

Innovativeness as determinant of firms' financial performance : the view of the financial analyst

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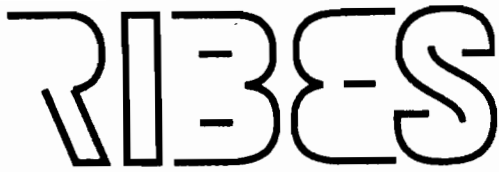
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**Innovativeness as determinant of firms'
financial performance:
the view of the financial analyst**

**E. Nijssen, B. Wieringa and J. Wind
WP 95-08**



Rotterdam Institute for Business Economic Studies

Rotterdam Institute for
Business Economic Studies
Faculty of Economic Sciences
Erasmus University Rotterdam
P.O. Box 1738 / 3000 DR Rotterdam
Room H15-01
Tel. 010-408 1314 / Fax 010-452 8857

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Abstract

To find out more about the way financial analysts look upon innovation and to gain insight into their cognitive model of the subject, qualitative and quantitative research was conducted. Both the impact of innovativeness on firm performance at the industry level and firm level were included. The industry level results show that the analysts consider innovativeness an important determinant of firm performance. The level of importance does, however, differ per industry. Furthermore, some industries are more product innovation driven and others more process innovation driven. The analyses at the level of the firm show that analysts see an initiating and directing role for strategic market orientation with regard to managing innovation. Innovativeness itself has a pivotal function in explaining both the current and future profits of the firm. Firms that have both a strong strategic market orientation and a innovative drive are considered the real winners in the marketplace

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Innovativeness as determinant of firm's financial performance: the view of the financial analyst

E. Nijssen, B. Wieringa and J. Wind

1. Introduction

Technological change has become a major factor in the firm's strategic environment (Gupta, 1994; Craig and Hart, 1992). In many industries there is an increasing demand for innovation. It has stressed the strategic importance of firms' R&D. Because of the increased importance and the fact that R&D management remains a difficult and risky task, many authors have tried to establish the key success factors for firms to do R&D. Some studies deal with forecasting and planning of new technologies (Capon and Glazer, 1987; Ford, 1988). Others concentrate on the factors that distinguish successful new products from unsuccessful ones (Cooper, 1988; Cooper and Kleinschmidt, 1986) or have looked at best practices from a broader perspective (Takeuchi and Nonaka, 1986; Peters and Waterman, 1982; Snow and Hebriniak, 1980). However, despite all these research efforts aimed at relating firm innovation to firm performance, a cohesive theory on the subject has yet to emerge (Soni, Lilien and Wilson, 1993). Furthermore, most research is based on data gathered using the firms' management as the prime source of information, i.e. using single or multiple key managers as respondents. Such data clearly have their limitations (Golden, 1992).

We set out to gain new and fresh insight into the importance of the innovativeness of the firm for firm performance. We asked financial analysts about their view and opinion on the role of innovation in the success of firms. Our purpose was to find their cognitive model, or mental model regarding the subject.

There were three motivations for our decision. First, financial analysts follow industries closely as to advise their clients on how to invest their money. Due to the nature of their job they may be considered to have expert knowledge. Second, financial analysts have rarely been involved in investigations about the innovativeness of firms. Third, firms may benefit from knowledge on the financial analysts' cognitive model about the impact of innovativeness for industries and firms. Financial analysts are key players in providing information and advice to shareholders. If analysts think that innovativeness is important for firms' current and future financial success, firms may want to communicate their research efforts more extensively, and pay more attention to, for instance, pre-launch communication strategies.

It should be clear that this paper deals with what financial analysts think about the role of innovativeness with respect to the success of a firm, i.e. their cognitive representation or mental map with respect to this issue. These cognitions may differ from objective reality.

Two central research questions were formulated. They reflect industry level and firm level measures of the impact of innovativeness on the financial performance of the firm. These questions are:

1. *How important is innovativeness for the profitability of firms in a particular industry and how does the importance of innovativeness vary over industries?*
2. *What is the mechanism, at the level of the individual firm, that relates innovativeness to performance and which other factors play a role in this context?*

This study is exploratory in nature. Therefore, it was decided to start with qualitative research. The design and results of this qualitative study will be presented in the next, second, section. The outcomes of the qualitative study are the basis for a quantitative study, that was undertaken thereafter. The methodology of this quantitative study will be discussed in the third section. After that the results of the quantitative study, both at the industry level and at the individual firm-level will be reported, respectively. The last section contains the conclusions and implications.

2. Qualitative research

To find out more about the way financial analysts look upon innovation and to gain insight into their cognitive model of the subject, we decided to first perform qualitative research. Eight in-depth interviews were held. They involved two heads of broker information departments of a major international Dutch bank and a Dutch broker firm, respectively. Additionally, six analysts of different Dutch banks and broker firms were interviewed. Their names and addresses were obtained from faculty of the university (e.g. the Finance department) and from two of the experts interviewed.

Four specific questions were formulated as a guide line for the interviews:

- (a) What are the characteristics of financial analysts, how do they carry out their job and which firms do they study?
- (b) What are the major sources of information financial analysts use?
- (c) What kinds of definition of innovativeness do they use, and what is the importance of innovativeness for firm performance?
- (d) What kind of measure(s) should be used to operationalize current and future performance?

For an answer to research question (c) a natural grouping procedure (Kuylén and Verhallen, 1988) was used. Natural grouping has a respondent divide a group of subjects/objects into different groups and subgroups, without apriori specification of the underlying dimensions. Afterwards, the respondent is asked for his/her motivation for the classification made, thus providing insight into the dimensions or attributes he/she uses. We provided the analysts with a list of firms and asked them to group those they were familiar with. In our "experiment" the respondent was instructed to cluster and subcluster based on the word "innovation".

We will shortly discuss the findings from this qualitative research.

(a) Type of firms and classification of industries

From the expert interviews we learned that in most European countries analysts are relatively young people, at the beginning of their careers. Only in England the situation is a different one. Here the analysts have a different status, with most analysts having been on the job for years. Although most financial analysts are organized by industry or cluster of industries, some of them study countries. They study these countries' major or most interesting businesses. The latter analysts generally work for the bigger broker firms.

Analysts focus and gather information on firms present at the stock market. The analysts are specially interested in high risk firms, i.e. those that stand to gain much, and those undervalued. They do not pay attention to many small and medium sized firms, nor to large cooperatives (generally not listed at the stock exchange).

(b) Sources of information

Financial analysts get their information from many different sources. The most important sources of information are: (bi)annual reports and firms' own publications, newspapers, publications of industry organizations, industry reports, and professional magazines. Apart from this desk research type of information, other important sources were mentioned. These comprise firm visits and analysts gatherings/conferences.

(c) Innovativeness

The analysts said that the importance of innovation differs per industry. Both product and process innovation should be distinguished. However, apart from innovation capacity a firm needs a market orientation or strategic vision to be successful in the long run. The firm should be able to create attractive new products and be able to market them well. One respondent gave the example of Philips. This firm is very innovative (e.g. Video 2000 system, Compact Disc) but is less successful in marketing its new products. "Philips invents, but for whom?"

All our respondents were able to fulfill the natural grouping task designed. From the analysis of the visit reports per respondent we learned that all respondents distinguished two hierarchical levels, while clustering the firms. These levels mostly referred to product innovation and strategic market orientation respectively *or* basic research and product innovation (see Table 1). The respondents differed regarding the hierarchical ordering of these dimensions. Based on the overall results we conclude that, to the opinion of the respondents, the concept of innovation comprises four aspects:

- product innovation,
- process innovation,
- strategic market orientation (including strategic vision), and
- R&D-budget.

This division parallels the difference between product technology, process technology and management technology (i.e. 'marketing technology') generally found in the literature (Capon and Glazer, 1987).

<< Table 1 about here >>

(d) Performance measure

Based upon the fact that we were dealing with financial experts market value seemed the most appropriate measure for success. However, the experts interviewed pointed out that in practice there is little consensus on the meaning and content of this construct. They suggested to simply use current en future gross profits to operationalize firm performance.

From the qualitative research we conclude that financial analysts do have a clear idea about what innovativeness is and its impact on performance. Furthermore, analysts consider innovativeness important for future performance. However, also a complementary concept, i.e. strategic market orientation of the firm (and its management) was identified based on the interviews. These findings laid the ground work for our quantitative study.

3. Methodology of the Quantitative research

Choice of industries

One of the objectives of our study was to examine the relative importance of innovation in different industries. We decided, for practical reasons, to limit the number of industries to ten. We wanted to include industries with different (expected) influences from technological development, also taking into account the possibility to obtain sufficient numbers of financial analysts following a particular industry (indications for this were obtained in the qualitative study). We decided on the industries listed in Table 3.

Sample

The quantitative research consisted of a mailed questionnaire. It was sent to 400 financial analysts located in The Netherlands, Germany, Great Britain, France, Italy and Spain. Their names were taken from the membership list of the European Association of Financial Analysts (EFFAS). The most current edition was dated 1992, and thus the addresses were not up to date. Consequently, a number of questionnaires were returned delivered (21 questionnaires). To stimulate response, a random number of 50 respondents were called upon and asked for their cooperation. We finally ended up with 46 questionnaires that could be used for further analyses. After correcting for the questionnaires that remained undelivered¹ this points at a response rate of about 15%. This is a somewhat disappointing result (the modal response in a business survey is about 20%), but it should be realized that this group of respondents have only occasionally been involved in market research.

Each questionnaire listed one industry and ten to fifteen firms from the industry, for evaluation. Each respondent filled out the questionnaire for the industries he/she studied. Analysts covering several industries filled out more than one questionnaire. In total the respondents evaluated 591 companies. The information on these companies was used in the qualitative analyses. Table 2 provides information on the characteristics of the respondents in the sample.

¹ This estimation is based on the assumption that only one fourth of the undelivered questionnaires was returned. This brings the response rate to $45/(400 - (4*21)) * 100\% = 15\%$.

<< Table 2 about here >>

Measurement

The questionnaire we used was divided into two parts. The first part established the importance of innovation for firms' financial performance in the ten industries selected. Based on the findings of the qualitative research a distinction was made between the impact of product innovation (degree to which a firm is active in the development and introduction of new products and in the improvement of existing products) and process innovation (extent to which a firm is active in the development and implementation of new technologies, methods and procedures for the production of its products.). Five point scales were used for this industry-level measure of innovativeness (1 = very limited effect; 5 = very large effect).

The second part of the questionnaire contained questions about individual firms in the industries the analyst had been studying over the past few years. Here, the purpose was to find out how, in the perception of the analysts, innovativeness of a firm is related to performance. This part of our research was led by a model (see Figure 1) in which three basic constructs are distinguished: strategic market orientation, innovation capacity and performance. We are primarily interested in the relationship between innovation capacity and performance, but it is interesting which role strategic market orientation (given the results of the qualitative research) plays in this context. It is likely that analysts will attribute an important role to the strategic market orientation of a company, but do they think that market orientation affects performance directly (through clever marketing of existing products) or indirectly, i.e. through innovation, which generates the superior products that can then be marketed successfully?

Our model was implemented in the LISREL-tradition (Backhaus et al, 1989), in which it is possible to measure a construct with more than one measurement. In our model innovation capacity was measured using three measurements: research effort (the total R&D budget including people), product innovativeness, and process innovativeness. With regard to performance past and future performance were distinguished. The firm's gross profits over the last five years and its expected gross profits over the next five years were used as indicators, respectively. The construct strategic market orientation was measured as the degree to which a firm is committed to its customers and is constantly seeking ways to respond more effectively to the needs and wants of its customers than its competitors. All variables were measured using five-point scales (1=very low; 5=very high).

In the survey also data were collected on a number of respondent characteristics such as age and education. Separate sections of the questionnaire for measuring firms' performance and innovativeness were used to prevent a halo effect.

4. Results from the industry-level measures of importance of innovativeness

Based on the respondents' evaluations of the ten industries selected, we calculated the following items to get an answer to the first research question, concerning the impact of innovativeness in a particular industry on firms' performance:

- the overall impact of innovation for firms' financial performance in all ten industries, taken together
- differences between industries, ordering industries according to the importance of innovation on firm performance
- product innovation versus process innovation: differences in relative importance of these two types of innovation among industries; and
- relationships with characteristics of respondents (experience, age, education and country)

The results are reported in Table 3. The industries are listed in increasing order of (overall) innovativeness. The hotel/leisure industry is perceived as the least innovative industry, the electrical industry (including electronics) as the most innovative industry. The results show that innovativeness is perceived to have a substantial to large influence on the financial performance of the firms in the industries under study. The overall average of innovativeness' impact is 3.32 on the five point scale used. However, important differences can be noted per industry. Especially in the pharmaceutical and electrical industry the perceived impact of innovation on the firms' level of performance is high. Looking at the overall evaluation of the industries by innovativeness' impact on performance the ranking of industries from low to high, shows face validity. A higher affect is registered for industries that experience more technological turbulence.² So, financial analysts do think technological developments and firms' innovativeness to influence firm performance. The affect differs between industries. Considering all 10 industries, we see that product and process innovativeness are roughly equally important where financial performance is concerned. Still, the overall average for product innovativeness is slightly higher than for process innovativeness (3.41 over 3.23). However, when we look at the individual industries large differences can be observed. For example, in the pharmaceutical industry product innovativeness has a significantly higher impact on financial performance than process innovativeness, according to our respondents. In the shipping industry, on the other hand, process innovation is considered more important than product innovation.

<< Table 3 about here >>

To see whether the respondents' background influenced their evaluation, additional tests

2 The list of rank order numbers on the impact of firms' innovativeness on performance seems to have face value. It shows a high impact of innovativeness on firm performance for industries like pharmaceuticals and electronics that are characterized by fast technological development. A low impact of innovativeness is found for the hotel/leisure industry and shipping, industries with a lower level of technological turbulence.

A check comparing the rank ordering of the analysts with the average number of patents registered per firm in these industries by the US Patent Office confirmed this (Business Week, august 9, 1993). The correlation between both measures is significant, although we only had matching patent information on six industries (product innovativeness 0.90 ($p < 0.01$); process innovativeness 0.84 ($p < 0.02$)).

were done. The evaluation of the importance of product and process innovativeness was brought into relationship with the respondents' experience, age, education and country. Only a significant correlation between age and product innovativeness could be observed. Older respondents consider product innovativeness less important for firm performance than younger respondents ($r = -0.34$, $p < 0.02$). Due to this limited relationship with individual characteristics it seems possible to speak of "*the analysts' view*" on the role of innovation at the industry level on firm performance.

Summarizing the results for research question one, we conclude that to the perception of the financial analysts innovativeness is an important factor in explaining the financial performance of firms in an industry (c. Porter, 1980). Both product innovativeness and process innovativeness have a significant influence. Although on the whole product innovativeness is slightly more important than process innovativeness, industry type really determines which type of innovation has a dominant role affect on firm performance. Finally, little systematic variation in the perceptions between analysts can be noted.

5. Results about the mechanism through which innovation affects firm performance

Linear structural equation modelling (LISREL) was used to analyse the data at the firm level. The objective was to get an answer to research question two, concerning the size and the direction of the effect of firm innovation capacity on firm performance.

Figure 1 shows the model designed. It is based on the outcomes of the qualitative research. The model treats strategic market orientation as the central independent variable. The firm's innovation capacity is an intermediate variable between strategic market orientation and financial performance. It is assumed that strategic market orientation directs innovation capacity, and innovation capacity determines the firm's performance. Thus, current gross profits and expected gross profits are the dependent variables.

The results show that the model has an adequate fit and that all relationships are significantly positive but one (see Table 4 and Figure 1).³ This implies that the answer to research question two is that an important positive effect of innovation capacity on both current and future gross profits is present.

<< Figure 1 about here >>

We will discuss the results more in detail, based on the three central relationships in the

³ Joreskog and Sorbom (1982) consider Chi Square to be a valid test statistic only if all the observed variables have a multivariate normal distribution, and the sample size is very large. They recognize that these conditions are seldom fulfilled in practice.

model, i.e. innovation capacity and firm performance, strategic market orientation and innovation capacity, and strategic market orientation and firm performance.

Innovation capacity and firm performance

There is a strong positive impact from innovation capacity, both on current (0.53) and future gross profits (0.57). The effect on future gross profits consists of a direct effect and an indirect effect, i.e. via current gross profits ($0.45 + (0.53 \times 0.22)$). Thus, the total effect of innovation capacity on expected gross profits is slightly higher than for current gross profits. Furthermore, we see that product innovation, process innovation and also general research efforts provide measures of innovation activity. Together they affect performance, meaning that the more innovative the firm is and the more resources it puts into R&D, the better its performance.

Strategic market orientation and innovation capacity

Strategic market orientation has a large positive effect on the firm's innovation capacity (0.45). It triggers innovation within a firm and directs its innovation capacity. Strategic market orientation helps the firm to detect strategic windows of opportunity in the marketplace. Based on these observations research efforts are directed towards specific innovations that will fuel the firm's current and future earnings and profits.

Strategic market orientation and firm performance

Strategic market orientation has complex linkages with current and future gross profits. An increase in strategic market orientation hardly affects current gross profits (ns) but its positive impact via the innovation capacity of the firm is still remarkable, i.e. 0.24 (0.45×0.53). Concerning expected gross profit the overall affect of strategic market orientation is 0.52. It consists of a direct effect of 0.25 and indirect effects, of in total 0.27 ($(0.45 \times 0.53 \times 0.22) + (0.06 \times 0.22) + (0.45 \times 0.45)$). These findings stress the financial implications that strategic market orientation has in directing the firm's innovation capacity. Especially the affect on future earnings is strong.

An interesting result is that, as far as performance over the last five years is concerned, according to the analysts, the effect of strategic market orientation on performance runs through innovation capacity. If a strategic market orientation is effective, it is effective in that it has stimulated a firm in its innovation capacity. There is hardly any direct effect from strategic market orientation on past/current performance: Strategic orientation that did not translate itself into innovation has not meant much for the past/current performance of the firm.

For future performance, i.e. expected gross profits in the next five years things are different. The impact of innovation capacity is still substantial, but now there is also a direct effect of strategic market orientation on performance: in the future a company can also be succesful in its marketing strategy without being very innovative in products or processes. This view of the analysts may be caused by what they observe in terms of actual firm strategies. For example, in the pharmaceutical industry some firms explicitly emphasize research and develop into research driven firms, whereas others emphasize marketing competencies and develop into marketing driven firms. Apparently, the analysts think that both types of firms can be succesful in terms of future performance.

Summarizing, the results show that both the strategic market orientation and the innovation capacity of the firm are key variables in our model representing the perception of the financial analyst. Innovation capacity has a strong direct positive effect on current gross profits and expected gross profits. The latter is, however, also influenced by innovativeness via current gross profits. Strategic market orientation is the variable directing the firm's innovativeness. It fulfills a boundary function. The direct effect of strategic market orientation on current gross profits is absent, i.e. not significant, but through innovation capacity there still is an important positive effect. The positive effect of innovation capacity on expected gross profits is high.

6. Conclusions and discussion

The industry-level results show that analysts, within their mental model, consider innovativeness of the firm important for its performance. The level of importance does, however, differ per industry. Furthermore, some industries are more product innovation driven (e.g. shipping), while others are more process innovation driven (e.g. pharmaceutical industry). Therefore, the answer to our first research question concerning the degree to which innovativeness influences the profitability of firms in an industry is that there is an important affect depending on the type of industry and the speed with which technologies become obsolete in such an industry (c. Soni et al, 1993).

The analyses at the firm level complement these findings. The results from the LISREL-analyses show that the model fits and thus that the answer to the second research question is that innovation capacity is an important predictor of current and future profits indeed. Furthermore, the model helps to understand the causal relationship between strategic market orientation, innovation capacity of the firm, and short term and long term financial performance of the firm. The results show an initiating and directing role for strategic market orientation and a pivotal function for firm innovativeness. The results clearly point out that the role of market orientation is a strategic one, influencing long term firm profitability.

The lack of a significant effect of strategic market orientation on current gross profit is remarkable, especially if the measure for market orientation that was used is considered, i.e. the degree to which a firm is committed to its customers and is constantly seeking ways to respond more effectively to the needs and wants of the customers than its competitors. Such a "market pull"-type of definition might be expected to have a stronger short term than a long term effect. Instead, we find the long term affect to be much stronger. The strategic market orientation of the firm gives direction to the way R&D competencies should be planned and applied, while developing new products and processes to fulfill customer and market needs (Slater and Narver, 1994). Strategic market orientation thus plays a very important role as a "boundary function". It refers to visionary leadership (c. Mintzberg, 1979) and entrepreneurship.

With regard to future performance financial analysts think that research driven or market driven firms will enjoy financial successful. However, those firms that managing do both research and marketing well, will outperform the rest (c. Miller, 1992).

7. Managerial implications

Four managerial implications stand out from our research. First, innovation capacity is to be considered an important factor in explaining firms' financial performance as perceived by financial analysts. It does affect current gross profits and, to a larger extent, future gross profits. From this point of view investing in the firm's innovation capacity means investing in current and future profits. Management must, therefore, foster the firm's innovativeness. Second, apart from technological innovativeness, strategic market orientation is important too. In fact, especially for future profits it plays a dominant role. It will help to shape the firm's innovation capacity and make its output contingent with its changing environment. Third, financial analysts favour firms that have both a strong market and technological drive. Those are the firms that they consider the real winners in the marketplace, i.e. those that will dominate future markets. Fourth, management should communicate the firm's R&D efforts and results. Analysts base their expectations about future profits of firms to a significant extent on their perceived innovativeness of the firm. So, it is important to communicate one's technological efforts and achievements to the world of the financial analysts and other stakeholders. This communication should include information showing that the firm's management has an adequate strategic vision and market orientation. Just like pre-launch strategies and general corporate communication, communication about the innovativeness of the firm is an equally important instrument for good public relations (e.g. with stakeholders). It can help the firm to ensure support from the financial world, for it will help to receive a more favourable evaluation by the financial analyst and shareholders. This will create extra possibilities to formulate a company's strategic policy.

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Motivation for clustering (n=6)	Number of times mentioned
- degree of product innovation	4x
- number of new products introduced	3x
- creating marketable solutions (mature/process industry)	1x
- R&D expenditures/budgets; emphasis placed on R&D	3x
- strategic vision, market orientation, entrepreneurship	4x

Table 1: Results from the natural grouping task

Characteristics (n=46)	Score
- average age of the respondents	34 years
- average number of years of experience of the respondents	9 years
- median and mode level of education of the respondents	masters
- average number of firms evaluated per respondent	13
- number of respondents per country	The Netherlands : 12 Great Brittan : 24 Others (BDR,SP,I,Fr) : 10

Table 2: Characteristics of the respondents

Industry	Impact of innovativeness on firm performance			Wilcoxon-test**)	
	product	process	overall*) rating	z-value	prob.
hotel/leisure	2.71	2.36	10	-1.63	0.10
shipping	2.41	2.90	9	-2.51	0.02
personal care	3.37	2.65	8	-2.61	0.00
financial services	3.37	2.76	7	-1.93	0.06
food	3.11	3.32	6	-1.05	0.30
aerospace	3.52	3.17	5	-1.52	0.13
chemical	3.30	3.67	4	-1.52	0.13
automotive	3.70	3.89	3	-0.78	0.44
pharmaceutical	4.46	3.57	2	-3.22	0.00
electrical	4.17	4.00	1	-0.97	0.33
overall	3.41	3.23	(3.32)	-2.43	0.02

*) The number printed represents the rank order of the industry, with 10= relatively low impact of innovativeness on financial performance; 1=relatively high impact of innovativeness on financial performance. The total degree of innovativeness per industry was derived as the mean of product and process innovativeness.

**) Test on the difference between importance of product versus process importance. The Wilcoxon-test (matched-pairs signed-ranks) tested the number of times respondents scored the impact of process innovativeness lower than impact product innovativeness against the number of times respondents scored the impact of process innovativeness higher than product innovativeness (The Wilcoxon version of the sign test takes also the magnitude of the scores into account). The probability reported is the 2-tailed value. It points at a significant difference between product and process innovation's impact on firm performance in the industry.

Table 3: Impact of innovation on firms' financial performance in different industries

Observed variables (X,Y)	Squared multiple-correlations for	
	X	Y
- research effort	0.48	
- product innovation	0.61	
- process innovation	0.42	
- past gross profit	1.00	
- expected gross profit	1.00	
- market orientation		1.00
Squared multiple-correlation for structural equations		
Innovation capacity	0.41	
past performance	0.18	
future performance	0.42	
Chi square (with 6 degrees of freedom) = 18.51 (p=0.0051)		
Adj. Goodness of fit index = 0.95		

Table 4: (Additional) results of the LISREL model

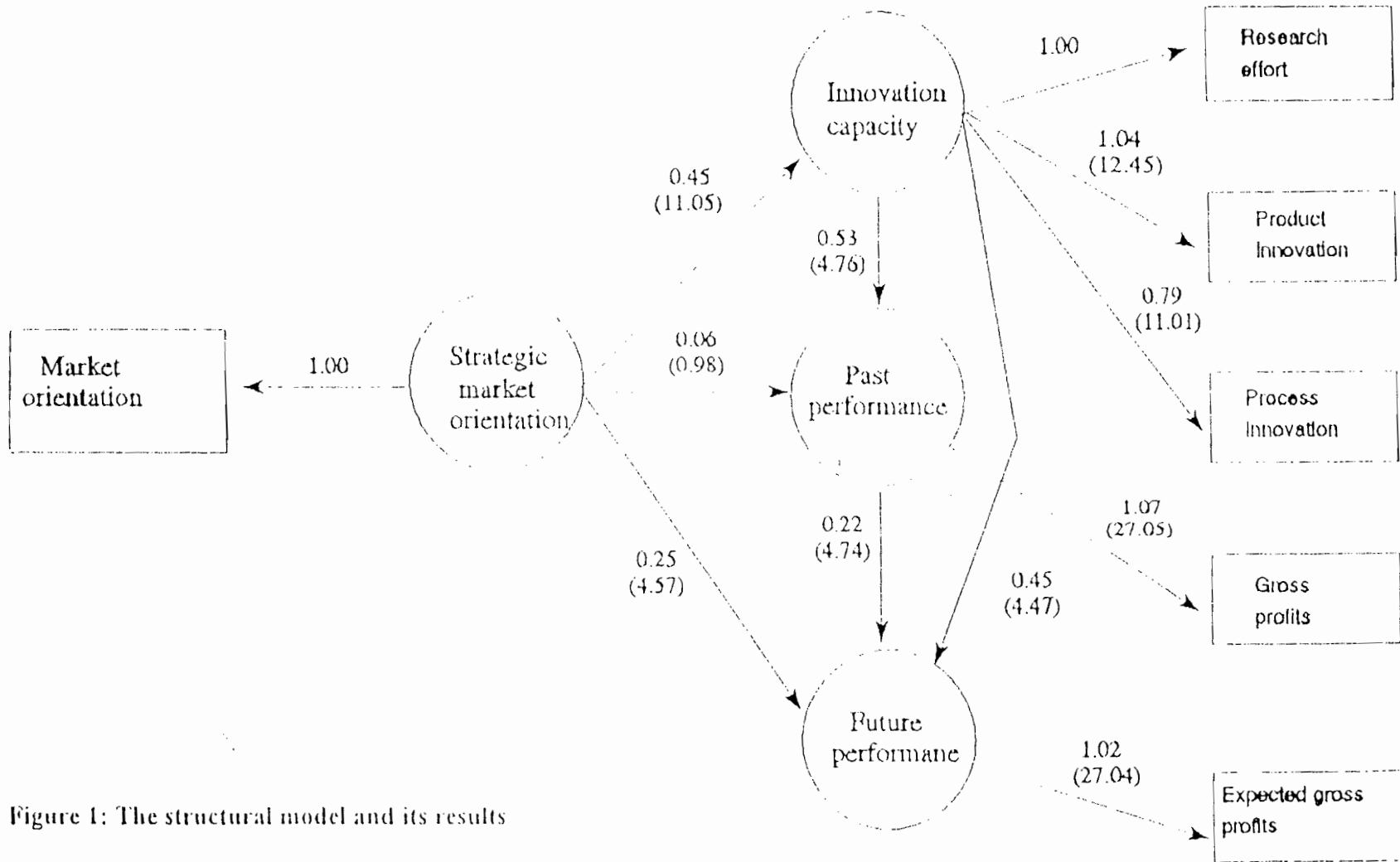


Figure 1: The structural model and its results

Centre for Market driven Innovations (CMI)

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