guidance to try and rationalise the actions of the huge numbers of IT budget holders in the NHS.

Further guidance was issued in November 1998, by the Information Management Group, entitled “Method for identifying the costs and benefits of computer systems used in health care”, issued in three volumes. The content was based on pilot studies carried out in two Districts. Archive research reveals that this extremely detailed documentation was compiled and issued without consultation with the newly established Centre of Responsibility (COR) for IT procurement.

The recognition that IT procurement as a whole required greater co-ordination had first been identified within South West Regional Health Authority supplies function. Work had begun with the Regional Computer Managers to co-ordinate IT into bulk purchase contracts with the major manufacturers. In 1987 an approach was made to the Procurement Directorate for funding to create a COR, in the same way as had been offered for other commodity areas. While the Directorate agreed the IT did now warrant a COR, it was made clear that there was no further funding available. South West RHA was given permission to establish a COR on the basis that it was self-funding.

As result the strategies pursued by the COR were, by admission of those involved, not necessarily aimed at establishing the best practice, but were “skewed to generate income”. For example a nationally approved suppliers list was developed, published as part of a “Nationally approved guide”. Any supplier included had to contribute a modest fee for the double page entry. The problem arose in defining what, precisely these suppliers were approved for. The approval process included a financial analysis, quality systems analysis, reference site and supplier site visits. Following this they were certified and allotted a number. They were listed in alphabetical order but no details were offered on the range of skills available or the projects for which they were approved.
12. Procurement Of Information Systems Effectively (POISE) - an overview

POISE is a flexible framework of actions, including detailed guidance on implementing the actions, designed to ensure that all relevant issues are considered during the procurement process.

It aims to focus the buyer on using the procurement process as a strategic process for refining and consolidating the needs of the organisation in the context of the solutions available, while ensuring adherence to the legislative and audit requirements and development of a comprehensive legal framework to protect the Trust on acquisition.

In brief the four stages comprise the following:

a) Plan the procurement

This includes five steps to encourage the buyer to verify and understand the procurement decision, research and understand the market, produce a procurement plan and establish a project board and project team.

b) Prepare the documents

Four steps take the buyer through production of a Detailed Statement of Need (internal document to establish all requirements including business objectives, to gain ownership of management), a Summary of Need, SON, (that information required by the supplier to understand the need), a relevant EC Advert, and a draft of the contract schedules ready for negotiation with the suppliers.

c) Purchase the system

This stage takes the buyer through placing the advert, shortlisting and issuing SON, evaluating responses, issuing draft contract framework for negotiation, issuing tender based on draft contract and awarding accordingly. It is the detailed guidance in this area, which ensures all aspects of the project are adequately and unambiguously covered in the contract which is the significant advance on previous guidance.

d) Perform contract

This includes three steps detailing key areas to be considered during implementation of the contract and post-implementation monitoring and review.

Unlike previous guidance, POISE was not issued in isolation, with little by way of further support available. A comprehensive support service is available from NHS Supplies to assist NHS trusts in the application of POISE and in managing their projects through to a successful conclusion. In addition, NHS Supplies has developed a set of comprehensive terms and conditions, based on work started by the COR. Written specifically to cover the issues facing NHS organisations buying Information Technology and designed in conjunction with supplier representatives from the industry trade associations to support the schedules detailed in POISE, they represent the first available set of agreed terms and conditions providing fair protection to both parties.

13. Current issues in IT purchasing in the NHS in 1996

The size and complexity of a modern hospital in the NHS means that effective data management, and access to accurate and detailed management data is a vital aspect of the service provision.

Traditionally, the public sector has not had this need by either buying the necessary technology and managing it in-house/through facilities management or, more latterly, by outsourcing the requirement completely and purchasing a managed service.
Considerable amounts of money are expended by NHS trusts in maintaining technical department capable of providing the IT service needed to keep the data flow within hospitals moving effectively.

In addition, the implementation of new systems is generally structured around payment in stages upon delivery of hardware and successive installation of aspects of the software. At the point when the system "goes live" the NHS trusts has generally paid up 80/90% of the contract value. Such an approach, while totally in line with approaches taken by commercial organisations means that a considerable amount of risk is being borne by the NHS trust.

For example, the risks of implementation delays and of non-performance, although covered in the contract through remedies, are in the first instance costs borne by the trust. Remedies can be sought but often require considerable delay while fault is proven and compensation is received.

In addition, the cost of risk of ownership, depreciation and obsolescence, and incorrect sizing estimates are all financial risks which are currently taken by public sector bodies when investing in IT.

In 1992, the Chancellor of the Exchequer in the UK announced the Private Finance Initiative, applicable to all Public Sector capital investment. It outlined the new basis on which capital expenditure is to be encouraged, seeking to transfer risk to the suppliers where they are better placed to manage them, thus ensuring better value for money. While targeted in the first instance at major construction projects, the focus has now moved to Information Technology. In November 1995, the NHS received formal guidelines on investment in information solutions.

The new guidelines, embodied in HSG 95(48), indicate that in the future, NHS trusts will define the specification to potential suppliers in terms of the business needs which are to be met by the new system or service. In addition it will define the benefits which are to be achieved, and the risks associated with the project which it is proposed to share with the supplier. There will no longer be any definition of what needs are to be met. While constraints such as third party system interfaces will be defined, the Trust is not at liberty to define whether the supplier must deliver the needs via an installed system run by the Trust or through an alternative means such as a "pay by transaction" service. In comparison with the "technology driven" approach employed during the early years, this represents considerable erosion of the power of computer departments within the NHS.

Evaluation of the proposed solutions will be in terms of ability to deliver business needs and benefits with respect to value for money and risk transfer. Any risks retained by the trust within the contract must be translated into cash terms and added to the net cost of the system quoted by the supplier. In addition other risks, such as implementation, non-delivery and non-performance are to be managed out of the process by means of the contractual detail. For example, no payment will take place until go-live, thus transferring the majority of risk of implementation and delivery on to the supplier. Furthermore, aspects of the service charge will then be tied to performance of specific service level targets, with reduced payment for below target performance and additional moneys for enhanced service level provision.

The introduction of the Private Finance Initiative (PFI) has had a significant impact on the procurement of Information Technology in the NHS. While it was first announced in 1992, the focus on IT purchasing did not have a major effect until February 1995. The issue of the Capital Investment Manual, by the NHS Executive in 1993 introduced an approach process designed to ensure that the business cases for larger IT projects were examined by various levels of authority in order to prevent unnecessary or expenditure of large sums of money on ill-thought out schemes or schemes which offered little actual or strategic benefit in return for the investment.

Three levels of approval must be sought depending on the whole life cost of the project in question. Where an IT project exceeds £1 million Whole Life Cost, the business case requires the approval of the Regional Outpost of the NHS Executive and the NHS Executive Headquarters. If the capital content of the project also exceeds £1 million, then the approval of Her Majesty's Treasury is also required before the procurement process can begin.

With introduction of the Private Finance Initiative, not one single IT project valued over £1 million was approved in 1995. As there had been little guidance issued to the NHS on the requirements of the Private Finance Initiative for IT investment, and no training for those involved in producing the business cases, this is perhaps not surprising.

Eventually, the requirements were summed up in HSG 95(48), a Health Service Guidelines document distributed in November 1995. The additional obligations on NHS trust during major IT project procurement also required a revision of the POISE guidance to ensure that requirements are now defined in terms of business need and that the evaluation of options proposed during the procurement process covers an effective consideration costs of the associated risks inherent in each option.

The re-write of POISE is now in progress, with a full, new edition due out in the second quarter of 1996. Interim guidance on the impact of PFI on POISE has been issued to ensure maximum available guidance is offered to the NHS IT buyers.

14. Conclusions

The complexity of the NHS, and the political nature of the controls exerted over it have led to a climate of changing aims, structures and policies. Within this, the supplies function has changed both as a result of the wider changes and as a result of the gradual awareness of the importance of controlling an expenditure of £4 billion per annum effectively. The internal conflicts which accompanied this growing awareness did not assist the earliest possible coordination of the purchasing activities.

This, coupled with a product market which began as highly complex and expanded at a remarkable rate into a multi-million pound market in the space of a decade prevented the early provision of specialist purchasing support to assist IT buyers in the NHS.

The recognition of the need for greater co-ordination in purchasing activity, coupled with the increasing standardisation of the product market, finally allowed the development of nationally agreed procurement methodologies to begin in the mid 1980's.

Since then, greater national line management and increased consultation with the trade associations has ensured that an effective IT purchasing process is now recognised as a valuable tool by both the buyers and the suppliers.

While the perception of "madness" may once have been relevant, there is definitely now a "method".

15. Further research

Summarised in the paper are the results of archive and literature searches, plus detailed interviews with key individuals in the supplies function over the last 20 years. The history which emerges shows the impact of greater organisational issues on the ability of the supplies function to develop best practice.
The need for co-ordination of all interested parties is clearly demonstrated but the impact of any or all of this on the ability of IT budget holders to acquire the required goods or services more effectively has not yet been examined.

The second stage of research planned as part of the MPhil involves a large number of interviews with IT managers and other stakeholders in an IT procurement to establish the attitudes and commitment to using a purchasing methodology. The intention is to interview a cross section of staff with a range of experience to gain insight into the changes in attitude, if any, over the last 15 years. By interviewing those who are relatively new to the NHS (less than five years) there will be an interesting comparison of attitude with those who have been buying IT in the NHS for much longer.

In addition, comparison of practice versus effectiveness now and in the past is planned to provide interesting data, while comparison with the methodologies used by the private sector will offer a broader context to the whole study.

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Evidence of a Watershed in the Purchasing Profession

A case of déjà vu?

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Abstract

This paper addresses the development and 'gentrification' of the purchasing profession in the United Kingdom. The paper demonstrates that the purchasing community, comprised of the profession, the occupation and academia stand at a major 'watershed' in the development of purchasing 'practice'. The paper also contrasts the development, and synergies, of the purchasing profession with the rise of Human Resource management (HRM) and offers some observations regarding the future direction of the Purchasing practice in United Kingdom.

Key Words: Future of Purchasing as a Profession; Department & Internal Strategy

1. Introduction

The elevation of purchasing and supply to the level of fully integrated corporate government has dominated the academic and practitioner literature in recent years. With almost evangelical delight, papers concern themselves with the attainment of critical mass and an undercurrent of strategic reformation within purchasing. These movements are perceived to be converging on the 'gentrification' of purchasing to reach strategic importance to industry, society and the economy.

This article examines, at a conceptual level, the 'gentrification process' and the implications for the 'practice' of purchasing. The arguments put forward within this paper, are a means of creating discourse between the various 'communities' involved in the environment of Purchasing and Supply. It is also an attempt to critique the legitimacy of purchasing as a strategic activity. It is hoped that the discourse generated will influence research initiatives and create an understanding of the behavourial and political aspects of the purchasing profession and 'gentrification process'. In this manner, alignment can be achieved between the key 'actors' within the purchasing and supply system and create a closer 'sense of purpose' between academia, the purchasing profession and occupational purchasing.

The paper draws from research conducted within the 'new' profession of Human Resource Management (HRM) as a means of understanding the difficulty of the 'gentrification process' in the late twentieth century. The paper concludes that the 'gentrification process' has begun to be distinguishable although the movement towards 'strategic integration' remains embryonic, underdeveloped and untested. The conclusion is that there remains a need for the behavioural analyses of purchasing and the generation of a coherent cosmology for the occupation of purchasing. The combination of research and 'meaning' within purchasing practice may provide clues to the future elevation of the profession.

2. The British Context

The British Purchasing and Supply environment is dominated by three major sources of influence:

1. The first 'actor' is the Chartered Institute of Purchasing and Supply (CIPS) - acting at industry level to represent the interests of the members within society and the wider environment;
2. The second major actor in the system is the Academic community within the Purchasing and supply field of study, who seek to disseminate information to shape and improve the 'practice' of purchasing;
3. The third force acting within the purchasing environment is the occupational 'practice' of purchasing that takes place within industrial organisations.

These three actors within the purchasing community, although in many respects autonomous, do not act in isolation. Instead, there is a great deal of influence and dissonance exerted between the institutions. Figure 1 displays the community and levels of interaction in shaping the direction of 'purchasing management' within the context of the United Kingdom.

![Figure 1. The Context Of Purchasing & Supply In The United Kingdom](image-url)

3. The Virtuous Circle Of Influence & Dissemination

At the theoretical level, there is a symbiosis between the actors in the system, such that new advances in the practice of purchasing can be relayed to each actor, to facilitate improvements in professional practice. Thus influence and conditioning occurs through the interaction of the three actors in a network of relationships. The pattern of behaviour encompasses the Lewin model of development(1958), where practice is 'unfrozen' due to the discovery of an improvement or the need to change. This is followed by a 'movement' stage where the system adopts the new practice, and then a 'refreezing' stage where the new practice is embodied within the operations and value system of the purchasing community.

The role of influence is important in the system and allows adjustments to be made in the behavioural patterns and strategies adopted by the 'actors'. Therefore 'influence' is the primary transaction between the actors, although remuneration and dissonance may also be transacted (Figure 2).
The interactions of the system represent a 'closed loop learning' model that is continually adjusting to innovations and pressures originating from within and beyond the profession. The model does not imply an 'equilibria' or self correcting system as neither actor has 'authority' to impose changes of behaviour. Instead, recommendation, mediation and coalition of interest are the only channels of influence. Power, is achieved via lobbying rather than bestowed by society (legal power). Thus, a new innovation may not be greeted positively by another actor and therefore the system will not 'unfreeze' but instead create a 'watershed' or departure of coalition.

Figure 2: Closed Loop Learning & Practice Improvement

![Diagram of closed loop learning](image)

The lack of direct 'power' has implications for the 'virtuous' system in that the autonomous nature of each actor can lead to the individual pursuance of goals that conflict with goals and values held by other actors in the system. Also the system is autonomous nature of each actor can lead to the individual pursuance of goals that

easily interrupted and the collaborative cohesion can become a source of dissonance

and division. However, once strategies and interests are declared the system can begin to adjust once again, to accommodate the new prescription or refuse to accept the influence leaving it isolated from practice. In terms of the virtuous circle, dissemination represents a process of 'gentrification' and improvement in the performance (industry level), professional standing (societal level) and an advance in the body of knowledge covering the field of study (academic level).

The first phase of 'gentrification' was evident in the 1960s when authors (Bailey et al 1964) began to disseminate purchasing management techniques. This process created a new sense of purpose, doctrine scientific management of the professional practice and its control. However, the latter part of the twentieth century has witnessed a series of 'watershed' both specific to each actor and in the success of influencing strategies within the community. (Note Reification of the actors is used to represent the behavioural aspects of the three members of the trilogy, except for occupational purchasing, who are managed by a political elite and exhibit human behavioural characteristics. The constraints of this article does not allow for the development of all the arguments within each field, and a summary approach has been taken.)

4. The Gentrification Process: New Debate?

The 'gentrification' debate is, in many ways, a historic legacy and can be traced to the industrial revolution in the United Kingdom. During this period in time, the dynastic elite and their performance as managers. Thus, over time, the professional manager began to emerge to bridge the gap between ownership and control of industry. This divorce of interest reflected a movement away from the pursuance of careers in industry towards other interests such as medicine, law, architecture, etc. This 'gentrification' from industry created the birth of the profession and new career paths. As a result, the value system and interests of the 'elite' needed to be protected to maintain exclusivity. Professions were formed to regulate and control the 'practice' the value system of the 'elite' and occupation. The word 'practice' is still linked to the conduct and vocabulary of the professions (i.e. medical practice) and embodies the close relationship between the individual and the profession in Britain. It is only the case that citation of professional status will occur before that of their employer. Following this 'gentrification', the professional manager emerged to generate a new affiliation between those who controlled economic resources and the professions. Thus professions began to expand and control societal importance, to some extent this process has not ceased, and CIPS represents one of the latest bodies to join the long lineage of professions. Professional status within purchasing has served to fuel the gentrification process to new levels of importance within the 'community' model, although it is not the only contributor to the 'gentrification process'.

5. The Professional Contribution: Conformance & Regulation

The professional contribution to gentrification is the development of policies and strategies that regulate the conduct of purchasing 'practice'. The professional body is concerned with the establishment of doctrine, maintaining the exclusivity of membership and the generation of a 'value' system for members. A concern of the institution is 'legitimisation' and the generation of societal 'authority' for the profession and this pursuit has accelerated since the award of Chartered status to the former Institute of Purchasing and Supply (IPS).

'Elitism' and exclusivity is exercised by conformance in terms of generating codes of conduct that directly regulate the development of purchasing 'practice' within the occupational sector. This form of regulation outlines the behaviour of the membership and 'value system' of the profession, and is codified in terms of actual terms and conditions of membership. To this end, CIPS governs the ethical and moral practice of purchasing in a manner that can be compared to the medical and legal professions.

However, within the United Kingdom, the gentrification of purchasing remains at an embryonic stage. The development of acceptance of purchasing within the broader professional society is therefore a core activity of the new profession. Indeed, the institute has already begun to demonstrate early signs of gentrification by the establishment and qualification of membership through such routes of discrimination as age, experience and academic qualification. These barriers to entry allow the professional body to restrict access and elevate the profession as the regulatory body within purchasing and supply. Entry qualifications are a major element of the profession and tend to reinforce the values of society, together with other societal institutions such as the universities and professional examination exemptions for degree holders. This allegiance to the academic sector acts as a 'secondary filter' mechanism to assure that members of the profession are trained and taught to the highest levels in order to maintain societal standing.

6. The Academic Contribution: Exclusivity & Training

The academic contribution to gentrification covers two areas of activity, teaching and empirical research on which information is disseminated to the 'virtuous circle of
influence. Teaching and the establishment of professional values mirrors the ‘elitism’ of the purchasing profession and also adopts similar discriminatory policies aimed at maintaining ‘exclusivity’ of studentship. This strategy is supported by the certification and approval of courses directly related to the profession.

The logic behind such educational prequalification is that ‘education is believed to provide the theoretical or conceptual learning, with the addition of some analytic skills, so that the manager is the better equipped to synthesise the experience he gets and quickly reach higher levels of senior management for which he is supposed to prepare’ (Anthony 1982). Beyond the university environment, the manager is then ‘groomed’ by the employing organisation in the profession skills required during the individual career. Thus the universities maintain a strong link with the development of senior management potential, societal values and the skills required to hold high office. Indeed, the universities operate a monopoly within this sector and tend to delegate the mundane elements of ‘practice’ to other institutions.

The research contribution, is comparatively more developed, and may be seen to exert influence in terms of the practice and values that underpin the improvement of occupational performance and societal status. However, there appears to be a dissonance between the academic contribution and advances in purchasing practice. Humby suggests ‘..recent years have seen significantly increased academic activity in the purchasing field... we are probably at point 10 or so on a scale that starts at zero and has 100 as an indicator of where purchasing needs to sit in the academic world to meet the real needs of business’ (1995). Thus, empirical research within the field is also immature and possibly reflects ‘functional’ innovation in practice rather than strategic considerations. To this end, academia has not provided the elevation of purchasing professionals to the strategic apex of the enterprise. This dyadic relationship with the value system of the profession has been reinforced in terms of integrating the universities at the committee stages of CIPS and the creation of professional chairs at leading institutions in the United Kingdom.

However, this element of the trilogy is embryonic, immature and teaching is not widespread. Thus, at least two of the institutions within the community have not yet developed and established comprehensive strategies, policies of regulation and direction for themselves. Instead, the current stage of development is characterised by a process of questioning the future policy direction of each institution. These internal processes of learning are characterised by a series of ‘watersheds’, most notably in the research sector, where purchasing has represented a crossroad where many interest groups (disciplines) have converged to study practice (sociology, economics, etc). Each discipline tends to adopt a specific epistemology that does not result in unity of opinion regarding gentrification. Thus, the empirical aspect of the dissemination process is undergoing a lengthy period of questioning, change and development and may send confusing messages of dissemination.

7. The Occupational Contribution

The final actor of the trilogy is occupational purchasing. Core to the activity of this actor is the elevation of purchasing to the most strategic level of business and resource management. However due to the fragmented nature of industry and the universal application of the title ‘professional purchaser’, the gentrification process has not yet produced a unique body of professional practice. Thus the issue of how purchasing becomes a strategic issue and professionalisation is a key question. However, research is often conducted in a vacuum with no cases examined or tested in real world settings.

The following analysis consists of the following categories Professionalisation & Legitimisation, Education & Research and finally Strategy & Structure. Each category consists of the dilemma posed as a research question.

8. The Watersheds - Conflict Through Alignment & Exertion Of Influence

Thus, the system is undergoing significant levels of development and embryonic gentrification. However, alignment is not always sustainable as interest groups and coalitions operate within each actor to support particular directions and strategies. Therefore, conflict of opinion, can disrupt the system, creating a watershed point despite the common interest of gentrification. These divisions of opinion reflect the health and immaturity of the field of study, however, if these views remain unresolved, the system may potentially dissolve and cause a stagnation in the trilogy. Thus the current levels of introspection often appear confused about the future direction of practice and a series of points in the system mark areas of tension, discontent and potential divergence. The paper will now explore the major sources of discontent and the need to address these controversial issues within a ‘virtuous circle’.

The following analysis consists of the following categories Professionalisation & Legitimisation, Education & Research and finally Strategy & Structure. Each category consists of the dilemma posed as a research question.

8.1 Professionalisation and Legitimisation

The legitimisation debate occurs within the channels of influence between all members of the trilogy and wider societies. It creates a potential watershed in the acceptance of professionalism at the enterprise level of the economy.

8.1.1 Can Managers Be Professionalised?

One of the dilemmas facing the purchasing community, reflects an inherent dichotomy between the role of management and that of professional values. Raelin suggests that this results from a clash of cultures ‘the corporate culture, which captures the commitment of managers, and the professional culture, which socially accredits professionals’ (1986). He contends, the development of professional practice has to recognise that there are some individuals that lack professional training but operate within professions and professionals that act unprofessionally. Thus, the question of ‘legitimisation’ through the association with professionalism and functional specialisation must also address whether professional status has any form of meaning within occupational purchasing. That is to say, the ‘prestige associated with professionalism has caused so many occupations to claim this status, it is an intriguing question whether the classification of “professional” has become meaningless... since most professionals can be found working in organisations, which by their nature threaten professional autonomy and ethical standards, one could wonder whether the professional classification might erode to a point where its membership would be insignificantly small’ (Raelin 1986). Inference would suggest that current research initiatives may be misdirected towards disseminating new techniques as opposed to the study of the political aspects of gentrification and that care needs to be established in the definition and ‘regulation’ of codes issued as ‘practice’. Both issues require contingent and behavioural analyses of the political process of purchasing including an understanding of issues such as individual self perception, levels of remuneration and sources of discontent in order to improve the ‘body of knowledge’.
cost competitiveness of consumer products. Such economic strategies cannot be achieved by purchasing and 'authority' created as these 'enactment-style' strategies are subordinate to the super-ordinate goals of the enterprise. In most instances, the goal is cost competitiveness and therefore an aspect of the perceived legitimate power of the marketing process.

The marketing process is also a major influence at the strategic apex of the enterprise and there has been a traditional lack of alignment with purchasing initiatives. However, if purchasing seeks to legitimate itself on the grounds of economics then significant efforts need to be focused on the integration with the marketing process. This disintegration is supported by the empirical work of Joag, purchasing executives rate themselves the highest in technical and commercial knowledge about the inputs, lower in similar knowledge about the organisation's finished products, and lowest in the marketing knowledge about the organisation's finished products. Moreover, they all feel their knowledge and expertise are utilised to a fair extent, if not to the fullest (1995). Therefore a common language or shared perspective may need to be developed in order to gain influence within the enterprise.

Power, and acceptance within the business elite is linked to the political processes of the business and in particular the 'personal' relations with functions that hold 'technical expert' and 'position' power. Participation may therefore be a better short-term goal than elevation per se. However, the purchaser must not only understand their own comfort/security with their role within the enterprise and its culture, but also understand the views and gain acceptance of the senior chairman in order to enact change and gain power. This activity has, so far, eluded the purchaser and often been thwarted by other functions such as operations, who although strategic, have been poor at formulating strategies (Hill 1991). It is these functions, with whom purchasing should seek coalition of interests.

In the absence of a political or justifiable claim to 'power, purchasing strategies become subordinated to functional goals. Thus, strategic acceptance will therefore be based on the performance of the function to surpass their expected contribution to these goals. Van Weele suggests that the 'new economic reality' asks for qualified purchasing managers, who are able to translate corporate strategies and competitive priorities in tailored purchasing and supplier strategies (1995). The primacy of purchasing is therefore regarded as a functional prerequisite not corporate, thus political means represent better channel of influence.

8.2 Education & Research
The education and research debate concerns the gentrification of the purchasing profession, the direction of empirical research studies and the dissemination of results between the actors in the system.

8.2.1 Are We Providing The Right Skills To Gain Strategic Importance?
Traditionally the commercial education of professional managers in the UK has been comparatively poor. Studies by Urwick & Brech (Anthony 1986) suggest that 'Engineers', the journal of professional engineers, argued that engineers lacked the commercial skills necessary to strategically manage the business (1874) and required analytical skills from training in economics, by 1893 the journal suggested that new skills needed to be developed, that of costing and commercial knowledge in order to increase the contribution of the professional at the strategic level. This debate may affect the Purchasing trilogy, where in courses in the subject are few and embryonic, often teaching the practice of management within the functional specialism rather than the managerial skills needed by industry such as change skills or cross functional techniques. Therefore, courses may require re-alignment with the interests of the actors in the trilogy as well as require more frequent review in order to maintain this external validity. At the enterprise, the 'need' to develop new skills questions the existence of the purchasing function control methods and may infer the need to widen managers perspectives in order to make the transition from functional specialisation to political process.

Indeed, many authors allude to the 'under-performance' of teaching within the university system. Leavitt (Anthony 1986) is by far the strongest critic of this link in the trilogy suggesting that 'the decline of American management is closely correlated with the rise of the American Business School .... Just to add a little salt to the wound, the Japanese have done what they've done without business schools' (1983). Humby notes that the issue may need to be addressed for the future performance of occupational purchasing. He states that 'Generations of purchasing professionals have talked about the need to be more strategic. With some notable exceptions this has been accompanied by an absence of credible explanations as to what is meant or how a strategic contribution can be measured... The coming years will see purchasing people increasingly engaged in new roles with the need for constantly refreshed personal and professional skills' (1995). In addition, Farmer contends that the comparatively better performance of the Japanese purchasing 'change agents' stems from 'educational background, levels of skill... and involvement in the total business as a key player' (1995). This last comment may suggest that the Japanese trilogy of influence is better aligned or mature than their British Counterparts, and that purchasing has been elevated due to its relationship with strategic competitive advantage.

8.2.2 The Research Agenda
The empirical research has also proved disappointing to the occupational purchaser and resulted in a confused dissemination of 'concepts and fads', often lacking conceptual underpinning, academic debate, and reliant on only a few chosen methodologies with significant limitations. Cox contends 'New concepts and ideas are taken up by practitioners under pressure, who need to demonstrate their "state of the art" knowledge and expertise, but who do not have the time to assess the practical utility of a concept for their own unique business environment. Often fads have not been properly evaluated empirically before they are touted as the latest "cure-all" for every management problem' (1995). Therefore, the dissemination of findings may be premature and occur in the absence of rigorous testing to be readily accepted by a 'professionalising elite'. In the pace to implement change, contingencies of the case would appear to be seen as secondary considerations, significantly 'blurred' by an analysis of applied behavioural research. The 'ignorance of context' potentially creates 'absurdity' within purchasing practice (blind emulation) as opposed to the result of any form of logical elevation process.
8.3 Strategy & Structure

The strategy and structure debate focuses on the changes in the enterprise level and the acceptance of the profession. It involves the levels of integration to corporate government and the future working structures that may need to be developed to support the future practice of purchasing.

8.3.1 Can Purchasing Gentrify Under The Constraints Of Organisational Hierarchy?

Another watershed is the ability of the profession to gentrify under the traditional bureaucratic structures that impinge on practice. The focus of research within the field has tended towards the perceived need to change the systems that regulate occupational deployment of strategy. Many authors suggest that a 'Centre-Led Action Network' (CLAN) approach needs to be developed such that a team of expert strategists sit at the 'hub' of an operational purchasing system. This approach combines the advantages of both centralised and decentralised organisational structures without incurring any of the disadvantages associated with either. It comprises a very small central strategy.. with actual purchasing undertaken in the businesses. Its success relies on networking between the individuals involved and their ability to innovate (Humby 1995). The new structures embody high levels of collectivism and professional individualism simultaneously, using information rather than overt control methods. In short a gentrified elite that control the purchasing strategies and resources. However the system may pose as many problems as seductively logical answers in the gentrification process.

The divorce of strategy from the operational aspect of the enterprise creates a secondary elitism and one that could threaten the longevity of the CLAN approach. 'It is probable that the majority of managers now at work will never receive another promotion...professional staff will reach their career plateau earlier... than was customary in the past. For a previous generation of managers, the expectations of career advancement provided the main motivational spur. If that expectation is no longer perceived then there are important implications for the morale and motivation of a large group of men... whose loyalty and enthusiasm is so essential to the well being of all organisations'(Anthony 1986). Thus, the conceptual model has serious implications for both the practice and membership of the profession, creating dissonance between individuals within the system, due to the lack of a career path outside the 'hub' and low levels of alignment of the individual to the profession of purchasing by virtue of 'de-professionalisation'.

8.3.2 Roles & Responsibilities: Cross Functional Participation?

New structures imply changes in the roles and responsibility of the professional to potentially threaten the individuality that is cherished so much.

The 'challenge is that successful firms will adopt a strategic approach to procurement management and, in doing so, major opportunities will become evident for those who can seize the time and develop their skills. For those who do not... may well be the harbinger of doom as the traditional role of purchasing in the functional firm gives way to the multi-functional lean enterprise of the future'(Cox 1995). Farmer suggests 'whilst aspects of the traditional purchasing role remain, it is likely that greater emphasis will be placed on information gathering and dissemination .... Meanwhile, the functional role will involve developing and establishing supply policy, and evolving and managing appropriate supply strategies'(1995). Resolution of conceptual issues to avoid internal conflict may infer that purchasing managers have to abandon the traditional lines of operational demarcation if they are to achieve elevation. 'This task is deemed to have been too difficult for British management to accomplish... the most disabling of criticism is that managers were not prepared to abandon their status or their formal authority in favour of joint submission to a new democracy in which their real authority would be enhanced'(Anthony 1986). Therefore, cross functional integration may hold the key to integration in the political and decision-making system of the enterprise.

However, hybrid management approaches (CLAN) may create dysfunction's notably, strategists may produce plans that are bypassed by cross functional working parties at the operational level with unclear lines of reporting. The hybrid approach will therefore see both gains and losses as control is decentralized and functional boundaries dissolved. Apathy may be shown towards strategic elevation from within the profession itself, a by-product of role ambiguity assigned and delegated to fellow 'subordinate' purchasing professionals. Thus 'Seeking to protect the autonomy that we have learned to prize, we aspire ourselves not to be manipulated by others; seeking to incarnate our own principles and standpoint in this world... We find no way open to us except by directing towards others those very manipulative modes of relationships which each of us aspires to resist... The incoherence of our attitudes and our experience arises from the incoherent conceptual scheme ...'(Macintyre 1981). The effects of changes to structures and strategies also lacks behavioural analysis concerning the impact of such change on the sustained performance, success and achievement of strategic elevation. It may also create a lack of professional association and dissolution of 'practice' potentially creating a 'sub class' of purchasing 'professional'.

Indeed, '...there is the likelihood that the demarcation lines which separated functions in traditional organisations will become increasingly blurred. Observation... shows that cross-functional project teams... are usurping some functional roles' (Farmer 1995), which supports the thesis of delegation in order to gain elevation of strategic power. This acceptance of professional erosion, may eventually create the cross-organisational 'process' of purchasing, similar to that of 'quality' that is owned by the business as much as the Quality Control (QC) specialism. The development of this 'cross' approach may undermine the 'societal' status and individual's 'self' perception of professional practice but also witness uncomfortable 'gaps' in the cross functional skills of the operational purchaser who is unprotected by the confines of the strategic 'hub'. The lack of a common language may compound these frustrations further, and taken to its logical conclusion, the practice of purchasing is likely to 'free itself of its bureaucratic control but lose all affiliations with the profession of purchasing' in its current format. The liberal dispersal of purchasers throughout the organisation may well facilitate CLAN approaches but also create divided loyalties for the individual level and no guarantee of performance improvement for the enterprise. Prescription and context may again conflict.

8.3.3 Contingency Theory & Traditional Normative Purchasing Doctrine

Academic research favours normative theory and has created untested 'cases fads' for practitioners, these two methodologies have a single failing, that is they are not 'universally applicable' and externally valid with the practice of purchasing. It may also be suggested that implicit to these approaches is the concept that purchasers have influence over the structures they work within. Humby reinforces the need for contingent analogues suggesting that 'it is critical for success that the way in which purchasing challenges, especially strategic ones, are addressed is carefully matched to the structure and culture of the host business. It is axiomatic that this must be done in a dynamic way if the latter are themselves in a period of change'(1995). The contingency argument is reinforced by Van Weele who argues that research must include an analysis of the 'demands on the capabilities and managerial abilities of purchasing managers' and in particular their ability to change, resolve conflict and their 'organisational political skills required' (1995). Therefore traditional methodologies, may significantly inhibit the elevation process that it seeks to
The development of HRM created the 'push' for strategic business legitimisation and a concern for long term strategy formulation (Beer et al. 1985). It embodied the gentrification and integration of the function with the senior management strategies of the enterprise. As such the direction of employees was substituted with the development of management interests for the provision and deployment of employees. As such HRM became compatible with the interests of management and an over management activity. The proponents of the new school of thought, suggest that the conceptual differences with the historic regime of 'personnel' management is a concern for strategy and planning rather than reaction and problem orientation. It was argued that the new gentrified regime created a systemised task that was managerial in focus, goal oriented, and placed greater emphasis on the context of HRM practice (Contingency approach). In short, HRM represented a means of gentrifying a 'support activity' of the business.

This HRM correlates highly with purchasing in terms of the purpose of gentrification, whilst historically being a subordinate function of higher organisational goals. The common treatment as 'cost centres' and strategies, confined to department, and emphasising regulation and control activities are also common. In many respects this 'young profession' embodies all the critical perspectives demonstrated by the present purchasing communities.

The personnel 'communities' greeted the new moves with cynicism suggesting that there was a lack of definition in the HRM approach to generating strategic alignment within the business. Fowler contends that attempts to gain strategic leverage was merely 'old wine' and could not be justified without changes in practical work rather than a more systematic management of the labour process (1987). His work suggested that the 'perceived' change from personnel management to HRM embodied little other than a change in title. An area that may affect the purchasing fraternity in terms of advertised positions for 'supply chain managers'. He contends that reality had not actually changed for this new breed of 'strategically legitimised' HRM professionals. Subsequent research by Guest supported this view and reinforced the 'inertia' of practice. This may infer that the CLAN approach to purchasing, may result in the title 'strategic' but the practice remains traditional in terms of 'buying'. The potential outcome is the de-professionalisation of subordinates and the impotency of strategists contained within a central 'think tank' protected by entry barriers.

A further criticism of the gentrification strategy has been proposed by Armstrong, who goes suggests that the problems with strategic HRM are first, that it does not specify the strategic goals, emphasising instead the strategic process and the troublesome concept of fit (1987). Secondly, he argues that it is still no different from what has been advocated for personnel management in text books and elsewhere. The programmes consist of procedures and techniques familiar to all personnel managers. This means there is nothing new in what is done within the HRM framework (1987). Difficulty associated with the development of a source of competitive advantage within the business.

Another area of 'commonality' is the recognition that 'practice' must be put in the context of the organisation. In essence, all professions will be viewed contiguously on their practice, its culture, political systems and unique operating conditions. In analysing the personnel environment, Miller argues that the distinction is the whole question of fit, most notably the fit of HRM to the strategic agenda. This fit of HRM to the strategic agenda is not always easy. The two functions have been distanced traditionally, but HRM seeks to bring together these disparate functions and disciplines in a systematic manner. In short, the development of operational linkages is what strategic HRM is all about (1989). Therefore, as part of the purchasing gentrification process, the use of a contingency approach could lead to the displacement of the traditional functional practice of Purchasing practice. The contention that practices and tools are used in a strategic and purposeful manner creates strategic legitimisation cannot be sustained.

HRM and purchasing share many common objectives such as organisational integration, the relinquishment of control in order to generate authority and strategic elevation. The objectives follow a similar route, in that influence is exerted across policy hierarchies in the business, via similar techniques as cross-functional working, permeating purchasing interests throughout the organisation in order to elevate. The result of this approach is the creation of corporate unitarism and legitimisation. However, both professions have advocated a CLAN approach for the management of this process, proposing that such relationships strengthen strategy decision (consultation management) and allow for individual innovation (Guest 1989). No empirical data supports this hypothesis that re-structuring creates 'success' within enterprises. Indeed, where change occurred, it focused on the redefinition of HRM itself, in order to delegate the mundane aspects of practice to other areas within the business, such as line management, in order to maintain the core elements of strategy formulation. CLANs have rarely gone beyond academic pontification to create high levels of individualism and collectivism.

The political behaviour of personnel managers and the CLAN approach, it can be seen that managers, whilst resisting bureaucratic control as anti-professional adopt traditional control methods with their subordinates. This is another aspect of the
unresolved debate regarding the 'appropriateness' of structures to strategic purchasing. Legge emphasises this behavioural analysis of political management by suggesting that 'personnel management evokes images of do-gooding specialists...lacking power. Our new enterprise culture demands a different language, one that asserts management's right to manipulate, and ability to generate and develop resources' (1989). This resort to the 'trusted' ways of control reflect the lack of a cosmology within the field and a common approach to legitimisation.

Despite a longer period of gentrification, HR has not resolved many of the problems shared with the purchasing, after almost ten years of discourse and dissonance. Indeed, there may be no 'one best way', '...personnel managers themselves identify different models of excellence in personnel management gives credence to the view that the HRM model is just one among a variety of forms of personnel management, and for some companies it may not be the most viable model' (Guest 1989). This reinforces the need for contextual study.

8.3.5 Analysis & Future Research Questions

In the light of the arguments proposed in this article some limited conclusions may be drawn in terms of focusing the direction and achievements open to the practice of purchasing. The 'practice' is likely to come under renewed scrutiny as companies begin to create lean working structures. This examination will bring with it new structures on which to base supply strategies. A cursory analysis of Porter's Value Chain (1986) would suggest that the current area of strategic attention has moved from achieving higher levels of organisational and purchasing performance. Academia cosmology and research infer new techniques and an approach that is contingent on the need to gain strategic elevation. This form of research will tend to emphasise the role of, and legitimisation of, partnerships and collaborations between 'success' defined as 'achieving the super-ordinate goals of the enterprise' and ' legitimacy aimed directly at the elevation of purchasing within corporate management. Management theory should become orientated toward the organisation within a unique operating environment. So such philosophies as 'partnership sourcing' have not provided the practice of purchasing with the cosmology necessary to exploit this method of supply interaction, whereas, 'co-makership' has provided the cosmology but without sufficient modifications to practice. This form of research will tend to emphasise the role of, and be drawn from, behavioural sciences rather than the current emphasis on normative techniques.

In terms of 'purchasing practice', it is inevitable that certain companies will pioneer activities and report successes, however, purchasing has not yet reached a uniform standard, and therefore individual purchasers will have to become aware of new techniques and the context in which they are 'successful' before modifying their own behaviour. This 'time lag' will stem many years from the initial dissemination of pioneering research to the enactment by the 'slowest' of purchasing innovators. The major concern is that changes in practice do not lead to initiative overload, or surpass the need to gain strategic elevation.

9. Conclusions

This paper has sought to synthesise many of the arguments within the purchasing and supply community by testing the process of 'gentrification' at a conceptual level. The conclusion is that the trilogy of purchasing is undergoing a high level of theoretical and occupational change. This change is beginning to place new strains upon the three major actors, at an individual level and also as members of the collaborative 'learning process'.

Gentrification and the pressures highlighted in this paper reflect a myopia that is not related to similar debates occurring within the academic disciplines and other professions. The field of purchasing is considerably disadvantaged by this introversion and to the 'outsider' it is characterised '...the utterance of protest...addressed to those who already share the protesters premises...who rarely have anyone else to talk to but themselves' (MacIntyre 1981). 'Within the comfortable confines of the supply community, purchasing academics and practitioners have misjudged the extent of the enterprise progress towards meaningful involvement? Perhaps taking the blinders off and accepting the status quo is a necessary step before further progress towards truly meaningful involvement can be achieved.' (Leenders 1995). It may be prudent to understand current practice and the system of individualistic needs before the practice can be legitimised within the wider and 'indirect' communities affecting the system.

The first stage in this process is to understand and research the behavioural aspects of purchasing as a political process within the wider socio-technical system of the enterprise. Whilst technical authority economics are two foundations on which the gentrification process rests, these have not been the mediums for strategic elevation. Participation in the political system may well prove a more fruitful route to equipping purchasers with the new skills to control company resources and exert influence over super-ordinate goal formulation and enactment. 'The profession is obviously heading for new frontiers!' (Van Weele 1995), this paper was designed to question the rate and direction of this journey and promote discourse as a means of benchmarking our progress towards the new reality of purchasing and supply.

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Beyond Vendor Assessment: Relationship Assessment Programmes¹

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Abstract

As the limitations of traditional buyer-supplier relations are becoming more recognised, the Vendor Assessment techniques associated with them are proving incapable of supporting the newer 'relationship' focused paradigms. This has led to a search for ways of establishing, or simulating, equity at the interface between customer and supplier. The theory of relationship assessment has been proposed as a replacement for vendor assessment within one of the leading paradigms, lean supply relationships (Lamming 1995). The principle of Relationship Assessment is based upon the perceived need for both parties within a supply contract to assess the relationship jointly, in order to work together to improve its performance and value adding/waste reduction potential. Relationship Assessment Programmes (RAP) may be seen to be both a development of vendor assessment schemes (i.e. a quantified analysis process coupled with a corrective action agenda) and a radical departure from traditional methods (the assessor is the joint customer-supplier team; the subject of the assessment is the relationship, in which both share, but for which neither can take sole responsibility). In order to understand RAP it is necessary to study both the development of vendor assessment and the principles of lean supply. This paper will present an account of recent UK research which led to the development of a conceptual model for Relationship Assessment Programmes. The model itself is presented, in the context of established literature, and a discussion of the steps which are currently being taken to operationalise the model and produce a Relationship Assessment management tool. The research is based upon case studies and postal questionnaires. The conceptual model has been constructed by the research team from Bath, in conjunction with several industrial collaborators: ICL Ltd, British Airways plc, Shell Downstream Procurement Ltd, and Partnership Sourcing Ltd. The paper concludes with a discussion of the practical barriers which must be overcome in the implementation of such a tool, and the potential benefits expected.

1. Introduction

For three decades a central practice of purchasing management has been a technique variously known as supplier quality assurance, vendor rating, supplier vetting, supplier accreditation, vendor appraisal, and vendor assessment. This practice appears to have developed out of two origins, both apparent first in the USA: defence procurement, in which military customers have long sought to ensure that their suppliers meet specifications - especially quality - by imposing rigorous schemes of

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assessments upon them, and international competition, especially in the automotive industry in the late 1960s.

In keeping with traditional views engendered within mass production thinking - viz., that industrial customers are in some way naturally superior to their suppliers, the practice of vendor assessment initially developed along the lines of schemes which enabled the customer to award points to the supplier for achievement against performance standards. During the 1970s such schemes, which were intrinsically mechanistic, were developed in some cases to high degrees of sophistication.

While relationships between industrial suppliers and customers have undergone a number of developments over the last thirty years, the ways in which relationships are assessed have remained remarkably static - principally involving tinkering with existing methods or systems. The mismatch between what existing systems can accommodate and what modern business relationships require is becoming increasingly apparent. Existing systems still focus upon assessing the "other" end of the dyad and, infrequently, upon assessing both actors in the exchange. What is increasingly being required is a system which addresses the key issue - how healthy is the relationship?

This paper outlines an ongoing research project, the Relationship Assessment Programme (RAP), currently being undertaken at the Centre for Research in Strategic Purchasing and Supply (CRiSPS) at the University of Bath. The project is developing an assessment system that focuses on the relationship between the actors in an exchange. The purpose of the research is to analyse the nature of buyer-supplier relationships in order to establish the best ways of assessing and developing them. This approach is based upon the precept that by concentrating on the assessment process on the relationship, the role and contribution of both actors within the exchange will be thrown into a sharper focus than would be possible using an existing unidirectional/bidirectional assessment system.

2. The development of the project

The principal methodological thread of the project has been to explore the antecedents to Relationship Assessment - identified as vendor assessment; to explore the previous work and established literature on models of relationships; to develop a conceptual model of relationships suitable for development of a relationship assessment tool; to test that model in industrial dyad case studies (i.e. by involving industrial customers and suppliers); and to construct the tool itself, once again testing it in pilot implementation, where possible.

The vendor assessment survey has provided an insight into the position that firms have taken in addressing performance in the supply chain. For example, it appears that the sharing of data on performance (of the supplier) is often considered unwise, or at least, unnecessary, by the customers. This impacts directly upon the design of the RAP conceptual model, since such exchange is clearly crucial to the success of any joint assessment activity. The results of the research therefore suggest that great emphasis must be laid on the role of shared data in assessment of facets within the relationship (e.g. Relationship Depth, Problem Solving, Closeness, etc. which are discussed below).

The survey and interview work completed on vendor assessment systems has revealed not only how UK organisations are assessing one actor but also why they are doing this, and whether these systems have lived up to their expectations. The lessons described by the primary research will provide guidance in the next stage of the programme - implementing a relationship assessment system - by giving an understanding of not only the mechanics of assessment systems but also the "softer" elements of managing inter-organisational relationships.

The findings from the vendor assessment survey are reported in full elsewhere (Lamming et al 1995): a summary is included below in support of the development of the RAP model itself.

3. Relationships and Vendor Assessment

3.1 What are vendor measurement systems?

One problem which the research team encountered early in the project was the variety of different systems, and names for these systems, currently being used in practice. This led to the development of a working definition of vendor measurement systems which was synthesised from the system descriptions experienced early in the research.

Vendor Assessment was defined as a formal process which combines a vendor selection stage (Vendor Appraisal - to aid decisions on which supplier best suits the customer's requirements) with a vendor performance measurement stage (Vendor Rating - to monitor the performance of a supplier and compare it to the customer's expected levels of performance). This followed the definitive work of Gregory (1986), Monczka (1988) and Timmerman (1986).

3.2 What are the benefits of these systems?

An emphasis upon managing the supply chain as a source of competitive advantage has led many industrial organisations to reassess the role of the supplier within their own ability to achieve or sustain competitiveness and customer service. The customers surveyed identified 'improved overall quality', 'better all round service', 'improved delivery performance' and 'improved relationships' as their top four benefits from using vendor assessment schemes, with 'reduced costs' close behind. The suppliers tended to agree although 'improved relationships' was top benefit for them. In each of the other categories, the perceived benefits were less marked for suppliers than for customers.

3.3 Supplier development

The transition from assessment to development appears at first to involve a simple logic: the information obtained by the customer during the process of assessment of the supplier could be used to help the latter to improve performance. Once again, the assumption is that the customer is able to interpret the information in a suitable way, and then communicate it effectively to the supplier, taking a leading role in the development process.

3.4 Problems with vendor measurement systems - Selling the concept

From the survey, it appears that problems frequently arise because the two parties have different perceptions of the value and purpose of the assessment system. While the customer may see the assessment process as a form of developmental cooperation, some suppliers appear to perceive it as an element in a coercive strategy on the part of the customer. If the benefits of the system are not "sold" to the supplier, its participation will be limited to compliance. The increasing fashion for customers to hold 'supplier events', sometimes making awards to suppliers who have achieved outstanding performance (e.g. during the past year), would appear to suggest that the need to sell the schemes is being recognised in some quarters.
3.5 Administering the system
With sophistication of the scheme comes resource intensity in administration. From the earliest days of vendor assessment, customers have used specialist staff and complicated calculation techniques to process data and support decision making. The customers and suppliers surveyed placed "increased administration" of the list of drawbacks to vendor assessment, although this was only moderately significant for them - perhaps surprising when it is realised, as we have recorded elsewhere, that some suppliers in the automotive industry, for example, have to deal with over twenty different assessment schemes from their customers (Lamming, 1994).

3.6 Summary of research findings on the use of vendor measurement systems
- 93% of suppliers contacted during the research said that they were the subject of some sort of vendor measurement system.
- 85% of the customer firms approached claimed that they used these systems as part of a wider strategy to improve supplier relationships.
- Vendor Assessment is being used as a tool to aid in reducing the size of the supplier base (over 80% of the customer firms surveyed said their primary use of these systems was to "filter out unsuitable suppliers").
- systems tend to be directed at suppliers of strategic components or services, at new suppliers, and at suppliers with a poor performance record.
- However, systems are not being regularly re-applied. This tends to undermine their use as strategic or ongoing indicators of supplier performance improvement.
- Customers invite the opinions of the supplier but little appears to be done to address their suggestions.
- Communication problems appear to be widespread, for example, assessment criteria and expected performance levels are often not given to the supplier in advance - where they are, typical notification time is 3 months or less.
- In most cases suppliers are not given detailed feedback on the assessment findings. It appears that little effort is directed in this way towards developing the capabilities of suppliers.
- Systems deal with predominantly operational criteria (price, quality, delivery etc.).
- Strategic factors (such as technological capability) appear well down the list of criteria used.

3.7 Summary - Vendor assessment
While the majority of customer firms claimed to be implementing Vendor Assessment as part of a strategy to improve supply relationships, there appeared to be a general lack of genuine involvement of suppliers in the design and development of the schemes. This omission extends to agreement or notification on assessment details, feedback to suppliers on performance achievements, and active help from the customer to enable the supplier to improve.

It appears that customers may believe that they are implementing a strategy for supplier development while not actually doing so. This conclusion is supported by the declared purposes for which the schemes are employed, and the situation in which they are applied - principally those to do with removing unwanted suppliers. The need to increase quality levels is clear, however, and is reflected in the benefits perceived by both customers and suppliers. The benefits of these systems appear, in general, to favour the customer rather than the supplier, although neither side sees the potential drawbacks as significant.

Suppliers generally do not see these schemes as part of specific "power plays" by the customer, and both see them as contributing to improved relationships.

3.8 The future for vendor assessment
While the use of supplier assessment systems is not new, the context within which they are being used is changing. To develop "strategic" purchasing and supply, organisations will have to adopt measurement systems that give them the flexibility and detailed information needed to manage increasingly complex buyer-supplier relationships. Existing systems need to be redefined to incorporate a much wider range of criteria. It would appear that a spectrum of measurement criteria is necessary, to be used selectively depending on the type of relationship, the type of commodity, part or service that is being purchased, and the functional and organisational structure of the organisations involved.

If buyer-supplier relationships are to be developed and advanced in practice, Vendor Assessment schemes must reflect the new requirements of such a process. This includes a periodic re-application of the assessment procedure, regular feedback of supplier performance data, and a closer collaboration between supplier and buyer on managing the assessment process.

In addition to the operational criteria, more strategic factors (longer-term factors such as the supplier's innovation capability) are being included in some advanced schemes (e.g., Nissan's QDDM scheme). This practice appears to place the discussion between customer and supplier on a different footing.

4. Developing a model for Relationship Assessment
The approach taken to this task was to develop an understanding and analysis of vendor assessment, and to conduct a comprehensive search of existing relationship models. In doing this, the need for a new model was not presumed. Assessment of previous work, however, led to the conclusion that no other model fully covered the aspects necessary for the purposes of this research.

Models which were especially influential in our thinking were those of Hakansson 1982 (the IMP model), Lamming 1993 (the lean supply model), Kanter 1994 (the eight 'Ts model) Dwyer, Schurr and Oh 1987 (including stages in the development of relationships), and Cousins 1994 (the Vendor Management Model). Many others were considered and analysed, including those not specifically related to marketing or purchasing (for example, the European Foundation for Quality Management model).

An important aspect of our thinking in this development process was the observation from research that an organisation's competitiveness can eventually only continue to be improved if it is recognised that intra-company development must be combined with inter-company development (see, for example, Carlisle & Parker, 1998).

Similarly, between organisations the prerequisites for Relationship Assessment may include radical developments in strategies - for example towards the concept of "cost transparency" (Lamming, 1993) and "goodwill trust" (Sako, 1992).

One of the key areas of emphasis throughout the research has been to identify the role of assessment within the relationship development process. The connection between the assessment criteria (and the systems that use them) and the stage in the relationship's development is vital. The deeper and closer the relationship, the more unsuitable existing systems appear to become for their assessment.

As explained, a thorough evaluation of the existing inter-organisational relationship models indicated that no single "off the shelf" system would be suitable.
for the requirements of the project. This led to a draft model being developed incorporating those features identified by the research as essential and placing them within a framework in accordance with the R&D paradigm that the assessment of relationships must focus upon features intrinsic to the relationship itself. This model is described below.

4.1 Types of relationship to be addressed

The R&D tool is required to be generic, having relevance for a broad range of relationship types. Within this broad specification, however, it is desirable to have a tool which may be ‘tuned’ to the particular requirements of a specific sector, firm or relationship. The R&D conceptual model has therefore been designed to allow for a number of possible relationship types and scenarios to be accommodated by the tool which will follow. It is probable that the tool will be best suited to assessment of established relationships, where the facets of the relationship are developed and are perceived by both parties as worthy of consideration. A relationship takes time to settle and may be expected to exhibit turbulence as the parties learn how to deal with one another. During this phase, it is likely that vendor assessment (and customer assessment) schemes will be used. Once the relationship has matured, it is reasoned, it may be assessed using the R&D tool.

5. The R&D Model

5.1 Development of the model

In assessing and dissecting other relationship models, the projected needs of the industrial collaborators for a relationship assessment tool were used to construct a simple scoring system - recording relevance and appropriateness of features as they were examined. This process enabled a ‘gap analysis’ to be performed between the available models and the requirements of the R&D principle. As it became apparent that no existing model compiled fully with the expressed requirements, relevant points of the models identified at this stage were abstracted, to contribute towards the development of the draft R&D relationship model. The research team then used this draft model as a base upon which to build the unique requirements of the project not already covered by existing systems, incorporating the lessons learned during the Phase 1 research, as discussed above.

The R&D model is based upon a different precept from those employed in other models developed to date. Whereas other models have been based upon the perspective and experience of either a supplier or a customer, or perhaps both separately, the R&D model develops an understanding of the relationship based upon a single, combined or integrated experience and perspective - that shared uniquely by both parties in the dyad. The model thus develops the concept of a relationship as an entity, joining two organisations together for the purpose of a mutually beneficial business transfer.

The operation of the model begins by establishing the factors internal to the organisation (within its control) which affect the relationship. It then identifies the facets of the relationship itself. Assessment of these facets should enable a comprehensive assessment of the health and vitality of the relationship (see Figure 1).

For a successful relationship, both parties must have the necessary Relationship Influencing Factors in place (see Table 1, below). Each firm must be able to understand its competitive environment (identify and quantify Competitive Pressures), and that of the other party, in order to establish a prepared, considered approach to meeting these pressures (establish Competitive Priorities). The firm must also have in place appropriate organisational structures (Internal Relationships) and competencies (Purchasing/Marketing Abilities) to establish and manage the relationship processes (e.g. technical communications). Developing an appropriate arrangement of Relationship Influencers should increase the likelihood of choosing the most suitable type of relationship approach for the firm, putting in place the right foundations for this relationship.

The relationship management and building process requires the development, implementation and management of Relationship Enabling Factors. These Enabling Factors relate to the handling of the relationship itself, having an impact at the operating level, where the majority of contacts between the organisations take place.

The combined Relationship Influencers and Relationship Enablers have a direct impact upon the intrinsic facets of the relationship. While the Influencers and Enablers may be controlled and developed internally within the organisations concerned, the relationship is external to the firms and the state of its facets is a product of their interaction. For example, each of the parties to the relationship can only influence or enable a facet, such as the Closeness of the relationship (the result of the predictability of each party’s actions as perceived by the other) - neither party is able to directly control or influence a facet on its own.

The conclusion that neither party can directly control the facets of the relationship on its own leads to a great deal of importance being placed upon the actions and intentions of both actors. If we accept that one side of the dyad cannot control the relationship, then the imposition of relationship development (supplier development) or relationship management (vendor management) activities upon, say, the supplier by the customer cannot be successful within this paradigm - suppliers and customers can only influence and enable the relationship together (although not necessarily in concert or deliberately). The R&D model places great emphasis upon this point and it is one of the foundations upon which the R&D tool is based.

The logic of the R&D model suggests that both parties accept that neither side can impose a collaborative type of relationship upon the other. These types of relationship approach require both parties to have the necessary Influencers and Enablers in place, to play an active part in the management and development of the relationship, and to recognise the importance of the other party’s role and influence, in order to generate the maximum degree of benefit for both organisations.

The R&D model therefore emphasises that both parties must recognise the need for joint responsibility if a mutually beneficial (and thus economically sound) relationship is to be successfully established. The implication of this is that an organisation which cannot contribute the necessary purchasing (or marketing) capabilities to the relationship development and management process will not achieve the desired outcomes.

The R&D model (and the R&D tool) attempts to clarify the different, and frequently conflicting, perceptions of the relationship which can occur (e.g. within separate functions) within a single organisation. To achieve this, the model identifies five distinct views of the relationship.
Figure 1. The RAP Conceptual Model of Relationships.

Figure 2. RAP: The Actual, Desired and Perceived Relationships.

Figure 3. Some examples of factors described in the RAP model.
The central core of the model (the Actual Relationship) is the ultimate focus for the relationship assessment process. The Actual Relationship is, however, generally partially distorted, or obscured, by the Desired Relationship of a customer or supplier. The model employs the same set of facets for these two versions of the relationship, in order to enable consistent analysis of each and possibly resolution of differences. The Desired Relationship is also distorted or obscured by the firm's perception of the relationship (the Perceived Relationship). To understand the Actual Relationship the actor must first understand the degree to which these two other views of the relationship obscure reality. This is not something which can be achieved alone - just as management of the relationship itself requires input from both parties, so development of an understanding of the Actual Relationship requires the perspectives and experiences of both parties to be integrated - through discussion of the Perceived and Desired Relationships. (See Figure 2).

Application of the RAP conceptual model should enable inter-organisational supply relationships and their internal and external operations to be better understood.

6. The RAP Tool

The RAP Tool is based upon three simple observations:

- Organisations in a dyadic relationship frequently do not clearly understand what is actually going on between them.
- Actors in a dyadic relationship frequently do not understand what is expected of them.
- Such organisations have no structured way of clarifying the two issues above.

The purpose of the RAP Tool is to provide the means by which organisations can more clearly understand their own desires and expectations of a relationship and subsequently to enable both parties to understand the relationship’s Influencers and Enablers. Organisations have their own perspectives of a relationship’s actual performance and their own desired (or expected) levels of relationship performance. The RAP Tool enables the two parties to gain a common perspective on what is actually happening between them and provides a clearer picture of the relationship’s performance. Without a clear picture of what is happening in a relationship no meaningful relationship management process can be developed.

The RAP Tool represents an innovative fusion of the benefits of a computerised central core with a simple framework which leads the users along a structured route, highlighting the key stages in the relationship analysis and assessment process. The RAP Process integrates techniques developed by the research programme with other analysis approaches and guides the actors in the relationship and requires them to use the assessment process collectively. The core of the tool is a spreadsheet-based decision support system (DSS) which uses the analysis data produced by the RAP Process and sifts it using Analytical Hierarchy Process techniques. This is a mathematical model that can encompass subjective as well as objective data series - essential when such a system relies upon personal opinion and judgement.

6.1 Objectives of the RAP Tool

- The RAP approach requires both parties to the process to work together to improve the performance of the relationship as a joint responsibility.
- The RAP approach enables its participants to develop a clearer understanding of a specific buyer-supplier relationship. It does this by getting both parties to:
  - Identify who influences and controls the relationship.
  - Clarify to themselves what benefits they want from the relationship.
  - Clarify to themselves what benefits they feel they are actually getting from the relationship.
  - Identify mismatches between the desired type/state of the relationship and the perceptions of the actual state of the relationship.
  - When this has been done individually, the participants use their individual findings as a base for developing a company level perspective of the relationship.
  - The RAP Tool allows the participants to understand the types of contact that they find most appropriate for a given scenario. This will enable them to understand the essential features that their firm finds most appropriate for a particular type of relationship. This will allow the users to identify their most appropriate management and assessment posture toward their supplier/customer and use this to evaluate the allocation of resources to a specific relationship.

The RAP Tool does not:

- suggest or prescribe ways that the actors can influence the actions of the other party (it is not a relationship management tool).
- it is not a method of assessing or measuring the other party (it is not a vendor assessment system).

6.2 Implementing the RAP Tool

Implementing the tool begins with the application of the three elements of RAP to each party and to the relationship itself. This basic framework contains the essence of RAP and, once accepted and understood can be used to focus attention on specific factors and facets (as discussed above). This process is briefly explained below.

**RAP Model**

![Figure 4. The three elements of the RAP approach](https://example.com/figure4)

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Element 1  • The Customer Dimension.

Focusing on the customer's perceptions of the relationship.

Identify the internal stakeholders/influencers.

Use the internal factors of the model to identify the touchpoints between the organisations.

Identify the type of influence that each stakeholder has upon the relationship.

Discuss the \( \text{E} \& \text{P} \) approach with the stakeholders and incorporate their responses (ie build a common understanding).

Individually.

A. Give those identified as influential figures in the relationship a list of relationship issues/questions to structure their thoughts. This will be based upon the \( \text{E} \& \text{P} \) Model categories and centre upon the relationship facets. Each will be asked to express their perceptions and desires from the relationship in terms of the Influencing and Enabling factors in the model.

B. Ask the participants to add to the list any criteria/issues they feel are not covered. They are allowed to add to the subcriterion, but not to remove any of the relationship facets presented in the model (this is to ensure that the essential features of the relationship are addressed in all cases).

C. Ask them to 'mark' their individual perception of the relationship.

D. Ask them individually to mark their desired relationship (focusing on the performance measures used by the organisation).

E. Ask them to give relative weights for each issue category expressing their beliefs about the category's relative importance to them/their function.

As a group.

A. Collect the individual marks and weights and input them to the \( \text{E} \& \text{P} \) Tool.

B. Use the Tool to compare their scoring patterns.

C. Get them to go through their marks and weights to remove spurious ones.

D. Get them to discuss why some issues are important, others not.

E. Revisit the marks/weights and make any adjustments they feel are essential.

F. Produce a consensus map, but keep the individual scores and note who gave them and why.

G. Identify those areas where the expectations of the relationship are not being met by the actuality ('gap analysis').

H. If the divergence is in one or more of the criteria with a significant weighting (and therefore is important to the firm), highlight the topic for discussion in Element 3.

Element 2  • The Supplier Dimension.

Focusing on the supplier's perceptions of the relationship.

(See through exactly the same structured process as the customer).

Element 3  • The Relationship.

Getting a relationship based perspective.

An essential feature of this approach is the emphasis upon both parties being comfortable with a "no blame" approach to the process (ground rules for the meeting must be set and observed). Another important stage is to ensure that the people involved are comfortable with the level of strategic discussion, but also have sufficient knowledge of the relationship to contribute on operational level issues.

The collective scores can be used as the start point for discussion and to identify areas of similarity or divergence between the two perception maps. It may be better not to discuss the issues of power and dependence in the early stages until all parties have 'earned' a level of 'trust' or confidence from each other. The discussion may be built around the other relationship facets in order to avoid confrontation as far as possible. As the process develops and the participants begin to relax in using the system the power and dependence issues can (if necessary) be revisited.

7. Summary

The \( \text{E} \& \text{P} \) approach will enable its participants to develop a clearer understanding of a specific buyer-supplier relationship. By developing a clearer understanding of the requirements of different relationships, the users can more easily identify the most appropriate posture toward their supplier/customer and use this knowledge to ensure an appropriate allocation of resources to a given relationship.

A genuinely relationship focused system of assessment must take into account the "keep of faith" that such an approach requires from its actors. In order to reduce the natural resistance that the system users may feel when asked to share information with a supplier or customer, the \( \text{E} \& \text{P} \) tool takes a progressive approach to this sensitive subject. This may require identification of a series of 'levels of commitment,' each of which may only be reached when both parties feel comfortable with the associated information and resource commitments. This should reduce the discomfort factor which might be expected to occur if sensitive information or actions are required of the actors before they become fully committed to the relationship assessment concept.

One of the recurring themes of the research has been the view frequently expressed by practitioners that a relationship can be a fragile thing, something that can be wrecked by actions or comments made without the intention of causing upset. One of the most important roles that the \( \text{E} \& \text{P} \) tool will play is in reducing the likelihood of such occurrences, and in providing a grievance handling procedure to ensure that the blockage to relationship management be removed. The tool provides a flexible generic base of features that can be adapted to meet the specific requirements of any industrial sector or type of business. Alongside this, however, the system will retain a number of essential concepts and processes that ensure the relationship remains the core of the assessment process.

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Notes

\(^{a}\) Defining the boundaries of the "relationship" is essential to ensure that all of the essential factors are considered during the assessment process.


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Account Management for Purchasing Management

A way to manage relationships with key suppliers

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Abstract

The importance of long term relationships is increasing for many suppliers and buyers. Many organizations implement account management in their sales organizations, a structural sales approach towards the most important customers. If account management is implemented successfully, this form of approaching key customers has considerable effects and is thereby proving to be one of the tools for future’s success. In our opinion account management for the purchasing function can have the same successes as it has for sales function. Account management for purchasing is a proactive way to approach key suppliers. The main difference between the account manager and the purchasing manager is the focus on the key supplier which the former has. The account manager has in-depth knowledge of the key supplier, pays attention to long term relationships, and coordinate communication with the supplier.

Key words: External strategy; Supplier strategies — power or partnerships; Theory

1. Introduction

While there is a clear tendency at the sales side towards a professionalization of the marketing and sales function, the purchasing function is still running behind these developments. Since several years many organizations implement account management in their sales organizations, a structural sales approach towards the most important customers. If account management is implemented successfully, this form of approaching customers has considerable effects and is thereby proving to be one of the tools for future’s success. Notwithstanding the improvements of the purchasing function and although there are in some cases purchasers that fulfil the role of account manager, there is little proof of formalized account management structures at the purchasing side. That is a missed opportunity, because in our opinion account management in the purchasing function will have the same benefits as it has for the marketing and sales function. This paper is not based on empirical research, but we present some of our own observations of the sales and purchasing approaches towards customers and suppliers respectively, and describe why account management is a appropriate tool for purchasing. The case of a producer of turbines show several changes in the purchasing function. This organisation uses the Kratje’s portfolio as a way to organize the purchasing department. Although this organisation is not using a formal form of account management, it is a good example of a company that makes efforts to improve the approach towards suppliers.

2. Changes in purchasing and marketing attitudes

2.1 The IMP Group

Relationships have always been at the basis for interaction between buyers and sellers. However, the importance that was given to these relationships has differed during this century. Before the hype of mass production and mass communication with its emphasis on efficiency, products and services were mainly sold through a personal approach tailored to individual customers. During this time of efficiency relationships between industrial companies have been neglected also in research. In literature the importance of relationships was recognised in the early eighties. Especially the Northern European IMP Group was one of the first that described the importance of interfirm relationships in their trendsetting work ‘International Marketing and Purchasing of Industrial Goods’ (Håkansson, ed.), 1982. They developed the interaction approach, built on a number of factors which are indicated as important in industrial markets, but which appear to have been largely neglected in previous research. Now the IMP Group is adopting the network approach. According to Håkansson and Snehota (ed.) (1995, p. 3) this approach is viewing relationships as part of a broader network structure, rather than as isolated entities. The interaction model is represented in Figure 1, on the following page. The IMP Group (Håkansson ed.), 1982, p. 14) emphasized that:

- “both buyer and seller are active participants in the market;
- the relationship between buyer and seller is frequently long term, close and involving a complex pattern of interaction between and within each company;
- the links between buyer and seller are often known and institutionalized into a set of roles that each party expects the other to perform;
- and close relationships are often considered in the context of continuous raw material or component supply.”

Today both academics and practitioners are well disposed towards interfirm relationships. Håkansson stated in 1982 (p. 4-5) that ‘Researchers in marketing have, however, no systematic and comprehensive knowledge on these relationships’, in today’s research much attention is paid to buyer-seller relationships judging by the considerable amount of research in this area.
2.2 From transactions to relationships

Long-term relationships and partnerships are seen as valuable means both by suppliers and buyers, compared to several years ago when there was more emphasis on transactions. In today's business environment, it is recognized that the firm’s performance depends not only upon its own efforts, skills and resources, but also on the efforts, skills and resources of other supplying and buying firms (Wilkinson and Young, 1994). The relationships between the firm and its counterparts affect both the short and the long term performance of the company, its economic and financial results, as well as its development potential (Fiocca and Snehota, 1994). According to Webster (1992), different types of relationships can be described by a continuum from pure transactions at one end to fully integrated hierarchical firms at the other end. A shift is noticeable in the range of business relationships from transactions to long term relationships and buyer-seller partnerships. (cf. Christopher, Payne and Ballantyne, 1991; Cooper and Gardner, 1993, Evans and Laskin, 1994; Kalwani and Narayandas, 1995)

According to Matthyssens and Van den Bulle (1994) two groups of factors contribute to the changing attitudes of marketing and purchasing towards close relationships. Primarily it is the change in buying attitudes and behaviour that leads to adoptions in marketing, but also external factors like the increased international competitive pressure and technological developments change the interaction between suppliers and buyers. The change in buying attitudes and behaviour is very clear. Purchasing is moving from an antagonistic model that is characterized by though negotiations, price orientation, short term contracts and multiple sourcing to a cooperative model with features like interaction, communication and long term, close relationships. Figure 2 shows some features of the transactional and the relational approach (based on Brand and Biemans, 1993; Ian Stuart, 1993; Macbeth, 1994; Matthyssens and Van den Bulle, 1994).

Figure 1. The interaction approach of the IMP Group.

For buyers, supplier relationships are becoming more significant due to three developments that have become more prevalent in the early nineties:

- Fewer suppliers take care of more volume of business because of supplier reduction, single sourcing, and cross buying. Quality improvement and uncertainty reduction are the most important factors for using fewer suppliers. (Gadde and Håkansson, 1994; Han, Wilson and Dant, 1993)
- A strong trend in augmentation of outsourcing, i.e. the transferring of activities or the hiring of experts for specific activities. Recent research of Moret, Ernst & Young (1995) shows that 94% of all Dutch companies outsource one or more activities. Motives for outsourcing are for instance the focus on core competencies, the reduction of total costs of ownership, flexibility and quality, risk reduction, and the concentration of specialised know-how in a few suppliers.
- Increasing involvement of suppliers in (technical) innovation processes. Owing to increased specialization, it is not possible for one company to cover all these areas. Also suppliers are willing to improve products or to invent new ones. For instance, car manufacturers involve suppliers early in the development process of their new products. Another reason for activating suppliers is to shorten lead times. (Gadde and Håkansson, 1994)

In addition to these developments, there are some other developments in the purchasing function (Gadde and Håkansson, 1994):

- Purchasing strategy is becoming an issue for top management. This strategy is directed towards finding efficient supplier structures, forming alliances with key suppliers, developing training programmes with suppliers and activating suppliers in technological development projects. This is a considerable change from the earlier emphasis on purchasing efficiency, such as the number of bids that had to be asked for.
- The organization of purchasing shifts from centralized purchasing departments towards a decentralization of purchasing activities. There are two reasons for this change. The first is that purchasing decisions must be made by people who are close to the problems to be solved. The second reason is that decentralization of purchasing has been well in accord with general organizational trends towards

Figure 2. Some features of the transactional and the relational approach.
independent profit centres with decentralized responsibility. Decentralization makes it generally easier to develop close relationships, while also making it more difficult to coordinate the relationships of the whole company.

- The changing role of purchasing will call for a shift away from functional specialization towards more integrated problem-solving. Highly specialized purchasers will be replaced by more general problem solvers. Today, a purchaser must be a member of a team working together with specialists from other functions.

Consequently relationships are becoming of more interest. Strong relationships with counterparts can have considerable advantages, like satisfied partners and reduction of costs (Gadde and Håkansson, 1994; Thomasen, In 't Veld and Winther, 1994). Empirical research show that, as a rule, a limited number of relationships have a profound effect on a company’s performance. Suppliers that are involved in long term relationships are able to achieve a higher level of sales growth, cost reductions, and higher profitability compared to suppliers that use a transactional approach, although not all suppliers in long term relationships are able to succeed (Kalwani and Narayandas 1995). Possibly, this is also true for purchasers. Generally speaking, close relationships are more important for suppliers. Today the power-balance is tipped more to the side of purchasing. An indication of this is the average number of years the relationship is expected to last. Suppliers expect that a relationship will last twice as long as buyers. (Elram 1995)

3. Account management in the sales function

As we have seen market performance of companies is dependent on the functioning of its relationships to others. Volumes, market share, profits and growth depend on how the company handles its relationships. According to Håkansson and Snehota (ed.),(1995) most of the company's costs and revenues stem from its main business relationships. As a rule two out of every three companies are in a situation where the 10 major customers (suppliers) represent more than two thirds of the total sales (purchases) (Fiocca and Snehota, 1994). Companies have all kinds of customers, varying from very small, unimportant customers to very important customers. Campbell and Cunningham (1983) distinguish four groups of customers:

- Tomorrow's customers
  Tomorrow's customers are customers that companies try to gain. Sales to these customers are low, but strategic resources are allocated to improve the current sales position and to develop the relationship.

- Today's special customers
  Today's special customers usually purchase large quantities. The relationships are old and the company is continually engaged in development work with them.

- Today's regular customers
  Today's regular customers also purchase large quantities and the relationships are established, but the exchanges are less intimate. The customers are less loyal, more price sensitive and development work tends to be intermittent.

- Yesterday's customers
  Yesterday's customers are often numerous, but, although the relationships are old, each contributes only to small sales volume and they receive little or no technical development work. They provide useful additional volume for little effort.

Especially for today's special customers and usually for tomorrow's customers it is necessary to establish and maintain a high quality relationship (Kempner, 1995). Many companies use account management to make sure that relationships with so-called (key) accounts are managed properly. Account management is a structural buying approach in which is aimed at long term relationships with selected customers with the final purpose of maximizing the company’s objectives (based on De Roos, Sweereman and De Koning, 1990; De Roos, 1994; Verra, 1994a). Account management often shows considerable improvements in the approach towards customers, like improved two way communication, shorter communication lines, better understanding of the supplier, increased involvement of personnel and continuity in the relationship. Furthermore, account management can lead to a better position in the market, increased share in turnover, increased profits and better marketing plans (Barrett, 1986; De Roos, Sweereman and De Koning, 1990; De Roos, 1994; Stevenson, 1981). The main responsibility of the account manager is the coordination of the communication with the customer. Especially in very complex situations in which many people, functions and hierarchical levels are involved in both the supplier’s and the buyer’s organizations, account management can be a very helpful tool to make sure that there is 'one face to the customer' (Verra 1993). The role of the account manager is shown in Figure 3.

![Figure 3. Role of the account manager (based on Cespedes 1995).](image)

4. Account management in the purchasing function

In more and more firms, purchasing is becoming proactive and strategically important. In 1998, Leenders and Blinkhorn introduce the term reverse marketing. Reverse marketing is an aggressive and imaginative approach to achieving supply objectives. The purchaser takes the initiative in making the proposal. The goal is to satisfy both short- and long-term supply objectives (Leenders and Blinkhorn, 1988, p. 2). A way to shape reverse marketing is to implement account management. While account management in sales shows considerable success, there is little proof of formalised account management structures at the purchasing side. In our opinion, account management for purchasing is a proactive way in the approach towards suppliers, that can have the same successes as it has for sales function.
4.1 Purchasing portfolio
According to Kraljic (1983), management must learn to make things happen to its own advantage, instead of simply monitoring current developments. Therefore purchasing (an operational function) must become supply management (a strategic one). He argues that whenever a manufacturer most procure a volume of critical items competitively under complex conditions, supply management is relevant. The greater the uncertainty of supplier relationships, technological developments, and/or physical availability of those items, the more important supply management is. Top management and senior purchasing executives can determine the type of supply strategy and the company needs by assessing the company’s situation in terms of the two following variables:

- the strategic importance of purchasing in terms of the value added by the product line, the percentage of raw materials in total costs and their impact on profitability, etc.;
- the complexity of the supply market gauged by supply scarcity, pace of technology and/or material substitution, entry barriers, logistics cost or complexity, and monopoly or oligopoly conditions.

![Figure 4. Kraljic’s (1983) purchasing portfolio](image)

The features of the four quadrants (Figure 4) are displayed in Table 1 on the following page.

### Table 1. Features of the Portfolio Quadrants (based on Kraljic, 1983)

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Non-critical Items</th>
<th>Leverage Items</th>
<th>Bottleneck Items</th>
<th>Strategic Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items purchased</td>
<td>Commodities, some specified materials</td>
<td>Mix of commodities and specified materials</td>
<td>Mainly specified materials</td>
<td>Scarce and/or high value materials</td>
</tr>
<tr>
<td>Supply</td>
<td>Abundant</td>
<td>Abundant</td>
<td>Production-based scarcity</td>
<td>Natural scarcity</td>
</tr>
<tr>
<td>Typical sources</td>
<td>Established local suppliers</td>
<td>Multiple suppliers, chiefly local</td>
<td>Global, predominantly new suppliers with raw technology</td>
<td>Established global suppliers</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Limited, normally 12 months or less</td>
<td>Varied, typically 12 to 24 months</td>
<td>Variable, depending on availability vs. short-term flexibility trade-offs</td>
<td>Up to ten years; governed by long-term strategic impact (risk and contract mix)</td>
</tr>
<tr>
<td>Decision authority</td>
<td>Decentralized; lower level (e.g., buyer’s)</td>
<td>Mainly decentralized; medium level (e.g., chief buyer)</td>
<td>Decentralized, but centrally coordinated; higher level (e.g., department heads)</td>
<td>Centralized; top level (e.g., vice president purchasing)</td>
</tr>
<tr>
<td>Key performance criteria</td>
<td>Functional efficiency</td>
<td>Cost/benefit analysis, material flow management</td>
<td>Cost management and reliable short-term sourcing</td>
<td>Long-term availability</td>
</tr>
<tr>
<td>Type of buyer</td>
<td>Negotiator</td>
<td>All round purchaser</td>
<td>Relationship builder</td>
<td>Relationship keeper - account manager</td>
</tr>
</tbody>
</table>

4.2 Key Suppliers
The approach of Kraljic is clearly product focused. According to his view, products have to be classified in order to determine the appropriate purchasing approach. Account management focuses on suppliers, the supplier is the basis for classification. A purchasing strategy purely based on product classification, is in our opinion limited. As we take Kraljic’s classification of purchasing items into account, it shows clearly that the group of strategic items is so important for the buying company that it has to establish long-term relationships to ensure delivery. Primarily for this group of items account management is a very helpful tool. According to Verra (1994b) supply management and account management are in fact the same. One of the Dutch Business Units of Philips use the purchasing portfolio as displayed in figure 5. Below the line, one can speak of catalogue products, the price is the most important selection criteria and suppliers can change every minute. Above the line the relationship with supplier is much more important and buyers aim at long lasting relationships. For this group of products account management is used. However, suppliers do not only deliver products, in many cases they are added value for customers. For instance, suppliers can be a source for new ideas, leading to product and process development. Also it possible that a supplier has several business units for which it is beneficial to coordinate the communication with these business units in order to obtain the same purchasing conditions and contracts. Thus, the sort of products is just one criteria in order to identify key suppliers. Other criteria are: substantial volume of business (20/80 rule), profit, turnover potential, strategic importance, innovativeness, position...
in the market and the location in different geographical areas; also more intangible factors - like image, importance in the market or ‘fit together’ - are reasons to mark suppliers as accounts.

![Figure 5. Account management in Kraljic’s portfolio](image)

4.3 The role of the purchasing account manager
The main difference between the account manager and the purchasing manager is the focus on the key supplier which the former has. Not the technical knowledge of products is important, but the ability to establish long-term relationships with suppliers is the key skill of an account manager. The account manager has in-depth knowledge of the supplier; pays attention to long term relationships and account planning, and communicate substantial not only with the account but also with different specialties within the company. Actually, the account manager is a people’s manager. Table 2 shows the differences between the purchaser and the account manager.

Table 2. Differences between purchasers and account managers (based on De Roos, Sweerman and De Koning, 1990)

<table>
<thead>
<tr>
<th>Regular purchaser</th>
<th>Purchasing account manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Transaction focus</td>
<td>• Relationship issue</td>
</tr>
<tr>
<td>• Short term focus</td>
<td>• Long term focus</td>
</tr>
<tr>
<td>• Specialist knowledge of own products package</td>
<td>• Generalist: broad knowledge about markets, own company and products. In depth knowledge about account(s).</td>
</tr>
<tr>
<td>• Individualist: operational tasks</td>
<td>• Team worker: tactical and strategical tasks</td>
</tr>
<tr>
<td>• Emphasis on buying activities</td>
<td>• Emphasis on account related activities</td>
</tr>
<tr>
<td>• Negotiations</td>
<td>• Cooperation and mutual problem-solving</td>
</tr>
<tr>
<td>• Communication mainly with own purchasing department</td>
<td>• Regular communication with various disciplines</td>
</tr>
<tr>
<td>• Only responsible for buying tasks</td>
<td>• Responsible for pre-buying, buying, and after-buying tasks</td>
</tr>
</tbody>
</table>

Especially in complex buying situations, account management can be a very helpful tool to make sure that there is ‘one face to the supplier’ (Verra, 1993). In the case of outsourcing of very complex, strategic items it is likely that a purchasing team with different specialties is involved in the buying process. The main responsibility of the account manager is the coordination of the purchasing team and the communication with the supplier. Figure 6 shows the role of the account manager in the interaction between both organizations.

![Figure 6. The role of account managers](image)

5. The case of a turbine producer
The case of a North-European producer of turbines illustrates some of the changes in purchasing management as mentioned above. This company uses Kraljic’s portfolio as a way to organize its purchasing department. Although it is not using a very formalized form of account management, it is a good example of a company that has different purchasers taking care of different suppliers, in different ways.

The company delivers complete plants and components for power and heat production to industry and utilities. Products include advanced steam and gas turbines, combined power and heat plants (co-generation), gas handling equipments and large heat pumps. Industrial turbines form the most important segment. Purchased goods as percentage of turnover has increased steadily at the company; from 40-45% in the early 90s, to some 70% now. Until the mid 80s, the company had a classically central purchasing organization. The function was mostly transaction oriented, focused on buying and administrating.

In the early nineties, top management made plans to implement a new approach to purchasing management. The new approach should be more aimed at interaction with suppliers, and this was put down in a purchasing strategy document. The new procurement department employs 70 people, divided into five groups. Purchased goods are placed in the Kraljic matrix, and the groups are organized around them, and should carry out the corresponding procurement strategies (figure 7).

One group (LI) is responsible for buying expensive goods, like electricity plant components, heatpumps and governing and control equipment. This department is situated in Kraljic’s lower left quadrant, and focuses on ‘playing the market’. The second group (SI) deals with the turbine package, the core of the company’s products. This group operates in the upper right quadrant and is constantly aiming at intensive cooperation with key suppliers. A third group (NCI) is situated in the bottom left quadrant, and should focus on administrative procedures. It has to deal with a lot of small suppliers (‘suppliers tail’), which have to be rationalized. IO deals with in-/outsourcing, and procures goods with important production processes. QE, finally, does quality engineering, and works for all other groups.

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In staffing these purchasing groups, management has been careful to select people with appropriate skills and characters for each group. In their view, purchasers operating in the upper right quadrant need entirely different skills than those who are active in the bottom left quadrant (see also table 1). The company has spent a lot of efforts on human resource development and management. This has been done to increase the overall level of professional skills within the purchasing department, in order to enable the purchasing organization to become more involved throughout the whole business process.

6. Conclusions

The importance of long term relationships is increasing for many suppliers and buyers. Account management is a structural approach aimed at establishing long-term relationships with key counterparts. Account management for purchasing can have the same advantages as account management for sales has. Especially in case of relative powerful suppliers and a certain dependence on the supplier or when there is a need for one face to the supplier, account management can be very meaningful. In times in which more attention is paid to the role of the company within networks and where there is a continuous search for ways to respond adequately to rapid external developments, long-term relationships and partnerships can be very helpful to contribute to the corporate strategy. As Ellram (1991) pointed out: 'Purchasing partnership involvement also represents a way for the purchasing function to improve its support of the firm's overall strategy. Thus, it seems unlikely that purchasing partnerships are a passing fad.' Account management for purchasing can be very helpful to establish these long-term relationships and partnerships with suppliers.

References
