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The interplay between outbound team strategy and market information processing in the course of ‘really new’ NPD projects

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A B S T R A C T
The purpose of the study is to explore how and when outbound team strategy – reaching out to other parts of the organization – plays a role in market information processing in really new NPD. Prior research mainly focused on intra-team factors, such as cross-functional integration, affecting market information processing in NPD. We conducted a comparative longitudinal case-study of two really new NPD projects, Shield and Anti-resist, in one chemical firm using in-depth interviews and archival data. Case findings suggest that lack of market information processing in Shield compared with Anti-resist was rooted in differences in outbound strategies between the two projects rather than intra-team factors. While the literature has praised decentralization for enhancing information processing and creativity, we conclude that this comes with the responsibility of individual NPD teams to proactively reflect on their own marketing actions along the way in really new NPD. This implies that managers better recognize team behavior and adapt their control mechanisms to incorporate outbound team strategies.

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1. Introduction

Market information processing (MIP) reduces the risk that new products fail because they do not meet evolving customer needs (Brown & Eisenhardt, 1995; Kirk, Jayachandran, & Bearden, 2005). And in contrast to earlier claims by Christensen and Bower (1996) and Berthon, Hultbert, and Pitt (1999), research has demonstrated that MIP enhances both incremental and radical product development performance (Baker & Sinkula, 2007; Kyriakopoulos & Moorman, 2004; Narver, Slater, & MacLachlan, 2004). Yet, processing market information in the practice of radical new product development (NPD) is complex. NPD teams face not only technological and resource uncertainties (Leifer et al., 2000), but also high levels of market uncertainty. It is often unsure what market information will be beneficial and whether or not customer–specific queries are representative for the whole market (Moore, 2002; Slater & Narver, 1998). Also, customers have often difficulties expressing latent needs (Slater & Narver, 1998) and if customers are powerful, there is little room for suppliers to control the path of technological progress (Christensen & Bower, 1996). Consequently, radical NPD teams that are often granted high levels of autonomy are really challenged to process market information for NPD decision-making. Therefore, it is not surprising that many NPD teams fall short of sufficiently generating, disseminating and using market information (Adams, Day, & Dougherty, 1998; Kok & Biemans, 2009).

Investigating how MIP in radical NPD can be managed, controlled and improved, researchers in the marketing and product innovation fields have mainly focused on firm level factors (Adams et al., 1998; Atuhene-Gima, Slater, & Olson, 2005; Kirk et al., 2005) and intra-team factors. Intra-team factors such as cross-functional integration and the level of priority team members give to the project, for instance, have been found to have a large impact on market information acquiring and dissemination (Griffin & Hauser, 1996; Ottum & Moore, 1997; Veldhuizen, Hultink, & Griffin, 2006). These researchers have largely overlooked the ‘external perspective’ rooted in the general management literature (Ancona, 1990). The external perspective focuses on the way team members cross team boundaries and reach out to other parts in the organization, such as senior management, for task coordination and political reasons. These outbound activities significantly impact team information processing and performance (Ancona, 1990; Ancona, Bresman, & Kaeufer, 2002; Ancona & Caldwell, 1992). For instance, a lack of outbound activities can result in teams becoming overly cohesive and so internally focused that they neglect valuable signals from their wider organizational network.

This study’s purpose is to explore how and when outbound strategy – reaching out to other parts of the organization – plays a role in market information processing in really new NPD. The ‘really new’ category is based on the classification of Garcia and Calantone (2002). To that end we conducted an in-depth longitudinal case study of two really new NPD trajectories, Shield and Anti-resist, in one single chemical firm (ChemCo) using qualitative research procedures.

This study contributes to the literature on market-oriented product innovation. It suggests that different outbound strategies lead to
differences in market information processing in really new NPD projects. It complements current research on intra-team level factors that influence MIP and extends our understanding of market-oriented product innovation. Our study also contributes to the literature on control in the context of really new product innovation management. Previous research has often taken a senior management perspective and found that in really new NPD decentralization and pushing down some level of control to the NPD team are necessary to secure creativity and flexibility, and consequently NPD performance (Bonner, Ruekert, & Walker, 2002; Griffin, 1997; Olson, Walker, & Ruekert, 1995). This literature, however, often ignores what this larger responsibility means for teams. For instance, how and when should teams implement self-control and reflection mechanisms to prevent falling into the trap of too much cohesiveness?

Our research helps project and team managers to understand the importance of reflection on own MIP activities aimed at developing really new products and how to execute this reflection. Until now, practical advice to support market-oriented product innovation has been largely focused on best practices in using market research methods (e.g. Barczak, Griffin, & Kahn, 2009) and general organizational arrangements (e.g. Adams et al., 1998). MIP reflection mechanisms have had far less attention.

This paper proceeds with a theoretical background (Section 2) that is used as a starting-point in our exploratory case research, describing research on market-oriented product innovation and the external perspective on temporal organizational teams. After the methods (Section 3) the findings are presented in Section 4. The paper closes with theoretical and managerial implications, opportunities for further research, and concluding remarks in Section 5.

2. Theoretical background

Market orientation and market learning researchers have identified different stages of market information processing in NPD (Adams et al., 1998; Baker & Sinkula, 1999; Moorman, 1995). For instance, Adams et al. (1998) describe MIP using Kohli and Jaworski's (1990: 6) three behavioral activities: “The organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it”. Other researchers have added stages that reflect the importance of learning elements in MIP such as information interpretation, evaluation and organizational memory (Day, 1994; Sinkula, 1994; Sinkula, Baker, & Noordewier, 1997). Investigating really new NPD, we take the view on market information processing that includes these learning elements. Additionally, we distinguish segment information from needs information. Segment information refers to information on market segment size, growth rate, and stakeholder behavior (other than customer behavior) that may influence customer preferences such as competitor moves and activities of distributors and governments (Adams et al., 1998; Smits, Vissers, & Dankbaar, 2011; Veldhuizen et al., 2006). Needs information is about understanding customer needs and wants in relation with particular product applications (Adams et al., 1998; Veldhuizen et al., 2006).

2.1. NPD team level factors affecting MIP

In contrast to firm level factors such as top management emphasis, compartmentalized thinking and market-based rewards systems (Adams et al., 1998; Atuahene-Gima et al., 2005; Kirca et al., 2005), NPD team level factors are likely to explain within firm differences in MIP among NPD projects. With respect to MIP in really new NPD, the literature mainly discusses intra-team level factors such as cross-functional integration, project priority setting, and the market research methods in use.

Cross-functional integration is relatively more important in really new product innovation when compared to incremental product updates (Atuahene-Gima, 2005; Olson et al., 1995). When a firm focuses on unfamiliar market segments, applications, or customers, and there is little experience with the new product concept, functional tasks are more challenging than in situations of a more straightforward modification of an existing product. As the difficulty of product innovation increases, so does the interdependence of different functional specialists involved in the project. The result is a greater need for cross-functional dissemination of market information.

The priority team members give to an NPD project is positively related to both generating market information and disseminating it across the team (Ottum & Moore, 1997; Veldhuizen et al., 2006). A high level of priority of a project will lead to more effort being put into the generation and dissemination of information about market segments and customer needs.

Using different market research methods in product innovation results in different market information being generated (Deszcz, Munro, & Noori, 1999; Janssen & Dankbaar, 2008; O’Connor, 1998). For instance, in situations of incremental NPD, it is proposed that product developers update their current understanding of a market segment, using market research techniques such as competitor analysis (Atuahene-Gima, 2005; Noble, Sinha, & Kumar, 2002) or focus groups and surveys (Leonard, 1995; Slater & Narver, 1998). For really new NPD, tools for exploring the future include extrapolating trends, science and technology mapping, and scenario analysis (Leonard, 1995; Schoemaker, 1995), whereas tools for uncovering latent customer needs include experiential market research techniques such as the lead user approach (von Hippel, 1988), emphatic design (Leonard, 1995), and customer visits (Slater & Mohr, 2006).

2.2. The external perspective

The management literature on temporal organizational teams which describes the external perspective (Allen, 1984; Ancona, 1990; Tushman, 1977) may complement market orientation research when explaining differences in MIP. The external perspective acknowledges that teams do not act in isolation, often have external demands, and that team behavior such as information processing and learning is not fully represented by looking at internal activities (Edmondson & Nemshord, 2009). Team members may also be proactive in spanning team boundaries, seeking information and resources from the environment, and molding external opinions (Ancona, 1990). Here, ‘environment’ refers to the organization that the team belongs to. The external perspective does not ignore internal team behavior but “the interest of those taking such a perspective is in the internal processes that influence and are influenced by people in the environment, rather than decision making or roles per se.” (Ancona & Caldwell, 1992: 336).

Research has mapped a variety of external team member roles, activities, and strategies. For instance Tushman (1977) and Allen (1984) have identified ‘boundary spanners’, ‘stars’, and ‘gatekeepers’ when analyzing imported technical information from outside the team. Ancona and Caldwell (1992) found that teams adopted distinct strategies of approaching their environment and found evidence that not just the amount of external communication but also the type of external communication affected performance. For instance, teams that focused on a combination of ambassadorial and task coordination activities had a higher performance than teams that focused on ambassadorial activities alone.

Adopting a longitudinal approach, researchers have investigated when boundary spanning activities occur in the course of team task execution. Gersick (1988), for instance, has found that groups responded to feedback and information from their environment only at certain points in their life cycles and dealt with internal and external requirements sequentially. Additionally, Ancona and Caldwell (1992) suggest that if teams enter cycles of external activity they do so early on, that these cycles are reinforcing, and that they determine team outcomes. For example, for teams that prioritize ambassadorial activities this cycle would
start with favorable senior management evaluations that give the team confidence and increase cohesiveness. In turn, however, this cohesiveness may cause that teams lessen their external activities later in the process which may lead to too little feedback seeking and therefore inferior outcomes.

Concluding, while previous research on NPD has mainly focused on intra-team factors affecting MIP behavior, the external perspective on temporal teams suggests that MIP might additionally be shaped by how teams reach out to the wider organization in which they are embedded. This might particularly be the case when teams face high levels of uncertainty and autonomy, as in many really new NPD projects. These circumstances increase the risk of teams becoming overly cohesive (Man & Lam, 2003) and MIP being too much influenced by pre-existing team values and emotional commitments (Berchicci & Tucci, 2010). However, research on the external perspective has not focused on MIP and the mechanisms through which MIP in really new NPD and outbound strategies are related deserve further exploration. Also, if boundary spanning activities are vital in the context of MIP, what external activities become important at what stage in the really new NPD process?

3. Methods

3.1. Research method

We used a comparative longitudinal case-study strategy using qualitative research procedures for the following reasons. First, this strategy fits investigating under-researched phenomena and the purpose of extending existing theory (Bluhm et al., 2011; Edmondson & McManus, 2007). Second, qualitative research procedures are well suited for identifying how and when events happen (Langley, 1999). Finally, these procedures allow for using multiple, complementary data sources which are needed when developing a comprehensive account (Yin, 1994).

3.2. Research setting

The research setting for this study is ChemCo, an innovative Dutch chemical firm. For reasons of confidentiality ChemCo is a fictitious name. It is part of a global multinational, but acts relatively independently as a separate legal entity with its own annual report. It develops and manufactures a high performance fiber in product forms such as powder, pulp, and filament yarn. Important end markets are the automotive and defense industries. Headquarters, R&D, and production sites are located in the Netherlands; global coverage is achieved through several sales offices and a few dozen sales agents around the world. In the period under study (2003–early 2008), ChemCo showed steady growth with €298 million in sales and 965 employees in 2003 and €434 million in sales and 1171 employees early 2008. Its strategy was aimed at achieving sustainable and profitable business activities, ambitious growth and further globalization, partly through high quality product development in close consultation with customers. The average R&D/sales ratio for this period was 4.4%. ChemCo operates its own research institute that employs around 100 researchers in total and organizes eight globally operating marketing/sales groups (m/s-group from this point onwards). Each of these groups employs around 7 marketing/sales people on average and targets a specific market segment including tires, communication cables, friction and sealing, and ballistics.

3.3. Case selection

Inspired by Lewis et al. (2002), we selected two ChemCo NPD projects that were not only judged by firm informants as promising, allowing for significant firm renewal, but also presented significant market uncertainty. In terms of Garcia and Calantone (2002) these were ‘really new’ NPD projects. The projects had not yet finished but were both in the development stage. This allowed us to study critical events, such as project completion or project termination in the development phase, in real time and increased the chances of finding respondents that could remember details of earlier project phases. The projects were very similar on aspects such as project size, intra-team factors, and starting time, but differed in terms of MIP and project success. Thus the projects were suitable for using a theoretical replication strategy (Yin, 1994). This way emerging conceptual findings from one case could be confirmed or disconfirmed by the comparative evidence from the other case, similar to the approach taken by Rindova and Kotha (2001). Table 1 presents an overview of the project characteristics of the two cases: Shield and Anti-resist. Detailed project descriptions are presented in Appendix A.

3.4. Data collection

Data collection started early 2006, when both projects were still under development and finished in 2008. Data were collected by interviewing project team members and non-project members who were closely related to the teams (see Table 2). Including non-project members was instrumental in investigating the effects of the external activities of the product development teams. Informants included members from the m/s-groups, other functional specialists, and senior managers allowing us to control for potential biases of individuals as suggested by Golden (1992). Some informants were interviewed multiple times.

For the non-project members the interviews focused on how product development was done in the company, what knowledge the respondents had of the projects, and the relationship they had with the projects. Project members were asked to elaborate upon the main process story including specific dates, (marketing) practices, milestones,

| Table 1 |
| --- | --- |
| **Project characteristics of the two cases.** | |
| **Shield** | **Anti-resist** |
| **Project objective** | Developing a new product to protect optical fibers in communication cables. | Developing a new product to reduce rolling resistance of tires. |
| **Project size** | Core team: 5 employees | Core team: 7 employees |
| | Investment level: medium; research had to take place but no major plant adaptations were necessary. | Investments level: medium; research had to take place but no major plant adaptations were necessary. |
| **Main ChemCo departments involved in the project** | M/s-group focusing on the communication cables market segment, in which ChemCo’s products were already used as reinforcement material, and ChemCo’s research institute. | M/s-group focusing on the tires market segment, in which ChemCo’s products were already sold as reinforcement material of cap plies, and ChemCo’s research institute. |
| **Project status early 2008** | History of approximately 5 years, product still under development. | History of approximately 3 years, project’s output was introduced into the market in 2007. |
events, and outcomes. We finished interviewing when we experienced saturation: additional interviews resulted in limited additional understanding (Glaser & Strauss, 1967; Lee, 1999).

Interviews lasted between 50 min and 2.5 h. Notes were taken and all interviews were taped and transcribed verbatim and were followed up with e-mails and telephone calls when needed. Interview data were supplemented with archival data such as new product proposals, process protocols, product announcements, a recent 90-page anniversary book published by ChemCo, presentations, patents, and business press articles for triangulation purposes and diminishing potential retrospective bias of the interviews. Several site visits over a total period of, at least, two years allowed for tracking some developments in real time.

3.5. Data analysis

Following Eisenhardt (1989) and Miles and Huberman (1994), our data analysis started with examining data and developing case summaries of the individual cases to get familiar with the case as a stand-alone entity. These summaries were sent back for review by several informants. Then we turned to detailed coding by dividing data into meaningful fragments. As starting point, we coded processing segment and needs information and intra-team factors that were found to influence MIP. Subsequently we turned to open coding (Strauss & Corbin, 1998) with regard to external activities. Depending on the activities’ persistence across multiple observations, recurrent data incidents emerged into categories and dimensions. Appendix B presents our data structure and exemplary case study evidence. As second step in data analysis we aimed at discovering relationships between internal and external team factors and MIP as well as how these relationships unfold over time. Subsequently these ‘relational concepts’ (Locke, 2001) were refined by using a cross case comparison in which we focused on similarities and differences between the two cases.

To further sharpen our findings we subjected our initial analysis to member checks (Lincoln & Guba, 1985) through an interactive workshop with 12 ChemCo employees in order to further validate our findings and revise them as necessary. Iterating back and forth between data, validation, and theory resulted in a robust understanding of how MIP progressed in the course of the innovation projects and how and when both internal and external team activities played a role in this process.

Aimed at ‘temporal bracketing’ (Langley, 1999) – analysis of how action in one period leads to changes in the next period – we classified the NPD projects in the two most distinctive stages: initiation – where new product ideas are generated, developed and evaluated – and implementation where product ideas are further developed and introduced into the market.

4. Results

4.1. Different market information processing patterns

Based on the distinction between segment information and needs information and our analysis we found different MIP patterns when comparing the two cases. While the Shield team predominately focused on processing needs information of a single customer, the Anti-resist team processed both segment and needs information.

In the initiation phase of Shield, which ran from 2002 until early 2005, team members predominately generated and used needs information of one single customer, an innovative communication cables producer. From early 2005 onwards, when prototype testing started and the Shield team was focused on implementing the project, MIP continued. With regard to MIP in the period 2005–2007, the Shield team updated needs information by testing prototype products together with the innovative cables producer. Additionally, the Shield team gained a broader perspective on developments in the communication cables market segment when it started processing segment information from November 2006 onwards after presenting a paper on the new product at an industry conference. This resulted in the segment information that, generally, cables producers were not very interested in the new product because they had existing solutions in place that worked out fine and were cheaper than ChemCo’s new product. This insight was gained relatively accidentally and late in the process after investments were going on for several years. As the sales manager involved in Shield explained:

“The most striking part of [Shield] has been that our commercial approach had not been right. What I explained before, we did not keep track of the broader market. We did not use a helicopter view to see if this was the way to go. This understanding actually began to emerge in November 2006 when our customer, together with us, presented the new concept at a conference for the cables industry. The response of the audience was that they already had their solutions in place. They asked us to elaborate on the benefits in comparison to these solutions. We absolutely did not have an answer to that. You can say that was the biggest challenge, the biggest shock. This was the wake-up call in the project. In this project we have been so focused on this one customer, that we lost

Table 2

Interviews and additional data sources.

<table>
<thead>
<tr>
<th>Shield (Core team)</th>
<th>Anti-resist (Core team)</th>
<th>Non-project members</th>
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<td>Interviews</td>
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<td>Sales manager, 2</td>
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<td>Researcher, 1</td>
<td>Project manager, 1</td>
<td>R&amp;D director, 1</td>
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the overall scope. Actually it is quite bizarre.” — Sales manager, interview 2007

After Shield’s proposed launching customer was sold to a party with other priorities in April 2007, the Shield team started looking for new launching customers. This resulted in the segment information that the communication cables industry already had their solutions in place and was neither impressed nor interested in ChemCo’s new offer. As a result the project was put on hold in the beginning of 2008.

It can be argued that, in hindsight, Shield failed because the absorption of segment information by the NPD team came too late in the project. From the start, team members were quite customer focused, processing needs information on the innovative cables producer all they could. However, to be fully market-oriented this information should have been augmented with a significant amount of segment information. Segment information was only processed relatively late in the implementation phase of the NPD process (Fig. 1). Only then it became clear that it would be hard to bring the new product to the market and sell it to a wide variety of cables producers. Collecting segment information at an earlier stage might have led to different decisions being made.

For Anti-resist we found that team members paid attention to both types of market information in both NPD phases. We found team members processing segment and needs information in the initiation phase of Anti-resist, which ran from 2004 until late 2005. Segment information was processed at the start of the project when a market study was executed which led to the new product idea. To further develop this idea, processing segment information was complemented by processing more specific needs information of several individual tire manufacturers in the early phases, as illustrated by a quote of Anti-resist’s project manager:

“Product specifications were hard to pin down because this product was also new to the customers. But they had certain expectations which they shared with us. We used these data in setting research targets … this was very early in the project.” — Project manager, interview 2006

Market information was also processed during the project’s implementation phase which ran from 2005 until market introduction in the summer of 2007. The project team tested prototypes with several potential customers by which they updated their needs information until the new product was introduced into the market. Additionally the team presented their product and test results at several tire conferences to attract additional customers and to update segment information from 2007 onwards (Fig. 1).

In comparison to the Shield team, the Anti-resist team followed a different MIP pattern. In Anti-resist, segment information was also processed at a much earlier stage, resulting in a product innovation process much smoother than for Shield. To analyze potential causes for this difference we now first compare intra-team characteristics across projects and then look into outbound team strategies.

4.2. Intra-team characteristics

The two cases were very similar with respect to the intra-team factors cross-functional integration, project priority setting, and the market research methods in use, of which previous literature has found that they have significant impact on MIP. In both cases intra-team team characteristics facilitated MIP.

It appeared from our analyses that within both Shield and Anti-Resist there was sufficient cross-functional integration to secure market information dissemination and use. Hence market information was not hampered due to lack of collaboration or interaction between different functions within the team. Good collaboration and limited cross-functional conflict within the two teams mainly resulted from the mutual respect and understanding between the researchers from ChemCo’s research institute and the marketers from the m/s-groups. In Shield, for instance, a sales manager had previously worked in the research department and knew the researchers very well. Also, in both projects sufficient cross-functional interaction was established by means of cross-functional meetings to disseminate market information across the team.

With regard to project priority setting we found limited differences between the two projects in the course of the innovation process. Specifically, project priority setting was very similar in the period before the second half of 2007, when Shield team members found out that other potential customers besides their prospect launching customer were less interested, and this launching customer...
was sold to a party with other priorities. Comparing several aspects of the projects led to this conclusion. First, we analyzed overall organizational tasks and responsibilities of team members. Throughout the development trajectory project members involved in Shield as well as the ones in Anti-resist also had to spend time on other projects and tasks. Hence, neither Shield nor Anti-resist had full-time project members. Second, with respect to expectations related to project outcomes, a noteworthy difference in expectations between projects might have led to differences in project priority of project members. If expectations are high, for instance based on promising technology, high sales expectations, or customer interest to test early prototypes, it can be argued that project priority in relationship to other tasks and responsibilities would also be high. In contrast, lower expectations would probably result in matching priority. Expectations on project outcomes were comparable across both projects. Across settings, project members had high hopes. They expected that the project would lead to an advanced type of fiber that could be added to existing product lines and was beneficial to customers. These expectations were mainly based on information from customers in the initiation phase and their willingness to test early prototypes.

Finally, with respect to market research methods, team members from both projects used experiential techniques which suited the non-incremental nature of the two projects. In both Shield and Anti-resist, project members used their experience to conduct market research by visiting customers and testing prototypes. These techniques are specifically suited for non-incremental innovation and were used to uncover and refine latent customer needs. In Shield’s initiation phase, project members visited a cables producer and by means of interviews and observations proactively identified the need for better cable protection. Using this information as research target Shield’s researchers came up with a new product, which was subsequently prototyped in the project’s implementation phase. In Anti-resist, visiting tire manufacturers and having conversations with them when initiating the project led to the insight that these parties were in need of material solutions that could reduce rolling resistance. Within ChemCo, this insight triggered a research effort and the resulting prototype products were then tested together with several tire manufacturers.

4.3. Outbound team strategies and MIP

How and when did the teams reach out to other parts of ChemCo with respect to MIP? In contrast to intra-team factors, we found clear differences between the two projects on this aspect. While project members in Shield mainly reached out by using an informing strategy, project members in Anti-resist relied on a reflecting strategy. This latter strategy allowed for more engagement of ChemCo employees outside the team in the course of the innovation trajectory, which stimulated reflection on ways of working with regard to MIP.

In Shield, project members mainly spanned the team boundary by informing ChemCo’s senior management, including the CEO and several functional directors, on activities they performed to generate market information, the nature of the information generated, and project progress. In doing so, project members used quarterly reports written by the communications cables m/s-group which provided an overview of all m/s-project groups. This type of communication with senior management could be described as one way vertical communication about MIP behavior from project members to senior management. The main motivation for informing senior management was showing them that the m/s-group was making progress with market-oriented innovation activities and thereby complying with ChemCo’s overall strategy. Informing senior management started early 2003, when the m/s-group started investing in Shield as a research project. It continued on a regular basis until the project was put on hold early 2008 (Fig. 2).

Only when the project team was in need of additional funds for testing a prototype product with their proposed launching customer that the m/s-group could not provide for in 2005, two-way communication was sought with ChemCo’s senior management. However, this interaction was aimed at raising funds, brief, non-recurrent, and only included Shield project members and the R&D director. It did not involve the CEO or commercial director, which both had extensive experience in marketing and sales of new high-tech products:

“The Shield team needed additional funds to conduct prototype tests together with a university. I was approached with a request from their side. We had a meeting in which they presented their plans and business case. After a discussion I granted the resources to conduct the tests which they did last year.” — R&D director ChemCo, interview 2006

By using a strategy of informing, Shield team members only created limited opportunities to engage outsiders and seek feedback on their way of MIP. The team was quite isolated from the rest of ChemCo and therefore created limited openings to proactively reflect and challenge the team norm that, MIP-wise, they were on the right track. Limited boundary spanning increasingly led to cohesion among team members and the incorrect belief that they processed enough market information to conclude that a wide range of communication cables producers was interested in their new product. The project members put limited effort in deliberately seeking ways to challenge their ways of interacting with the market and playing the devil’s advocate:

“For [Shield] I must say we were not fully aware of this critical fact. We were too internally focused and did not put effort in discussing our way of market research with outsiders. We did not search for critical comments and did not validate our way of connecting with the market. This understanding actually came to light at the end of 2006 when we gave a presentation at a conference.” — Sales manager, interview 2008

In comparison to Shield, the project members that worked on Anti-resist used another outbound strategy. The Anti-resist project members deliberately decided to reflect on their MIP behavior by reaching out to other parts of ChemCo. We uncovered three main practices used by Anti-Resist project members to reflect on MIP behavior: 1) using a formal NPD protocol available within ChemCo, 2) having recurrent steering group meetings, and 3) interaction with other ChemCo m/s-groups (Fig. 2).

Anti-resist project members first reached beyond their team with regard to assessing MIP behavior by searching and using a formal NPD-protocol available within ChemCo. In their search for reflecting on their activities, Anti-resist team members looked for ways to compare their own way of MIP with best practices. Within ChemCo they found and adopted an NPD-protocol that several other m/s-groups had used in product innovation and had received positive evaluations. The adoption of this protocol happened early 2004, when the project had just started. This protocol included several process stages and gates with checkpoints regarding market and customer analyses. It brought structure to project activities and it was used by the team members to establish their own MIP activities, benchmark, and reflect on ways of working. In contrast, using a formal NPD-protocol for reflection purposes was something that was clearly lacking in project Shield:

“The point is we used a relatively ad-hoc approach in [Shield]. There were not really moments you had to meet a milestone or reflect on your way of working. After its start-up we just did the project besides our other duties. We did not think of using the formal project protocol with all the different stages and activities that is available within the organization to reflect on our activities. We used a rather unstructured way of working.” — Sales manager, interview 2008
At the end of 2004, when early prototype products looked promising, Anti-resist team members felt the need for further reflection on their way of working. Furthermore, the team also wanted to engage outsiders and gain organizational support for the project because investments were coming up. In a response to these needs, the Anti-resist project manager approached ChemCo’s executive team to discuss the idea of a steering group of senior managers to recurrently discuss project issues, specifically the ones related to commercializing the new product. This way, the team thought, it could create a sounding board and install a means to interact and reflect on the way of MIP. At the same time, such a sounding board provided the opportunity to persuade senior managers that Anti-resist was important, and provided a means to secure resources. The Anti-resist project manager succeeded in setting up this steering group, involving several of ChemCo’s senior managers among which the commercial director and the R&D director. The steering group regularly met with representatives from the Anti-resist team, discussed project progress and resource needs, and challenged Anti-resists’ assumptions with regard to marketing decisions:

“The [Anti-resist] project manager came to us proposing to initiate a steering group to guide this project from a further distance than day-to-day routines. They convinced us the project was important. We saw the project’s potential and agreed this was the way to go. Now, we meet regularly and we discuss project progress. We try to play the critical outsider as much as possible and challenge the team on their assumptions both in the field of technology as well as in marketing.” – R&D director, interview 2006

The third activity within the reflecting strategy was interaction with other ChemCo m/s-groups. This activity started the second half of 2005 when the Anti-resist team was testing prototypes. Team members felt they could learn from other m/s-groups within ChemCo of how they tested new product concepts and discuss their thoughts on prototyping. Together with ChemCo’s overall marketing manager the team initiated several presentations at organization-wide marketing and sales meetings. Additionally, the business manager involved in Anti-resist had meetings with business managers of other m/s-groups in which he discussed the project. Inputs from these external interactions were used when testing prototypes. Although the main reason for Anti-resist team members to get involved in horizontal communication with other m/s-groups was to reflect on the current ways of MIP, an additional reason was to improve Anti-resist project awareness of other m/s-groups and sense their attitude toward the project. The business manager foresaw that if the new product could be successfully introduced into the market the next step was investing in a new manufacturing facility to scale up production, which would be a large investment for ChemCo. By discussing and promoting the Anti-resist project with other m/s-groups from the second half of 2005 onwards, the business manager also wanted to create a positive attitude toward the project. Such an attitude, the business manager thought, would benefit securing resources for investing in manufacturing facilities, which would be a company-wide affair.

In sum, project members in Shield adopted the outbound strategy of informing. By using this strategy they reached out to ChemCo’s senior management by informing them on their MIP activities. Although the strategy of informing offered the possibility to show senior management that the m/s-group was progressing with market-oriented innovation activities it resulted in limited reflection on the team’s MIP activities. This led to processing limited segment information, and, eventually, to a situation in which Shield was put on hold. Project members in Anti-resist, in contrast, adopted a reflecting strategy by which they purposefully searched for possibilities to mirror their MIP behavior in order to refine it. This strategy clearly supported a more complete MIP pattern, which in turn led to a successful product introduction. Table 3 summarizes our findings.

5. Discussion and conclusion

The aim of this research was to explore the relationship between outbound strategies and MIP in really new NPD. Using qualitative research procedures and a longitudinal research setup, we analyzed the occurrence of relevant outbound team activities in the course of two really new NPD projects within the same firm in detail. Our study
monstrates that differences in outbound strategy can explain why teams differ in processing market information.

Our work contributes to research on what team factors determine MIP patterns in really new product development, thereby extending the literature on market-oriented NPD. It suggests that the external perspective complements current team level analyses on antecedents of market information processing. While current studies have mainly focused on intra-team factors, such as cross-functional integration, project priority setting, and the market research methods in use (e.g., De Luca & Atuahene-Gima, 2007; O’Connor, 1998; Ottum & Moore, 1997; Veldhuizen et al., 2006), our research shows that the type of outbound strategy teams use seems to matter as well. Together the intra-team and external perspective represent more fully the wide range of activities team members actually do to ensure that information is processed and new products meet evolving market needs.

Additionally, our study revealed that outbound strategies can have different activity centers of gravity at different points in the NPD trajectory. Specifically for the reflection strategy we found these differences. In the early part of the NPD process, Anti-resist team members mainly relied on an NPD protocol as single means for reflection. This underlines the enabling effect of procedures to guide behavior for uncertain innovation activities (e.g., Cardinal, 2001). Additionally this finding is consistent with research that addressed the positive effect of formalization on MIP (Jaworski & Kohli, 1993; Kirca et al., 2005) and market learning in NPD (Lynn, Skov, & Abel, 1999). On a more speculative note, focusing on an NPD protocol as ‘non-human’ and single reflection mechanism in the early phases might be less disturbing for necessary team building than including additional ‘human’ mechanisms such as reaching out to ChemCo’s senior management and other employees at that point. Opening up team boundaries may have some negative effects on internal processes. External activities, specifically interactions with other organizational members, consume a lot of time and bring divergent views into teams. This may hinder team building, which is particularly important in the early phases of team development (Wheelan & Hochberger, 1996). While the teams in Ancona’s (1990) study surmounted this problem by strong leadership, the Anti-resist team overcame this by slowly building up external activities, starting with reaching out to relatively controllable artifacts such as an NPD protocol.

Later on in the NPD trajectory, the Anti-resist team complemented using an NPD protocol with human interactions. While the expansion of boundary spanning activities might be of better fit in later NPD stages given the importance of teambuilding in the early stages, other aspects seem of importance as well. Interaction with senior management, on top of using an NPD protocol was, for instance, not only used for reflection purposes but also to promote the project throughout ChemCo and secure resources for further investments. So in terms of Ancona and Caldwell (1992), with regard to external activities Anti-resist team members not only managed their ‘workflow structure’, (i.e. market information processing), but also invested in managing the ‘power structure’, (i.e. promoting the project and securing resources). This suggests that while non-human reflection mechanisms are mainly used for benchmarking, human reflection mechanisms can be used for multiple purposes.

This study further highlights the opportunity to study a higher level of learning than commonly used by scholars investigating MIP in NPD. Most of these studies are using two levels of learning, for instance exploitation and exploration in market learning (e.g. Berchicci & Tucci, 2010; Kim & Atuahene-Gima, 2010; Slater & Narver, 1995). The lowest level is commonly used to indicate MIP pertaining to current product domains, market segments, expressed customer needs and incremental NPD, while the second level concurs with processing information on latent customer needs and new market segments in really new product innovation. Our study suggests that product innovation also benefits from reflection on market information processing similar to what others have called ‘meta-learning’ (Visser, 2007) or ‘deutero-learning’ (Sinkula, 1994). This higher level of learning refers to the inquiry into and the reflection on the processes of learning from the market. This ‘meta-market-learning’ may be more important in uncertain situations like really new NPD projects because in these situations teams lack ‘hard numbers’ and are more likely to rely on beliefs and ideology, which may not always be the best reflection of reality (e.g. Berchicci & Tucci, 2010).

Finally, our work contributes to the literature on control in the context of really new product innovation management. We highlight the importance of team member initiative when establishing NPD control. In the context of our study, some might argue that senior management is to blame for limited MIP in project Shield. Senior managers ought to know what is going on in the organization. It is their task to monitor NPD teams and proactively challenge them on their ways of working thereby increasing success. This argument can be grounded in research on NPD control, which often adopts a senior management viewpoint (e.g., Bonner et al., 2002; Manz & Sims, 1987). Although too much senior management control may stifle new product team autonomy and innovation and, consequently, harm market information processing and new product performance, some level of senior management control is beneficial. It ensures that information and insights are not overlooked, processed at the right time, and assumptions of the product development team are validated by organizational members not directly involved (e.g. Brown & Eisenhardt, 1995). Specifically, research shows that when senior managers take the initiative to sit together with team members early in the project and discuss issues such as project goals and schedules project success will be enhanced (Bonner et al., 2002). We add to this literature that the responsibility to establish this, so-called, interactive control is not restricted to senior managers only and that NPD teams can also make a difference. Employees on a lower hierarchical level have a responsibility in bringing their projects, ideas, and progression under the attention of senior management. They have to ‘champion’ the project to achieve senior management interest, commitment, and create room for interactive control. This seems specifically the case with respect to really new NPD. Here opportunities are often ‘emergent’ and flow ‘bottom up’ because specialists on a lower hierarchical level are better able to perceive new patterns and changes in the firms’ environment than generalists operating at a higher organizational level (Burgelman & Sayles, 1986). Thus, lower positioned technological and marketing gatekeepers have to sell their ideas to senior management, particularly during the early phases of really new product development.

<table>
<thead>
<tr>
<th>Outbound strategy</th>
<th>Position of NPD team in the organization</th>
<th>Main practices used by the NPD team</th>
<th>Purpose of practices</th>
<th>Timing of practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shield</td>
<td>Informing</td>
<td>Filing progress reports (one way vertical communication) Using NPD protocol</td>
<td>To show progress in MIP</td>
<td>From late in the initiation phase onwards</td>
</tr>
<tr>
<td>Anti-resist</td>
<td>Reflecting</td>
<td>Having recurrent steering group meetings (two way vertical communication) Interactions with other m/s-groups (two way horizontal communication)</td>
<td>To benchmark and so reflect on ways of MIP</td>
<td>From early in the initiation phase onwards</td>
</tr>
<tr>
<td></td>
<td>Integrated</td>
<td></td>
<td>To reflect on ways of MIP, and also to promote the project and secure resources</td>
<td>From late in the implementation phase onwards</td>
</tr>
</tbody>
</table>

Table 3: Overview outbound strategies used in Shield and Anti-resist.
prior to project formalization (Reid & de Brentani, 2004). Yet, project members also have to proactively interact with senior management in the later phases of an innovation project. Our research shows that promoting a project inside the company and improving its visibility alongside the NPD trajectory can improve its importance.

5.1. Management implications

Our research helps managers to shape crossing team boundaries in the context of reflecting on MIP behavior. Really new NPD teams that exclusively focus on internal practices facilitating MIP may become overly cohesive resulting in becoming less market-oriented over time. Organizations may prevent this by developing a really new NPD protocol and encouraging teams to use it. Additionally senior management can take measures to enhance the changes that project managers and teams reflect on their MIP behavior together with outsiders. They can include these important practices in training programs, reflection sessions and coaching (Ruekert, 1992). Also they can include external MIP reflection as an aspect of control policies. Though implementing these policies should happen with care. If they are applied too strictly and mechanically they will not benefit overall MIP in really new NPD and can even harm this behavior (Sethi & Iqbal, 2008).

Crossing team boundaries to evaluate and discuss MIP behavior cannot be done without recognizing the importance of different types of market information and developing a typology of market information resources on which existing products are built. A pragmatic way to identify market information resources is to explicitly classify the market segments that the firm already has constructed, customers that are targeted, and the customer applications in which products are used. Once a market knowledge typology has been developed it can be used for mapping the existing product portfolio as well as reviewing running NPD projects: What projects are behind in generating and using market information, and in what projects sufficient market information is integrated?

5.2. Limitations and future research

This section discusses several limitations that provide meaningful opportunities for further research. We analyzed data from two NPD projects in one firm. This is a logical choice, given the aim to conduct an in-depth longitudinal case study using data gathered from different sources such as in-depth interviews and a workshop. While a similar organizational context supported focusing on differences in team level factors between the projects, our findings might be rather idiosyncratic and only permit a certain level of analytical generalizability (Yin, 1994). Insights and generalizations drawn from our study might be rooted in the uniqueness of the organization. Further research may thus also want to test the theoretical insights that were obtained by our study on a larger scale. To what extent do our inductively derived strategies really matter in explaining successful market-oriented product innovation? As really new product development projects differ across industries and firms (O’Connor, 1998), researchers may also want to include different industries and types of firms. Our research specifically focused on really new NPD and suggested that outbound strategies would be specifically beneficial in this context. Additional research should look further into this by including product innovation projects with varying levels of innovativeness.

5.3. Concluding remarks

Our study highlights that even if really new NPD project members process market information they may want to validate this process because they can process too little market information or not process a particular type of market information at all. In a single NPD project, project members can therefore be customer oriented but, at the same time, losing sight of the overall market. By looking into a variety of different market information types, tracking market information processing over NPD trajectories, and discussing organizational practices that can influence market information processing, we aimed to add to research on market-oriented product innovation.

Although researchers have long highlighted the benefits of decentralization for information processing (Jaworski & Kohli, 1993; Kirca et al., 2005), and creativity (Bonner et al., 2002) in the context of really new NPD our study illustrates that this comes with a certain responsibility for new product teams. These teams need not be too much inward focused, and have to ‘externally’ reflect on their MIP practices, for instance, by using formal protocols available within the organization or proactively start a dialog with senior management. This ‘outside’ reflection may increase the team’s market orientation and therefore its chance for success. It seems that the external perspective to team behavior offers meaningful opportunities for further exploring market-oriented product innovation. We ask our colleagues to join us on this research journey.

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Appendix A. Project descriptions

A.1. Project Shield

In 2002 an existing customer of ChemCo – an innovative communication cables producer with leading technology that used ChemCo’s yarn in its cables – discussed with ChemCo’s m/s-group the problem that electrical sparks damaged its cables used in networks based on a high voltage power pylon infrastructure. This resulted in the initiation of project Shield. During the initiation phase ChemCo’s research institute was able to develop an innovative semi-conductive oil. Impregnating yarn with this oil reduced the sparks, which significantly increased the lifetime of the cables.

The implementation phase of Shield started when ChemCo began testing cables together with the innovative cables producer early 2005. After some iterative testing, results looked promising. In November 2006, ChemCo’s customer invited ChemCo to jointly present a paper on the project’s developments at an industry conference. The cables world, however, was not that impressed because the majority of the cables producers already used a solution that was well accepted by their customers further down the value chain, the network operators. It appeared to ChemCo that their proposed launching customer had relatively higher cable requirements than the average cables producer. In April 2007 the multinational that owned ChemCo’s customer sold this organization to another cables producer. This new owner had other priorities and decided not to promote ChemCo’s new type of yarn. From late 2007 onwards ChemCo focused on continuing developments with other cables producers. However, limited interest from other cables producers ultimately resulted in ChemCo putting Shield on hold early 2008.
A2. Project Anti-resist

In 2004 the tires m/s-group decided to do a market study on the future needs of the tire industry. This study revealed that tire manufacturers aimed to contribute to lower fuel consumption by reducing the rolling resistance of tires. Meanwhile the organization’s research department had accidentally found a way to improve the hysteresis properties of rubber compounds, which potentially could reduce the rolling resistance of tires. Based on these insights Anti-resist was initiated. After some development work, ChemCo’s research institute managed to develop a prototype product ready to be tested with potential customers.

The end of 2005 marked the start of the implementation phase of Anti-resist. At that time the project team started collaborations with several tire manufacturers to test the new product. The feedback on reducing rolling resistance was positive and first quantities of the products were sold in 2007.

Appendix B. Data structure

<table>
<thead>
<tr>
<th>Category</th>
<th>Dimension</th>
<th>Exemplary case study evidence*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing market information</td>
<td>Segment information</td>
<td>“Based on desk research and interviewing different customers our team learned that reducing rolling resistance was a hot topic in the tires industry. I can show you the figures...you see that this is the priority list of tire manufacturers until 2012. These data were input for developing rough calculations of the market potential very early in the project.” — Business manager Anti-resist, interview 2006</td>
</tr>
<tr>
<td></td>
<td>Needs information</td>
<td>“When [Shield] started, around 2002, we already made yarn which is used as reinforcement in this type of cables. In that same year our team focused on getting our research target right. By means of several site visits and meetings with [innovative cables producer] we were able to measure and discuss the electrical conductivity of the cables that were in use at that time so we got a feeling of what the customer wanted to achieve. We used these data in formulating our research target early in the project.” — Researcher, interview 2006</td>
</tr>
<tr>
<td>Intra-team factors</td>
<td>Cross-functional integration</td>
<td>“In house we developed several versions of the product and discussed them in the team. We had fruitful meetings with our research department. In these meetings we extensively shared and exchanged information when something came up.” — Sales manager Shield, interview 2007</td>
</tr>
<tr>
<td></td>
<td>Project priority setting</td>
<td>“Project members come from our m/s-group and our research department. We all have other duties besides the project. For instance we have to achieve sales targets with regard to our existing products.... Preliminary results are looking promising, we have a lot of tires manufacturers involved in testing, which means the industry is interested. Everybody really likes working on the project.” — Business manager Anti-resist, interview 2007</td>
</tr>
<tr>
<td></td>
<td>Market research methods</td>
<td>“We had very open communication with [innovative cables producer]. At the start of the project we visited them several times and observed their manufacturing process.... After we had a first prototype product we started testing it together with [innovative cables producer]. This experimentation resulted in several iterations which improved our initial prototype product.” — Sales manager Shield, interview 2007</td>
</tr>
<tr>
<td>Boundary spanning: informing strategy</td>
<td>Filing progress reports</td>
<td>“As m/s-group we provide senior management with quarterly reports on the progress of all our projects. When this concerns new products we detail our value proposition, project progress, the activities we carried out, and future challenges. A schematic overview of [Shield] is included in these quarterly reports.” — Sales manager, interview early 2006</td>
</tr>
<tr>
<td></td>
<td>Using NPD protocol</td>
<td>“When working on [Anti-resist] we used the project management tool that is available in our organization from the start of the project in 2004. You have different phases such as exploratory phase, market assessment, development, and commercialization. This framework also includes stage-gate checklists. We used this tool to structure marketing discussions in the team and making sure that we covered a wide variety of market aspects along the way.” — Business manager, interview 2006</td>
</tr>
<tr>
<td>Boundary spanning: reflecting strategy</td>
<td>Steering group meetings</td>
<td>“After we had developed some material that looked promising we wanted to further rationalize our way of working. Was this the product form we had to develop? Did we assess the market the right way? We had made assumptions but we needed to validate these. To that end we thought about initiating a steering group and have recurrent steering group meetings. We approached senior management of our organization to act as sounding board and challenge our value proposition and the way we assessed the market” — Project manager Anti-resist, interview 2006</td>
</tr>
<tr>
<td></td>
<td>Interaction with other m/s-groups (horizontal two-way communication)</td>
<td>“Prototyping often isn’t straightforward and you have to make strategic choices who to involve at what particular time. Partly based on information exchanges with business managers from other m/s-groups our team decided on the characteristics of companies that we wanted to involve in our testing trajectory. Sometimes you need this reflection, otherwise you can get too attached to first thoughts, which might not point to the best strategy” — Business manager, interview 2006</td>
</tr>
</tbody>
</table>

*We provide one illustrative interview quote per dimension. However, all dimensions are supported by multiple data incidents taken from interviews and several of them are supported by the additional data sources.

References


