Customer oriented, but losing sight of the big picture: how lack of 'outside' validation can limit market information processing in NPD teams

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Abstract

NPD teams enhance their change of success when they process rich and diverse market information in the course of a new product innovation trajectory. A large body of literature has advocated that including this information, such as insights on developments in market segments and customer needs regarding product applications, in new product decision-making is critical for new product performance. Contrary to earlier findings this is not only the case for incremental NPD but also for their really new counterpart. Additionally, research has focused on within NPD team practices that allow firms to be market oriented innovators, hereby focusing on cross-functional integration, project priority setting, and using the right market research tools. However, the practice of innovation is complex. NPD teams have to spread attention and processing enough market information can easily be overlooked. Against this backdrop we present a comparative longitudinal case-study which provides detailed insights of two new product trajectories, Shield and Anti-resist, in one chemical firm, ChemCo. We illustrate what market information was processed over the course of the two innovation processes. We find that project members in Anti-resist processed a larger variety of market information when compared to the ones in Shield, especially in the early phases of the project. In due course this led to the Anti-resist team being able of introducing the product into the market while Shield was put on hold. Lack of market information processing in Shield was not due to within NPD team factors which have been a focus point of previous literature. Project members in Shield, in comparison to the ones in Anti-resist, were less proactive in validating their market information processing practices with the wider organizational context 'outside' the NPD team in the course of the innovation trajectory by means of using a formal NPD protocol and interacting with ChemCo's senior management. While marketing literature has praised decentralization for enhancing market information processing, our main contribution to the literature on market oriented NPD is that this comes with the responsibility of individual NPD teams to proactively validate their own marketing actions along the way.

Keywords: Market information, market orientation, really new NPD, information management, comparative longitudinal case-study

INTRODUCTION

Market information processing (MIP) reduces the risk that new products fail, because they do not meet evolving customer needs (Brown and Eisenhardt, 1995, Kirca et al., 2005). And in contrast to earlier claims (Berthon et al., 1999, Christensen and Bower, 1996) research has demonstrated that MIP not only enhances incremental new product development (NPD) performance, but has a positive effect on really new NPD performance as well (Baker and Sinkula, 2007, Kyriakopoulos and Moorman, 2004, Narver et al., 2004). Despite these findings, processing market information in the practice of NPD, which literally involves hundreds of decisions (Krishnan and Ulrich, 2001) is difficult. Many NPD teams fail to develop high levels of market orientation and consequently fall short of sufficiently generating, disseminating, and using market information in really new product decision-making (Adams et al., 1998, Kok and Biemans, 2009, Workman, 1993). Not surprisingly NPD failure rates remain high, averaging 40% (Barczak et al., 2009).

While organizational barriers and configurations that affect MIP *across firms* have extensively been investigated (Atuahene-Gima et al., 2005, Jaworski and Kohli, 1993, Kirca et al., 2005), antecedents of MIP in really new NPD projects *within firms* have received scant attention. MIP in really new NPD projects not only differs from incremental NPD projects (O'Connor, 1998). Really new NPD projects also show differences in MIP behaviors, for example in the tools employed to understand market needs and techniques used for reducing market uncertainty (O'Connor, 1998). While Atuahene Gima, Slater, and Olsen (2005) and Adams and colleagues (1998) are amongst the very few studies paving the path of investigating barriers to MIP in really new NPD projects, they abstracted from within-firm differences in discerning organizational barriers. Really new NPD projects within one firm - in particular within a single SBU - face similar organizational conditions such as the same level of decentralized NPD decision-making authority, the same reward system, and the same organizational climate, culture or inertia. These projects are also expected to face similar interdepartmental conditions as well as top management emphasis on market orientation. Not surprisingly, firm-level antecedent studies hardly explain differences in MIP behavior across really new NPD projects within firms, as they account only for firms that differ in the level of MIP (cf. Kessler and Chakrabarti, 1996). As a consequence, these studies largely fail to inform us on the decisions, mechanisms, and practices of implementing a market orientation in individual really new innovation projects.

Factors in the closely surrounding organizational environments of really new NPD-projects are likely to better explain MIP differences across these projects. This involves NPD-team level factors such as cross-functional integration (Griffin and Hauser, 1996, Olson et al., 1995), market research tools (Deszca et al., 1999, Janssen and Dankbaar, 2008, O'Connor, 1998), and project priority setting (Ottum and Moore, 1997, Veldhuizen et al., 2006). In addition, it may also involve outward/inward bound team strategies (Ancona, 1990, Ancona and Caldwell, 1992). However, research on the effect of NPD-team level factors is scattered and scarce. While the effect of outward/inward bound strategies on MIP has hardly been investigated, the effect of project priority setting on MIP is not investigated in the context of really new NPD-projects. In addition, these NPD-team level effects have not been studied in conjunction with cross-functional integration and market research tools use and in the context of different really new NPD-projects. Concluding, a coherent body of knowledge on NPD-team level factors and their underlying mechanisms that are responsible for MIP differences across really new NPD projects within SBUs, is sorely lacking.

The purpose of this study is to explore how and why MIP behaviors in one really new NPD project can differ from another within a single SBU. Using longitudinal case study method, we investigated two really new NPD projects within the same SBU of a chemical firm. Additionally, we identify why in one project a wide variety of market information with

sufficient depth was processed, allowing the NPD team to commercialize the new product, and while in the other project the processing of rich but less diverse market information resulted in the project's termination. This study contributes to the literature on market-oriented product innovation in several ways. First current research has largely focused on within team factors effecting MIP in NPD, such as cross-functional integration. We highlight that the way teams reflect on their MIP behavior by reaching outside the team to the wider organizational context also can make a difference. Second, by using a longitudinal case research approach, it addresses methodological limitations of survey methods (Goldon, 1992, Huber and Power, 1985, Kessler and Chakrabarti, 1996) and retrospective cross-sectional approaches (Jaworski and Kohli, 1993).

This paper begins with reviewing product innovation and market orientation literature. This is followed by presenting a conceptual framework. After the method the findings are presented. Additionally, we discuss the findings. The paper closes with the conclusion, limitations and further research opportunities.

LITERATURE REVIEW

Our study mainly builds on research in the fields of product innovation and marketing. Early product innovation research describes MIP activities across the various stages of the NPD process (Cooper, 1983). The activities mainly involved including the voice of the customer, not only in the early but also in the later stages of the process. Marketing research extended market information to also include monitoring competitor's actions and their effect on customer preferences, as well as other exogenous factors such as government regulations, technology, and environmental forces.

However, it was not until recently that scholars in the fields of product innovation as well as marketing have identified multiple complementary types of market information useful in new product decision making (Adams et al., 1998, Smits, 2010, Veldhuizen et al., 2006, Zahay et al., 2004). Three often cited information types are segment information, needs information, and customer information. *Segment information* refers to knowledge 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, 2010, Veldhuizen et al., 2006). *Needs information*, in turn, refers to understanding customer needs and wants in relationship with particular applications (Adams et al., 1998, Veldhuizen et al., 2006). Finally, *customer information* is information on existing or potential customers frequently found in CRM systems such as contact information, nature of decision making units, and purchase history (Zahay et al., 2004).

Marketing research also disentangled MIP in three organization wide 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" (Kohli and Jaworski, 1990 p. 6). The responsiveness to market information can take forms such as selecting the appropriate target markets, product innovation, and enhancing customer-perceived quality. These three behavioral activities have been applied in the context of NPD (e.g. Biemans, 1995) and (e.g. Adams et al., 1998).

More recently research has focused on the differences in market information for developing really new compared to incrementally new products. For incremental product updates, customers can easily recognize their own needs and express suggestions for improvement because reference products already exist in the market. In addition, firms need information on immediate threats by competitors to excel in incremental innovation (Atuahene-Gima, 2005, Noble et al., 2002). In contrast to incremental product innovation,

really new product innovation explorers new market segments (Hamel and Prahalad, 1994) and aims to uncover latent customer needs (Slater and Narver, 1998).

NPD-team level factors

Although firm-level factors can clearly support or constrain MIP in innovation projects (Adams et al., 1998, Atuahene-Gima et al., 2005, Kirca et al., 2005) NPD team level antecedents are likely to make a difference when it comes to within firm differences among really new NPD-projects. NPD-team level antecedents include cross-functional integration, project priority setting, the use of market research tools, and team strategies.

In the product innovation literature, most attention on NPD-team level antecedents has gone to the integration of the perspectives of project members with different functional backgrounds. Cross-functional integration can be broken down into collaboration and interaction (De Luca and Atuahene-Gima, 2007, Kahn, 1996). While collaboration refers to the intangible and unstructured recognition by team members with different functional backgrounds of their strategic interdependence and their need to cooperate for the benefit of the organization, interaction is about organizing the information integration itself. Cross-functional integration of team members specifically benefits the dissemination and usage of market information in product innovation (De Luca and Atuahene-Gima, 2007, Kahn, 2001, Li and Calantone, 1998). Cross functional integration is relatively more important in really new product innovation when compared to incremental product updates (see e.g. 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, the functional tasks involved in developing the concept and bringing it to the market 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 exchanges of ideas, information, and other resources.

Although cross-functional integration has gained the most extensive attention as NPD-team level antecedent of MIP, other antecedents have also been investigated. Two of them are market research tools in use and project priority setting. Using different market research tools in NPD results in different market information being generated (Deszca et al., 1999, Janssen and Dankbaar, 2008, O'Connor, 1998) . Therefore it is argued that type of market research tools in use by the NPD team influences MIP during the innovation trajectory. For incremental NPD projects, it is proposed that developers update their current understanding of a market segment, specifically a competitor analysis seems to have a positive effect on generating meaningful market information (Atuahene-Gima, 2005, Noble et al., 2002). Additionally, organizational members can update their understanding of customer's expressed needs by using techniques such as focus groups and surveys (Leonard, 1995, Slater and Narver, 1998). For really new projects, in contrast, suitable market research tools to generate market information include extrapolating trends, science and technology mapping, and scenario analysis (Leonard, 1995, Schoemaker, 1995). Furthermore, uncovering latent customer needs requires using tools that allow for experiential interaction with customer such as the lead user approach (von Hippel, 1986), emphatic design (Leonard, 1995), or customer visits (Slater and Mohr, 2006). By using these tools, project members can get to know customers' working practices so well that they become able to anticipate unspoken, or latent, needs.

Another NPD-team level antecedent is project priority setting. The priority of firm and team members given to an NPD project is positively related to both generating market information and disseminating it across the team (Ottum and Moore, 1997, Veldhuizen et al., 2006). The level of importance of a project will lead to more effort being put into the

generation and dissemination of information about customers, their needs, and market segments. Also, important projects might receive more organizational resources which, in turn, may influence MIP.

The mainstream management literature on teams discusses the role of team strategies. Outward bound strategies based on external activities that engage relevant outsiders are better predictors of team performance than inward bound strategies based on internal group processes and frequency of communication related to task and maintenance activities (Ancona, 1990, Ancona and Caldwell, 1992). This holds for teams that are dependent on their external environment and concerns not only the general performance of consultant teams (Ancona, 1990), but also the innovation performance of NPD-teams (Ancona and Caldwell, 1992). However, these studies hardly inform us about the information processing mechanisms that are underlying these performance effects.

Concluding, previous studies have uncovered team level factors that play a role in innovation projects in general or MIP in NPD in particular. However, the insights are still scattered and scarce. As a result, these factors are likely to explain only part of the picture. NPD-team level factors treated in the product innovation literature such as the effect of priority setting on MIP have not been investigated in the context of really new product innovation, nor has it been investigated in conjunction with the other NPD-team level factors, such as cross-functional integration. In addition, team-level factors treated in the mainstream management literature such a outward/inward bound strategies have hardly been investigated in the context of MIP and really new NPD-projects. More importantly, these factors have not been considered in explaining differences in MIP in really new NPD-projects within a single firm. In the empirical part of this study we aim at integrating the views in these literatures to extend our understanding team-level factors anteceding MIP in really news NPD-projects within a single firm.

METHODS

Research method

We chose a longitudinal comparative case-study strategy for this research. We aimed at exploring the project context and its potential dynamics which, potentially, can trigger project teams to process more or less market information in the course of a product innovation project. This exploration suggested that rich qualitative data was necessary, which makes a case study methodology appropriate (Edmundson and McManus, 2007, Yin, 1994). This methodology enables looking into multifaceted events and extensive interaction with research objects by which event sequences can be clarified, overlapping factors disentangled and contexts can be taken into account (Eisenhardt, 1989, Lee, 1999). In addition, a comparative design generates field-based insight into how and why MIP differs across NPD projects, whereas the longitudinal setup enables tracking down the differences and their explanations in different project phases.

Research setting

The research setting for this study is ChemCo[1], a Dutch chemical firm. Although this chemical firm is part of a global multinational, it acts relatively independently. For instance, ChemCo is a separate legal entity with its own annual report. The company manufactures and sells a high performance fiber in product forms such as powder, pulp, and filament yarn. Important end markets are the automotive and defense industries. The companies' headquarters, R&D, and production sites are located in the Netherlands, global coverage is

[1] For reasons of confidentiality ChemCo is a fictitious name

achieved through seven sales offices and a few dozen sales agents around the world. In 2007, ChemCo had €434 million in annual sales and employed about 1,200 people.

Table 1: Key numerical data ChemCo 2002-2007 (mainly based on annual reports)

ChemCo	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Sales (MM €)	240	298	348	379	416	434
EBIT (operating profit; MM €)	55	80	91	108	120	116
EBIT/sales ratio (%)	22.9	26.8	26.1	28.5	28.8	26.7
Employees	901	965	993	1,036	1,128	1,171
R&D expenses (MM €)	12	14	15	16	18	16
R&D/sales ratio (%)	5.0	4.7	4.3	4.2	4.3	3.7

In the period 2002-07, ChemCo's 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. For marketing and sales, the company has organized eight globally operating marketing/sales groups (m/s group from this point onwards). Each of these groups targets a specific market segment with a set of product forms and employs around 7 marketing/sales people on average. These market segments include tires, optical fiber cables, friction and sealing, and ballistics. For research, ChemCo operates its own research institute which employs around 100 people in total.

Case selection

Within ChemCo we selected two product innovation projects as main cases for in-depth analysis. Inspired by Lewis and colleagues (2002), two criteria were used to select projects. The projects had to be judged by firm contacts as promising, allowing for significant firm renewal, but also presenting significant market uncertainty. Hence, they had to be considered more than incremental advances. Additionally, these really new innovation projects had to have progressed beyond the front end of innovation but not yet introduced into the market. In contrast to studying long finished projects this latter criterion allowed us to study critical events, such as project completion or project termination in the development phase, in real time[2]. Also, in comparison with long finished projects, this criterion increased the changes of contacting respondents that could remember details of earlier project phases. Table 2 presents an overview of the cases, *Shield* and *Anti-resist*, that were studied.

Table 2: Overview two cases studied

	Shield	**Anti-resist**
Project objective[1]	Developing a new product to protect optical fibers in communication cables	Developing a new product to reduce rolling resistance of tires
Project status early 2008	History of approximately 5 years, still under development	History of approximately 3 years, introduced into the market in 2007
Project size	Core team: 5 employees Investment level: medium; research had to take place but no major plant adaptations were necessary	Core team: 7 employees Investments level: medium; research had to take place but no major plant adaptations were necessary[2]
# of informants core project team	3	4
# of interviews core project team	4	5
# of other informants from	9	

[2] Our research timeframe did not allow for analyzing a project from start to finish in real time.

ChemCo	
# of interviews other informations from ChemCo	11
Workshop participants	12

[1] From the perspective of ChemCo
[2] However, major investments in a plant to manufacture the new product were planned for in 2007

Data collection

Data were collected by interviewing project team members and ChemCo employees who were closely related to this group. Informants included members from the m/s groups, other functional specialists, and senior managers. Some informants were interviewed multiple times (see table 2). The use of multiple informants allows information to be checked, thus providing the opportunity to control for potential biases of individual respondents (Dougherty, 1990). The interviews contained both general and more specific questions. In most cases, two questions ("Could you please describe how the project developed over time and what you are doing at the moment?") were enough to trigger the main process story. After the initial story, we followed up with in-depth questions, focusing on specific dates, working practices, milestones, events, and outcomes. Since there was no list of people that had been or were involved in the projects under study, the selection of respondents was based on information provided by other respondents. We finished data collection when additional interviews resulted in limited additional understanding (Glaser and Strauss, 1967, Lee, 1999). Interviews lasted between 50 minutes and 2.5 hours. Notes were taken and all interviews were taped and transcribed verbatim. All interviews were carried out on-site, were held by the first author and a research assistant, and were followed up with clarifying e-mails and telephone calls when needed. We collected data between 2006 and 2008. The first author was in contact with informants and had several site visits over a total period of, at least, two years which allowed for tracking some developments in real time. Interview data were supplemented with archival data such as new product proposals, product announcements, product catalogues, presentations, and business press articles.

Data analysis

For case analysis we mainly relied on approaches suggested by Eisenhardt (1989) and Miles and Huberman (1994). Data analysis started with examining data of the individual cases. The aim was to get familiar with the case as a stand-alone entity. We divided information in meaningful fragments. These fragments were labeled with a few words to indicate the meaning of the fragment. During coding we generated preliminary notes of insights that emerged per case. After finishing data collection, this description was fed back for review by several respondents. Inspired by our literature review we then focused on similarities and differences concerning MIP and its antecedents between the two cases.

To further sharpen our findings we subjected our initial analysis to member checks (Lincoln and Guba, 1985) by initiating an interactive workshop in cooperation with ChemCo with 12 employees participating. These member checks served to further validate our findings and revise them were necessary. Iterating back and forth between data, validation, and theory resulted in a robust understanding of how MIP progressed in the course the innovation projects and what triggered specific processing patterns within NPD teams.

Presentation of findings

In presenting our findings we start with describing the two NPD projects. In doing so we divide the innovation process in two main stages: initiation and implementation (Woodman et al., 1993, Zaltman et al., 1973). During the initiation phase new product ideas are generated, developed and evaluated (Kijkuit and Van den Ende, 2007). Sometimes this phase is also called the 'front end' of innovation (Khurana and Rosenthal, 1998). The second phase is the implementation phase. Throughout this phase product ideas are further developed into physical products and introduced into the market. Now we discuss the two projects in more detail and present the results of an analysis of MIP and its team level antecedents.

RESULTS

Overview Shield project

Shield was mainly carried out by ChemCo's research institute in combination with one of its m/s groups. The m/s group involved focused on the fiber optic cables segment (i.e. communication cables), where ChemCo's yarn is sold as cable reinforcement material. In a specific type of fiber optic cable which can be installed by using an existing high voltage power pylon infrastructure, the following problem may occur. Installation of the cable alongside high voltage power lines results in electromagnetic fields that can give rise to significant voltage gradients along the length of the cable. If the cable surface becomes partly dry and partly wet because of sunshine and moisture, these gradients can induce a current along the cable. Over time, these currents, which produce sparks, can leave tracks that damage the reinforcement material and the cable, and eventually disturb the transmitted signals.

By the end of the nineties, an existing customer of ChemCo, an innovative cable producer with leading technology[3], had talked about this problem with ChemCo's m/s group. It was only until 2002 that both parties found the time to look into this issue again, which resulted in the initiation of project *Shield*. After a period of research, ChemCo's research department was able to come up with a semi-conductive oil. In ChemCo's lab, impregnating yarn with this oil in an additional manufacturing step reduced the currents, which significantly increased the lifetime of the cables.

The implementation phase of *Shield* started when ChemCo's customer tested cables together with the innovative cable producer. 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 cable world, however, was not that impressed because the majority of the cable 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 cable producer. In April 2007 the multinational that owned ChemCo's customer sold this organization to another cable 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 cable producers. However limited interest from other cable producers ultimately resulted in ChemCo putting *Shield* on hold.

Market information processing in Shield project

Inspired by the three types of market information that were synthesized from literature (i.e. segment information, needs information, and customer information) we found that in the

[3] This customer was listed as one of the world's 50 most innovative companies by *Fast Company* magazine in 2008

initiation phase of *Shield*, which ran from 2002 until early 2005, team members predominately generated and used needs information and customer information on one single customer, the innovative communication cable producer. A researcher involved in *Shield* explained processing needs information:

> "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 cable 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

Processing customer information can be illustrated by a quote from a sales manager that was involved in the project:

> "At the initiation of the project we already had a long history in this market segment and knew most of the players. In this project we focused on one of our existing customers that can be considered as technology leader in this field. In the early stages when we were formulating a project together with this customer, I visited them several times. In these visits I tried to map who were the main decision makers at the customer and what their opinions were on this development. Were they advocates or opponents? When we learned we had sufficient support at our customer we decided to formulate a research project." – Sales manager m/s group, interview 2006

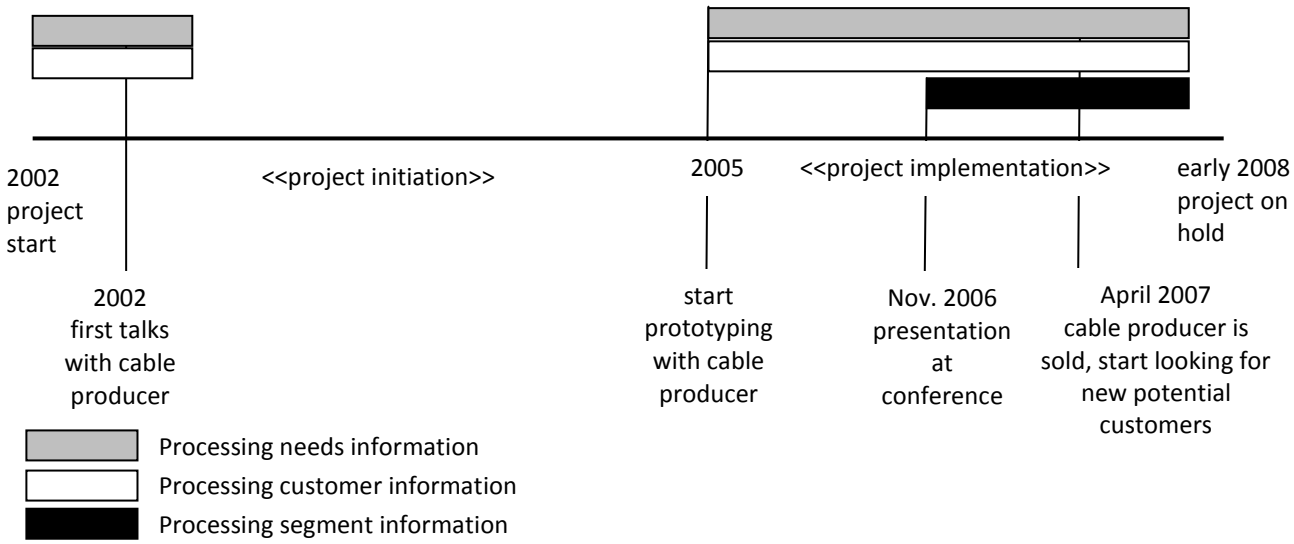
From 2005 onwards, when prototype testing started and the *Shield* team was focused on implementing the project MIP continued. With regard to MIP in the period 2005 – 2007, the *Shield* team was updating needs information by testing prototype products together with the innovative cable producer. These ongoing customer interactions also allowed for keeping customer contact information up to date. Additionally, the *Shield* team gained a broader perspective on communication cable market segment when they started processing segment information from November 2006 onwards when, invited by their launching customer, they presented a paper on ChemCo's new product at an industry conference. This resulted in the segment information that, generally, cable 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 cable 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 the overall scope. Actually it is quite bizarre." – Sales manager m/s group, interview 2007

In sum 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 and contact information on the innovative cable producer all they could. However, to be fully market oriented this information had to be augmented with segment information, and needs and customer information on additional potential customers. Segment information was only processed relatively late in the implementation phase of the NPD process (figure 1). Only then it became clear it would be

hard to bring the new product to the market and sell it to a wide variety of cable producers. The overall communication cable industry already had their solutions in place and were neither impressed nor interested in ChemCo's new offer. Collecting segment information at an earlier stage might have led to different decisions being made.

Figure 1: Market information processing Shield



Overview Anti-resist project

Just as *Shield*, project *Anti-resist* was carried out by ChemCo's research institute in combination with one of its m/s groups. While the m/s group involved in *Shield* focused on the fiber optic cables segment, the m/s group involved in *Anti-resist* focused on the tires market, where ChemCo's yarn is sold as reinforcement material for cap plies of tires.

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.

Market information processing in Anti-resist project

Focusing on MIP during the initiation and implementation of *Anti-resist* we found that team members put attention on all three types of market information in both NPD phases. We found team members processing segment, needs, and customer information in the initiation phase of *Anti-resist*, which ran from 2004 until late 2005. Processing segment information in the early stages was explained by the head of the m/s group:

> "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 in the

priority list of tire manufacturers until 2012. This data was input for developing rough calculations of the market potential very early in the project." – Head m/s group, interview 2006

The project manager of *Anti-resist* illustrated processing needs information in the early phases:

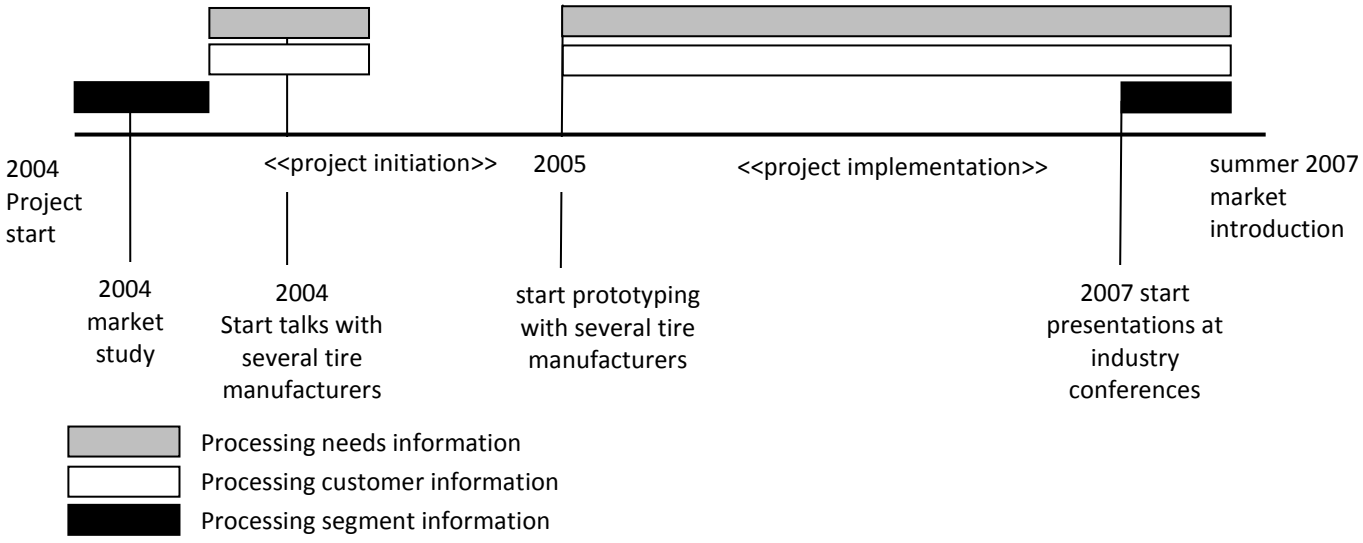
"Product specifications were hard to pin down, because this product was also new to the customers. But they had certain expectation which they shared with us. We used these data in setting research targets very early in the project." – Project manager, interview 2006

Finally, customer information processing was highlighted by the head of the m/s group:

"At the start of the project we called our prototype product 'modified fiber'. However we quickly found out that the fiber people at our customers did not really understand the product and were not allowed to make decision on adopting it. They referred us to the material people who appeared to have a larger stake in decision making in the area of reducing rolling resistance." – Head m/s group, interview 2007

Market information processed in the initiating phase was complemented by MIP during the project's implementation phase which ran from 2005 until market introduction in the summer of 2007. In this period the project team focused on testing prototypes with several potential customers by which they updated their needs and customer 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 potential customers and to update segment information from 2007 onwards (figure 2).

Figure 2: Market information processing Anti-resist



In sum it can be argued that, in comparison to the *Shield* team, the *Anti-resist* team followed a different MIP pattern. In both projects needs and customer information were processed in both the initiation and implementation phases of the product innovation process, and segment information was processed in the implementation phase. However, 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 compare team level antecedents of MIP of both projects.

NPD-TEAM LEVEL ANTECEDENTS OF MIP

To compare team level antecedents of MIP in order to identify why MIP in the two projects occurred in a different fashion, we structured our analysis using NPD team level antecedents of MIP identified in the marketing and NPD literature (i.e. cross-functional integration, project priority setting, and market research tools in use). Regarding these antecedents we found that the two projects were quite similar to a certain extent (see table 3). This triggered conducting a further analysis which revealed that the difference in MIP was directly related to a difference in cross boundary strategy across both teams. The following sections detail our findings

Table 3: Overview comparison team level antecedents

Dimension	NPD Phase	Shield	Anti-resist
Cross functional integration	Initiation	• Team members collaborated and interacted by using their internal organizational network	
	Implementation	• Team members collaborated and interacted by having recurrent team meetings	
Project priority setting	Initiation	• Team members were involved in other projects besides the project under study • Team member expected a positive project outcome	
	Implementation	• Team members were involved in other projects besides the project under study • Team member expected a positive project outcome during early implementation. However, expectations about a positive project outcome decreased for Shield in 2007, while they were maintained for Anti-resist	
Market research tools to uncover latent customer needs	Initiation	• Team members used experiential market research tools, such as customer visits to uncover information on latent customer needs	
	Implementation	• Team members used experiential market research tools, such as testing prototype products with customers to refine information on latent customer needs	
Market research tools to map future market segment trends	Initiation	• Team members did **not use** market research tools to map future market segment trends	• Team members **purposefully used** desk research and aggregated data from customer interviews to uncover and map future market segment trends
	Implementation	• Team members **accidentally** uncovered that the market segment already had solutions in place that worked out well through presenting at an industry conference	• Team members **purposefully** used presenting at industry conferences to update their market segment information

Cross-boundary strategy	Initiation and implementation	• Project members **informed** the organization on MIP by summary reports to senior management throughout the project	• Project members **reflected** on their own MIP by interacting with senior management and using an NPD protocol available within the organization throughout the project

Cross-functional integration

From our analysis it appeared 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 with a team.

We assessed cross-functional collaboration by assessing mutual respect and understanding between functions (Kahn, 2001). Good collaboration and limited cross-functional conflict within the two new product 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. Employees from the m/s groups respected and understood their research colleagues. They were well aware that in the 1970s and 1980s ChemCo researchers were the ones that discovered the material that formed the basis for the company in its present form. The company had always been technology driven, investing around 5% of turnover in R&D, regardless of economic cycles, and ChemCo marketers that were interviewed all felt that continuing this tradition was essential for future growth. Similarly, researchers in both projects felt the same way about their marketing colleagues. For instance, both m/s managers involved in Shield were very well connected with their team members from research. One had a PhD in physics and therefore could speak on par with research which was very much appreciated by the researchers. The other had worked in research before he joined the m/s group and had good personal relationships with the researchers.

We assessed cross-functional interaction to establish MIP by focusing on cross-functional meetings and documented information exchanges (Kahn, 2001). In both projects enough cross-functional interaction was established to disseminate market information across the team. In doing so, team members extensively used two mechanisms: using the internal organizational network, and using recurrent team meetings. In the initiation phase of both projects employees from different departments came together to discuss ideas and concepts which resulted in the integration of market information with other relevant information. Because this happened prior to an official project status, this integration was dependent upon the internal organizational network ties among ChemCo employees from different departments. After developing concepts and first prototypes both innovation projects became officially legitimized by ChemCo and received an official project status. For both projects this resulted in market information integration shifting from a rather informal to a more formal context. An important practice that was used to establish cross-functional interaction in the more formal implementation phase of the projects was using recurrent cross-functional team meetings of a team of functional specialists from different departments.

Project priority setting

With respect to project priority setting we found limited significant differences between the two projects. In our analysis we compared several aspects of the projects which led to this conclusion.

First, we analyzed overall organizational tasks and responsibilities of team members (Ottum and Moore, 1997). Project members involved in Shield as well as the ones in Anti-resist had other projects and tasks next to the projects under study throughout the

development trajectory. Hence, neither Shield nor Anti-resist had full-time project members. For instance, both the marketers involved in Shield as well as the ones from Anti-resist were involved in selling, advising customers, and developing other innovation projects.

Second, we focused on expectations related to project outcomes. A significant difference in expectations between projects might lead 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. In our analysis we found that for both projects expectations on project outcomes were quite similar in the initiation and early implementation phases across the teams. As with the majority of really new NPD projects at this stage (see e.g. Leifer et al., 2000) project members had difficulties pinning down quantitative outcomes, such as eventual sales figures, in the early project phases because of high project uncertainty. Expectations on project outcomes mainly were of qualitative nature and were comparable across both projects. Across settings, project members had high hopes. They expected that the project would lead to a further developed type of fiber which could be added to existing product lines and was of benefit to customers. These expectations were mainly based on information from customers in the initiation phase and their willingness to test early prototypes. As informants from both projects explained in the early project phase:

> "For now it looks optimistic. Although we have to speculate on how much the new product would sell, we think we have identified a real customer need for our product idea. In fact, at the moment, we have a potential customer that is testing a prototype version. This is a positive signal about its potential. This also raised the enthusiasm of project members, and put [Shield] high on their agendas." – Manager m/s group , interview 2006

> "If we can make this work we expect to introduce a new product that really addresses the needs of our customers. We already have several big players testing our prototype products. This is a big step forward. Everyone in our project is excited to work on [Anti-resist]. They all put in considerable time and effort to pushing this thing forward." – Project leader Anti-resist, interview 2006

Priority levels became less similar in the second half of 2007 after Shield team members had find out that other potential customers besides their prospected launching customer were less interested, and this launching customer was sold to a party with other priorities. While project priority remained high for team members involved in Anti-resist, this priority largely decreased for Shield team members:

> "Expectations for [Shield] have changed over time. The realization that we focused so much on one potential customer, and limited leads for our new product at the moment, definitely decreased enthusiasm and commitment from project members. It was like being struck by reality. At the moment we are thinking about putting [Shield] in the back of our minds and waiting for better times. We have decreased the priority we give to it. Regarding innovation, our m/s group has started focusing more on 'fiber to the home' developments, and what we can do there." – Sales manager m/s group, interview 2008

Market research tools

In really new product innovation, customer needs are often latent. Project members can use experiential market tools, such as emphatic design or customer visits to generate market information and anticipate unspoken needs (Leonard, 1995, O'Connor, 1998). Further in the innovation process this initial information can be refined by prototype testing with customers (Lynn et al., 1996). We used these insights to assess and compare the usage of market research tools suitable for really new product innovation in both projects.

In both Shield and Anti-resist, project members used customer visits and testing prototypes with customers as market research tools to uncover and refine latent customer needs. In Shield's initiation phase, project members visited a cable producer and by means of interviews and observations proactively identified the need for better cable protection. Using this information as research target the researchers involved in Shield 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. Thus, regarding market research tools to uncover latent customer needs and refine initial information, activities across the two projects were quite similar and no clear differences could be identified that could explain differences in MIP.

Next to uncovering and specifying latent customers needs, market research tools can be used to map more general future market segment trends. Suitable tools include, for instance, extrapolating trends and scenario analyses (Leonard, 1995, Schoemaker, 1995, Wheelwright and Clark, 1992). Using the resulting information in the NPD process allows firms to anticipate changes in market segments. Regarding the use of this type of market research tools we found a clear difference in effect between Shield and Anti-resist.

Project members in Shield did not focus on mapping future market segment trends. In this project, project members solely focused on generating and refining latent needs of one proposed launching customer (i.e. innovative cable producer) and gave little attention to where the total market was heading. By presenting at an industry conference together with their launching customer, they accidentally found out that, generally, the market was satisfied with existing solutions. Instead of in need for better protection solutions cable manufacturers future needs were to reduce the costs of cable protection. The new ChemCo product could not satisfy this need. While it provided better protection it was also more expensive than existing solutions. As one of the Shield project members explained:

> "[At the industry conference] lots of cable producers told us they already had well-working solutions in place and asked us to elaborate on the cost benefits of our new product in comparison with these solutions. This came as a surprise to us and we could not give a clear response to that question." – Sales manager m/s group, interview 2008

In contrast to Shield, project members involved in Anti-resist put deliberate effort in uncovering and mapping market segment trends throughout the NPD trajectory. When initiating the project in 2004 they used desk research and aggregated data from customer interviews by which they found out that reducing rolling resistance would become big in the near future:

> "In 2004 we interviewed three of our customers. These are the biggest three in the industry and cover about 65% of the market. We mainly asked them questions on the nature of their future needs. Combining these interview data with desk research brought the insight that reducing rolling resistance was, and still is, an important concern in the market. It is in the top three of concerns and forecasts say this will be the case until 2012 at least." – Project leader Anti-resist, interview 2006.

Next to market information on latent customer needs, this information on future segment trends was disseminated within ChemCo and used by several researchers inside the research department for starting the development of a new product.

> "In 2004 colleagues from the tires group approached our research group to discuss the issue of reducing rolling resistance of tires. We were working on a slightly different topic but, surprisingly, some

experiments pointed to improving the hysteresis properties of rubber compounds which potentially could reduce the rolling resistance of tires. Because we knew there was a market need, we looked further into that issue." Researcher Anti-resist, interview 2007

Additionally, after a period of working closely together with a few tire manufacturers to refine the new product Anti-resist project members started proactively giving presentations at industry conferences. Feedback on these presentations by industry stakeholders allowed team members to monitor possible future changes in the tires market.

Cross boundary strategy

Cross boundary strategy refers to how teams reach out to the wider organizational environment, and in particular the organization's senior management, regarding their MIP behavior (cf. Ancona, 1990, Ancona and Caldwell, 1992). On this aspect we found clear differences in effect between the two projects.

In Shield, project members mainly reached out by *informing* ChemCo's senior management, including the CEO, the commercial director, the R&D director, and the manufacturing director, 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 group projects:

"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 m/s group, interview 2006

This type of communication could be described as one way communication on MIP behavior; from project members to senior management. Only when the project team was in need of additional funds for testing a prototype product 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 brief, non-recurrent, and only included Shield project members and the R&D director. It did not involve the CEO and commercial director, which both had extensive experience in marketing and sales of new 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." - R&D director ChemCo, interview 2006

By using a strategy of informing, Shield team members only created limited opportunities to reflect on their way of MIP outside team boundaries. They also created limited openings to proactively challenge the team norm that, MIP-wise, they were on the right track. Limited 'outside' validation 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 cable producers were interested in their new product. The project members put limited effort in deliberately seeking ways to challenge their ways of interacting with the market, playing the devil's advocate, and enriching the project by bringing a fresh perspective along the way:

"For [Shield] we were focused on this one customer and not on the market as a whole. We did not use a helicopter view to see if this was the way to go. When working on [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 in 2006 when we gave a presentation at a conference." - Sales manager Shield, interview 2008

In comparison to project members of Shield, the ones that worked on Anti-resist used a different cross boundary strategy. The project members in this latter project used a strategy of *interacting* with the wider organizational environment and ChemCo's senior management in particular to *reflect* on their MIP behavior. We uncovered two main practices allowing Anti-Resist project members to proactively interact with their host organization to establish recurrent reflection on their MIP behavior: having recurrent steering group meetings and using a structured NPD protocol available within the organization.

Mid 2004, when early prototype products looked promising, the Anti-resist team felt the need for reflection on the NPD team's ways of working. In a response to this need, the Anti-resist project manager approached ChemCo's board of directors 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 their way of MIP.

"After we had developed some material that looked promising we wanted to 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 wanted to approach top 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

The project manager succeeded in setting up this steering group, involving several of ChemCo's senior managers among which the commercial and the R&D director. The steering group regularly met with representatives from the Anti-resist group, discussed project progress and resource needs, and challenged Anti-resists' assumptions on market figures and customer interaction results:

"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. 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 ChemCo, interview 2006

Next to recurrent steering team meetings with senior management, Anti-resist project members reached beyond their team with regard to assessing MIP behavior by using a formal NPD protocol available within ChemCo. In their search for reflecting on their way of working, Anti-resist team members looked for a protocol to reflect on their practices and limiting overlooking things in the course of the product innovation trajectory. In 2004 the group adopted an NPD process protocol that was generally available within ChemCo and used in several other larger projects before. This protocol included several process stages and gates with checkpoints regarding market and customer analyses. It brought structure to project activities and the group used it in internal meetings to benchmark their way of MIP:

"When working on [Anti-resist] we used the project management tool that is available in our organization. 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." – Head of m/s group, interview 2007

In contrast to Anti-resist, project members involved in Shield did not use a general protocol, resulting in a rather unstructured internally focused way of working, increasing the risk of developing 'taken for granted' team assumptions:

> "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. We used a rather unstructured way of working." – Sales Manager m/s group, interview 2008

DISCUSSION

We have studied MIP in the course of a really new product innovation process by analyzing and comparing projects Shield and Anti-resist in chemical firm ChemCo. While the output of Anti-resist could be introduced onto the market, which can be considered as initial measure for success (Seidel, 2007), the prototype product in Shield, in contrast, could not be commercialized.

Distinguishing segment from needs and customer information and using a longitudinal set up, our data point to a difference in processing segment information in the early phases of the project between the two projects as being one of the main causes for the difference in outcome. The team involved in Shield only, and quite accidentally, started processing segment information late in the implementation phase. The Anti-resist team, in contrast, proactively processed this information in both the initiation and implementation phases of the project. When segment information was also processed at the outset of the project Shield team members probably might have steered by a different compass and deliberate new product decision-making would, most likely, be different. Here our findings are in line with those of Veldhuizen and colleagues (2006) who found that conscious use of segment information in the early stages of an NPD project contributes to the use of market information in the later stages and relates to project success.

The differences in market information processing between the two projects can hardly be explained by focusing on team factors that have been the main focus of earlier studies (see e.g. De Luca and Atuahene-Gima, 2007, Griffin and Hauser, 1996, Kahn, 2001, Ottum and Moore, 1997, Veldhuizen et al., 2006). With respect to cross-functional integration, team members in both projects collaborated and interacted in basically the same way using their internal organizational network during initiation and having recurrent team meetings during implementation of the project. Additionally, in both teams working on the project had quite similar priority, specifically during initiation and the early phases of implementation. Additionally, the use of market research tools to uncover latent customer needs (see e.g. O'Connor, 1998) did not appear to differ significantly among the project teams either and therefore does not explain market information processing differences. However, for mapping future market segment trends the teams differed in their use of market research tools in the course of the project. The Anti-resist team purposefully used specific tools in both stages, while the Shield team did not use market research tools during initiation and only started using tools to generate segment information very late in the implementation phase. This makes clear that it is not only about the difference in market research tools, but also about their actual use in the different NPD phases

A further search for differences in team practices that may have caused the different MIP patterns to occur resulted in identifying a clear difference in cross-boundary strategy related to MIP behavior between the two projects. While the Shield team reached out to the wider organizational environment by informing senior management on their MIP activities, the Anti-resist team did so by interacted with senior management and using an established

organizational NPD protocol. We found that solely informing senior management was clearly the wrong strategy to establish reflection on team MIP behavior outside team boundaries, and validate the team's way of working. This strategy could not overcome that the Shield team developed strong cohesion among team members resulting in limited questioning, analyzing, and evaluating ways of working. This is somewhat related to the notion of groupthink (Janis, 1982) which is a type of thought within a deeply cohesive in-group limiting critical testing and evaluating of ideas.

Who is to blame for the limited 'outside' validation of MIP behavior by the Shield team? Some might argue that 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 control, which often adopts a senior management viewpoint. 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 control might be beneficial. It can ensure that information and insights are not overlooked, processed at the right time, and assumptions of the NPD team are validated by organizational members not directly involved (Brown and Eisenhardt, 1995). Specifically, interactive control, conceptualized as two way interactions between senior management and project members on project strategies, goals, procedures, and results along the new product trajectory, seems to have a positive effect on innovation performance (Bonner et al., 2002). In contrast to predetermined control standards, that are assumed to remain constant over the course of a control period, interactive control seems to be better equipped for coping with market information processing in really new NPD, for which outcomes are often hard to predict. In a similar vein, Lewis et al. (2002) found that participative control, which resembles interactive control, specifically benefited the effectiveness of innovation projects that have to cope with high market uncertainty.

On the other hand, however, one can also argue that NPD teams can also make a difference and that employees on a lower hierarchical level have a certain 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 reflection. This seems specifically the case with respect to really new product innovation. In this type of innovation 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 and Sayles, 1986). Thus, lower positioned technological and marketing gatekeepers have to sell their ideas to senior management, particularly during the early phases of product development, prior to project formalization (Reid and de Brentani, 2004). Yet, project members also have to proactively interact with senior management in the later phases of an innovation project. It was found, for instance, that new product teams that heavily relied on extensive external ties inside the company, both for political reasons and task coordination, greatly improved the dispersal of innovation throughout the organization and enhanced changes of success (Ancona and Caldwell, 1992). Promoting a project inside the company and improving its visibility may improve its importance.

MANAGEMENT IMPLICATIONS

In this study we have illustrated possible differences between MIP in product innovation projects with different success levels. By studying the teams and the wider organization in which both MIP patterns took place we also focused on why we found these differences.

If organizations want to improve their MIP in really new product innovation a logical first step would be recognizing the importance of different types of market information and

develop a typology of market knowledge resources on which existing products are built. A pragmatic way to identify market knowledge 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?

Our research can also assist managers in analyzing and improving the practices of really new NPD teams regarding MIP. From the literature review we derived several important within team practices effecting MIP such cross-functional integration, project priority setting, and using specific market research tools. If different organizational functions find it difficult working together several mechanisms can be applied for improvement. Examples are co-location schemes, integrating roles, and team reward criteria and incentive systems (Griffin and Hauser, 1996, Inkpen and Tsang, 2005). Additionally, teams can decrease misinterpretations between functions by using boundary objects, such as prototype products, in team discussions. Boundary objects are key elements in cross-functional information representations and can cross cognitive boundaries between different functions (Carlile, 2002). Organizations can manipulate project priority setting by documenting the number of projects within the organization and the workload per employee, and developing related policies. The use of specific market research tools can be refined by providing formal and informal training experiences, such as market research training programs, reflection sessions and coaching (Ruekert, 1992).

Next to within team practices our research highlighted the importance of crossing team boundaries and reaching out to the wider organizational context to reflect 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 implementing a really new NPD protocol and encouraging teams to use it. Additionally management can implement control policies to make sure teams reflect their MIP behavior with outsiders. Though implementing these policies should happen with care. If they become too rigorous they will not benefit overall MIP in really new NPD and can even harm this behavior (Sethi and Iqbal, 2008).

CONCLUSION

Our study highlights that even if really new NPD project members process a certain amount of market information still problems may arise when commercializing new products. Project members can process too little of a certain type of market information or not process a particular type of market information at all. In a single innovation project, project members can therefore be customer oriented but, at the same time, losing sight of the overall market. By looking at a variety of different market information types, tracking market information processing over product innovation trajectories, and discussing organizational practices that can influence market information processing, we have enhanced our understanding on market oriented product innovation. We have painted a nuanced, longitudinal picture of how and why market information happened in one project, and how and why this same processing was limited in another project in the same firm. Although marketing researchers have long highlighted the benefits of decentralization for information processing (Jaworski and Kohli, 1993, Kirca et al., 2005), 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 to be too much inward focused, and have to ‘externally’ validate their MIP practices, for instance, by using formal protocols available within the organization or proactively start a dialogue with

senior management. This 'outside' reflection may increase the team's market orientation and therefore its chance for success.

Having highlighted the study's contribution, we now discuss several limitations that provide meaningful opportunities for further research. We analyzed data from two innovation projects in one firm. While a similar overall organizational context supported focusing on differences in team level factors, our findings might be rather idiosyncratic and only permit a certain level of analytical generalizability (Yin, 1994). Insights and generalizations drawn from this study may be rooted in findings from a unique organization. Further research may also want to test the theoretical insights that were obtained by our study. Also, because we mostly relied on scheduled in-depth interviews with ChemCo employees for collecting data, we gained limited insight into different stages of market information processing, specifically in the early phases of the projects. It might be, for instance, that in *Shield* some segment knowledge was generated and disseminated across the innovation team but not used in new product decision-making for some reason. Detailed participant-observation studies may open up market information processing and assess why some pieces of market information are used and other pieces are rejected.

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