The marketing function in exploratory product innovation: contrasting different project types

Abstract

This paper focuses on the marketing function in product innovation projects in established b-t-b firms. The marketing function in an innovation project is a term to denote both the project members that connect the project to customers or, more broadly, the market, and their activities in innovation projects. Drawing on data from four successful product innovation cases in the chemical industry, and distinguishing between a low and high level of exploration, the paper identifies similarities and differences in the marketing function. We find cross-functional integration and close customer collaboration being similar in all four projects, but we find differences in several market information generation practices, and differences in the overall organizational position of the marketers (i.e. those performing marketing tasks) between low exploration projects on one hand and high exploration projects on the other hand. The paper contributes to an emerging literature that addresses the marketing function in the context of exploratory product innovation.

Keywords: Marketing function, exploratory product innovation, market information, multiple cases.

INTRODUCTION

In business markets, product innovation is one of the business processes that benefit from a well-performing marketing function (Day, 1994, Homburg et al., 1999, Rust and Moorman, 1999). A marketing function in innovation projects is a term to denote both the project members that connect an innovation project to the market (i.e. the marketers), as well as the marketing activities that these project members execute in the context of the innovation project. A well performing marketing function increases the market orientation of developing new products (Rust and Moorman, 1999, Verhoef and Leeflang, 2009). A market orientation, in turn, enhances product innovation performance (Kirca et al., 2005, Poolton and Barclay, 1998).

Recently, empirical research has put more emphasis on levels of novelty in product innovation. Literature typically distinguishes between two levels of novelty[1]. Product innovation with a low level of novelty is referred to as 'exploitative' (Tushman and Smith, 2002) or 'incremental' (Atuahene-Gima, 1995). Projects in this category focus on the improvement of existing products for existing markets, using current firm technologies, market positions, and channels (Kyriakopoulos and Moorman, 2004). Product development with a higher level of novelty is referred to as 'exploratory' (Tushman and Smith, 2002), 'discontinuous' (Anderson and Tushman, 1990), or 'radical' (Atuahene-Gima, 1995). Firms use this type of projects to move beyond current product/market linkages and focus on new organizational knowledge. It is argued that both types of innovation projects need different organizational contexts (Leifer et al., 2000, Tushman et al., 2010). In the marketing domain, investigations into these differences have focused on aspects such as market intelligence generation practices (see e.g. Deszca et al., 1999, O'Connor, 1998), and the overall organizational position of the innovation project's marketers (see e.g. Christensen, 1997, Srivastava et al., 1999).

In this paper we argue, however, that a dichotomous classification of different levels of novelty in product innovation for identifying the characteristics of suitable marketing functions is too simple and can even be misleading. Specifically in the case of exploratory, or non-incremental innovation, an emerging collection of scholarly work has illustrated that a large number of innovation projects lie in-between exploitative and pure exploratory innovation (Barczak et al., 2009, Garcia and Calantone, 2002), and additional levels of novelty can be identified (Kyriakopoulos and Moorman, 2004). Yet, the business marketing literature has rarely linked this insight to characteristics of a project's marketing function. In this research we address this topic and enrich the literature by answering the question whether and how the marketing function differs across exploratory innovation projects with different levels of novelty in the marketing domain.

THEORETICAL BACKGROUND

In marketing, investigations into the characteristics of a well-performing marketing function in product innovation projects have, at least, focused on two complementary aspects: the generation of market intelligence, and the position of the project's marketers in the overall organizational design.

Generating market intelligence

One of the most important activities of marketers in product innovation is generating market intelligence from the firm environment so that it can be used in the product development trajectory (Day, 1994, Srivastava et al., 1999, Workman, 1998). In comparison with exploitative

[1] Here, novelty is described from the perspective of the firm

product innovation, exploratory product innovation needs different market information, which requires different types of market research methods (Deszca et al., 1999, Janssen and Dankbaar, 2008, Leonard, 1995, O'Connor, 1998).

In an exploitative product innovation project, marketers have to update a firm's current understanding of the market, most notably by analyzing the immediate threats by competitors (Atuahene-Gima, 2005, Noble et al., 2002). Additionally, it is recommended that information is collected about developments with regard to familiar customer needs (Cooper and Kleinschmidt, 1986, Cooper and Kleinschmidt, 1994). Because reference products already exist in the market, customers can easily recognize their own needs and express suggestions for improvements. These suggestions can be collected with traditional market research techniques such as focus groups and surveys (Leonard, 1995, Slater and Narver, 1998).

As compared to exploitative product innovation, exploratory product innovation requires different market research practices. It has been argued that such projects look into market segments currently not served by the firm and made up of totally new potential customers (Hamel and Prahalad, 1994, Leonard, 1995, Slater and Narver, 1998). In these cases, suitable methods for generating market intelligence include extrapolating trends, science and technology mapping, and scenario analyses (Leonard, 1995, Schoemaker, 1995, Wheelwright and Clark, 1992). Also methods such as 'backcasting' and 'visioning' that start from an envisioned end-state and then move back to identify the means to get there seem appropriate (Deszca et al., 1999, Hamel and Prahalad, 1994, O'Conner and Veryzer, 2001). Furthermore, information must be generated on future customer needs. Future needs are often latent because customers have limited capabilities to see through the eyes of the technologist and do not know what solutions, functions, and enhanced futures a technology might offer (Leonard, 1995). Uncovering these needs requires market research methods that allow for deeper experiential interaction with customers such as the lead user approach (von Hippel, 1986), emphatic design (Leonard, 1995), customer visits (Slater and Mohr, 2006), and customer immersion sessions (Deszca et al., 1999). Finally, testing prototypes along the way to generate market intelligence seems rather common in exploratory product innovation (Lynn et al., 1996, Veryzer, 1998).

Position in the overall organizational design

Next to market intelligence generation, another important aspect of the project's marketing function in product innovation is the position of the project's marketers in the overall organizational design. Recent studies suggest that marketers should not only contribute to promoting and selling existing products, but that they should also be involved in establishing exploratory innovations (Atuahene-Gima et al., 2005, Kyriakopoulos and Moorman, 2004, Srivastava et al., 1999). However, specifying marketers sub-tasks has given rise to differentiation and integration challenges (Olson et al., 2005). Specifically when different marketing tasks have different time-frames and routines, and therefore require different sets of incentives, competences and culture, it can be difficult to combine them (Christensen, 1997, Levinthal and March, 1993). Combining these tasks is particularly challenging when different types of product innovation are pursued simultaneously. Marketing tasks pertaining to exploitative product innovation, referred to as 'exploitation' activities (cf. March, 1991), include the generation and use of information on market segments and customer needs already familiar to the organization. Marketing tasks that fit exploratory product innovation, referred to as 'exploration' activities, relate to the generation and use of information about new market segments and about unknown customer needs (Atuahene-Gima et al., 2005). Combining different activities, and the associated

different logics, can be challenging (Kaupilla et al., 2010). Past success with existing knowledge and skills and the increased efficiency of further exploitation in similar domains can result in exploitation driving out exploration (Levinthal and March, 1993). This may enhance short short-term performance but eventually can result in a competence trap since marketers, and firms, may become incapable of renewal. Christensen and Bower (Christensen and Bower, 1996), for instance, have shown how leading firms in the disk drive industry lost their position when new technology came about because marketers placed too much emphasis on customer's expressed needs. Some companies that were new to the industry took risks and invested resources in new products that seemed to have little market potential but would later dominate the market. Losing companies relied on well-known expressed customers needs and listened too carefully to their customers, who were not aware of new technology developments and therefore did not express a need for them.

To better cope with this challenge, organizational design approaches have been put forward that support a combination of contrasting marketing tasks for innovation purposes in a single organization, referred to as plural or ambidextrous marketing organization (cf. Christensen, 1997, Tushman and O'Reilly, 1996, Tushman et al., 2010). Ambidextrous organizational designs have intra-organizational design heterogeneity that fits the contrasting requirements of exploitation and exploration. Ambidextrous marketing organizations couple high structural differentiation with senior management integration. Exploitation is done by marketers that are highly integrated in the mainstream organization. These employees are responsible for activities such as selling existing products, answering customer questions, and supporting other organizational departments on incremental product innovation. Exploration such as taking part in radical product innovation projects, in contrast, is the responsibility of marketers that tend to be structurally differentiated from the mainstream organization. To buffer this more fragile exploratory marketing function from inertial forces associated with its more dominant exploitative counterpart they are only loosely coupled with the mainstream organization (Raisch et al., 2009, Weick, 1976). Exploratory marketers operate in organizational subunits that are relatively smaller, more decentralized and operate more flexible processes (Tushman et al., 2010).

The need for a refined perspective

From research on generating market intelligence in product innovation, and research on the position of the project's marketers in the overall organizational design, general guidelines can be derived for organizing the marketing function in product innovation with different levels of novelty. Most of this literature relies on a dichotomous classification for identifying levels of novelty in innovation (e.g. Atuahene-Gima, 1995, O'Connor, 1998, Tushman et al., 2010, Veryzer, 1998). However, an emerging collection of scholarly work has illustrated that many innovation projects lie in-between exploitative innovation and pure exploratory innovation (e.g. Barczak et al., 2009, Garcia and Calantone, 2002, Kyriakopoulos and Moorman, 2004, McGrath, 2001). These studies report that in most innovation projects knowledge resources and information that already reside in the firm are combined with knowledge and information that is newly generated (Li et al., 2010). In these cases, existing knowledge provides the capacity to absorb new product ideas (Cohen and Levinthal, 1990), and exploration and exploitation are combined in a single project.

Regarding the marketing domain of innovation, not all exploratory projects include both new market segments and new customer applications. Some projects only target new customer

applications in defined market segments (Abernathy and Clark, 1985). For instance, Barczak et al. (2009) find that 'additions to existing product lines', which fall in-between exploitative and pure exploratory innovations, comprise a large part of firms' innovation portfolios. Also McGrath (2001) shows that firms might process information on new customer needs while still focusing on a previously defined market segment.

Although studies in product innovation increasingly acknowledge that new product portfolios often contain projects with different levels of novelty in market information, this insight is rarely linked to the issue of identifying suitable characteristics of the marketing function in product innovation. In the empirical part of this research we address this topic using four case studies on the nature of the marketing function in innovation projects with different levels of novelty in the marketing domain. Although we find some similarities between projects with different levels of novelty, we also find several important differences.

RESEARCH SETTING AND METHODS

Research strategy

This study uses a comparative case-study design for investigating the characteristics of the marketing function in exploratory innovation projects. Comparative case studies allow for the examination of multifaceted events, extensive interaction with research subjects, and taking different contexts into account (Langley, 1999, Yin, 1994). Through collecting rich qualitative data we are able to identify relevant aspects of the organization of the marketing function in innovation projects that are not fully accounted for by existing theories.

Research context

Our research focused on the chemical industry, a capital-intensive process industry that creates and transforms chemical substances to provide the market with functionally advantageous, non-assembled products (Cesaroni et al., 2004, Smits, 2010). We restricted the chemical industry to the C20 NACE code, which includes manufacturers of chemicals and chemical products such as fibers but excludes manufacturers of pharmaceutical products. While the choice of a single industry may limit the generalizability of results, it also reduces problems that arise when sampling from different industries. Different industries increase external sources of variance which have to be controlled for when examining firm level phenomena (Bass et al., 1978). Specifically innovation processes differ across industries (Pavitt, 1984). The need for controlling extraneous sources of variance can distract from identifying a robust set of firm level-variables, specifically when samples are small.

Selecting firms

Four product innovation projects in four different chemical firms have been examined. As a first step in case selection, chemical firms were selected by using membership lists of trade organizations in the Netherlands and the European Industrial Research Management Association. For reasons of accessibility, we aimed for selecting companies that have a significant presence in the Netherlands, Belgium, or Germany. Finally the companies should have a size of over €100 million in sales revenue, which indicated that they were established organizations that had to facilitate exploration in the context of ongoing exploitation. Because prior research has shown that most marketing and product innovation activities take place at the level of the business unit

(Piercy, 1985, Workman et al., 1998), the business unit instead of the corporate level was selected as organizational context. The sizes of these business units ranged from €250 to €700 million in annual sales revenue, with an average size of €410 million. Two business units manufacture engineering plastics, one produces a high performance fiber, while the last business unit is involved in developing and selling specialty chemicals.

Selecting cases

As a second step in case selection we selected one product innovation project per business unit. Senior management had judged these projects as being more than incremental innovations. Also, the results of these projects had to be just before market introduction or had been introduced into the market less than two years ago. The rationale for the latter requirement is that long finished projects would reduce the chances of contacting respondents who had been involved in the project, and those that could be contacted might have problems remembering the details of the projects. Market introduction can be considered as an intermediate measure of project success (Seidel, 2007). An overview of the four cases is given in table 1.

Table 1: Overview cases studied

	Diffuse	**Anti-resist**	**Tough**	**Additive**
Objective[1]	Applying a familiar plastic in an unfamiliar application	Applying a new type of fiber in an unfamiliar application	Applying a familiar plastic in unfamiliar applications	Applying familiar polymer technology in unfamiliar applications
Duration (approximately)	3 years	3 years	5 years	5 years
Project's marketers	- Business development manager - Product manager	- Business manager - Sales managers	- Application development managers - Business development managers	- Project leader - Business development managers
Interviews	4	11	12	4

[1] From the perspective of the firm

Levels of novelty in the marketing domain

To distinguish between different levels of novelty in the marketing domain of a product innovation project we rely on prior theoretical conceptualizations. An extensive literature has regarded product innovation as an act of information processing or the management of knowledge (Brown and Eisenhardt, 1995, Madhavan and Grover, 1998, Nonaka and Takeuchi, 1995). Also, scholars in the field of marketing and product development have identified multiple complementary market-related information types in new product decision making (Adams et al., 1998, Dougherty, 1990, Jaworski and Kohli, 1996, Veldhuizen et al., 2006). Synthesizing these

literatures results in the observation that often a distinction is made between *market segment information* and *customer need information*. Market segment information refers to information on market segment size, growth rate, and stakeholder behavior (other than customer behavior) that may influence customer preferences. Examples of stakeholder behavior are competitor moves and activities of distributors and governments. Market segment information reflects what Jaworski and Kohli (1996: 126) called "a sensitivity to the underlying forces that shape a market or an industry." It is called 'environmental information' by Veldhuizen et al. (2006), and 'business data' by Adams and colleagues (1998). Customer need information, in turn, refers to understanding customer needs and wants in relation to particular applications. This information is also referred to as 'customer information' (Veldhuizen et al., 2006) or 'product concept development information' (Adams et al., 1998).

Combining these two information types with the exploration/exploitation distinction in marketing tasks we find two levels of exploration, and therefore novelty, in the marketing domain among the four innovation projects under study. Tables 2 and 3 present an overview.

Table 2: Processing market segment information

Project	**Market segment information related to…** ***Type of market information processing***	**Example evidence**
Diffuse	Signage *Exploitation*	"At the start of the project, signage as used at airports and bus stops was already a defined market segment were we sold our existing products." (Product manager) "[Updated market information] pointed to ultra-slim displays being a trend in the market for signage." (Business developer)
Anti-resist	Tires *Exploitation*	"We started looking in the tire industry, because we already knew the tire industry and it was easy to look there." (Business manager) "[At the start of the project] we interviewed three of our customers, which cover about 65% of the market, and asked them what they saw as market trends." (Business manager)
Tough	Gears *Exploration*	"In [Tough] we tried to use existing product grades in a market segment that was new to our firm" (Marketing manager) "Initially, our team researched trends in applications, for example electronic power steering (EPS) was a trend that was developing and is going to grow further in the future."

		(Researcher)
Additive	Plastics *Exploration*	"Our company wanted to get more out of its existing product line. The new product types were closely related to our existing chemistry, but focused on a new market segment." (Business manager) "Our team managed to get knowledgeable about the sales volumes of several plastics." (Researcher)

Table 3: Processing customer need information

Project	**Customer need information related to…** ***Type of market information processing***	**Example evidence**
Diffuse	License plate system *Exploration*	"We were already selling products in this market, and the license plate system was a new application for us." (Business developer) "[Our customer] needed our product in a specific shape…so there were several interactions between us and the customer to come up with the right product." (Business developer)
Anti-resist	Rolling resistance in tires *Exploration*	"For our company this project is quite exciting because it is a new application in a familiar market segment." (Business manager) "Very early on our marketing people confronted customers with our prototypes to get initial market feedback on customer needs." (Researcher)
Tough	• Engine gears • Electronic power steering (EPS) gears • Interior gears *Exploration*	"One of the challenges was lack of application knowledge…we had to develop that by interactions with application builders." (Researcher) "After some development work we found out that in a lot of EPS applications, our material was not easily accepted because there was often too little difference with competing materials that were cheaper." (Business developer)
Additive	• Polymer chain extension in plastics	"We knew very well what types of resin we could make with this technology and were convinced that we had a broad synthesis stage to make a lot of potential plastic additives.

	• Flow modifying in plastics • Dispersing in plastics *Exploration*	However we did not know what potential customer needs were." (Researcher) "In the beginning we had low molecular weight additives, which are typically used as dispersants or flow modifiers. A little bit different but the idea is the same: getting lower polymer weight, lower viscosity, and better flow Then the team made a sample that increased viscosity, so the opposite approach. That was what customers really loved, they really could use that." (Business manager)

Two projects, Diffuse and Anti-resist showed a relatively *low* level of exploration. In these projects employees updated their understanding of a particular market segment (i.e. exploitation) and generated knowledge related to totally new customer needs (i.e. exploration). Hence, the projects' marketers combined exploration and exploitation. Notice that 'new' in this context is a relative tem, referring to a deviation from information, knowledge and experiences that are familiar to the firms in which the projects were carried out. For instance, in project Anti-resist, marketers focused on the tires segment. This segment had already been defined by the firm and existing products were already targeted towards this segment. However, regarding customer need information, marketers in Anti-resist focused on 'rolling resistance in tires', which was a totally new customer need for the company. Also low exploration projects still have a higher level of novelty than projects that are purely based on exploitation. In contrast to projects Diffuse and Anti-resist, projects Tough and Additive showed a *high* level of exploration. In these two projects exploration took place regarding both market segment and customer need information. Hence, the marketers in these projects solely focused on exploration.

Data collection

Data were collected by interviewing actors involved in the product innovation projects, and organizational members who were related to this group. Informants included project marketers, other functional specialists, and senior managers. An often-cited problem in researching the marketing function is its lack of organizational homogeneity in structure, responsibilities and terminology (Krohmer et al., 2002, Möller and Rajala, 1999). Following Workman (1998), this research regards the marketing function in exploratory product innovation as the functional specialists that connect 'the market' with other relevant functional groups in implementing innovations such as research and manufacturing. These specialists often had functional titles such as 'account manager', 'business development manager', or 'application development manager'. The marketing function in product innovation includes the activities that marketers execute in the context of the innovation project.

The interviews contained general and more specific questions. In most cases, a single question ("Could you please describe how the project developed over time?") was enough to trigger the main innovation 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 were no records 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. Most interviews were carried out on-site, but three interviews were by telephone because respondents were located more than 500 kilometers away. All interviews were held by the first author personally and were followed up with clarifying e-mails and telephone calls when needed. The first author was in contact with respondents and had several site visits over a period of more than a year, which allowed for tracking some developments over 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 data analysis we relied on techniques suggested by Eisenhardt (1989) and Miles and Huberman (1994). Data analysis started with examining data from single cases. We divided information in fragments, labeled with a few words to indicate the meaning of the fragment. For each case, 'notes of insight' were generated that were sent back for review to several respondents. In a next step we focused on similarities and differences between cases. Significant discrepancies and agreements were noted and further investigated. To sharpen the findings the cases were systematically compared with existing literature. In one case an interactive workshop was held in cooperation with the host organization. Iterating back and forth between data and theory resulted in a robust understanding of the characteristics of the marketing function in the context of exploratory product innovation.

In presenting our findings we focus on similarities and differences in characteristics of the marketing function between the two pairs of cases. Consistent with iteratively integrating data from field research and scholarly literature, the following sections will discuss data and theory jointly (Orton, 1997).

FINDINGS

Similarities between low exploration and high exploration projects

A well performing marketing function senses the market and links the firm to (potential) customers (Day, 1994, Rust and Moorman, 1999). In product innovation, the marketing function is responsible for collecting information about customer needs, competitor behavior, and market trends, and their translation into customer solutions. Moreover, it demonstrates the relevance of customers and their needs to other functions in the organization (Li and Calantone, 1998, Srivastava et al., 1999). In this role, innovation project marketers have to generate market understanding on which the development team as a whole has to act. For *generating market information* in exploratory innovation projects, literature has suggested several market research techniques (see e.g. Slater and Mohr, 2006, Veryzer, 1998, von Hippel, 1986). In this context, our data point to close collaboration with one or several customers in the later phases of the innovation process, and show that this is similar in both types of exploratory innovation projects. Collaborating with customers focused on testing out new-to-the world products outside the company and refining market information so that product prototypes, eventually, could be introduced into the market. An example of close customer collaboration, allowing for experimental interaction in a later phase of development, comes from low-exploration project Diffuse. Here customer interactions were used to refine market information and, based on that, improve prototype products so they could be tailored to a newly developed license plate system. As a business developer involved in the project put it:

> "The customer needed our product in a specific shape, so we produced sheets and laser-cut them in specific shapes…so there were several design iterations before we came up with the right product. Because we had such a close collaboration with them, we learned that developing the light transparent license plate system was more difficult than creating the lighting unit which contained our material." - Business developer

Similar customer collaboration was found in both high exploration projects. Project Tough may serve as an example. In this project close customer collaboration was used to learn about potential customers' material needs with regard to gear applications, and to provide resin grades that could meet these needs. Customer collaboration continued until the customer application was realized. As explained by a project member:

> "If you are active in a new segment, you have a lot of new customer contacts. If you only talk about gears, we learned that you not always get in touch with the right person at the buyer's side…you have to talk about the whole actuator system….In one application project we worked closely with [a tier 1 automotive supplier] and an [automotive OEM] for testing prototypes. With another customer we developed an alternative processing step. Specifically in the later phases of these sub-projects we closely worked together with customers."- Business developer Tough

In project Additive close customer collaboration in the later phases of the project was so intense that it led to a joint patent application by the supplier and the customer:

> "In the later phases of the project we managed to get very close with potential customers. We had close relationships, partnerships, or joint developments. These joint efforts even led to applying for an application patent together with this potential customer, which was granted." - Senior researcher Additive

Another important characteristic of the marketing function in product innovation is the *integration* of marketers *with other internal functions,* such as researchers (Hirunyawipada et al., 2010, Rust and Moorman, 1999, Verhoef and Leeflang, 2009). This integration is widely regarded as beneficial for product innovation performance. In particular, it encourages the dissemination and usage of market information (De Luca and Atuahene-Gima, 2007, Griffin and Hauser, 1996, Li and Calantone, 1998). Different mechanisms can be used to facilitate integration with other functional departments. Generally, organization theory positions these mechanisms along a continuum (Burns and Stalker, 1961, Galbraith, 1973, Mintzberg, 1979). One end of this continuum is characterized by mechanistic approaches, such as integration by hierarchy of authority in which senior managers are the principal cross-functional integrators. On the other end one can find more participative or organic approaches, such as autonomous cross-functional teams. In the projects under study we found that in both low exploration and high exploration projects marketers 'were integrated' by utilizing two relatively organic approaches: using the internal organizational network, and having recurrent cross-functional team meetings.

In the early phases of the projects specialists from different functions acting on a relatively low hierarchical level came together to discuss ideas and concepts which resulted in the integration of marketers with other functions such as research. Because these activities happened

prior to an official project status and with limited senior management involvement, this integration was dependent upon the internal organizational network ties among functional specialists. The marketers had to search for, or were approached by, other specialists that possessed complementary knowledge in the context of product innovation. As explained by an employee that worked on Anti-resist, a low exploration project:

> "At the start [of Anti-resist] it was not a separate project and there was no management involved. I had talks with my contacts at our research institute on this rolling resistance issue and they looked into it. At that time it was rather informal: no separate budget and no project formulated. I just relied on my network within the organization." - Business manager Anti-resist.

We observed the same behavior of using the internal organizational network in Additive, a high exploration project:

> "[Additive] was initiated because the marketing managers from the value proposition team tried to come up with new ideas to apply our technology by talking to people with different functional backgrounds across the company." - Senior researcher Additive

Later in the product innovation trajectory, at the start of project implementation, the product concepts under study became officially legitimized by the firms in which they were carried out and received an official project status. Accordingly, the integration of the marketers shifted from a rather informal to a more formal context. An important means to integrate marketers in these later phases of the project were recurrent cross-functional team meetings in which the marketers had face-to-face contact with a small number of other functional specialists. We observed this mechanism in both low exploration and high exploration projects. The response from a marketer in low exploration project Diffuse illustrates the use of recurrent cross-functional team meetings:

> "In the later phases of the project we, marketers, had recurrent meetings with the lab that created the raw sheet, and the people here in our customer lab who had the laser cutting equipment and who fabricated the different designs." - Business developer Diffuse

The response from an employee involved in Tough illustrates the use of this mechanism in a high exploration project:

> "We had three or four cross-functional meetings per year with the global team. Besides that we had recurrent local cross-functional meetings related to specific applications. Corporate research and [Tough's] home organization became very well connected." - Researcher Tough

With respect to the *overall organizational position* of innovation projects' marketers, which is the third characteristic of the marketing function in innovation projects, we did not find any similarities between low and high exploration projects.

Differences between low exploration and high exploration projects

Besides similarities between low and high exploration projects, we also found several important differences.

The first difference relates to *market information generation* in the early phases of the innovation project. In low exploration projects we found that marketers used market segment scanning as a means to collect information from the market. Market segment scanning refers to monitoring and analyzing an earlier defined market segment. This scanning enhances the recognition of unmet needs that are opportunities for exploratory product innovation. Segment scanning can help to find new application domains within the existing market segment. Thus, market segment scanning starts with a given market structure, for which information on offers, buyers, and sellers is well developed within the organization. The organization will only focus on new opportunities within the boundaries of these defined segments. Project members active in market segment scanning used both primary and secondary sources of market information, including talking to customers, visiting trade-fairs and industry conferences, and desk research. Employees involved in low exploration project Anti-resist further explicate these market scanning activities:

> "[Anti-resist] is a new product and a new application for us. This is quite exciting because we do not disturb our current application [tire reinforcement ed.] in this market segment. The market segment is the same, but it is a new application in the tires market. We are not replacing anything, but add a new application. So we already had relations and were familiar with the market as a whole." - Business manager Anti-resist

> "We interviewed two or three customers in the tires market and asked them about their future needs. Combining these interviews with desk research pointed to rolling resistance as an important generic customer concern." - Business manager Anti-resist.

Instead of market segment scanning, employees in high exploration projects were active in market segment construction. They started by focusing on one or several applications that fell outside market segments that were familiar to the firm. The aim was to bring together uses and users of the concept or prototype offered. Subsequently, drawing on the experience gained with early potential users, the project team constructed a new market segment for the firm by aggregating potential viable applications and adding more market information such as competitor information. Market segment construction requires a deliberate search outside current market segments. It was initiated when the organizations under study experienced the violation of their market segment frame of reference, which forced them to admit the limits of prevailing understanding and practices. In project Tough, for instance, the awareness that their product grades were being used in several gears applications triggered the reconstruction of their market frame of reference. As Tough's application developer put it:

> "The organization learned that some Asian manufacturers were making gears out of some of their product grades. Gears were something no one in the organizations was involved in and there was no existing knowledge base. After this learning, a project was initiated focusing on gear applications. If you look at gears, they look quite simple, but specifically the first two years we had to investigate what they could do and what were specifics when you make them out of plastics. We only had our product grades which carry differentiated properties of heat resistance and durability and a vague idea about gears as starting point.

> We had to get a feeling for this market, applications, and what was important. As the project continued we were able to cluster applications, and based on the knowledge of what we could and couldn't do with our products, this evolved into a perspective of what we now call the 'gears market'. It was not that we started out with this nicely carved market segment. From my perspective, it has been an exploration." - Application developer Tough

A second difference that we found when contrasting *market information generation* in the two types of projects was related to hiring additional employees from outside the organization. In the two low exploration projects the project's marketing function comprised marketers that already were working in the firm before the project had started. In Diffuse the sub-team of marketers, a business developer and a product manager, remained the same throughout the product development process:

> "Together with [product manager] I was responsible for all the marketing activities such as generating market information, fine-tuning the product with customers, and delivery, from the start of the project. This set-up was not changed in the course of the project implementation." - Business developer Diffuse

In project Anti-resist we found changes in the marketers sub-team over time. At project start up, a business manager was responsible for linking the project to the market and later on, due to a change in responsibilities, this business manager was assisted by several sales managers. Although a change took place, the sales managers who were added to the overall project team all had a prior history in the company. Also in this project, no new people were hired:

> "At the start of this project I was a sales manager…..[At the start of the project], the marketing and the commercial part of [Anti-Resist] was done by me. In 2005 the tire department was founded and they gave me full responsibility of managing this department. At that time I was still involved in the marketing of the project, but several of our sales managers were added to the team to help me out." - Business manager Anti-resist

In contrast to the low exploration projects, new employees from outside the company were hired to complement the marketing function of the two high exploration projects. These new employees had a background in the market segment that the organization wanted to target by the innovation project. Hiring these 'segment specialists' improved the organization's absorptive capacity (Cohen and Levinthal, 1990), thereby increasing the efficiency of market information generation and interpretation. As the business developer involved in Tough put it:

> "I was hired in 2005 because [organization] was looking for someone with experience in gears. I have 20 years of experience in the gears world. At the time I was hired, the project was already running for some time. The team already had formulated potential applications. However, from my experience, I knew beforehand that some would probably be harder to realize than others." - Business developer Tough

Similar findings come from Additive:

"The project started around 1999 but I was hired in 2002 because they had limited marketing competences in the plastics field. Before 2002 I had spent almost 20 years developing plastics. I was assigned to set up business development activities in the plastics segment in Europe." - Business developer Additive

"The project leader that was hired to manage [Additive] from 2001 onwards really made a difference. He had a lot of experience in the plastics industry. He knew how to open doors. In the months after he was hired he made contact with all the major plastics companies in North America, Europe, and Korea." - Senior Researcher Additive

We also found a difference between low and high exploration projects regarding the overall *organizational position* of the project's marketers. In the two low exploration projects the marketers were highly integrated in the mainstream organization (cf. Raisch et al., 2009). These marketers were responsible for both the exploration and exploitation part of the product innovation project under study and they had additional exploitative marketing tasks such as selling existing products and developing incremental product updates. As employees involved in low exploration projects put it:

"I was involved in five other projects next to [Diffuse]. Most of them focused on small improvements of existing products." - Business developer Diffuse

"At the start of this project I was a sales manager selling yarn for tire reinforcement worldwide. Besides that, I initiated and became involved in [Anti-resist]." - Business manager Anti-Resist

For the high exploration projects, in contract, we found the projects' marketers being less integrated in the mainstream organization. In these projects the marketers were solely responsible for marketing tasks in the project under study. They were exclusively focused on exploration and relieved from routine tasks such as selling existing products. As explained by employees working on the high exploration projects:

"I am business development manager and I am solely focused on the gears segment. In fact we have a world-wide team of marketing and technical people that are totally dedicated to [Tough]." - Business developer Tough

"We had a team with business developers and researchers of about 10 people that was totally dedicated to [Additive]. They were released from other activities so they could concentrate on the project. I think this made a huge difference." - Senior researcher Additive

Finally, with respect to cross-functional integration, which is a third characteristic of the marketing function in innovation projects we did not find differences between low and high exploration projects.

DISCUSSION

In our analysis we determined similarities and differences in the characteristics of the marketing function in the context of successful innovation projects with different levels of novelty. In doing so, we used four case studies from different firms in the chemical industry. Using two levels of novelty, and focusing on two important marketing practices (i.e. the generation of market information and cross functional integration) and the overall organizational position of the project's marketers, we found several similarities and differences which we summarize in table 4.

Table 4: Characteristics of the marketing function in exploratory innovation

<table>
<tr><th>Aspect</th><th>Low exploration projects</th><th>High exploration projects</th></tr>
<tr><td rowspan="2">Market information generation</td><td>1a. Market segment scanning (early phases)
2a. Marketers only include employees with a history in the organization</td><td>1b. Market segment construction (early phases)
2b. Hiring segment experts to complement the marketers and speed up information generation</td></tr>
<tr><td colspan="2">3. Close customer collaboration (later phases)</td></tr>
<tr><td>Cross-functional integration</td><td colspan="2">4. Using the internal organizational network (early phases)
5. Having recurrent cross-functional team meetings (later phases)</td></tr>
<tr><td>Overall organizational position of marketers</td><td>6a. Highly integrated in the mainstream organization</td><td>6b. Less integrated in the mainstream organization</td></tr>
</table>

Market information generation

With regard to market information generation for initiating exploratory product innovation the literature argues that the marketers should focus on the future and analyze market segments currently not served by the firm (Hamel and Prahalad, 1994, Leonard, 1995, Slater and Narver, 1998). Suitable research methods include extrapolating trends, science and technology mapping, scenario analyses, backcasting, and visioning (Leonard, 1995, Schoemaker, 1995, Wheelwright and Clark, 1992). Next to offering a perspective on new market segments, marketers should generate more focused insights on latent customer needs (Narver et al., 2004). Uncovering these needs requires research methods such as the lead user approach (von Hippel, 1986), emphatic design (Leonard, 1995), customer visits (Slater and Mohr, 2006), and customer immersion sessions (Deszca et al., 1999). Based on a detailed distinction between two levels of exploration, our work nuances these findings and extends the scholarly insights presented above.

For generating market information in the early phases of product innovation our cases show differences in activities associated with degree of exploration. In the projects with a low level of exploration, we observed market segment scanning (1a; here and below, reference is made to table 4). This activity refers to the project marketers' generating market information on events

and trends in a market segment previously defined by the firm, 'foreseeing' developments, and picking up latent customer needs. When scanning market segments, marketers try to decouple themselves from familiar customer needs and attempt to identify latent needs while still building on well-known segment insights, such as familiar modes of exchange, and buyer and seller identities. Marketers have to 'unlearn' (Hedberg, 1981) parts of their market knowledge to open themselves up for new market information. In comparison to low exploration projects, a different market information generation practice was found in the early phases of high exploration projects. We call this practice market segment construction (1b) which refers to constructing a new market segment to complement the existing set of market segments served by the firm (cf. Harrison and Kjellberg, 2010). In segment construction the starting point for market information generation is not a familiar, sharply defined market segment . Based on internally available product concepts or prototypes marketers first try to identify potential applications and users that completely fall outside market segments that are familiar to the firm. In a next phase, marketers iteratively try to aggregate potential viable applications and to generate additional market information until the new segment has been created and its characteristics determined.

In the context of market information generation we also found a difference in the composition of the group of marketers when comparing low with high exploration projects. In low exploration project we found that throughout the innovation project, this group consisted of employees that already had a history in the firm (2a). For the high exploration projects, though, we found that experts were hired in the field the firm hoped to enter by executing the project (2b). These experts complemented the group of marketers and sped up information generation . The practice of hiring new employees is hardly discussed in the literature on market oriented product innovation. In management research, however, hiring new employees for innovation purposes has been advocated (Ancona and Caldwell, 1998, Perretti and Negro, 2007). New employees may provide new cognitive resources and fresh social capital which enhance accessing, generating, and interpreting new information, thereby fostering organizational innovation. However, there are also potential downsides to hiring new employees (Jackson et al., 1993). Socialization processes can be costly and difficult because newcomers do not share the prevailing information, norms, and values. In the low exploration projects the practice of hiring segment specialists was absent, so we may conjecture that a trade-off point exists. In high exploration projects the benefits of hiring new employees are seen as more important than the detriments while in low exploration projects the perceived costs and difficulties of hiring new marketing employees are believed to exceed the benefits.

For generating market information in the later phases of the innovation projects we also found the project's marketers intensively collaborating with potential customers (3). This result confirms prior research. An important aspect of market research in the later phases of exploratory innovation projects is close collaboration with potential customers to test prototypes and refine market information (Leonard, 1995, Lynn et al., 1996, O'Connor, 1998). We did not find a difference between low and high exploration projects. A longitudinal perspective may help to explain why information generation practices are different in the early phases of the two types of projects and similar in the later phases. Cheng and Van de Ven (1996), for instance, found that when a team was engaged in exploratory innovation, it started with high levels of exploration. Subsequently, under the need to bring a product to the market, the team increasingly relied on exploitation. Exploration does not generate any returns without some efforts to fix and exploit the new information later in the process (McGrath, 2001). Consequently, most of the difference in market information generation practices between exploratory projects with different levels of

exploration is to be found in the early project phases. Later in the process, as an effect of increasing market information exploitation, both types of projects will be more similar, and both will benefit from the same market information generation practices.

Cross-functional integration

An additional focus of our analysis has been cross-functional integration. With regard to this aspect, our findings confirm prior research that found that organic integration mechanisms, such as applying cross-functional teams, are appropriate for exploratory innovation (Griffin, 1997, Olson et al., 1995, Swink, 2000). The rationale is that when a firm and its potential customer are unfamiliar to each other and customers have little experience with a new product concept, the functional tasks involved in product innovation are more challenging than in the case of modification of existing products. As the difficulty of product development increases, so does the interdependence of different functional specialists involved in the project, making organic integration approaches more effective than mechanistic ones. In contrast, exploitative product innovation, in which there is less cross-functional interdependence, benefits from mechanistic integration approaches because these increase efficiency without losing their effectiveness.

In our analysis, we found no differences in integration mechanisms in use between projects with different levels of exploration. This result might be a consequence of product innovation being a rather difficult and uncertain process in general. Only a small number of projects are so predictable that they benefit from economizing on integration expenses (Souder et al., 1998). Both low and high exploration projects presumably lie above the level of uncertainty for which it is beneficial to use mechanistic integration mechanisms.

Additionally we found, though, that the cross-functional integration mechanisms used in the early project phases differed from the ones used in the later phases. In the early phases integration was realized by the different functional specialists using their internal organizational network (4), while in the later phases integration took place by having recurrent cross functional team meetings (5). This difference makes sense when looking at integration through the eyes of social capital theory (Adler and Kwon, 2002). Because of differences in belief systems, perceptions, and competences, intra-organizational networks involving functional specialists from different departments are often made up out of weak ties (Griffin and Hauser, 1996, Workman, 1993). In the early phases of a project, these weak ties, generally, are beneficial because they can provide search benefits (Hansen, 1999), autonomy (Perry-Smith and Shalley, 2003), and a diverse set of information resources (Granovetter, 1973) at low costs of time and effort, making it possible to foster creative idea generation and concept development. In contrast, the later phases of product innovation benefit from small development groups with stronger ties, which recurrent cross functional team meetings can provide. Strong ties create trust and mutual understanding between functions, which are essential in carrying out high interdependent tasks such as bringing exploratory innovation projects to the market (Ancona and Caldwell, 1992, Hansen, 1999).

Overall organizational position of marketers

Finally, we focused on the overall organizational position of the project's marketers. Prior literature on structural ambidexterity has conceptualized (Tushman and O'Reilly, 1996) and illustrated (Raisch et al., 2009, Tushman et al., 2010) that exploratory marketers have to be buffered from inertial forces, stemming from their exploitative counterparts, by limited integration in the mainstream organization. And indeed, we found a lower degree of integration

in high exploration projects than in low exploration projects (6a, 6b). In low exploration projects, however, it seems that combining exploration and exploitation is possible by contextual ambidexterity (Gibson and Birkinshaw, 2004). In contrast to structural ambidexterity, the recently emerged perspective of contextual ambidexterity advocates that exploration and exploitation are both carried out in the mainstream organization. Leaders are expected to create a supporting context for both activities by balancing hard elements (discipline and setting ambitious objectives) with soft elements (support and trust). Raisch et al. (2009) conjecture that the choice for either integration or differentiation depends on the relative importance of exploration in organizational tasks. Our empirical findings confirm this conjecture.

CONCLUSION AND FURTHER RES EARCH DIRECTION

In this research we examined the marketing function in successful exploratory product innovation in detail. Using the 'level of exploration' as contingency variable, distinguishing between early and later phases in the innovation process, and focusing on several organizational aspects, we found similarities and differences between low and high exploration projects. These findings have important implications for theory and practice.

Marketing and product innovation research often takes a high level of analysis, and distinguishes between exploitative and exploratory product innovation when discussing differences in suitable management practices. By taking a lower level of analysis we add to the abovementioned literatures that with regard to organizational practices not all exploratory projects are equal, and that systematic differences can be found. Differences in market information generation practices and the overall organizational position of the marketers can be observed when multiple levels of exploration, or novelty, are taken into account. Additionally, ours is one of the few studies that bring recent insights on organizational ambidexterity into the business marketing domain.

Our research also has implications for industrial marketing managers. To assess strategic options, these managers need to understand the multiple and interrelated dimensions of the way marketing activities are arranged and have to be configured. Also they need to accept that there is no single configuration template of the marketing function that fits all product development projects. In this context our work can be used for benchmarking purposes (Day, 1994). Based on our findings, industrial marketing manager may focus on selecting strategic options that fit their current marketing function. Alternatively they may decide to adapt their marketing function and move closer to the benchmark characteristics that better fit new strategic directions.

Finally we present some limitations that provide meaningful opportunities for further research. Our work may be extended to other industries using a similar research design, which would improve transferability of findings to other settings. We collected most of our data after the project outcomes were known. Such retrospective perspective provides the advantage of knowing the 'big picture', how things developed, and what they brought about. However, there are also downsides. Prior knowledge of process outcomes may lead to cognitive bias and impression management from both respondents and researchers (Huber and Power, 1985, Poole et al., 2000). Although we took several measures to minimize the negative aspects of retrospective studies, additional studies which include real-time analyses may further reduce these. As proposed by Leonard-Barton (1990), these studies, for instance, could combine our retrospective results with real-time product innovation cases to better observe the change process as its unfolds. Finally, although our cases were essential for theory building they only permit a certain level of analytical generalizability (Yin, 1994). Further research may test the theoretical

insights that were obtained by our study. Testing relationships between organizational configurations of the project's marketing function, different types of exploratory product innovation, and new product performance by survey studies may result in statistical generalizations across various settings, thereby increasing external validity.

REFERENCES

ABERNATHY, W. J. & CLARK, K. B. (1985) Innovation: mapping the winds of creative destruction. *Research Policy,* 14**,** 3-22.

ADAMS, M. E., DAY, G. S. & DOUGHERTY, D. (1998) Enhancing new product development performance: an organizational learning perspective. *Journal of Product Innovation Management,* 15**,** 403-422.

ADLER, P. S. & KWON, S.-W. (2002) Social capital: prospects for a new concept. *Academy of Management Review,* 27**,** 17-40.

ANCONA, D. G. & CALDWELL, D. F. (1992) Bridging the boundary: external activity and performance in organizational teams. *Administrative Science Quarterly,* 37**,** 634-665.

ANCONA, D. G. & CALDWELL, D. F. (1998) Rethinking team composition from the outside in. IN GRUENFELD, D. (Ed.) *Research in managing groups and teams.* Stamford, CT, JAI Press.

ANDERSON, P. & TUSHMAN, M. L. (1990) Technological discontinuities and dominant designs: a cyclical model of technological change. *Administrative Science Quarterly* 35**,** 604-633.

ATUAHENE-GIMA, K. (1995) An exploratory analysis of the impact of market orientation on new product performance: a contingency approach. *Journal of Product Innovation Management,* 12**,** 275-345.

ATUAHENE-GIMA, K. (2005) Resolving the capability–rigidity paradox in new product innovation. *Journal of marketing,* 69**,** 61-83.

ATUAHENE-GIMA, K., SLATER, S. F. & OLSON, E. M. (2005) The contingent value of responsive and proactive market orientations for new product program performance. *Journal of Product Innovation Management,* 22**,** 464-482.

BARCZAK, G., GRIFFIN, A. & KAHN, K. B. (2009) Trends and drivers of success in NPD practices: results of the 2003 PDMA Best Practices study. *Journal of Product Innovation Management,* 26**,** 3-23.

BASS, F. M., CATTIN, P. & WITTINK, D. R. (1978) Firm effects and industry effects in the analysis of market structure and profitability. *Journal of Marketing Research,* 15**,** 3-10.

BROWN, S. L. & EISENHARDT, K. M. (1995) Product development: past research, present findings, and future-directions. *Academy of Management Review,* 20**,** 343-378.

BURNS, T. & STALKER, G. M. (1961) *The management of innovation,* London, UK, Tavistock.

CESARONI, F., GAMBARDELLA, A., GARCIA-FONTES, W. & MARIANI, M. (2004) The chemical sectoral system: firms, markets, institutions and the processes of knowledge creation and diffusion. IN MALERBA, F. (Ed.) *Sectoral systems of innovation.* Cambridge, Cambridge University Press.

CHENG, Y. T. & VAN DE VEN, A. H. (1996) Learning the innovation journey: order out of chaos? *Organization Science,* 7**,** 593-614.

CHRISTENSEN, C. M. (1997) *The innovator's dilemma: when new technologies cause great firms to fail,* Boston, MA, Harvard Business School Press.
CHRISTENSEN, C. M. & BOWER, J. L. (1996) Customer power, strategic investment, and the failure of leading firms. *Strategic Management Journal,* 17**,** 197-218.
COHEN, W. & LEVINTHAL, D. A. (1990) Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly,* 35**,** 227-251.
COOPER, R. G. & KLEINSCHMIDT, E. J. (1986) An investigation into the new product process: steps, deficiencies, and impact. *Journal of Product Innovation Management,* 3**,** 71-85.
COOPER, R. G. & KLEINSCHMIDT, E. J. (1994) Screening new products for potential winners. *IEEE Engineering Management Review,* 22**,** 24-30.
DAY, G. S. (1994) The capabilities of market driven organizations. *Journal of Marketing,* 58**,** 37-52.
DE LUCA, L. M. & ATUAHENE-GIMA, K. (2007) Market knowledge dimensions and cross-functional collaboration: examining the different routes to product innovation performance. *Journal of Marketing,* 71**,** 95-112.
DESZCA, G., MUNRO, H. & NOORI, H. (1999) Developing breakthrough products: challenges and options for market assessment *Journal of Operations Management,* 17**,** 613-630
DOUGHERTY, D. (1990) Understanding new markets for new products. *Strategic Management Journal,* 11**,** 59-78.
EISENHARDT, K. M. (1989) Building theories from case study research. *Academy of Management Review,* 14**,** 532-550.
GALBRAITH, J. K. (1973) *Designing complex organizations,* Reading, MA, Addison-Wesley.
GARCIA, R. & CALANTONE, R. (2002) A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management,* 19**,** 110-132.
GIBSON, C. B. & BIRKINSHAW, J. (2004) The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal,* 47**,** 209-226.
GLASER, B. & STRAUSS, A. (1967) *The discovery of the grounded theory: strategies of qualitative research,* London, UK, Weidenfeld and Nicholson.
GRANOVETTER, M. S. (1973) The strenght of weak ties. *American Journal of Sociology,* 78**,** 1360-1380.
GRIFFIN, A. (1997) The effect of project and process characteristics on product development cycle time. *Journal of Marketing Research,* 34**,** 24-35.
GRIFFIN, A. & HAUSER, J. R. (1996) Integrating R&D and marketing: a review and analysis of the literature. *Journal of Product Innovation Management,* 13**,** 191-215.
HAMEL, G. & PRAHALAD, C. K. (1994) *Competing for the future,* Boston, MA, Harvard Business School Press.
HANSEN, M. T. (1999) The search-transfer problem: the role of weak ties in sharing knowledge across organizational subunits. *Administrative Science Quarterly,* 44**,** 82-111.
HARRISON, D. & KJELLBERG, H. (2010) Segmenting a market in the making: industrial market segmentation as construction *Industrial Marketing Management,* 39**,** 784-792.
HEDBERG, B. (1981) How organizations learn and unlearn. IN NYSTROM, P. C. & STARBUCK, W. H. (Eds.) *Handbook of organizational design.* London, UK, Cambridge University Press.

HIRUNYAWIPADA, T., BEYERLEIN, M. & BLANKSON, C. (2010) Cross-functional integration as a knowledge transformation mechanism: implications for new product development. *Industrial Marketing Management,* 39**,** 650-660.
HOMBURG, C., WORKMAN, J. P. & KROHMER, H. (1999) Marketing's influence within the firm. *Journal of Marketing,* 63**,** 1-17.
HUBER, G. P. & POWER, D. J. (1985) Retrospective reports of strategic-level managers: guidelines for increasing their accuracy. *Strategic Management Journal,* 6**,** 171-180.
JACKSON, S. E., STONE, V. K. & ALVAREZ, E. B. (1993) Socialization amidst diversity: the impact of demographics on work team old-timers and newcomers. IN CUMMING, L. L. & STAW, B. M. (Eds.) *Research in organizational behavior.* Greenwich, CT, JAI Press.
JANSSEN, K. L. & DANKBAAR, B. (2008) Proactive involvement of consumers in innovation: selecting the appropriate techniques. *International Journal of Innovation Management,* 12**,** 511-541.
JAWORSKI, B. J. & KOHLI, A. K. (1996) Market orientation: review, refinement, and roadmap. *Journal of Market Focused Management,* 1**,** 119-135.
KAUPILLA, O.-P., RAJALA, R. & IYRÄMÄ, A. (2010) Antecedents of salespeople's reluctance to sell radically new products. *Industrial Marketing Management* 39**,** 308-316.
KIRCA, A. H., JAYACHANDRAN, S. & BEARDEN, W. O. (2005) Market orientation: a meta-analytic review and assessment of its antecedents and impact on performance. *Journal of Marketing,* 69**,** 24-41.
KROHMER, H., HOMBURG, C. & WORKMAN, J. P. (2002) Should marketing be cross-functional? conceptual development and international empirical evidence. *Journal of Business Research,* 55**,** 451-465.
KYRIAKOPOULOS, K. & MOORMAN, C. (2004) Tradeoffs in marketing exploitation and exploration strategies: the overlooked role of market orientation. *International Journal of Research in Marketing,* 21**,** 219-240.
LANGLEY, A. (1999) Strategies for theorizing from process data. *Academy of Management Review,* 24**,** 691-710.
LEE, T. W. (1999) *Using qualitative methods in organizational research,* Thoasand Oaks, CA, Sage.
LEIFER, R., MCDERMOTT, C. M., COLLARELLI O'CONNER, G., PETERS, L. S., RICE, M. & VERYZER, R. W. (2000) *Radical Innovation: How mature companies can outsmart upstarts,* Boston, MA, Harvard Business School Press.
LEONARD-BARTON, D. (1990) A dual methodology for case studies: synergistic use of a longitudinal single site with replicated multiple sites. *Organization Science,* 1**,** 248-266.
LEONARD, D. (1995) *Wellsprings of knowledge,* Boston, MA, Harvard Business School Press.
LEVINTHAL, D. A. & MARCH, J. G. (1993) The myopia of learning. *Strategic Management Journal,* 14 95-112.
LI, C.-R., CHU, C.-P. & LIN, C.-J. (2010) The contingent value of exploratory and exploitative learning for new product development performance. *Industrial Marketing Management,* 39**,** 1186-1197.
LI, T. & CALANTONE, R. (1998) The impact of market knowledge competence on new product advantage: conceptualizations and empirical examination. *Journal of marketing,* 62**,** 13-29.
LYNN, G. S., MORONE, J. G. & PAULSON, A. S. (1996) Marketing and discontinuous innovation: the probe and learn process. *California Management Review,* 38**,** 8-37.

MADHAVAN, R. & GROVER, R. (1998) From embedded knowledge to embodied knowledge: new product development as knowledge management. *Journal of Marketing,* 62**,** 1-12.
MARCH, J. G. (1991) Exploration and exploitation in organizational learning. *Organization Science,* 2**,** 71-87.
MCGRATH, R. G. (2001) Exploratory learning, innovative capacity and managerial oversight. *Academy of Management Journal,* 44**,** 118-131.
MILES, M. & HUBERMAN, M. (1994) *Qualitative data analysis,* Thousand Oaks, CA, Sage.
MINTZBERG, H. (1979) *The structuring of organizations: a synthesis of the research,* Englewood Cliffs, NJ, Prentice-Hall.
MÖLLER, K. & RAJALA, A. (1999) Organizing marketing in industrial high-tech firms: the role of internal marketing relationships. *Industrial Marketing Management,* 28**,** 521-535.
NARVER, J. C., SLATER, S. F. & MACLACHLAN, D. L. (2004) Responsive and proactive market orientation and new product success. *Journal of Product Innovation Management,* 21**,** 334-347.
NOBLE, C. H., SINHA, R. K. & KUMAR, A. (2002) Market orientation and alternative strategic orientations: a longitudinal assesment of performance implications. *Journal of Marketing,* 66**,** 25-39.
NONAKA, I. & TAKEUCHI, H. (1995) *The knowledge creating company: how Japanese companies create the dynamics of innovation,* New York, NY, Oxford University Press.
O'CONNER, G. C. & VERYZER, R. W. (2001) The nature of market visioning for technology-based radical innovation. *Journal of Product Innovation Management,* 18**,** 231-246.
O'CONNOR, G. C. (1998) Market learning and radical innovation: a cross case comparison of eight radical innovation projects. *Journal of Product Innovation Management,* 15**,** 151-161.
OLSON, E. M., SLATER, S. F. & HULT, T. M. (2005) The performance implications of fit among business strategy, marketing organization structure, and strategic behavior. *Journal of Marketing,* 69**,** 49-65.
OLSON, E. M., WALKER, O. C. & RUEKERT, R. W. (1995) Organizing for effective new product development: the moderating role of product innovativeness. *Journal of Marketing,* 59**,** 48-62.
ORTON, J. D. (1997) From inductive to iterative grounded theory: zipping the gap between process theory and process data. *Scandinavian Journal of Management,* 13**,** 419-438.
PAVITT, K. (1984) Sectoral patterns of technical change: towards a taxonomy and a theory. *Research Policy,* 13**,** 343-373.
PERRETTI, F. & NEGRO, G. (2007) Mixing genres and matching people: a study in innovation and team composition in Hollywood. *Journal of Organizational Behavior,* 28**,** 563-586.
PERRY-SMITH, J. E. & SHALLEY, C. E. (2003) The social side of creativity: a static and dynamic social network perspective. *Academy of Management Review,* 28**,** 89-106.
PIERCY, N. (1985) *Marketing organization. An analysis of information processing, power and politics,* London, UK, George, Allen & Unwin.
POOLE, M. S., VAN DE VEN, A. H., DOOLEY, K. & HOLMES, M. E. (2000) *Organizational change and innovation processes: theory and methods for research,* New York, NY, Oxford University Press.
POOLTON, J. & BARCLAY, I. (1998) New product development from past research to future applications. *Industrial Marketing Management* 27**,** 197-212.

RAISCH, S., BIRKINSHAW, J., PROBST, G. & TUSHMAN, M. L. (2009) Organizational ambidexterity: balancing exploitation and exploration for sustained performance. *Organization Science,* 20**,** 685-695.
RUST, R. T. & MOORMAN, C. (1999) The role of marketing. *Journal of Marketing,* 63**,** 180-197.
SCHOEMAKER, P. J. H. (1995) Scenario planning: a tool for strategic thinking. *Sloan Management Review,* 36**,** 25-40.
SEIDEL, V. P. (2007) Concept shifting and the radical product development process. *Journal of Product Innovation Management,* 24**,** 522-533.
SLATER, S. F. & MOHR, J. J. (2006) Successful development and commercialization of technological innovation: insights based on strategy type. *Journal of Product Innovation Management,* 23**,** 26-33.
SLATER, S. F. & NARVER, J. C. (1998) Customer-led and market-oriented: let's not confuse the two. *Strategic Management Journal,* 19**,** 1001-1006.
SMITS, A. (2010) Ambidextrous marketing organizations to support product innovation. Radboud University Nijmegen.
SOUDER, W. E., SHERMAN, J. D. & DAVIES-COOPER, R. (1998) Environmental uncertainty, organizational integration, and new product development effectiveness: a test of contingency theory. *Journal of Product Innovation Management,* 15**,** 520-533.
SRIVASTAVA, R. K., SHERVANI, T. A. & FAHEY, L. (1999) Marketing, business processes, and shareholder value: an organizational embedded view of marketing activities and the discipline of marketing. *Journal of Marketing,* 63**,** 168-179.
SWINK, M. (2000) Technological innovativeness as a moderator of new product design integration and top management support. *Journal of Product Innovation Management,* 17**,** 208-220.
TUSHMAN, M. L. & O'REILLY, C. A. (1996) Ambidextrous organizations: managing evolutionary and revolutionary change. *California Management Review,* 38**,** 8-31.
TUSHMAN, M. L. & SMITH, W. K. (2002) Organizational technology. IN BAUM, J. (Ed.) *Companion to organizations.* Malden, MA, Blackwell.
TUSHMAN, M. L., SMITH, W. K., WOOD, R. C., WESTERMAN, G. & O'REILLY, C. A. (2010) Organization designs and innovation streams. *Industrial and Corporate change,* 19**,** 1331-1366.
VELDHUIZEN, E., HULTINK, E. J. & GRIFFIN, A. (2006) Modeling market information processing in new product development: an empirical analysis. *Journal of Engineering and Technology Management,* 23**,** 353-373.
VERHOEF, P. C. & LEEFLANG, P. S. H. (2009) Understanding the marketing department's influence within the firm. *Journal of Marketing,* 73**,** 14-37.
VERYZER, R. W. (1998) Discontinuous innovation and the new product development process. *Journal of Product Innovation Management,* 15**,** 304-321.
VON HIPPEL, E. (1986) Lead users: a source of novel product concepts. *Management Science,* 32**,** 791-805.
WEICK, K. E. (1976) Educational organizations as loosely coupled systems. *Administrative Science Quarterly,* 21.
WHEELWRIGHT, S. C. & CLARK, K. B. (1992) *Revolutionizing product development,* New York, NY, The Free Press.

WORKMAN, J. P. (1993) Marketing's limited role in new product development in one computer systems firm. *Journal of Marketing Research,* 30**,** 405-421

WORKMAN, J. P. (1998) Factors contributing to marketing‘s limited role in product development in many high-tech firms. *Journal of Market Focused Management,* 2**,** 257-279.

WORKMAN, J. P., HOMBURG, C. & GRUNER, K. (1998) Marketing organization: an integrative framework of dimensions and determinants. *Joumal of Marketing,* 62**,** 21-41.

YIN, R. K. (1994) *Case study research: design and methods,* Thousand Oaks, CA, SAGE Publications.