Neue Perspektiven der
marktorientierten Unternehmensführung

Hrsg.: Ruth Stock-Homburg und Jan Wieseke

Nicolas Zacharias

An Integrative Approach to Innovation Management

Patterns of Companies' Innovation Orientation and Customer Responses to Product Program Innovativeness

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RESEARCH

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marktorientierten Unternehmensführung

Herausgegeben von
Professor Dr. Ruth Stock-Homburg, Technische Universität Darmstadt
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Nicolas Zacharias

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With a foreword by Prof. Dr. Ruth Stock-Homburg

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Series Foreword

Current developments like rapidly changing customers' requirements, shortened product life cycles, increasing globalization, and demographic change associated with skilled worker and manager shortage present organizations with completely new challenges. The successful handling of these challenges requires the development of new business management concepts. These concepts should consider the following points:

- the increase of the companies' market and innovation orientation (e.g., by the adaptation of the organizational structure respectively the promotion of the employees' innovation and customer orientation),
- the implementation of new working principles (e.g., customer-oriented and virtual global teams),
- the long-range maintenance of managers' and employees' employability (e.g., by the setup and expansion of intercultural competences as well as targeted steps towards the promotion of the work-life balance), right up to
- the preservation and expansion of human resources (e.g., by personal marketing activities such as targeted steps towards the advancement of elder and female employees as organizational potential).

The variety of possible starting points shows: a scientific consideration from the viewpoint of a single economic discipline meets these various challenges only to some extent. The series "Neue Perspektiven der marktorientierten Unternehmensführung" is dedicated to successful concepts of managing current and future developments in organizations' practical experiences and presents an interdisciplinary perspective. This interdisciplinary approach is accounted for by a parallel illumination of different economic disciplines (i.e., marketing, innovation management, and human resource management). Additionally, the interface of different facets of business economics and psychology (i.e., work and organizational psychology) is of particular importance.

The dissertations being published in the series “Neue Perspektiven der marktorientierten Unternehmensführung” orient themselves content wise and conceptually towards international scientific standards. Starting from a stringent theoretical foundation the respective research topic is qualitatively and quantitatively investigated.

The present titles deal with central questions in market-oriented business management. Thereby the single volumes provide scientists with new insights and suggestions for their research in that they approach the topics in different ways. For organizations’ practical experiences the different dissertations offer implications for dealing with current and future challenges of the market-oriented business management.

Darmstadt and Bochum, July 2011 Ruth Stock-Homburg and Jan Wieseke

Foreword

The importance of innovation for firm performance is virtually undisputed among practitioners and scholars alike. Against this background, in the last decades, a huge number of scientific papers in the area of marketing and innovation management dealt with answering the question how to generate innovations and how they affect firm performance. In this context, mainly organizational characteristics (e.g., organizational design and processes) as well as environmental variables (e.g., competitive intensity and market dynamism) were investigated. Thereby the customer perspective, i.e., how customers assess a firm's innovations, remained largely neglected. Furthermore, extant research largely focuses on the innovativeness of single products by ignoring peculiarities of product program innovativeness which is highly relevant from a strategic perspective.

Nicolas Zacharias closes this gap and aims to provide deeper insight in customer-related outcomes of product program innovativeness. Relying on well established organization theories, a broad range of antecedents of product program innovativeness has been investigated. The author essentially focuses on two phenomena within his dissertation:

- typical patterns of firms' innovation orientation and their performance implications (product program innovativeness and financial performance) as well as
- the effect of product program newness and meaningfulness on customer loyalty.

The purpose of this work was to both theoretically and empirically investigate these two phenomena. Thus, it decisively contributes to the extension of the scientific state of knowledge in these areas.

At the beginning of the thesis, the author develops a systematic framework, depicting antecedents and customer-related outcomes of product program innovativeness. The two aforementioned key aspects of this thesis were investigated within two studies.

The first study challenges the "the more … the better" approach, which can be frequently observed when firms invest to increase their innovativeness. Relying on contingency theory and boundary theory as well as data from R&D managers, marketing managers, and customers, four alternative patterns are presented. In these typical patterns of firms' innovation orientation, the antecedents of product program innovativeness are handled clearly distinctive. A key finding is that firms have to carefully select the right combination of activities to enhance their innovativeness rather than investing in all potential innovation drivers.

In the second study, "the good and bad" of product program innovativeness was investigated. Thereby the author challenges writings claiming that innovations are unquestionable indicators of company performance. The theory-based empirical study reveals that innovations have to be assessed in terms of their newness and meaningfulness. While meaningfulness clearly enhances customer loyalty, customers are reluctant regarding product newness. Thus, a finding of this work is that besides ensuring a clear customer benefit of their innovations, companies should also have customer uncertainty associated with new products in mind.

The present work essentially extends the scientific state of knowledge involving two highly interesting phenomena – antecedents and customer-related outcomes of product program innovativeness at the program level. In addition, interesting findings for managers, responsible for marketing and innovation have been generated. A broad diffusion in science and business practice is desirous for this thesis.

Darmstadt, July 2011 Ruth Stock-Homburg

Acknowledgements

The last three years as a doctoral student have been a remarkable experience. During this period the excellent research environment at my department and the university allowed me to work on a wide range of different projects, which enabled me to satisfy my curiosity in various directions. Despite the hurdles any doctoral student encounters, I was always very happy in my work and also discovered my passion for research along the way. However, all this would not have been possible without the many people I owe gratitude to.

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I also want to thank my colleagues, who have always been supportive of my endeavors with their willingness to help, their offers of suggestions, their availability as discussion partners, or simply their presence as friends. Particular thanks go to Gisela Bieling and Björn Six, who have accompanied me throughout my doctoral studies and have lent me their advice.

My girlfriend Anja has been always there for me, and I thank her. She has been a constant source of peace and has helped me to maintain balance. I also thank her for making me attentive to the important things in life, particularly in turbulent times.

Most of all I thank my family, my mother, my father, Jasmin and Marlon, for their love and support. Their encouragement has always let me feel comfortable about my decisions and has given me the strength to pursue my goals, including my doctoral studies. This thesis is dedicated to them.

Frankfurt, July 2011 Nicolas Zacharias

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List of Abbreviations

α	Cronbach's alpha
ANOVA	Analysis of variance
AVE	Average variance extracted
B2B	Business-to-business
CR	Composite reliability
PPM	Product program meaningfulness
PPN	Product program newness
r_{wg}	Within-group interrater reliability
s. d.	Standard deviation

1 Introduction

1.1 Relevance of the Thesis

1.1.1 Managerial Relevance

"New products are the lifeblood of companies"
(Lynn et al. 1999, p. 320).

Managerial practice has identified innovation as a central success factor for companies today, and CEOs underline innovation's importance with statements such as "all I've done since I got here is focus on one word: innovation" (Zander 2005) or "the only way for […] companies to reach revenue goals […] is to 'innovate like crazy'" (Tuttle 2010). Managers regard innovation as a focal point of a company's competitiveness and "a crucial element for its long-term strength and survival" (Damanpour/Gopalakrishnan 1999, p. 57). Thus, innovations are particularly critical for companies' long-term success, and "it is impossible to escape the reality that corporations must be innovative in order to survive" (Amabile 1988, p. 124).

The overarching relevance of innovations is reflected in the financial investments in research and development (R&D) worldwide. The latest statistics of the National Science Foundation (2008) report that U.S. expenditures for R&D reached $368 billion in 2007, of which $241 billion was invested in the industrial sector. Between 1990 ($152 billion) and 2007, expenditures more than doubled. Between 1980 and 2007, the ratio between R&D expenditures and gross domestic product increased from 2.27% to 2.62% in the U.S., from 2.14% to 3.39% in Japan, and from 2.35% to 2.53% in Germany (National Science Foundation 2008). Despite a general increase in innovation expenditures, the percentage of sales invested in R&D varies greatly between industries (see Figure 1-1). The electronics and automobile industries lead with an investment ratio of 9.6% each, and the second tier is represented by the chemical and pharmaceutical industry (7.5%), technical and R&D services (6.6%), machinery (6.4%), and IT and telecommunication (5.7%) (Rammer et al. 2011).

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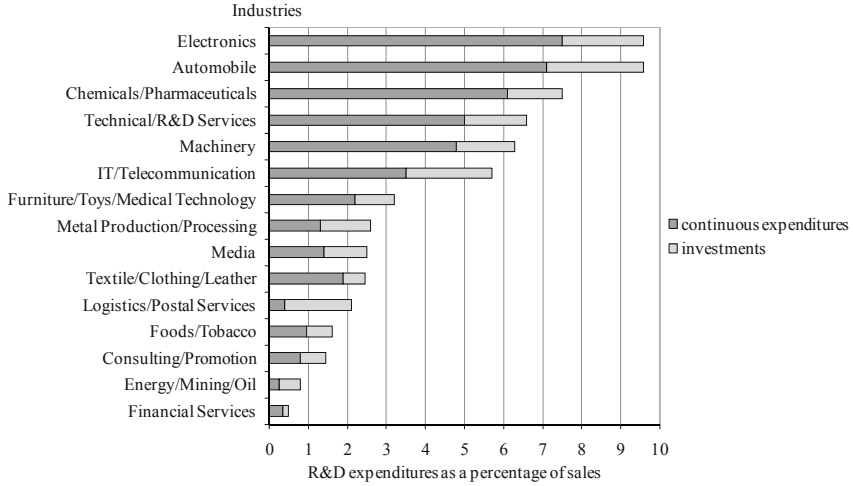
DOI 10.1007/978-3-8349-7042-8_1,

Figure 1-1: R&D Expenditures as a Percentage of Sales of Selected Industries in 2009 (Rammer et al. 2011)

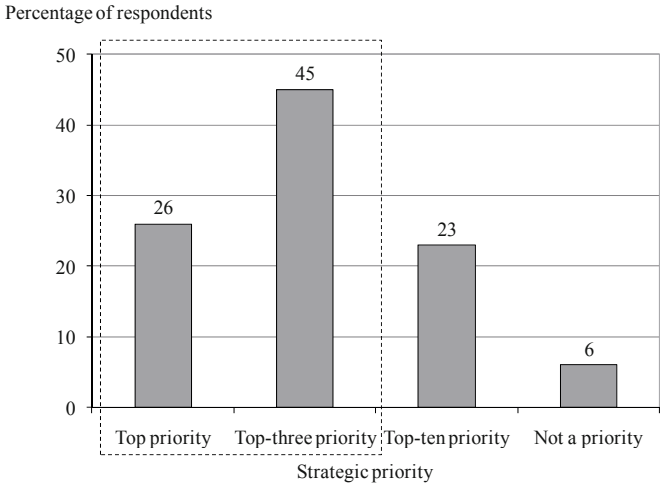


Apart from these economics statistics, "innovation is back at the top of corporate agenda" (Kanter 2006, p. 73). "Literally, it is impossible to read business journals or newspapers, attend business conferences, or read annual reports without constantly hearing about the importance of innovations" (Amabile 1988, p. 124). Over 70% of managers consider innovation to be a top-three strategic priority for their companies, as the results of a senior executive survey depicted in Figure 1-2 emphasize (Andrew et al. 2010). As a consequence, two-thirds of the world's 1000 leading innovation companies increased their R&D spending in 2009, even though 65% experienced sales drops during the financial crisis and 32% even incurred losses (Jaruzelski/Dehoff 2009). The German position improved over the course of the crisis: while in 2007 only 45 German companies qualified for the top 1000 innovation companies, 49 companies made it into the ranking in 2008 (Jaruzelski/Dehoff 2009).

Despite the critical role that managers ascribe to innovation, nearly 50% of the new products that appear in the marketplace fail each year (Lynn et al. 1999; Morris et al. 2003). About one in ten new product concepts succeeds commercially, only one in four development projects is a commercial success, and more than 40% of development projects fail to meet stated objectives (Cooper/Edgett/Kleinschmidt 2004). The failure rates are even higher in some of the highly competitive industries. For example, over 70% of newly introduced fast-moving consumer goods are no longer listed after

12 months and amount to misinvestments of 12 billion Euros for German retailers (Markenverband/GfK/Serviceplan 2006). These high flop rates of new products cause considerable financial losses and embarrassment to their promoters (Sivadas/Dwyer 2000). Thus, although innovations are highly desirable for the potential gains they offer, success is difficult to achieve.

Figure 1-2: Strategic Priority of Innovation (Andrew et al. 2010)

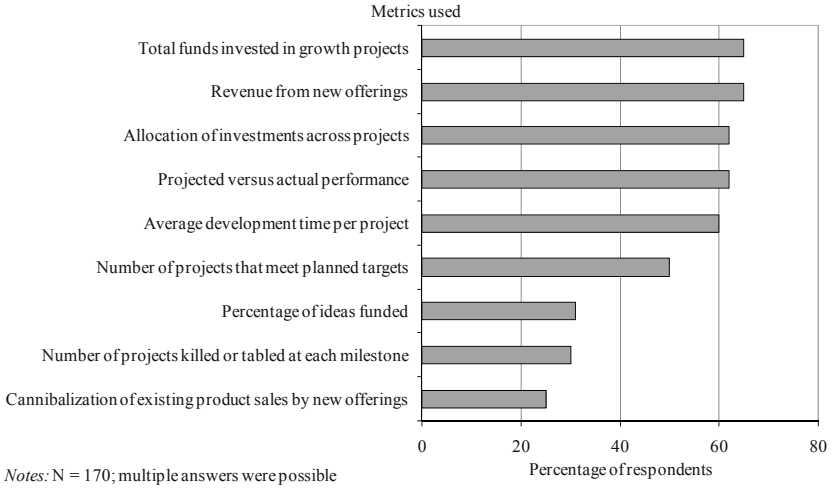


Notes: N = 1600 senior executives

Possible reasons for the obstacles on the road to success may lie in the challenge of implementing effective innovation management in managerial practice. The activities companies perform are often highly fragmented, and many companies focus on very specific areas, such as strategy (e.g., Chesbrough/Appleyard 2007), structures (e.g., Prakash/Gupta 2008), or processes (e.g., Nonaka 1990). The lack of cohesiveness in innovation programs may be the reason companies often do not reach their desired innovation results (e.g., Danneels/Kleinschmidt 2001; Henard/Szymanski 2001). This approach is particularly surprising given that every part of a company plays a specific and important role in the implementation of an overall orientation toward innovation (Iyer/Davenport 2008). Therefore, a significant challenge for managers is to find the right combination of organizational elements (strategy, structures, processes, etc.) to put their companies on the path to successful innovation.

Another cause for innovation failures may be companies' mistaken approaches to assessing innovation success, which usually corresponds to misleading objectives during the development phase of innovations. As Figure 1-3 shows, most companies use financial metrics to assess innovations, such as total funds invested into specific projects. This perspective has two drawbacks: it is mainly input-driven and, owing to its strict focus on financial outcomes, it also hinders companies' abilities to innovate (Christensen/Kaufman/Shih 2008). Instead, managers should pay more attention to customer-related outcomes, since customers ultimately decide the success of innovations (Hauser/Tellis/Griffin 2006). "To fail to understand what the customer wants will almost certainly work against the success of the project or product" (Cumming 1998, p. 23). Innovations usually fail because the customer sees them as too incremental, the price does not reflect the offered value, or they target the wrong customer segments (Markenverband/GfK/Serviceplan 2006). For these reasons, managers should apply a more customer-centered focus to their companies' innovation activities and reevaluate the way they assess innovation performance (Bettencourt/Ulwick 2008).

Figure 1-3: Metrics Used in Managerial Practice to Assess Innovations (Andrew et al. 2009)



Notes: N = 170; multiple answers were possible

To better support the effective introduction of innovations, companies need to know more about how to successfully implement an innovation-oriented strategy. "Innovation is regarded as a focal point of an organization's strategy" (Damanpour/Gopalakrishnan 1999, p. 57) and should guide managers in deciding how to most

effectively combine organizational factors to reach superior innovativeness in their companies. For example, it is interesting which combinations of these factors are dominant in managerial practice and how successful these combinations are in terms of innovativeness and other performance criteria. This information would allow managers to analyze the position of their companies and to identify desirable management patterns.

Managers should also learn more about customer responses to innovations. A better understanding would enable more effective management of innovations and reduce the high failure rates of new product introductions. Companies would benefit from a better customer reputation, a more competitive market position, and a stronger financial position. For example, knowledge about how to increase customer loyalty as an outcome of newly introduced products would be of great value to companies, since customer retention is much more cost-efficient than acquiring new customers (Reichheld/Sasser 1990). Accordingly, investigating customer responses to innovations and related contingencies is of great interest to managerial practice.

1.1.2 Scientific Relevance

Academic literature reflects a compelling interest in innovations, specifically in relation to new product performance and the measurement issues associated with new product success (e.g., Atuahene-Gima 1995; Cooper/Kleinschmidt 1995; Yap/Souder 1994). Antecedents of new product performance, such as development cycle time, the new product development process (e.g., Cooper/Kleinschmidt 1995), and product innovativeness (e.g., Ali 2000; Brockman/Morgan 2003; Henard/Szymanski 2001), have also attracted considerable research attention. The many existing empirical studies indicate a good understanding of new product performance on the product level, but have largely neglected the organizational level of innovativeness. However, the organizational level offers the opportunity to investigate the strategic role of innovativeness (Cooper/Kleinschmidt 1995; Siguaw/Simpson/Enz 2006). On the one hand, the organizational level of innovativeness serves as an adequate outcome of organizational strategies and actions, since they correspond to the same level. On the other hand, the organizational level of innovativeness represents an important signal to a company's environment, which matches the level of many external stakeholders, such as business-to-business customers. Therefore, this thesis focuses not on innovations at the product level but instead on phenomena related to innovativeness at the organizational level, i.e., product program innovativeness.

To adequately manage product program innovativeness, strategic approaches must be organization-wide to offer the necessary guidance. Over the last two decades, academics have given increased attention to various concepts of strategic orientations (e.g., Citrin/Lee/McCullough 2007; Paladino 2009; Zhou et al. 2005). Strategic orientations reflect the guiding principles that influence a company's strategy making and implementation (Noble/Sinha/Kumar 2002; Slater/Olson/Hult 2006). They represent the elements of an organization's culture, systems, and structures that guide interaction both within and outside the organization. Therefore, a strategic orientation serves as an overarching principle that connects strategy making and implementation (Atuahene-Gima/Ko 2001; Gatignon/Xuereb 1997; Hurley/Hult 1998).

Research on strategic orientations focuses strongly on market orientation (e.g., Gebhardt/Carpenter/Sherry 2006; Grewal/Tansuhaj 2001; Kirca/Jayachandran/Bearden 2005), although "market orientation is not the only viable strategic orientation" (Noble/Sinha/Kumar 2002, p. 25). Recent research emphasizes the importance of alternative orientations, such as a competitor (e.g., Day 1990, 1994; Homburg/Grozdanovic/Klarmann 2007), entrepreneurial (e.g., Lumpkin/Dess 1996; Rauch et al. 2009; Richard et al. 2004), technology (e.g., Atuahene-Gima/Evangelista 2000; Gatignon/Xuereb 1997; Zhou/Yim/Tse 2005), or innovation orientation (e.g., Maltz/Menon/Wilcox 2006; Olson/Slater/Hult 2005; Siguaw/Simpson/Enz 2006).

Among these, an innovation orientation has been identified as one of the most important strategic orientations for long-term success by practitioners (Berthon/Hulbert/Pitt 1999; Kim/Mauborgne 1997) and researchers (Zhou et al. 2005). "Innovation orientation is the key driver for overcoming hurdles and enhancing a firm's ability to successfully adopt or implement new systems, processes, or products" (Zhou et al. 2005, p. 1050; see also Hurley/Hult 1998). However, despite its increasing importance for managerial practice and the rising number of publications in the last few years, knowledge regarding an innovation orientation is scarce when compared, for example, with understanding of a market orientation (e.g., Jaworski/Kohli 1993; Song/Parry 2009). A review of definitions in extant literature (see Table 1-1) yields a definition of an innovation orientation as a guiding principle for strategy making and implementation with the purpose of increasing a company's innovativeness (Manu 1992; Noble/Sinha/Kumar 2002; Siguaw/Simpson/Enz 2006). Thus, an innovation orientation serves as an overarching principle that guides and promotes programs designed to enhance innovativeness (e.g., Siguaw/Simpson/Enz 2006; Zhou et al. 2005).

Table 1-1: Selected Definitions of Innovation Orientation

Author(s)	Definition
Innovation Orientation as Overarching Principle	
Amabile (1997, p. 52)	"The most important elements of the innovation orientation are: a value placed on creativity and innovation in general, an orientation toward risk […], a sense of pride in the organization's members and enthusiasm about what they are capable of doing, and an offensive strategy of taking the lead toward the future […]."
Berthon/Hulbert/Pitt (1999, p. 37)	"Managers in firms' that enact a technological innovation orientation devote their energy towards inventing and refining superior products."
Hurley/Hult (1998, p. 43)	"Innovativeness is the notion of openness to new ideas as an aspect of a firm's culture. Innovativeness of the culture is a measure of the organization's orientation toward innovation."
Maltz/Menon/ Wilcox (2006, p. 149)	"A firm with an innovation orientation is one which focuses less on introducing faster processes and more on attaining an open atmosphere which promotes the introduction of new ideas as a response mechanism."
Olson/Slater/Hult (2005, p. 52)	"An innovation orientation indicates that the firm not only is open to new ideas but also proactively pursues these ideas in both its technical and administrative domains."
Siguaw/Simpson/ Enz (2006, p. 558/560)	"The defining factor of long-term survival through innovation appears based not on specific, discrete innovations or on a single market or learning orientation but rather on an overarching, organization-wide knowledge structure, termed innovation orientation." (p. 558) Innovation Orientation is a "multidimensional knowledge structure composed of a learning philosophy, strategic direction, and transfunctional beliefs that, in turn, guide and direct all organizational strategies and actions, including those embedded in the formal and informal systems, behaviors, competencies, and processes of the firm to promote innovative thinking and facilitate successful development, evolution, and execution of innovations." (p. 560)
Simpson/Siguaw/ Enz (2006, p. 1133)	"More recent research has examined innovation as a system-based, firm-wide orientation toward innovation."
Worren/Moore/ Cardona (2002, p. 1128)	"The firm's orientation toward innovation, which we label innovation climate. […] A positive innovation climate exists where the development of new ideas is encouraged and rewarded."
Innovation Orientation as Output	
Homburg/Hoyer/ Fassnacht (2002, p. 96)	Innovation orientation of a business strategy relates "to the number of innovations a company offers, how many customers these innovations are offered to, and how strongly these innovations are emphasized."
Manu (1992, p. 334)	"Innovation orientation […] is a multiple construct having to do with innovative output (new products and processes), innovative effort (R&D) and timing of market entry. As an orientation it encompasses the total innovation programs of companies and is strategic in nature because it provides direction in dealing with markets. It is therefore a very important strategic issue."
Manu/Sriram (1996, p. 82)	Innovation orientation "consists of the following components […]: 1. New product introductions in both relative and absolute terms. 2. R&D expenditures (product and process). 3. Order of market entry."

Marketing and management research considers companies' innovation orientation from several perspectives. Empirical work has investigated antecedents (Zhou et al. 2005) and performance outcomes of companies' innovation orientation, such as innovation speed (Kessler/Chakrabarti 1996), capacity to innovate, and competitive advantage (Hurley/Hult 1998). Another research stream captures the phenomenon by grouping various strategic decisions regarding innovations, focusing on relatively specific issues, such as companies' favorable innovations (Manu/Sriram 1996), innovation activities in different geographic regions (DeSarbo et al. 2005) or environments (Hambrick 1983; Lawless/Finch 1989), the marketing of innovations (DeSarbo et al. 2006; Slater/Olson 2001), or innovation processes (Miller 1988). As these concentrations demonstrate, empirical treatments of companies' innovation orientations remain rather scarce and fragmented, which is not satisfactory. A company's innovation orientation is a highly complex phenomenon and "it is this complex configuration among the parts that constitutes the most vital source of competitive advantage" (Miller/Whitney 1999, p. 5). Thus, the field needs an approach to describe typical patterns of companies' innovation orientation.

A suitable approach to identifying typical patterns of companies' innovation orientation and explaining their outcomes is to develop a taxonomy (Doty/Glick 1994). Multivariate configurations offer useful and holistic explanations of complex organizations (e.g., Dess/Lumpkin/Covin 1997; Hambrick 1984; Miller 1987), and configurational theory posits the existence of an ideal pattern of organizational characteristics that yield superior performance (Van de Ven/Drazin 1985). Up to this point, extant research has not covered a theory-based taxonomy of companies' innovation orientation types and their performance outcomes. In developing such a taxonomy, this thesis enhances "the chances of deriving types that inform conceptual debate [since the approach is] guided by promising theoretical paradigms" (Miller 1996, p. 508).

This thesis investigates the concept of companies' innovation orientation from a new holistic perspective. This approach contributes by addressing the following shortcomings in extant research:

- Despite increasing attention to strategic orientations, the major body of previous research has focused on a market orientation and has neglected companies' innovation orientation (e.g., Noble/Sinha/Kumar 2002).

- The few studies focusing on innovation orientation have not investigated how companies implement an innovation orientation in different parts of the organization—that is, which patterns of companies' innovation orientation exist—and also lack a theoretical foundation.
- In addition, this thesis contributes by investigating the performance outcomes of these patterns, such as product program innovativeness.

Besides focusing on patterns of companies' innovation orientation, this thesis uses outcomes of the identified patterns to investigate a second phenomenon on the organizational level: customer responses to product program innovativeness. Despite the central role customers play in the success of innovations, prior research has largely neglected examination of customer responses (Hauser/Tellis/Griffin 2006). For example, studies of innovativeness at the organizational level (e.g., Atuahene-Gima/Slater/Olson 2005; Hauser/Tellis/Griffin 2006) and customer loyalty (e.g., Johnson/Herrmann/Huber 2006; Lam et al. 2004) mainly appear in two separate research streams. Thus, linking these phenomena is highly relevant, because both streams would benefit by gaining knowledge from each other (Durisin/Calabretta/Parmeggiani 2010; Simpson/Siguaw/Enz 2006).

While managerial practice tends to focus on the positive performance outcomes of innovativeness, empirical results regarding customer responses to innovations have created ambiguity as to whether the performance implications are positive or negative (e.g., Henard/Szymanski 2001; Szymanski/Kroff/Troy 2007). Owing to the various definitions and conceptualizations of innovativeness employed in extant research these mixed results are no surprise, because different dimensions of innovativeness may yield different performance implications (e.g., Atuahene-Gima 1996c; Gatignon/Xuereb 1997; Meyer/Roberts 1986). Thus, these findings highlight the desirability of developing a clear definition and conceptualization of innovativeness at the organizational level.

Important scientific insights for developing this conceptualization come from two streams of literature—that pertaining to creativity and that relating to innovativeness. Conceptual work in creativity research indicates that different dimensions of innovativeness may generate different customer responses (Danneels/Kleinschmidt 2001; Gatignon/Xuereb 1997). Presently, no innovativeness research systematically compares customer responses to the different dimensions of innovativeness. In making this

comparison, this thesis addresses the fact that "creativity researchers and innovation researchers have failed to capitalize on potential synergies" (Ford 1996, p. 1112).

By investigating the phenomenon of product program innovativeness and its customer responses, this thesis offers several important contributions with respect to the following research gaps:

- Despite the equivocal findings in empirical literature, no consistent conceptualization capturing different dimensions of innovativeness has evolved.
- The few studies that compare different dimensions of innovativeness have not investigated customer responses toward these dimensions (Atuahene-Gima 1996c; Calantone/Chan/Cui 2006; Im/Workman 2004).
- Extant research has mainly relied on direct effects of the dimensions of innovativeness on performance (e.g., Szymanski/Kroff/Troy 2007), but has largely neglected contingencies to increase understanding of the outcomes of innovativeness.
- Finally, this thesis also offers a theoretical foundation to explain the investigated relationships, thereby responding to the call for more theoretical underpinnings in the design of innovation research (Durisin/Calabretta/Parmeggiani 2010).

1.2 Major Goals of the Thesis

The preceding sections emphasize the high relevance of a theory-based taxonomy of companies' innovation orientation, its impact on innovativeness, as well as customer responses to different dimensions of innovativeness. To meet the challenges presented by the current state of research, this thesis pursues two major goals, which Figure 1-4 illustrates with their related research questions.

Figure 1-4: Major Goals of the Thesis

Major Goal 1 : **Development of a theory-based taxonomy of companies' innovation orientation**	**Major Goal 2:** **Analysis of customer responses to different dimensions of innovativeness**
▪ How can innovation orientation be conceptualized? ▪ Which variables are necessary to describe patterns of innovation orientation comprehensively? ▪ Which patterns of innovation orientation can be identified? ▪ How do these innovation orientation patterns differ in terms of performance?	▪ How can innovativeness be conceptualized to capture the phenomenon more comprehensively? ▪ How do customers respond to different dimensions of innovativeness? ▪ Which customer-related outcome should be employed to capture responses of B2B customers? ▪ How do contingencies influence the relationships between different dimensions of innovativeness and customer responses?

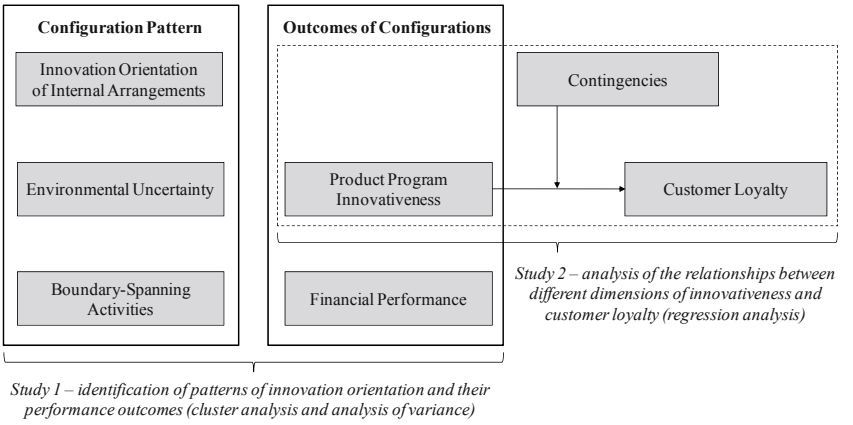
The first major goal is the *development of a theory-based taxonomy of companies' innovation orientation*. To accomplish this goal, the variables selected as necessary to describe patterns of innovation orientation are based on a strong theoretical foundation, which is often missing in extant research in this area. In particular, this thesis draws on configuration theory and boundary theory to extend the frequently used internal arrangements of companies by environmental uncertainty and boundary-spanning activities to more comprehensively capture the phenomenon. Based on this conceptualization, this thesis strives to identify patterns of companies' innovation orientation by applying cluster analysis to a multi-industry dataset with multiple informants per company. The identified patterns are analyzed regarding their performance outcomes in terms of product program innovativeness and financial performance using analysis of variance. This approach challenges existing "the more, the better" approaches and instead identifies effective patterns that exhibit trade-offs regarding performance implications.

The second major goal relates to the *analysis of customer responses to different dimensions of innovativeness*. To reach this goal, a review of relevant definitions and conceptualizations in creativity and innovativeness literature serves as a basis for introduction of a new two-dimensional conceptualization of product program innovativeness, which allows the capture of different customer responses to different dimen-

sions of innovativeness. Customer responses in terms of customer loyalty are tested on the basis of a model that also includes contingencies. Direct as well as moderator effects are explained theoretically by drawing on information economics. An extended sample from the first study in the thesis serves as the empirical basis for testing the hypotheses using regression analysis.

Figure 1-5 depicts the overall framework of the thesis. It illustrates the primary relationships between different variable categories as well as the interconnection between the two studies that make up the total investigation.

Figure 1-5: Framework of the Thesis



1.3 Structure of the Thesis

The thesis comprises four chapters. The first chapter outlines the managerial and scientific relevance of the two phenomena investigated (see section 1.1) and sets out the major goals and the structure of the thesis (see sections 1.2 and 1.3).

The next two chapters describe the two studies related to major goals 1 and 2 (see Figure 1-4). Chapter 2 describes *Study 1 – patterns and performance outcomes of innovation orientation,* and chapter 3 explains *Study 2 – different dimensions of product program innovativeness and their effects on customer loyalty.* The chapters are structured identically (see Figure 1-6). First, an introduction presents an overview of the phenomenon under consideration (see sections 2.1 and 3.1, respectively). Second, the conceptual background is explained, including the theoretical foundation, framework, and

hypotheses (see sections 2.2 and 2.3 and 3.2 and 3.3, respectively). Third, the methodology, including data collection, measurement procedure, and the employed hypothesis testing procedure, is described in detail (using cluster analysis for study 1 and regression analysis for study 2; see sections 2.4 and 3.4, respectively). Fifth, the resulting patterns and performance outcomes of companies' innovation orientation (see section 2.5) as well as the results of the hypothesis testing of main and moderator effects regarding customer responses to innovativeness (see section 3.5) are presented and interpreted. Finally, implications for research and managerial practice, limitations of the studies, and avenues for further research are discussed (see sections 2.6 and 3.6, respectively).

Figure 1-6: Organization of the Studies

	Step 1: Introduction to Study	**Step 2: Conceptual Background**	**Step 3: Methodology**	**Step 4: Empirical Results**	**Step 5: Discussion**
Study 1:	Section 2.1	Sections 2.2 and 2.3	Section 2.4	Section 2.5	Section 2.6
Study 2:	Section 3.1	Sections 3.2 and 3.3	Section 3.4	Section 3.5	Section 3.6

Chapter 4 presents the conclusions of this thesis. The research contributions are summarized in section 4.1 and the concluding remarks for managerial practice are presented in section 4.2.

2 Study 1 – Patterns and Performance Outcomes of Innovation Orientation[1]

2.1 Introduction to Study 1

Innovativeness provides an important source of firm competitive advantages and success (e.g., Cho/Pucik 2005; Hult/Hurley/Knight 2004). Therefore, companies invest considerable resources in programs designed to increase their innovativeness (e.g., Iyer/Davenport 2008; Kanter 2006) and researchers identify a broad set of innovation drivers—from strategy, structures, and culture to the management of customer boundaries—that might enhance that innovativeness. Although many of these activities appear promising, companies generally confront a dilemma: Their resource constraints prevent them from investing in all innovation drivers in parallel and force them instead to focus on the most important drivers. But which most promising factors combine most effectively to lead to superior innovativeness?

We propose to answer this question by determining if companies exhibit typical patterns in terms of their emphasis on different innovation drivers and, if so, how these patterns differ with regard to innovation performance. By identifying various patterns and their performance implications, we offer guidelines for companies to develop specific programs and focus appropriately and affordably on the best methods to increase their innovativeness.

Prior studies focus mainly on companies' internal arrangements, such as strategy, structures or processes, and culture (Hurley/Hult 1998; Menguc/Auh 2006). Innovation management literature further includes environmental variables, such as market-related and technological turbulence, as determinants of innovativeness (e.g., Gatignon/Xuereb 1997; Manu/Sriram 1996). This notion is based on theoretical work and empirical evidence that companies' environments affect firm performance (e.g.,

[1] With kind permission from Springer Science+Business Media: Journal of the Academy of Marketing Science, Patterns and Performance Outcomes of Innovation Orientation, 2010, forthcoming, Stock, R.M./Zacharias, N.A.

N. Zacharias, *An Integrative Approach to Innovation Management,*
DOI 10.1007/978-3-8349-7042-8_2,

Siguaw/Simpson/Enz 2006; Song/Parry 2009). Recent research also emphasizes the effects of a company's boundary activities, which link it to its environment (e.g., Fang 2008; Grinstein 2008; Shu/Wong/Lee 2005). Extant empirical studies offer a good understanding of the drivers of innovativeness but also implicitly assume that maximizing all available antecedents leads to sustained innovativeness.

Companies that face resource constraints likely cannot maximize all the antecedents. Therefore, integrative studies attempt to combine huge numbers of antecedents in a regression or causal model, with innovativeness as the outcome variable (e.g., Hult/Hurley/Knight 2004; Paladino 2008), and thereby put the antecedents in order according to their contributions to innovativeness. Another interesting approach identifies the typical patterns of a broad set of antecedents (Hauser/Tellis/Griffin 2006) and then considers the various pathways to innovativeness in terms of their performance implications. Both approaches are valuable, yet they reveal important findings related to different aspects of innovativeness: The first identifies the most important innovation drivers, whereas the second explores whether typical patterns exist and how they differ in terms of their resultant innovativeness. Thus, research on antecedents of innovativeness has provided substantial contributions, yet knowledge about typical patterns of innovation drivers that actually characterize companies in terms of their approaches to attain innovativeness is scarce.

In this tradition, this study aims to identify typical patterns of companies' innovation orientation and their performance outcomes. We define an innovation orientation as a guiding principle for strategy making and implementation with the purpose of increasing a company's innovativeness (Manu 1992; Noble/Sinha/Kumar 2002; Siguaw/Simpson/Enz 2006). Thus, it serves as an overarching principle that guides and promotes programs designed to enhance innovativeness (e.g., Siguaw/Simpson/Enz 2006; Zhou et al. 2005). Unlike the relatively well-researched market orientation construct (e.g., Jaworski/Kohli 1993; Song/Parry 2009), knowledge of innovation orientation remains scarce, and our approach contributes to extant marketing research in several ways.

First, our taxonomic approach recognizes that companies face resource constraints and exhibit different approaches to innovativeness. We explore typical patterns of innovation orientation and consider the various pathways to innovativeness in terms of their performance implications. This perspective challenges "the more, the better" approaches and aims to identify effective types that reflect a broad set of innovation drivers: internal arrangements (i.e., innovation orientation of strategy, structures/

processes, human resource systems, culture, and leadership), environmental variables (i.e., market-related dynamism, technological turbulence), and boundary activities (i.e., customer information acquisition activities). Whereas prior research frequently has focused on one or two of these dimensions (e.g., Fang 2008; Hambrick 1983; Siguaw/Simpson/Enz 2006), our approach provides an integrative analysis of patterns that consist of all three dimensions.

Second, in recognition of the importance of sound conceptual grounds for taxonomies (Marks/Mathieu/Zaccaro 2001), our research contributes from a theoretical perspective. Specifically, we integrate configuration theory (e.g., Ketchen/Thomas/Snow 1993; Miller 1987; Vorhies/Morgan 2003) and boundary theory (Aldrich/Herker 1977) to deduce the major dimensions for investigating innovation orientation and reason theoretically why these dimensions may be relevant. Rarely have these theories been applied together to explore marketing or innovation management phenomena. Furthermore, we develop hypotheses about the patterns of companies' innovation orientation and their performance outcomes that are based on the performance implications of both theories. These hypotheses extend taxonomy research, another rarely employed approach in extant literature (Fader/Lodish 1990; Zúñiga-Vicente/de la Fuente-Sabaté/Suárez-González 2004).

Third, we investigate the performance outcomes of the various patterns of innovation orientation and thereby reveal some counterintuitive findings related to the performance implications of certain patterns. For example, the most innovative pattern is not optimal financially. We also investigate the levels of environmental uncertainty that are beneficial for innovativeness and financial performance. Thereby, we provide interesting findings with regard to the extreme ends of the spectrum of environmental uncertainty.

Fourth, we use a multiple informant approach and gather data from marketing managers, R&D managers, and customers to provide empirical evidence derived from various perspectives (Gatignon/Xuereb 1997). Szymanski and colleagues (2007) complain that innovativeness studies are almost exclusively based on managers' assessments of customers' views of innovativeness; we validate marketing managers' assessments of product program innovativeness with the opinions of customers. This innovative dataset significantly extends existing knowledge about companies' innovation orientation.

2.2 Theoretical Background

Configuration theory describes a company's search for dominant gestalts or configurations that may lead to superior performance (e.g., Ketchen/Thomas/Snow 1993; Miller 1987; Ward/Bickford/Leong 1996). A configuration denotes constellations of elements inside or outside the organization that come together within a unifying theme (e.g., Meyer/Tsui/Hinings 1993; Miller/Mintzberg 1988), formed by the combination of the organization's internal arrangements and the external environment (e.g., Hambrick 1984; Veliyath/Srinivasan 1995). The internal arrangements include fundamental variables that drive organizations (Meyer/Tsui/Hinings 1993; Vorhies/Morgan 2003); the environment comprises external factors relevant to a company's actions (Ginsberg/Venkatraman 1985; Zhou et al. 2005).

Configuration theory integrates all relevant variables within the organization's configuration (e.g., Meyer/Tsui/Hinings 1993; Miller 1987). Firm performance reflects the degree of consistency or fit among the variables in a configuration (Venkatraman 1989), such that higher fit improves performance and reveals ideal configurations that yield superior performance (Vorhies/Morgan 2003). Because there is more than one way to succeed, various configurations can lead to strong performance (Gresov/Drazin 1997; Katz/Kahn 1978), in a phenomenon called equifinality (Meyer/Tsui/Hinings 1993).

To describe the patterns of innovation orientation, we therefore need to identify the elements that form each configuration. Extant research in the configuration theory tradition draws on the internal arrangements of the company's strategy, structures, processes, systems, culture, and leadership as fundamental variables that shape organizational design (Meyer/Tsui/Hinings 1993; Vorhies/Morgan 2003). These variables also appear in several conceptual papers and studies related to innovation orientation (e.g., Manu 1992; Siguaw/Simpson/Enz 2006) and thus appear to be important elements of innovation orientation.

Configuration theory indicates that external elements form constellations or patterns, in the sense that the environment constrains organizational choice and thereby interrelates with the internal organization (e.g., Hambrick 1984; Meyer/Tsui/Hinings 1993; Veliyath/Srinivasan 1995). Including the external dimension also acknowledges the concept of equifinality with regard to the environment (Meyer/Tsui/Hinings 1993) because several different constellations may exist in comparable environmental settings (Gresov/Drazin 1997). Finally, decisions may be subject to fatal misjudgments if the

decision makers fail to take environmental conditions into account (Miller/Friesen 1983). To elaborate on this environmental dimension, we draw on boundary theory.

Boundary theory suggests that organizations depend on their environment to obtain critical resource inputs and to dispose of outputs (Aldrich/Herker 1977). The environment also provides a source of uncertainty, that is, unpredictability in a company's surroundings, as perceived by organizational members (e.g., Clark/Varadarajan/Pride 1994; Duncan 1972; Leifer/Huber 1977). Innovation management pertains to dynamic changes, especially in offered products, which are mirrored by environmental dynamism, such as the frequently used market-related dynamism and technological turbulence variables (Buganza/Dell'Era/Verganti 2009; Homburg/Workman/Krohmer 1999). Consistently, the dynamic aspect of environmental uncertainty appears particularly important in the context of innovations (Duncan 1972).

Boundary theory further holds that organizational boundaries circumscribe and limit organizations (Leifer/Huber 1977). Thus, a major organizational challenge relates to managing boundaries with an environment, including externally generated uncertainty (Aldrich/Herker 1977; Spender/Kessler 1995). That is, boundary-spanning activities represent fundamental managerial activities that greatly affect business success (Dollinger 1984; Jemison 1984). A company's boundary-spanning activities attempt to reduce environmental uncertainty to a manageable level by gathering information about the environment (Clark/Varadarajan/Pride 1994; Leifer/Huber 1977), which enables them to respond adequately to market requirements (Slater/Narver 1999) and generate attractive offers (Harmancioglu/Grinstein/Goldman 2010). Thus, boundary-spanning activities are particularly important for managing environmental uncertainty in the context of innovations (Spender/Kessler 1995).

Marketing literature commonly considers boundaries with customers (e.g., Singh 1998; Stock 2006). With regard to innovation management, customer-related boundaries appear critical for companies' innovativeness for several reasons (e.g., Calantone/Chan/Cui 2006; Danneels/Kleinschmidt 2001). First, by managing customer-related boundaries, a company can acquire information about customer needs, which helps it develop successful innovations (e.g., Clark/Varadarajan/Pride 1994; Kelly/Kranzberg 1975). Because of their knowledge, customers are among the most important sources of external information for innovations (e.g., Magnusson/Matthing/Kristensson 2003; Nambisan 2002). Second, customer-related boundaries may establish a communication platform that increases customer acceptance of new products (Schatzel/Calantone 2006; Sorescu/Shankar/Kushwaha 2007). Consistently, extant innovation literature

considers customer-related boundary-spanning activities key to successful innovation management and suggests fostering such activities by incorporating customer information (e.g., Calantone/Chan/Cui 2006; Danneels/Kleinschmidt 2001; Hauser/Tellis/Griffin 2006).

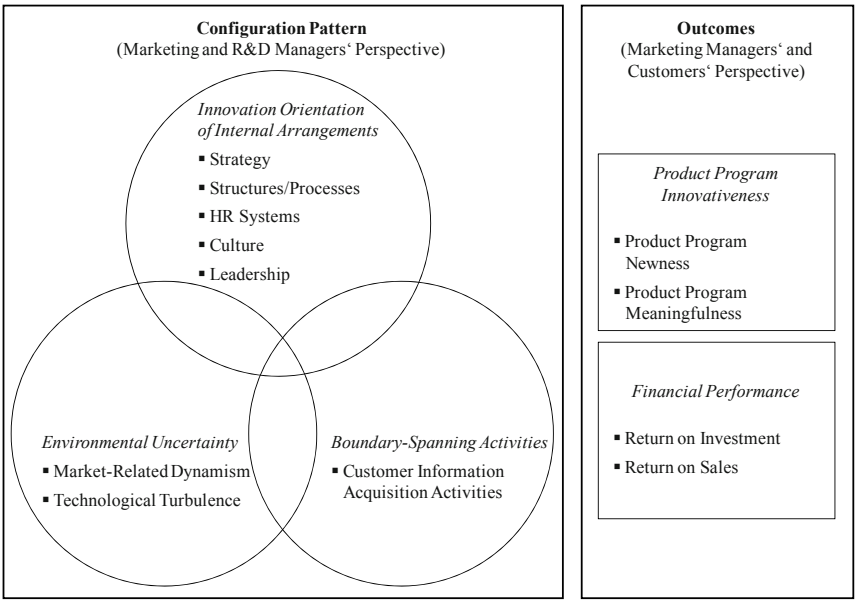
Thus, configuration and boundary theory both contribute to this study: Configuration theory indicates the need to consider internal and external elements to attain an integrated view of organizations. We consider both internal arrangements and environmental variables highly relevant for our investigation of companies' innovation orientations. Boundary theory confirms the importance of the environment (i.e., environmental uncertainty) as a contingency factor and identifies boundary-spanning activities as a third key dimension that links internal arrangements and environmental uncertainty. Both theories indicate valuable performance implications that we employ to develop hypotheses about the patterns of companies' innovation orientation and explain their performance outcomes.

2.3 Framework and Hypotheses

2.3.1 Framework of the Study

To investigate the different patterns of innovation orientation and their performance implications, we propose the framework in Figure 2-1. In line with our theoretical basis in configuration and boundary theory, we include internal arrangements, environmental uncertainty, and boundary-spanning activities as particularly relevant dimensions of the different patterns of innovation orientation. Firm performance therefore reflects the fit among internal arrangements (i.e., innovation orientation of strategy, structures/processes, human resource systems, culture, and leadership), environmental uncertainty (i.e., market-related dynamism, technological turbulence), and boundary-spanning activities (i.e., customer information acquisition activities) in a particular organizational configuration. As such, a company's innovative performance outcomes depend on the configuration pattern as a whole.

Figure 2-1: Configuration Pattern and Outcomes



Outcomes To investigate the performance outcomes of different patterns of innovation orientation, we consider two facets of innovativeness and financial performance. Because we investigate innovation orientation at the company level, our outcomes need to reflect this level as well. Therefore, we draw on product program innovativeness, which refers to the company's whole range of products (Atuahene-Gima/Slater/Olson 2005), defined as the degree of newness and meaningfulness of a company's product program.

Our multidimensional approach thus encompasses the concepts of newness and meaningfulness (Lengnick-Hall 1992; Subramanian/Nilakanta 1996). *Product program newness* refers to the degree of difference between a company's product program and existing alternatives (e.g., Garcia/Calantone 2002; Szymanski/Kroff/Troy 2007). *Product program meaningfulness* (also known as value, usefulness, utility, or advantage; Fang 2008; Szymanski/Kroff/Troy 2007) is the superiority of new products in terms of their quality and benefits (Calantone/Chan/Cui 2006).

The financial performance outcomes consist of returns on investment (ROI) and return on sales (ROS). Both measures appear frequently in prior marketing literature (e.g., Hult/Ketchen 2001; Noble/Sinha/Kumar 2002).

Configuration Pattern In line with configuration theory and boundary theory, we include internal variables that constitute an organization's innovation orientation, environmental uncertainty variables, and boundary-spanning activities as configuration variables. As suggested by extant configuration theory research (Meyer/Tsui/Hinings 1993; Vorhies/Morgan 2003), we capture the internal arrangements with strategy, structures/processes, human resource (HR) systems, culture, and leadership.

Configuration theorists emphasize the consideration of a company's strategy as essential to an understanding of whether it will be able to survive in the long run (Hambrick 1984). To determine a company's long-term direction in support of innovativeness, we therefore include *innovation orientation of strategy* as an internal arrangement (Gatignon/Xuereb 1997; Siguaw/Simpson/Enz 2006). It refers to the degree to which a company's strategy focuses on driving innovativeness. An innovation-oriented strategy generates superior innovations through an active search for new opportunities (e.g., Drucker 1970; Engelland/Summey 1999), the continuous creation of new products, and proactive competitive positioning (Cooper/Woo/Dunkelberg 1989). Thus, an innovation orientation of strategy might contribute to a pattern associated with product program innovativeness (Gatignon/Xuereb 1997).

Furthermore, configuration theorists claim that a comprehensive configuration incorporates internal arrangements that shape organizational design (e.g., Meyer/Tsui/Hinings 1993; Vorhies/Morgan 2003). Among these elements, structures/processes, HR systems, culture, and leadership form the major formal and informal configuration variables. *Innovation orientation of structures/processes* entails the degree to which structural and procedural elements promote the generation of innovations (Olson/Walker/Ruekert 1995; Subramanian/Nilakanta 1996). Companies with a high innovation orientation of structures/processes focus, for example, on providing sufficient resources for responsible units, improved information flows, and strong decision-making processes. These aspects enhance efficiency during the generation of innovations and thus contribute to product program innovativeness.

An *innovation orientation of HR systems* is important for innovativeness (e.g., de Brentani 2001; Shipton et al. 2006), because employees provide a major source of knowledge (Grant 1997). On a general level, an organization's HR management sys-

tems consist of recruiting, development, appraisal, and reward systems (Atuahene-Gima 1996b; Harris/Ogbonna 2001). Accordingly, we define the innovation orientation of HR systems as the degree to which these systems foster a company's innovativeness. For example, companies might train employees in creativity techniques or reward them on the basis of the quality of their new product ideas.

Gilley and colleagues (2008, p. 155) recognize that "multiple elements within the organizational culture … serve to enhance or inhibit innovation." We therefore define the *innovation orientation of culture* as the degree to which values, norms, and artifacts support the company's innovativeness. This definition mirrors the conceptualization of market-oriented organizational culture by Homburg and Pflesser (2000). Values (e.g., flexibility, creativity) appear in organizational members' beliefs (Chan/Shaffer/Snape 2004); norms (e.g., willingness to find unbureaucratic solutions, appreciation of unconventional ideas) involve the company's expectations that organizational members support its innovativeness through their behaviors (Bowen/Ostroff 2004); and artifacts (e.g., stories of exemplary behavior; Higgins/McAllaster 2002) relate to the circulation of stories, arrangements, and rituals (Homburg/Pflesser 2000) An innovation-oriented culture increases innovativeness by pushing organizational members toward innovation and creating an innovation mentality (e.g., de Brentani 2001; Miron/Erez/Naveh 2004). Furthermore, organizational members' values regarding innovations make them sensitive to innovations and can generate advantages in a market.

The *innovation orientation of leadership* refers to the degree to which leaders promote subordinates' innovation orientation. Innovation-oriented leaders not only demonstrate innovation orientation in their own behavior but also encourage employees to adopt such attitudes through employee motivation, intellectual stimulation, and support for employees (Elenkov/Judge/Wright 2005). In turn, employees generate positive attitudes toward the generation of new and beneficial products, which motivates them to support product program newness and meaningfulness in their own behaviors (Denning 2005; Elenkov/Judge/Wright 2005).

Configuration and boundary theory both suggest that companies' activities should acknowledge their environmental challenges. According to boundary theory, environmental uncertainty represents a particular challenge (e.g., Leifer/Huber 1977), and the high dynamism associated with generating new products implies that market-related dynamism and technological turbulence are particularly promising facets for capturing environmental uncertainty (e.g., Buganza/Dell'Era/Verganti 2009; Duncan 1972).

Market-related dynamism represents the frequency of major market-related changes, including products or services offered by competing suppliers or changes in customer preferences (Homburg/Workman/Krohmer 1999; Stock 2006). *Technological turbulence* represents the rate of technological change in the industry (Jaworski/Kohli 1993). Markets with high market-related dynamism and/or technological turbulence require companies to keep up with their changing environment by introducing innovations into the market. If environmental uncertainty is high, companies need innovations to differentiate themselves from competitors. Thus, companies are pushed to pursue high product program innovativeness in highly uncertain environments (Buganza/Dell'Era/Verganti 2009), which heightens the value of new products for customers in these markets. Empirical evidence confirms that environmental uncertainty is associated with product program innovativeness (Souder/Sherman/Davies-Cooper 1998).

Boundary theory further highlights boundary-spanning activities as important for companies' survival. We consider the degree of *customer information acquisition activities* (Fennell/Alexander 1987; Meznar/Nigh 1995) because boundary theory holds that, especially in markets characterized by environmental uncertainty, companies approach customers to gather information (Laursen/Salter 2006) and that information is "the greatest stimulus to innovation" (Sanchez/Elola 1991, p. 55). These information acquisition activities produce ideas for new products that generate value for customers (Fang 2008). Moreover, empirical evidence indicates that boundary-spanning activities are associated with product program newness (e.g., Fang 2008; Laursen/Salter 2006).

2.3.2 Hypotheses

According to configuration theory, companies search for configurations that will lead to superior performance (Ward/Bickford/Leong 1996). Configuration and boundary theory also indicate that internal arrangements, environmental uncertainty, and boundary-spanning activities are relevant dimensions for understanding companies' innovation orientation. Furthermore, configuration theory predicts different patterns of innovation orientation that comprise the three dimensions. Specifically, the configuration variables reflecting the three dimensions may display different levels in a particular pattern. Thus, we hypothesize:

H_1: Companies exhibit different patterns of innovation orientation that comprise internal arrangements, environmental uncertainty, and boundary-spanning activities.

Configuration theory further indicates that consistency among the configuration variables contributes to a company's performance, while a lack of fit harms performance (Venkatraman 1989; Vorhies/Morgan 2003). Accordingly, different patterns of innovation orientation should vary in their product program innovativeness and financial performance. Equifinality in turn indicates that several of these patterns can be associated with equally high levels of product program innovativeness and financial performance (Gresov/Drazin 1997; Meyer/Tsui/Hinings 1993).

Despite its prediction that companies search for high consistency in their configuration variables that results in more or less successful pattern depending on the consistency reached, configuration theory does not specify how to achieve this consistency. However, boundary theory suggests that boundary-spanning activities foster companies' performance, such that a promising pattern would be characterized by relatively high environmental uncertainty and high boundary-spanning activities (Katz/Kahn 1978). Companies faced with an uncertain environment experience regular changes in the market and technologies (Homburg/Workman/Krohmer 1999), which requires them to keep up with their changing environment and differentiate themselves from competitors by introducing innovations (Buganza/Dell'Era/Verganti 2009). Companies that also carry out boundary-spanning activities can acquire valuable innovation information, which increases their performance and supports their efforts to manage environmental uncertainty (Clark/Varadarajan/Pride 1994; Miller/Friesen 1983; Spender/Kessler 1995). Thus, we hypothesize:

H_2: Product program innovativeness and financial performance are higher for companies that exhibit relatively high environmental uncertainty and boundary-spanning activities compared with other patterns of innovation orientation.

2.4 Methodology

2.4.1 Data Collection

A large-scale survey across companies in five different industry sectors—software/IT, service, utilities, machinery, and electronics—provides the data for this study. These sectors are among the largest and most impactful in the U.S. economy (U.S. Census Bureau 2006), and they belong to industries often covered in extant innovation management and marketing research pertaining to product program innovativeness, which makes them particularly pertinent for this study (e.g., Atuahene-Gima 1996a; Citrin/Lee/McCullough 2007). In Table 2-1, we provide the sample characteristics. Company

sizes in the different industries largely mirror the overall distribution of the sample; however, we do not explicitly calculate detailed, industry-specific distribution requirements. In terms of representativeness, we mainly focus on the industries and company sizes of the overall sample. The participating companies employed at least 50 persons, which enabled us to eliminate very small firms that lacked distinct functional departments (Ottum/Moore 1997); otherwise, our sample captures a wide range of company sizes. Furthermore, though companies with 500 or more employees represent less than 5% of companies in the U.S. economy (U.S. Census Bureau 2006), we consider this segment important for our study, as supported by existing studies in the field of innovation management (e.g., Atuahene-Gima 1996a; Yadav/Prabhu/Chandy 2007).

Table 2-1: Study 1 – Sample Composition

Company Data		Customer Data	
Industry Sector		**Industry Sector**	
Software/IT	26.2%	Media	2.8%
Services	22.3%	Commercial Trade	3.7%
Utilities	21.4%	Industrial Services	7.5%
Electronics	15.5%	Software/IT	8.4%
Machinery	14.6%	Utilities	17.8%
		Financial Services	0.9%
Sales Volume		Chemical Industry	2.8%
< $10 million	33.0%	Machinery/Electronics	22.4%
$10 - $25 million	21.4%	Tourism/Transport	3.7%
$25 - $50 million	15.5%	Automobile Industry	3.7%
$50 - $100 million	12.6%	Energy	4.7%
$100 - $250 million	5.8%	Other	21.5%
$250 - $1billion	7.8%		
> $1 billion	3.9%		
Number of Employees			
< 100	34.9%		
101-200	23.3%		
201-500	14.0%		
501-1,000	3.5%		
1,001-5,000	11.6%		
5,001-10,000	3.5%		
> 10,001	9.3%		

Because an object's ratings cannot be divorced from its perceiver, we selected the most knowledgeable informants with the greatest expertise to report on each construct. Specifically, marketing and R&D managers are the key informants; this gives us two

highly relevant perspectives in the context of innovations (Danneels/Kleinschmidt 2001).

The data collection involved several steps. In the first step, we randomly selected 1,000 marketing managers from companies on a listing maintained by a commercial address provider, to whom we sent personalized letters with requests for their participation. After follow-up telephone calls, 304 marketing managers indicated their willingness to participate. We then sent a code for the Internet-based survey to these participants and, after five weeks, received 177 completed electronic questionnaires (response rate = 17.7% of initial contacts, 58.2% of willing participants). These marketing managers provided information about the innovation orientation of HR systems and culture, customer information acquisition activities, product program innovativeness, and financial performance. Because of their relative closeness to the market, they also assessed market-related dynamism. In addition, they identified an R&D manager in their company and provided five customer names and addresses. Most marketing managers (162 of 177) identified the R&D managers, and 82 agreed to provide the names and addresses of their customers.

In the second step, we contacted the R&D managers, from whom we received 103 completed electronic questionnaires (response rate = 63.6%). These R&D managers assessed the innovation orientation of strategy, structures/processes, and leadership. Because of their knowledge about technical advances, they also assessed technological turbulence.

The marketing managers' questionnaires provided the names and addresses of 410 customer companies affiliated with 82 of the surveyed organizations. We undertook a third data collection step and contacted the customers through personalized letters and follow-up telephone calls. This effort resulted in 107 usable customer responses (response rate = 26.1%) affiliated with 46 companies (average of 2.33 customers per company). The customers provided information about their perceptions of product program innovativeness.

In summary, our data collection procedure generated a total of 103 cases with responses from both marketing and R&D managers and 107 customer responses related to 46 companies. To assess nonresponse bias, we compared early and late respondents (Armstrong/Overton 1977) and found no significant differences with regard to the core constructs or outcome variables. Therefore, nonresponse bias does not appear to be an issue.

2.4.2 Measurement Procedure

The questionnaire was based on a comprehensive literature review and field interviews with 18 academics and practitioners. We adopted previously used and validated scales from existing literature whenever possible. We pretested and refined an initial draft of the questionnaire.

To identify companies' innovation orientation types, we conducted a cluster analysis, which requires relevant constructs to describe the investigated phenomenon (i.e., active cluster variables). As we show in Figure 2-1, we use eight active cluster variables as configuration elements; they are highly relevant to the patterns of companies' innovation orientation.

For the operationalization, we used reflective multi-item measures (unless otherwise indicated), because the observed variables are interchangeable manifestations of the underlying construct. We also employed formative measurement models—which are appropriate when the constructs provide a summary index of observed dimensions that define and determine the construct (Diamantopoulos/Winklhofer 2001; Jarvis/MacKenzie/Podsakoff 2003)—for the artifact dimension (circulation of stories, arrangements, and rituals; Homburg/Pflesser 2000), as well as for the multidimensional constructs. These are namely innovation orientation of structures/processes (determined by structures and processes), innovation orientation of HR systems (recruiting, development, appraisal, and rewards; Atuahene-Gima 1996b; Harris/Ogbonna 2001), and innovation orientation of culture (innovation orientation of values, norms, and artifacts; Homburg/Pflesser 2000). All items, including the sources used for the scale development and specification of respondents (i.e., marketing managers, R&D managers, and/or customers), appear in Table 2-2.

Table 2-2: Study 1 – Scale Items for Construct Measures

Construct and Source	Items	α/CR/AVE/r_{wg}
Innovation Orientation of Strategy[a] (Respondents: R&D managers) (adapted from Miles/Snow 1978)		.70/.71/.45/–
	Our company generally enters the market first with its products and services.	
	Our company does not hesitate to enter new market segments that offer appropriate opportunities.	
	Our company intends to offer innovative products based on dramatic performance increases.	

Construct and Source	Items	α/CR/AVE/r_{wg}
Innovation Orientation of Structures/Processes[a] (Respondents: R&D managers) (self-developed scales)		
● **Structures**	In our company, we have specific units for the generation of innovations. It is clearly regulated who is responsible for innovations. In our company, people know who is in charge of innovations. The units responsible for innovation have sufficient resources for the generation of innovations. The units responsible for innovation have sufficient competencies for the introduction/generation of innovations.	.91/.91/.68/–
● **Processes**	The processes in our company … … are aimed at the generation of innovations for the customer. … for the generation of innovations are highly important to the company. … are better focused on the generation of innovations than the processes of our competitors. … facilitate innovations to a high degree.	.89/.89/.68/–
Innovation Orientation of HR Systems[a] (Respondents: marketing managers) (adapted from Huang 2000; Khatri 2000)		
● **Recruiting**	Competencies for the management of innovations are an important criterion for recruiting. We expect high innovativeness and creativity from our new employees. During the recruiting process, we test applicants for innovativeness and creativity.	.81/.82/.60/–
● **Development**	During training sessions for innovativeness, the development of social competencies is the focus. Training programs to increase personal innovativeness are offered regularly. During training sessions, the strategic importance of innovation orientation is communicated to the employees.	.86/.86/.68/–
● **Appraisal**	In our company, the innovation skills of employees are regularly appraised. In the appraisal process, the innovation orientation of employees is explicitly incorporated as a criterion. The performance of employees regarding innovativeness is systematically assessed and evaluated.	.90/.90/.75/–
● **Rewards**	High performance in innovativeness is valued highly by performance-related rewards. Employees with extraordinary innovation orientation are rewarded highly. Extraordinary performance in the increase of innovativeness is rewarded by bonuses.	.89/.90/.75/–

Construct and Source	Items	α/CR/AVE/r_{wg}
Innovation Orientation of Culture[a] (Respondents: marketing managers) (adapted from Homburg/Pflesser 2000)		
● **Values & Norms**	In our company, … … we particularly emphasize innovativeness and creativity. … we rate the flexibility of the employees very high. … we are very open toward innovations (e.g., related to products and/or processes). … we expect that unbureaucratic solutions are found quickly in difficult situations (e.g., in cases of massive customer complaints). … we expect that new value-adding products and services are detected and developed permanently. … we appreciate unconventional ideas (especially if they come from the customer).	.91/.91/.63/–
● **Artifacts**	In our company, … … stories of exemplary innovation-oriented behavior of executives (e.g., founders, chief executives, managers) circulate. … attractive meeting and discussion areas (e.g., cafeterias or intranet) exist where information regarding innovations can be exchanged informally. … we regularly organize events for customers or cooperation partners in the context of new product innovations.	–/–/–/–
Innovation Orientation of Leadership[a] (Respondents: R&D managers) (adapted from Stock/Hoyer 2002)	The managers of our company … … encourage activities that foster innovations. … express appreciation for innovation-oriented attitudes of their employees. … criticize employees' behaviors that are not innovation-oriented. … support innovation-oriented employees in particular. … demonstrate an innovation orientation in their own behavior. … set the goals of their employees in order to promote a high innovation orientation.	.94/.94/.72/–
Market-Related Dynamism[a] (Respondents: marketing managers) (adapted from Homburg/Workman/Krohmer 1999)	In our market, major changes occur frequently in the area of … … products offered by our competitors. … market development strategies of our competitors. … customer preferences in product features. … customer preferences in product quality/price relationship. … new competitors.	.84/.85/.54/–
Technological Turbulence[a] (Respondents: R&D managers) (according to Jaworski/Kohli 1993)	The technology in our industry is changing rapidly. Technological changes provide big opportunities in our industry. It is very difficult to forecast where the technology in our industry will be in the next 2 to 3 years. A large number of new product ideas have been made possible through technological breakthroughs in our industry.	.81/.82/.54/–

Construct and Source	Items	α/CR/AVE/r_{wg}
Customer Information Acquisition Activities[a] (Respondents: marketing managers) (adapted from Jaworski/Kohli 1993)		.73/.74/.42/–
	In our company, we meet with customers at least once a year to find out what products and services they will need in the future.	
	Our products/services are strongly influenced by customers during their development.	
	Individuals from our R&D department interact directly with customers to learn how to serve them better.	
	Individuals from our marketing and sales department interact directly with customers to learn how to serve them better.	
Product Program Newness[a] (Respondents: marketing managers and customers) (adapted from Cooper 1979; Olson/Walker/Ruekert 1995)		Marketing: .87/.88/.59/– Customer: .89/.88/.66/.80
	The products/services of our company …	
	… are novel.	
	… are inventive.	
	… differ significantly in terms of their newness from existing products/services of competitors.	
	… are exceptional.	
	… are not predictable.	
Product Program Meaningfulness[a] (Respondents: marketing managers and customers) (adapted from Cooper/de Brentani 1991; Mishra/Kim/Lee 1996)		Marketing: .82/.84/.52/– Customer: .94/.94/.68/.95
	The newly developed products/services of our company …	
	… offer unique advantages to our customers.	
	… offer higher quality than the products/services of our competitors.	
	… solve the problems of our customers.	
	… lead to significant cost savings for our customers.	
	… deliver high benefits for our customers.	
Financial Performance[b] (Respondents: marketing managers) (according to Delaney/Huselid 1996)		
	To what extent has your company (business unit) achieved better results than the competition in these areas?	
	- Return on investment	–/–/–/–
	- Return on sales	–/–/–/–

Notes: α: Cronbach's alpha; CR: Composite reliability; AVE: Average variance extracted; r_{wg}: Within-group interrater reliability (median), only for customer data.
[a]Items measured with seven-point rating scales with the anchors 1 = "strongly disagree" and 7 = "strongly agree."
[b]Items measured with seven-point rating scales with the anchors 1 = "much worse" and 7 = "much better."
● Dimensions of multidimensional constructs.

To ensure the reliability and validity of our scales, we conducted exploratory and confirmatory factor analyses. For all reflective constructs, the Cronbach's alpha exceeds the recommended minimum of .7 (Nunnally 1978), which indicates a high degree of internal consistency. Composite reliability, or the shared variance among a set of indicators that measure an underlying construct (Fornell/Larcker 1981), is greater than the threshold value of .6 (Bagozzi/Yi/Phillips 1991). We applied Fornell and Larcker's (1981) rigorous criterion to test for discriminant validity (Anderson/Gerbing 1993). As we reveal in Table 2-3, the diagonal elements representing the square roots of the average variance extracted (for reflective constructs) are greater than the off-diagonal elements. This finding even persists for the high correlations between the innovation orientations of structures/processes and leadership (r = .69), as well as between the innovation orientations of HR systems and culture (r = .64). Thus, discriminant validity is not a problem in our study. Two constructs, innovation orientation of strategy and customer information acquisition activities, show average variance extracted values of less than .5. However, we retained these measures because we emphasize the face and content validity of the two constructs, in that the scope of the content of the constructs are adequately reflected by the items as a group (Brahma 2009; Churchill 1979). Furthermore, we validated the importance of all items in a pretest that included qualitative interviews. Considering the variety of psychometric properties assessed (Diamantopoulos/Siguaw 2000), we kept both constructs in our analysis.

Table 2-3: Study 1 – Correlations and Descriptive Statistics of Active Cluster Variables and Outcome Variables

	Innovation Orientation of Strategy	Innovation Orientation of Structures/Processes	Innovation Orientation of HR Systems	Innovation Orientation of Culture	Innovation Orientation of Leadership	Market-Related Dynamism	Technological Turbulence	Customer Information Acquisition Activities	Product Program Newness	Product Program Meaningfulness	Return on Investment	Return on Sales
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	**0.67**											
2	0.59	**n/a**										
3	0.16	0.12	**n/a**									
4	0.25	0.17	0.64	**n/a**								
5	0.41	0.69	0.22	0.27	**0.85**							
6	0.22	0.03	0.23	0.27	0.15	**0.73**						
7	0.28	0.27	-0.02	0.14	0.19	0.30	**0.73**					
8	0.10	0.12	0.44	0.52	0.21	0.20	0.13	**0.65**				
9	0.28	0.15	0.34	0.50	0.21	0.19	0.14	0.34	**0.77**			
10	0.22	0.16	0.18	0.43	0.26	0.29	0.29	0.38	0.61	**0.72**		
12	0.19	0.16	0.14	0.22	0.05	-0.07	0.03	0.29	0.23	0.10	**n/a**	
13	0.18	0.15	0.09	0.18	0.08	-0.04	0.05	0.26	0.23	0.09	0.92	**n/a**
Mean	5.10	4.62	3.97	5.04	5.01	4.22	4.57	5.55	4.64	5.89	4.90	4.86
s. d.	1.04	1.21	1.12	1.11	1.11	1.14	1.17	1.16	1.24	0.87	1.12	1.15

Notes: N = 103. Diagonal elements in bold are the square roots of the average variance extracted for constructs measured reflectively with multiple items.

2.4.3 Validation with Customer Data

Performance assessments based solely on self-reported data can be problematic, due to the effects of informant bias (Bagozzi/Yi/Phillips 1991; Kumar/Stern/Anderson 1993) and common method bias (Podsakoff et al. 2003). Therefore, we validated our data with additional information and enhanced the validity of our measures of product program innovativeness by considering information from outside the organization (i.e., customers). By taking into account customer perceptions of companies' innovativeness, we also adopted Szymanski and colleagues' (2007) recommendation to include customer perspectives in innovation research.

To determine whether aggregating assessments by groups of customers of each company is appropriate, we used the index of within-group interrater reliability (r_{wg}) established by James and colleagues (1984). For all constructs assessed by customers, the

median r_{wg} values exceed the proposed minimum of .70 (.80 for product program newness and .95 for product program meaningfulness; see Burke/Finkelstein/Dusig 1999). Of all the r_{wg} values we estimated, 88% of the product program newness and 93% of the product program meaningfulness values are greater than .70, which justifies the data aggregation. We averaged the customer responses for each company into a single group composite value for our subsequent data analysis (Van Bruggen/Lilien/Kacker 2002). In addition, we correlated the marketing managers' assessments of the different product program innovativeness outcomes with the equivalent constructs from the customer data. The results indicate high correlations for product program newness (.52; $p < .01$) and meaningfulness (.45; $p < .01$), in support of the validity of the managers' perceptions.

2.4.4 Cluster Analysis

We employed a four-stage clustering approach, building on the procedure outlined in previous literature (e.g., Bunn 1993; Cannon/Perreault 1999). The clustering procedure consists of four stages: eliminate statistical outliers, identify the number of clusters, assign observations to clusters, and assess the stability of the cluster solution. We used SPSS 15 and SAS 9.1 for the calculations.

In the first stage, we performed a single-linkage clustering algorithm to identify outliers in our dataset and eliminate 2 of the 103 observations, for an elimination rate of 1.94%. Determining the appropriate number of clusters is central to cluster analysis (Milligan/Cooper 1987); we employed the elbow criterion and the pseudo-t^2 index (Duda/Hart 1973) in combination with the hierarchical clustering algorithm developed by Ward (1963).

To assign observations to clusters, we adopted a hybrid approach, as recommended by Punj and Stewart (1983). We first applied Ward's (1963) algorithm, then adopted the k-means method, which builds on the previous solution. The k-means procedure yields exceptional results if given a reasonable starting solution (Milligan/Cooper 1987).

To assess the stability of our cluster solution, we cross-validated the cluster assignments using the procedure recommended by Cannon (1992): we split the sample into three subsamples of equal size (A, B, C) and undertook the clustering procedure twice for (A or B) and (B or C). Finally, we evaluated whether the observations in subsample B appear in the same cluster for both runs, as was the case in 75% of the observa-

tions. Considering the small size of our sample after the split, this result provides a good indication of the stability of the solution.

2.5 Results

An important issue for cluster analysis involves verifying whether the clusters offer meaningful interpretations (Rich 1992). Table 2-4 provides statistical descriptions of the clusters; Table 2-5 offers a verbal description. In H_1, we proposed that companies exhibit different patterns of innovation orientation that comprise internal arrangements, environmental uncertainty, and boundary-spanning activities. The cluster analysis reveals that companies exhibit four different patterns of innovation orientation, in line with configuration theory. The single variables for the three dimensions achieve different levels in most of the four configurations. Thus, companies can be distinguished according to their particular patterns of innovation orientation.

Table 2-4: Statistical Cluster Description

	Total	Integrated Innovator	Internally Driven Preserver	Proactive Customer-Oriented Innovator	Top-Down Innovator
Percentage of Observations	**100% (n = 101)**	**17.8% (n = 18)**	**12.9% (n = 13)**	**30.7% (n = 31)**	**38.6% (n =39)**
Internal Arrangements					
Innovation Orientation of Strategy		6.15 [a]	4.67 [b,c]	4.58 [c]	5.30 [b]
Innovation Orientation of Structures/ Processes		5.58 [a]	4.19 [b]	3.61 [b]	5.29 [a]
Innovation Orientation of HR Systems		4.87 [a]	2.67 [c]	4.40 [a,b]	3.78 [b]
Innovation Orientation of Culture		6.02 [a]	3.42 [c]	5.50 [a]	4.86 [b]
Innovation Orientation of Leadership		6.02 [a]	4.22 [b]	4.35 [b]	5.47 [a]
Environmental Uncertainty					
Market-Related Dynamism		5.54 [a]	3.38 [c]	4.26 [b]	3.90 [b,c]
Technological Turbulence		5.86 [a]	4.44 [b]	3.93 [b]	4.51 [b]
Boundary-Spanning Activities					
Customer Information Acquisition Activities		6.32 [a]	4.40 [c]	6.09 [a]	5.28 [b]

Notes: Reported values are mean values. In each row, cluster means that have the same superscript are not significantly different ($p < .05$), according to Duncan's and Waller's multiple-range test. Means in the highest bracket are assigned a, means in the next lower bracket b, and so forth.

Table 2-5: Verbal Cluster Description

	Integrated Innovator	Internally Driven Preserver	Proactive Customer-Oriented Innovator	Top-Down Innovator
Internal Arrangements				
Innovation Orientation of Strategy	High	Moderately low	Low	Medium
Innovation Orientation of Structures/ Processes	High	Low	Low	High
Innovation Orientation of HR Systems	High	Low	Moderately high	Medium
Innovation Orientation of Culture	High	Low	High	Medium
Innovation Orientation of Leadership	High	Low	Low	High
Environmental Uncertainty				
Market-Related Dynamism	High	Low	Medium	Moderately low
Technological Turbulence	High	Low	Low	Low
Boundary-Spanning Activities				
Customer Information Acquisition Activities	High	Low	High	Medium

2.5.1 Interpretation of Patterns of Innovation Orientation

To interpret the clusters, we assign labels to them, which serve didactic purposes by emphasizing the distinctive empirical aspects of each cluster and also facilitate our discussion.

Cluster 1 (Integrated Innovators) All eight active cluster variables rank as the highest for this type. Environmental uncertainty and boundary-spanning activities are both high. Their innovation orientation is reflected in their high scores on the strategy, structures/processes, HR systems, culture, and leadership constructs. Overall, this pattern represents a relatively balanced and integrated approach. These companies lack a specific focus on any selected variables in their internal arrangements; an approach which would require additional resources. Prior literature has identified such an integrated implementation of innovation orientation as a suitable strategy to achieve innovativeness in highly uncertain environments (e.g., Calantone/Garcia/Dröge 2003; Siguaw/Simpson/Enz 2006). We call these companies "integrated innovators."

Cluster 2 (Internally Driven Preservers) The environmental uncertainty of these companies is low, as evidenced by their lowest overall market-related dynamism scores and second lowest technological turbulence score. This type also achieves the lowest ranking for boundary-spanning activities and several internal arrangements, including the innovation orientation of HR systems and culture. With regard to the overall pat-

tern, the emphasis on the innovation orientation of strategy and structures/processes suggest a centralized, structure-driven innovation orientation. However, these companies do not implement a company-wide innovation orientation, and they avoid customer information acquisition activities, which implies that they mainly focus on internal sources of innovativeness. These activities characterize them as "internally driven preservers."

Cluster 3 (Proactive Customer-Oriented Innovators) The environmental uncertainty of these companies is mediocre: market-related dynamism is at a medium range, and technological turbulence exhibits the lowest score among all clusters. However, this type engages very actively in customer information acquisition activities, which is the type's most dominant characteristic, despite the low environmental uncertainty. With regard to internal arrangements, this type mainly benefits from its comparatively high innovation orientation of culture and HR systems. The innovation orientation of strategy, structures/processes, and leadership reveal rather low scores. These companies appear to base their innovativeness mainly on customers' preferences, which they glean through boundary-spanning activities and support of organizational members through their culture and HR systems. The companies have a strong customer orientation (e.g., Grinstein 2008; Stock/Hoyer 2005), and we call them "proactive customer-oriented innovators."

Cluster 4 (Top-Down Innovators) The last type experiences medium levels of environmental uncertainty paired with medium boundary-spanning activities. The pattern of these companies displays a high innovation orientation of structures/processes, paired with strong innovation orientation of strategy and leadership. The other internal arrangements achieve medium scores. Together, these findings indicate a top-down management approach, in which innovation orientation is mainly pushed down through the organization, with a general lack of interaction with customers (Ginsberg 1997). The innovation orientation of culture and HR systems might be complex to align in this setting and thus may lag. On the basis of these results, we call these companies "top-down innovators."

2.5.2 Performance Outcomes of Innovation Orientation Patterns

We investigate the extent to which these configurations differ in terms of the outcome variables: product program innovativeness (i.e., product program newness and meaningfulness) and financial performance (i.e., ROI and ROS). In Table 2-6, we provide statistics for all outcome variables.

Table 2-6: ANOVA Results of Performance Outcomes

	Integrated Innovator	Internally Driven Preserver	Proactive Customer-Oriented Innovator	Top-Down Innovator	ANOVA Significance
Product Program Innovativeness					
Product Program Newness	5.33 [a]	3.43 [b]	4.90 [a]	4.67 [a]	.000
Product Program Meaningfulness	6.58 [a]	5.42 [c]	6.04 [a,b]	5.69 [b,c]	.000
Financial Performance					
Return on Investment	4.78 [a,b]	4.23 [b]	5.16 [a]	5.05 [a]	.043
Return on Sales	4.72 [a,b]	4.23 [b]	5.06 [a]	5.05 [a]	.073

Notes: Reported values are mean values. In each row, cluster means that have the same superscript are not significantly different ($p < .05$), according to Duncan's and Waller's multiple-range test. Means in the highest bracket are assigned a, means in the next lower bracket b, and so forth.

The results reveal that several patterns of innovation orientation are equally successful regarding product program innovativeness and financial performance. Integrated innovators, proactive customer-oriented innovators, and top-down innovators achieve the same high level of innovativeness with regard to product program newness. Proactive customer-oriented innovators and top-down innovators are equally successful in financial terms. As such, these results are consistent with the concept of equifinality from configuration theory (Meyer/Tsui/Hinings 1993).

Our data partially support H_2, which proposes higher product program innovativeness and financial performance for companies with high environmental uncertainty and boundary-spanning activities. Integrated innovators attain the highest product program innovativeness, but they do not perform optimally in financial terms. In contrast, proactive customer-oriented innovators and top-down innovators—both with medium to low levels of environmental uncertainty—achieve the highest financial performance, which is somewhat surprising. However, these patterns appear particularly promising according to configuration theory. Their outcomes suggest that both types emphasize an appropriate combination of activities with regard to financial performance, which implies the consistency of these variables, in configuration theory terms (Venkatraman 1989).

2.5.3 Interpretation of Performance Outcomes of Innovation Orientation

The integrated innovator faces high environmental uncertainty and conducts intensive customer information acquisition activities. Its product program innovativeness is

highest for both outcome variables. This result is consistent with extant literature that suggests high environmental uncertainty encourages companies to generate unique competitive advantages and increase their innovativeness (Gatignon/Xuereb 1997; Jaworski/Kohli/Sahay 2000). Boundary-spanning activities also help these companies gather valuable information from customers, which can serve as an innovation stimulus (Sanchez/Elola 1991).

Regarding financial performance, this type attains only the third highest score. Boundary theory indicates that financial performance suffers from the costs associated with environmental uncertainty and boundary-spanning activities, which include the costs of customer information acquisition and information dissemination across the organization (Kohli/Jaworski/Kumar 1993; Souder/Sherman/Davies-Cooper 1998). Coordination costs mark any exchange relationship but are especially high in conditions of high environmental uncertainty (Conner/Prahalad 1996).

A less favorable constellation, characterized by low levels of environmental uncertainty and boundary-spanning activities, is the internally driven preserver. This type suffers the lowest scores on product program innovativeness and financial performance. None of the determinants—environmental uncertainty or boundary-spanning activities or the innovation orientation of internal arrangements—stimulates innovativeness in this type (Laursen/Salter 2006; Sanchez/Elola 1991).

The proactive customer-oriented innovator ranks second in terms of product program innovativeness and highest in financial performance. According to boundary theory, these companies' boundary-spanning activities exceed the information requirements associated with their environmental uncertainty. Their strong customer focus reveals customer needs (Narver/Slater/MacLachlan 2004), as shown by their high product program meaningfulness outcome. The proactive customer-oriented innovator attains almost the same product program innovativeness outcomes as the integrated innovator, but it is superior in financial terms. Whereas the integrated innovator fosters the innovation orientation of all internal arrangements and also incurs costs associated with high environmental uncertainty, the proactive customer-oriented innovator adopts patterns that lead to high innovativeness and superior financial performance, that is, patterns with the "right" combination of activities that fit together well.

Finally, top-down innovators score third in terms of product program innovativeness. They reach about the same level as integrated innovators and proactive customer-oriented innovators in terms of product program newness, but their product program

meaningfulness lags significantly behind. The medium level of customer information acquisition activities may be the main reason. However, top-down innovators also achieve high financial performance, because they save on the integration and coordination costs associated with boundary-spanning activities (Conner/Prahalad 1996; Souder/Sherman/Davies-Cooper 1998) while also avoiding some of the costs of an integrated approach. Overall, this type also attains the "right" pattern—that is, good fit—in its innovation orientation.

2.6 Discussion

2.6.1 Implications for Research

As a point of departure from prior research, we observe that academic knowledge about the antecedents of innovativeness is relatively advanced but also tends to assume that maximizing the levels of every variable in a large set is the way to increase innovativeness. Yet according to configuration theory, companies can adopt various patterns of innovation drivers. This perspective challenges "the more, the better" approaches and aims to identify effective types of fit among innovation drivers as configuration variables. We therefore provide further knowledge about typical patterns of companies' innovation orientation and their associated outcomes, along with several key contributions.

First, we contribute to research on companies' strategic orientations. Marketing research tends to focus on the concept of market orientation (e.g., Noble/Sinha/Kumar 2002; Song/Parry 2009), but research regarding the facets and outcomes of the phenomenon of innovation orientation remains scarce. This gap is surprising—an innovation orientation is critical to strategy research (Zhou et al. 2005), yet our study is one of few to consider this managerially important strategic orientation. Innovation orientation is a particularly promising strategic orientation because innovations are fundamental to companies' efforts to gain sustainable competitive advantages. As such, it is critically important to offer companies strategic directions with regard to their innovation orientation. This study offers a foundation for how to implement an innovation orientation and which patterns to pursue with regard to innovation orientation, environmental uncertainty, and boundary-spanning activities.

Second, our multidimensional framework of innovation orientation exemplifies the use of different dimensions to explain investigated phenomena with greater breadth. Whereas prior research frequently has focused on one or two dimensions (e.g., Fang 2008;

Hambrick 1983; Siguaw/Simpson/Enz 2006), our approach, with its integrative analysis of patterns that comprises internal variables, environmental variables, and a link between these two dimensions, seems promising and offers a content-based contribution. Theoretically, this comprehensive view integrates the perspectives of configuration theory and boundary theory. In doing so, we follow the call for more theoretical underpinnings in the design of innovation research (Durisin/Calabretta/Parmeggiani 2010; Stock 2010).

Third, the patterns of innovation orientation we find confirm extant literature but also add to it. Integrated innovators target innovativeness with every part of their organization and are most successful in terms of product program innovativeness. Similarly, findings from dependency analyses indicate the benefits of emphasizing a large set of innovation drivers. However, our analysis of performance outcomes reveals that several alternative patterns are equally successful for some outcome variables. That is, several optimal approaches exist, consistent with the concept of equifinality from configuration theory (Meyer/Tsui/Hinings 1993). For example, the proactive customer-oriented innovator and top-down innovator types both reach about the same level of financial performance, despite their totally different approaches. This finding suggests that both types emphasize an appropriate combination of activities to attain strong financial performance.

Fourth, with regard to boundary theory, our findings show that companies may focus on boundary-spanning activities even in low environmental uncertainty conditions. Companies with relatively high boundary-spanning activities compared against a particular level of environmental uncertainty (e.g., proactive customer-oriented innovators, top-down innovators) incorporate more information about the environment than required (e.g., Schwab/Ungson/Brown 1985). With their superior knowledge about customer needs, they enjoy better product program innovativeness and financial performance; this finding extends the performance implications of boundary theory, stated in H_2.

Fifth, levels of environmental uncertainty that reflect each end of this spectrum do not serve firms well financially. Instead, moderate to low levels of environmental uncertainty seem more financially beneficial, as exemplified by the proactive customer-oriented innovators and top-down innovators. With regard to innovativeness outcomes, high environmental uncertainty seems very promising, as the integrated innovator type demonstrates.

Sixth, to the best of our knowledge, this study is the first in the field of innovation marketing to use a sample based on two highly important informants in the context of innovations and validation with additional customer data. We collected data from two manager groups within each company (marketing managers and R&D managers), then used customer data to validate the managerial responses regarding product program innovativeness, an approach that can help reduce common method bias (Podsakoff et al. 2003).

2.6.2 Implications for Managerial Practice

This study contributes to managerial practice in several ways. Our results confirm that different types of innovation orientation are associated with different performance outcomes. In particular, proactive customer-oriented innovators and top-down innovators attain relatively high innovativeness levels and offer seemingly reasonable approaches, even when they face resource constraints.

To achieve a proactive customer-oriented innovator profile, companies could invest in boundary-spanning activities and the innovation orientation of their HR systems and culture. To improve their boundary-spanning activities, companies can pursue several routes. First, they might schedule regular meetings with customers to discuss new product ideas. For example, Harley-Davidson regularly discusses customer needs and new product ideas with riders during focus groups (Leonard 2002). Second, companies should look for boundary-spanning employees with high sensitivity to customer needs during their HR recruitment and development efforts.

Another important means to become more like a proactive customer-oriented innovator is through the innovation orientation of HR systems. For example, companies can train employees intensively in creativity techniques to increase their innovation orientation. Or companies can reward employees for their interesting new product ideas, as Google does (Iyer/Davenport 2008). To increase the innovation orientation of culture, they also can promote innovation-oriented values by expressing appreciation for creativity and unconventional ideas, perhaps by displaying innovation-oriented artifacts in their tangible environment. The office furniture manufacturer Steelcase created its new corporate development center as a pyramid, with many open areas designed to promote the exchange of ideas, including coffee stations with white boards for employees to record their spontaneous thoughts (Higgins/McAllaster 2002).

To achieve the pattern exemplified by the top-down innovator, companies should foster their innovation orientation of structures/processes and leadership. For example, they could establish specific units responsible for the generation of innovations. For example, Bank of Boston (now part of Bank of America) created an innovative unit that focused on inner-city markets (Kanter 2006). Although established performance criteria, such as transaction times and profitability per customer, suggested closing the underperforming branches of this new unit, the leaders of the new unit were able to propose novel performance criteria that were more appropriate for the new market (Kanter 2006).

Finally, managers should acknowledge that the environment plays an important role and carefully analyze it before making decisions about the innovation orientation of their companies. Further, they need to keep an eye on available resources if they plan to attain a certain pattern of innovation orientation. Despite the potential benefits in terms of innovativeness, there are also costs involved with aligning internal arrangements to make them more innovation oriented.

2.6.3 Limitations and Avenues for Further Research

Despite these contributions, our research contains several limitations that also suggest directions for further research. First, our empirical results reflect our specific sample; additional research needs to confirm our results across a broader range of industries. Because we did not develop any sampling requirements for single industries, it might be valuable to ensure that the company sizes are actually representative of each industry in a particular subsample.

Second, our study does not offer a longitudinal perspective, which would increase knowledge about the changes to the different firm types over time. With a longitudinal approach, researchers also could investigate how specific companies change over time and evaluate the causes for such changes. In doing so, this stream of research could generate knowledge about the strategic determinants of an innovation orientation.

Third, the customers we surveyed for this study were recommended by managers, which may produce a selection bias. The key consequence would be a positive bias in the mean value of customers' assessments of product program innovativeness, which did not emerge in our data. However, customer data unmarked by the influence of marketing managers would be preferable; therefore, additional research might acquire

a complete list of customers from the investigated companies and randomly select customers from it.

Fourth, our financial performance outcomes are limited to efficiency-based measures and do not provide for effectiveness-based measures. It would be insightful for further research to compare how different types influence both efficiency-based and effectiveness-based financial performance outcomes.

Another avenue for research relates to the application of multiple theories. Instead of applying different theories to different parts of a larger model (e.g., to explain different paths in dependency analyses), theories can be applied together more often to develop integrated research models. This pathway would lead to stronger theory, which requires "patterns of interconnectedness" (Stewart/Zinkhan 2006, p. 478). Further research should follow this pathway to elaborate on additional determinants, antecedents, and outcomes of the largely neglected phenomenon of innovation orientation.

Researchers also could attempt to associate our derived patterns with other important marketing research streams. For example, in relation to the field of market orientation, additional research could investigate the conditions (e.g., market versus product orientation) in which different patterns are more or less successful in terms of product program innovativeness. This effort would refine the performance implications of innovation orientation, and the results could spread innovation orientation as a dominant strategic orientation in managerial practice. Another valuable path might be paved by comparing our empirically derived patterns of innovation orientation with the conceptual types developed by Miles and Snow (1978), which could lead to greater understanding of strategic orientations toward innovativeness.

Finally, many companies attempt to increase their innovativeness by acquiring innovative competitors (Prabhu/Chandy/Ellis 2005). Evidence indicates that it is easier to integrate relatively similar companies than companies with different organizational patterns (Prabhu/Chandy/Ellis 2005); further research should identify which types of companies are easier or harder to merge, according to their patterns of innovation orientation. This investigation would be particularly valuable for innovative companies that constantly acquire smaller competitors to gain their knowledge and associated innovations.

3 Study 2 – Different Dimensions of Product Program Innovativeness and Their Effects on Customer Loyalty[2]

3.1 Introduction to Study 2

The management of innovative products is particularly critical in business-to-business (B2B) relationships. As these relationships are usually long-term in nature, companies' success depends largely on the ability to keep customers attracted. Innovations appear to play a key role in this endeavor, because they offer several advantages to B2B customers. In particular, new products provide value by helping customers improve their own products (Subramanian/Nilakanta 1996), by demonstrating that the supplier is capable of keeping up with technological developments and trends in the market, and by indicating the supplier's ability to stay competitive. These benefits make the supplier an attractive partner for B2B customers seeking to establish long-term relationships. Thus, a company's innovativeness may be an important means of fostering customer loyalty in B2B relationships.

Despite the critical role of new products in creating strong B2B ties, half of all new products introduced never fulfill this promise because they fail in the marketplace (Morris et al. 2003). A possible reason for such failures may be companies' erroneous evaluation of customer responses to innovations, on which the success of innovations ultimately hinges (Hauser/Tellis/Griffin 2006). Anecdotal evidence indicates that many companies tend to focus only on the positive side of innovativeness—that is, positive customer responses such as increased customer loyalty—and ignore potential threats deriving from negative customer responses to new products, such as relationship termination (Athanassopoulos/Gounaris/Stathakopoulos 2001).

These negative customer responses toward innovativeness may occur particularly in a B2B context, in which adoption of an innovation may require major behavioral

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changes on the part of customers. These changes include alterations throughout the customer's value-creation chain, as adopting new products may entail modifications of manufacturing processes, require human resources development activities for employees, or set new standards for quality control (McDade/Oliva/Thomas 2010). Thus, companies must recognize that several reasons may underlie customers' reluctance to adopt innovations. To fully comprehend the opportunities and threats associated with innovations, companies need to understand both positive and negative customer responses to innovativeness.

Empirical research concerning customer responses to innovative products offers mixed findings (e.g., Henard/Szymanski 2001; Szymanski/Kroff/Troy 2007). Many studies report positive effects of innovativeness on customer-related outcomes such as customer acceptance (e.g., Langerak/Hultink/Robben 2004; Luo/Bhattacharya 2006), but others find negative effects (e.g., Atuahene-Gima 1996c; Tatikonda/Montoya-Weiss 2001). Obviously, such equivocal empirical results regarding customer responses to new products create ambiguity as to whether the relationship is positive or negative.

However, these mixed results may reflect the various definitions and conceptualizations of innovativeness in extant research. From a conceptual perspective, newness (e.g., Garcia/Calantone 2002) and meaningfulness (e.g., Fang 2008) of recently introduced products potentially generate different customer responses. Meaningfulness may be associated with positive customer outcomes, such as cost savings (Danneels/Kleinschmidt 2001) or better fulfillment of customer needs (Gatignon/Xuereb 1997). In contrast, product newness appears to trigger negative associations for customers, such as increased uncertainty resulting from a lack of standards to evaluate the innovation (Schmidt/Calantone 1998) or greater learning effort resulting from required behavioral changes. Both dimensions of innovativeness seem to generate customer responses, but in different ways, reflecting two sides of the same coin. A comprehensive understanding of customer-related outcomes of innovativeness requires an investigation of the two dimensions of innovativeness in parallel (e.g., Hauser/Tellis/Griffin 2006; Szymanski/Kroff/Troy 2007). The few studies that examine the two dimensions of innovativeness do not investigate customer responses such as customer loyalty (e.g., Atuahene-Gima 1996c; Calantone/Chan/Cui 2006). To the best of the authors' knowledge, no extant research systematically compares customer responses to the different dimensions of innovativeness.

In pursuit of an understanding of differential customer responses, this investigation addresses several important questions that are of great interest to both academics and

managers. The first question is: *How can innovativeness be conceptualized to capture the phenomenon more comprehensively?*

This study answers this question by introducing to marketing research a multidimensional conceptualization of innovativeness at the program level. A review of creativity and innovation literature leads to a clear distinction of product program newness and meaningfulness as two particularly important dimensions of product program innovativeness.

The program level of innovativeness seems particularly appropriate for analyzing customer relationships at the company level, because researchers have supposed its study to be much more insightful than innovativeness of a single product (Siguaw/Simpson/Enz 2006; Stock/Zacharias 2010). Managers' program choices establish the shape of the business of the future (Cooper/Edgett/Kleinschmidt 1999), thus determining the long-term success of companies. Furthermore, product program innovativeness offers an important signal to B2B customers, which often procure multiple products from the same company. Finally, innovativeness at the program level remains underresearched, and innovation research "must move from the micro [or product level] of analysis to the company or macro level" (Cooper/Kleinschmidt 1995, p. 375).

These considerations point to the importance of knowing how different dimensions matter in terms of customer responses toward the company. Therefore, a second question arises: *How do customers respond to newness and meaningfulness of product program innovativeness?*

In providing an answer, this study contributes to ongoing discussions about whether innovativeness is always beneficial (e.g., Henard/Szymanski 2001). The empirical results indicate that the two dimensions of product program innovativeness have varying effects. In addition to finding the frequently studied positive response to innovativeness, this investigation also reveals negative customer responses for another dimension of innovativeness. Information economics (e.g., Phlips 1988; Stigler 1961) offers a theoretical explanation of both effects and their underlying mechanisms. Therefore, this study responds to the call that innovation research "might further benefit from explicitly stating the theoretical underpinnings in its research design" (Durisin/Calabretta/Parmeggiani 2010, p. 447).

This investigation explores B2B customers' responses to product innovativeness in terms of customer loyalty. Because B2B relationships often entail long-term partnerships, customer loyalty should be a particularly relevant customer-related outcome of

product innovativeness. Surprisingly, theory-based and empirically grounded research on this link is scarce, and studies of product innovativeness (e.g., Atuahene-Gima/Slater/Olson 2005; Hauser/Tellis/Griffin 2006) and customer loyalty (e.g., Johnson/Herrmann/Huber 2006; Lam et al. 2004) mainly appear in two separate research streams. Thus, studying the innovativeness–loyalty link would contribute to both research streams by expanding knowledge of whether innovativeness supports the maintenance of long-term relationships.

A contingency perspective holds that customer responses to product program newness and meaningfulness depend on contingencies. This viewpoint leads to a third research question: *Under which conditions is the innovativeness–loyalty link stronger or weaker?*

To elaborate on this issue, this study investigates contingency factors that might alter the relationship between product program innovativeness and customer loyalty. This exploration contributes to the existing literature, which mainly studies direct effects of the dimensions of innovativeness on performance (e.g., Szymanski/Kroff/Troy 2007). To increase understanding of the outcomes of innovativeness this examination tests two moderators—the brand's association with innovativeness and customer integration.

From a managerial perspective, this study helps managers understand how innovativeness might influence customer metrics such as loyalty, which has important implications for the development and marketing of innovations. This study reveals that managerial practice should be attentive to both the newness and the meaningfulness of the product program and also that positive overall customer responses depend on different treatments for the two dimensions. Specifically, the results not only provide guidance on how managers might best deal with both newness and meaningfulness but also demonstrate how a strong brand association with innovativeness and a high level of customer integration affect potential customer resistance to innovations and foster customer loyalty.

The subsequent sections have the following organization. The next section develops the two-dimensional conceptualization of innovativeness at the program level on the basis of a review of extant literature. The following part draws on information economics (e.g., Phlips 1988; Stigler 1961) to present the conceptual background of this study and describe the framework of the study and the hypotheses related to main and moderating effects. The methodology section explains the data collection, the mea-

surement procedure for the study's constructs, and the hypotheses testing procedure. The results section presents findings, and the final section contains a discussion of implications and suggestions for future research.

3.2 Two Dimensions of Product Program Innovativeness

Prior research offers a vast number of conceptualizations of innovativeness, often using the same label for different constructs and diverse labels for similar constructs (e.g., Danneels/Kleinschmidt 2001; Henard/Szymanski 2001). To conceptualize product program innovativeness, two research streams provide valuable insights, namely, studies of creativity and research concerning product innovativeness. Creativity refers to the generation of ideas, which can be used to develop new products, processes, or other organizational outcomes (e.g., Amabile 1988; Woodman/Sawyer/Griffin 1993). An important merit of this stream is the distinction between newness and meaningfulness of creativity. While newness refers to the novelty, originality, or uniqueness of ideas or their related outcomes within the domain of interest (e.g., Im/Workman 2004), meaningfulness generally comprises the usefulness, value, advantage, or appropriateness of the generated ideas to the target group, such as customers (e.g., Ford/Gioia 2000; Sethi/Smith/Park 2001). Although the two dimensions are conceptually distinct, both are part of the overarching concept of creativity.

In contrast to creativity, which focuses on the generation of ideas, innovativeness refers to "the successful development, adoption and implementation of creative ideas" (Im/Workman 2004, p. 115). Thus, creativity is an antecedent of innovation, along with other necessary antecedents (Amabile 1988; Sethi/Smith/Park 2001). Mainstream literature tends to conceptualize innovativeness as the difference between new and previous offerings—that is, as the degree of newness (e.g., Garcia/Calantone 2002; Szymanski/Kroff/Troy 2007). However, recent research indicates that both newness and meaningfulness are important to a more comprehensive understanding of the phenomenon of innovativeness (e.g., Henard/Szymanski 2001; Szymanski/Kroff/Troy 2007). Thus, a broader definition of innovativeness includes a meaningfulness dimension, namely, the degree to which new products are superior in terms of their quality and benefits (e.g., Calantone/Chan/Cui 2006; Hsieh/Tsai/Wang 2008). Table 3-1 illustrates both the common ground and the differential focus of innovation and creativity research and provides an overview of selected definitions from both fields.

Table 3-1: Selected Definitions of Dimensions of Innovativeness and Creativity

Author(s)	Definition(s)	Label(s)	Focal Dimension(s)
Innovativeness Research			
Garcia/Calantone (2002, p. 112)	"'Innovativeness' is most frequently used as a measure of the degree of 'newness' of an innovation. 'Highly innovative' products are seen as having a high degree of newness and 'low innovative' products sit at the opposite extreme of the continuum."	Innovativeness	Newness
Langerak/Hultink (2006, p. 206)	Product innovativeness "is defined as the extent to which the new product is new to the target market and to the developing firm."	Product innovativeness	Newness
Calantone/Chan/Cui (2006, p. 410)	Product advantage "refers to a product's superiority relative to other products in the marketplace on dimensions such as quality, benefit, and function."	Product advantage	Meaningfulness
Fang (2008, p. 90)	"New product innovativeness refers to the extent to which the product differs from competing alternatives in a way that is meaningful to customers and therefore reflects meaningful uniqueness."	New product innovativeness	Meaningfulness
Henard/ Szymanski (2001, p. 364)	Product innovativeness is the "perceived newness/originality/uniqueness/radicalness of the product." Product advantage is the "superiority and/or differentiation over competitive offerings."	Product innovativeness/ product advantage	Newness, meaningfulness
Szymanski/Kroff/ Troy (2007, p. 44)	"While product innovativeness is defined in the literature as the degree of newness or difference from existing alternatives, some researchers have extended the definition of innovativeness to include the usefulness or meaningfulness of the innovative feature."	Innovativeness (newness and meaningfulness)	Newness, meaningfulness
Sethi/Sethi (2009, p. 209)	Novelty "is defined herein as the degree to which the new product is different from competing alternatives. Appropriateness, on the other hand, is defined as the extent to which the product is useful, relevant, and necessary for customers relative to competing alternatives."	New product innovativeness (novelty and appropriateness)	Newness, meaningfulness
Creativity Research			
Woodman/Sawyer/ Griffin (1993, p. 293)	"Organizational creativity is the creation of a valuable, useful new product, service, idea, procedure, or process by individuals working together in a complex social system."	Organizational creativity	Meaningfulness
Andrews/Smith (1996, p. 179)	"First, novelty refers to the degree of difference between a product's most recent marketing program and the competitors' programs. Second, meaningfulness refers to the extent to which the marketing initiatives are thought to be attractive or valuable to the group for which they were devised (e.g., consumers, retailers)."	Marketing program creativity (novelty and meaningfulness)	Newness, meaningfulness

Ford/Gioia (200l, p. 715)	Novelty is defined "as the extent to which a decision was unusual within the context of their organizations, and […] value as the extent to which a decision accomplished the objectives desired by the participating decision makers."	Creativity in decision making (novelty and value)	Newness, meaningfulness
Sethi/Smith/Park (2001, p. 74)	"Novelty […] refers to the extent to which a concept, idea, or object differs from conventional practice within the domain of interest. Appropriateness is the extent to which a given output is viewed as useful or beneficial to some audience."	Novelty and Appropriateness	Newness, meaningfulness
Im/Workman (2004, p. 115)	New product and marketing program creativity is defined as "the degree to which new products and their associated marketing programs are perceived as representing unique differences from competitors' products and programs in ways that are meaningful to target customers. […] Thus, creativity, which involves the generation of novel and meaningful ideas, is a necessary though not sufficient antecedent of innovation."	New product/ marketing program creativity (novelty and meaningfulness)	Newness, meaningfulness

Drawing on the similarities in the conceptualizations of both streams outlined above, the argument of this study is that capturing product innovativeness requires both newness and meaningfulness. On the one hand, a company's regular introduction of new products does not ensure meaningfulness for customers, as the elevated failure rates of newly introduced products may attest (Sivadas/Dwyer 2000). Although products with a high degree of newness may offer no meaningful added functionality, they must nevertheless compete with well established products that already satisfy customers' needs. On the other hand, product meaningfulness is not universally associated with newness, and customers may find incremental innovations to be very meaningful, even though they offer very little newness. For example, a new lubricating oil product may provide extensively improved thermodynamic functionality for a production process while not being substantially new. Thus, newness and meaningfulness appear to be separate dimensions, which if investigated together may generate richer insights into the concept of product innovativeness (Sethi/Sethi 2009; Szymanski/Kroff/Troy 2007).

Insights contained in the literature on creativity and innovativeness suggest a distinction between product program newness (PPN) and product program meaningfulness (PPM). This investigation focuses on innovativeness at the program level, which pertains to a company's whole range of products (e.g., Atuahene-Gima/Slater/Olson 2005; Menguc/Auh 2006; Stock 2010). Accordingly, on the basis of prior literature, *product program newness* refers to the degree of difference between a company's product program and existing alternatives (e.g., Garcia/Calantone 2002; Szymanski/

Kroff/Troy 2007). *Product program meaningfulness* is the average superiority of the company's recently introduced products in terms of quality and benefits (Calantone/ Chan/Cui 2006).

The few existing studies that integrate the two dimensions of innovativeness rely mainly on the product level, but indicate that newness and meaningfulness represent separate dimensions of innovativeness. Calantone, Chan, and Cui (2006) investigate newness and meaningfulness as part of a larger model and find no significant effect of newness on new product profitability but positive performance implications for meaningfulness. Im and Workman (2004) find similar results in their study, which is rooted in creativity research and which reveals no statistically significant effects of newness and positive effects of meaningfulness on market and financial performance. Atuahene-Gima (1996c) employs both dimensions, as well as other constructs, to identify mediating effects between market orientation and performance outcomes. That study reveals no effect of newness on market success and a negative effect on project impact but positive effects of meaningfulness on market success and project impact. The results of these three investigations indicate differential effects of newness and meaningfulness on company performance and suggest that the two dimensions of product program innovativeness may also represent distinct dimensions. On the basis of prior considerations and empirical research, the following is proposed:

H_3: The two dimensions of product program newness and product program meaningfulness are distinct in the sense that they exhibit discriminant validity.

3.3 Conceptual Background

3.3.1 Information Economics

In developing hypotheses about the functional structure of the relationship between product program innovativeness and customer loyalty, this study draws on information economics (e.g., Phlips 1988; Stigler 1961), following the theoretical logic from Stock (2010). Marketing and innovation researchers increasingly employ information economics to explain customer uncertainty generated by innovativeness (e.g., Lauga/Ofek 2009). The theory relies on two major premises.

First, exchange partners seek to maximize their utility (Heide/Wathne 2006). In the context of this study, the concept of utility maximization applies to the relationship between a company and its customers. When making decisions, customers are guided

by expectations about the utility they may derive from a specific exchange relationship in the future. The greater the expected utility from this relationship, the stronger the probability that customers will remain loyal to a company. To alter customers' expectations in favor of companies, information economics proposes signaling as an effective activity. Signaling, which includes a signal of product program innovativeness, allows companies to indicate that they are able to meet customer needs (Fang 2008). Hence, product program innovativeness increases the utility customers anticipate from a particular exchange relationship (e.g., Jedidi/Zhang 2002), and actually meeting customers' needs through product program innovativeness then leads to customer loyalty (Lam et al. 2004).

Second, information economics supposes that the allocation of information between exchange partners influences the decisions of the two parties, i.e., the company and its customers (Spence 1973). A customer who lacks information about a company's products experiences information asymmetry (Kirmani/Rao 2000) and a corresponding uncertainty about the products. Customer uncertainty is particularly great when assessment of the utility of the offered products is complicated (Heide 2003; Hoeffler 2003). The greater the uncertainty associated with innovative products, the lower the customer's confidence that the company can meet the customer's needs (Magnusson/Matthing/Kristensson 2003). Thus, uncertainty has a negative effect on customer loyalty.

In summary, information economics is an appropriate basis for this study for two reasons. First, it explains why product program innovativeness affects customer loyalty. Information economics, with its emphasis on signaling, seems particularly appropriate to explain customer-related effects of the whole product program in longer-term relationships, in which individual products are less important. That is, product program innovativeness serves as a signal for customers, enabling them to form opinions about the competitiveness of future products and the seller as a whole.

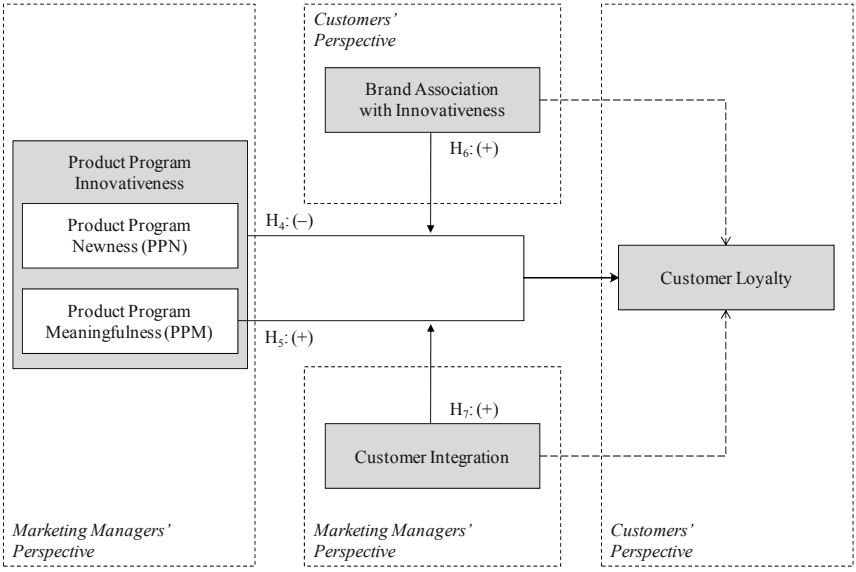
Second, information economics offers an explanation for the mechanism between product program innovativeness and customer loyalty via two opposing effects (Stock 2010). As a positive effect, product program innovativeness represents a signal demonstrating a company's ability to deliver according to customers' expectations and to meet customer needs, which leads to customer loyalty. A negative effect of product program innovativeness results from rising information asymmetry corresponding with an increasing level of innovativeness, which ultimately lowers customer loyalty because it adds to customers' uncertainty with respect to a company's competence to

meet their needs. In consequence, the two aspects of innovativeness—PPN and PPM—may have different effects on customer responses such as customer loyalty.

3.3.2 Study Framework

The framework in Figure 3-1 depicts PPN and PPM as two dimensions of product program innovativeness that influence customer loyalty. Despite the importance of long-term relationships in a B2B context, investigations have largely neglected to compare the different dimensions of product program innovativeness as they pertain to customer loyalty (Danneels/Kleinschmidt 2001; Simpson/Siguaw/Enz 2006). This study's framework also includes the potential moderating effects of the brand's association with innovativeness and customer integration. Both constructs are important in the context of information economics because they influence information asymmetries between exchange partners. For example, a strong brand image can reduce the negative influence of product newness on customer loyalty. In addition, both constructs appear as important contingencies in innovation research (Gatignon et al. 2002; Hauser/Tellis/Griffin 2006).

Figure 3-1: Framework of Study 2



In exploring the outcome of product program innovativeness, this investigation considers customer loyalty. Loyalty reflects the long-term performance of a relationship (Daugherty/Stank/Ellinger 1998), which is particularly important in B2B settings (Lam et al. 2004). *Customer loyalty* is a customer's intention to repeatedly repurchase products from the same company (Homburg/Giering 2001).

By considering potential moderators of the link between product program innovativeness and customer loyalty, this study aims to determine the conditions in which a negative effect of PPN might be buffered or a positive effect of PPM might be enhanced with regard to customer loyalty. For the newness–loyalty relationship, in line with information economics theory this study considers a brand's association with innovativeness to be an important signal that may reduce customer uncertainty. This association refers to an image of the brand that customers hold (Keller 1993). Accordingly, *brand association with innovativeness* refers to the degree to which customers associate an image of innovativeness with the company (Aaker 1996).

In relation to the meaningfulness–loyalty link, customer integration may be a potential moderator. *Customer integration* relates to "the degree to which customers are involved into a company's value-creating process" (Homburg/Stock 2004, p. 148). This construct is particularly important in B2B settings (Stock 2006), because it supports customer acceptance of new products by increasing the value customers receive from innovations (e.g., von Hippel 1986). Customer-related information also helps companies better meet customer needs (Fang 2008) and protects against the high failure rates of newly introduced products (Link 1987).

3.3.3 Main Effects Hypotheses

Drawing on information economics and previous empirical results, this study proposes that a company's product program newness negatively affects customer loyalty (e.g., Atuahene-Gima 1996c; Meyer/Roberts 1986). From a theoretical perspective, a customer's lack of information about a company's offering and the difficulty of assessing its output increase with the newness of the product program (e.g., Ali 2000; Heide 2003). With its emphasis on differentiation from products already in the market (Atuahene-Gima 1996c), PPN leads to information asymmetry, which hinders customer judgments of the product program (Ali 2000) and thus increases customers' perceived risk associated with the products (e.g., Danneels/Kleinschmidt 2001; Levinthal 1988). Perceived risk is particularly detrimental in B2B relationships, because success largely hinges on customer willingness to establish long-term relationships. Thus, on

the basis of theoretical considerations and previous empirical findings, the following is hypothesized:

H_4: Product program newness negatively affects customer loyalty.

In contrast, a company's product program meaningfulness is expected to positively affect customer loyalty. Again, on the basis of information economics and extant literature, this study considers PPM to be a signal to customers that the new products offer superior quality and benefits (e.g., Atuahene-Gima 1996b; Heil/Robertson 1991). PPM demonstrates that a company can keep up with technological developments and trends in the market, meet customer needs, and provide unique advantages to customers (Hsieh/Tsai/Wang 2008). Thus, PPM reduces customers' uncertainty about innovative products. In addition to meta-analyses that strongly confirm a positive relationship between PPM and performance (e.g., Henard/Szymanski 2001; Szymanski/Kroff/Troy 2007), empirical studies support the notion of positive customer responses to PPM (e.g., Langerak/Hultink/Robben 2004; Luo/Bhattacharya 2006). Therefore, the following is hypothesized:

H_5: Product program meaningfulness positively affects customer loyalty.

3.3.4 Moderating Effects Hypotheses

Information economics and extant literature suggest that a brand association with innovativeness should buffer the negative effect of PPN on customer loyalty. Information economists identify a company's brand as one of the most important signals for reducing customer uncertainty (Erdem/Swait/Valenzuela 2006). An effective brand serves as a signal to enhance awareness and create a favorable image in terms of innovativeness (Klink/Athaide 2010), which lowers information asymmetry as well as customers' perceived risk associated with the products (e.g., Danneels/Kleinschmidt 2001; Kirmani/Rao 2000). The marketing literature also emphasizes the effectiveness of branding as a signal to customers of product quality (e.g., Heide 2003; Keller 1993). In particular, a brand's association with innovativeness enables customers to infer innovative product quality (e.g., Kirmani/Rao 2000) and thus reduce their uncertainty with respect to new products (Aaker 1996). Another advantage to a strong association of a supplier's brand with innovativeness relates to the improvement of B2B customers' reputation with end customers (Henard/Dacin 2010). For example, Dell advertisements carry the logo of Intel, its innovative supplier. Intel's association with innovativeness not only retains Dell as a customer but also increases Dell's reputation with

end customers. In summary, the more strongly a customer associates a brand with innovativeness, the less likely the customer is to be swayed by innovative offerings of competitive suppliers, thus increasing customer loyalty (Henard/Dacin 2010). Therefore, the following is postulated:

H_6: Brand association with innovativeness weakens the negative impact of product program newness on customer loyalty.

Further, customer integration should strengthen the positive effect of PPM on customer loyalty. In the logic of information economics, customer integration signals that customers can anticipate increased utility from the exchange relationship with a company (e.g., Jedidi/Zhang 2002). Customer integration sends customers an important signal that the company is willing to coordinate its innovations with customer needs and demonstrates the company's ability to deliver long-term benefits to customers through their relationship with that company. In this vein, extant literature is consistent: customer integration increases the quality and benefits (i.e., meaningfulness) of new products which then better meet customer needs (e.g., Fang 2008; von Hippel 1986).

In addition to this economic value, customer integration may provide relational value by developing an interaction between exchange partners (Chan/Yim/Lam 2010). This interaction may be particularly important in B2B relationships, because it enables suppliers to better communicate the meaningfulness of their innovative products (Vargo/Lusch 2004), which keeps customers attracted. Thus, customer integration allows companies to strengthen the positive effect of PPM on customer loyalty by integrating customers. On the basis of these theoretical considerations and extant literature regarding customer integration, the following is hypothesized:

H_7: Customer integration strengthens the positive effect of product program meaningfulness on customer loyalty.

3.4 Methodology

3.4.1 Data Collection

This study relied on a specific dataset to examine innovativeness–loyalty relationships. The data collection aimed to gather triadic data from marketing and R&D managers of B2B companies as well as their customers. Because an object's ratings cannot be divorced from its perceivers, the participants selected were the most knowledgeable informants with the greatest expertise in the relevant topic to report on each construct.

This design reduced the effects of informant bias (e.g., Kumar/Stern/Anderson 1993) and common method bias (Podsakoff et al. 2003).

To increase the generalizability of this study's findings, a large-scale survey solicited responses from companies in five different industries, which were selected for their macroeconomic importance. These industries included electronics (17.0%), machinery (16.5%), services (14.3%), software/IT (32.4%), and utilities (19.8%), and companies' sales volumes ranged from less than $10 million to more than $1 billion.

The data collection comprised several steps. The first step was random selection of 1,000 marketing managers of companies from a list maintained by a commercial address provider, who received personalized letters with requests for participation. After follow-up telephone calls, the marketing managers who indicated their willingness to participate received a code for the Internet-based survey. These marketing managers provided information about PPN and PPM, as well as customer integration into the value-creation process. Because of their relative closeness to the market, they also assessed competitive intensity and market-related dynamism, which serve as control variables in the study. In addition, they were asked to identify an R&D manager in their company and to provide five customer names and addresses. As a reward for participation, the marketing managers could receive individualized feedback about their customers' loyalty relative to that of customers of other companies within the same or other industries. This offer emphasized that the feedback and participation in this study would make sense only if the managers honestly provided data from customers with different levels of loyalty.

In a next step, the R&D managers assessed the control variable technological turbulence, because their jobs require them to possess knowledge about technical advances. In a last data collection step, the customers received personalized letters and follow-up telephone calls with the goal of obtaining at least two customer assessments per company. These contacts informed the customers that they had been identified by the marketing manager of the initial company and solicited their participation in the study. As candid responses were desirable, these customers received assurances that their assessments would be used exclusively for research purposes and forwarded anonymously to the company affiliated with the marketing manager. Those customers who participated provided information about their loyalty with the identifying company and their association of that company's brand with innovativeness. This effort yielded an average of 2.24 usable customer responses per company with at least two customer

responses for 68.9% of the cases. Tests for any impact of the customer response rate on customer loyalty revealed no effect (β = .07; n. s.).

In total, the data collection procedure generated 180 triadic cases, with responses from marketing and R&D managers and customers. A comparison of early and late respondents (Armstrong/Overton 1977) to assess nonresponse bias revealed no significant differences for any of the constructs.

3.4.2 Measurement Procedure

The development of the questionnaire relied on a comprehensive literature review and field interviews with 18 academics and practitioners. During these qualitative interviews, participants expressed their opinions on the role of innovativeness for customer relationships in general, the management of product program innovativeness, and the relevance of different customers to innovativeness. Discussions also focused on an initial draft of the questionnaire, which was primarily based on previously used scales from existing literature. This pretest led to refinement of the questionnaire and adaptation of some of the scales. The final set of items, including the sources used for scale development and specification of respondents, appears in Table 3-2.

Table 3-2: Study 2 – Scale Items for Construct Measures

Construct and Source	**Items**	**α/CR/AVE/r_{wg}**
Customer Loyalty (Respondents: customers) (adapted from Homburg/Giering 2001)		.89/.89/.74/.91
	We intend to maintain a long-term relationship with this seller.	
	It is very likely that we will purchase products/services from this seller again.	
	We intend to stay loyal to this seller.	
Product Program Newness (Respondents: marketing managers) (adapted from Cooper 1979; Olson/Walker/Ruekert 1995)		.91/.91/.67/–
	The products/services of our company …	
	… are novel.	
	… are inventive.	
	… differ significantly in terms of their newness from existing products/services of competitors.	
	… are exceptional.	
	… are not predictable.	

Construct and Source	Items	α/CR/AVE/r_{wg}
Product Program Meaningfulness (Respondents: marketing managers) (adapted from Cooper/de Brentani 1991; Mishra/Kim/Lee 1996)		.90/.91/.58/–
	The newly developed products/services of our company …	
	… offer unique advantages to our customers.	
	… offer higher quality than the products/services of our competitors.	
	… offer higher value than the products/services of our competitors.	
	… solve the problems of our customers.	
	… lead to significant cost savings for our customers.	
	… are supportive of our customers' efforts to simplify their processes.	
	… deliver high benefits for our customers.	
Brand Association with Innovativeness (Respondents: customers) (self-developed scale)		.80/–/–/–
	The seller's brand is central to our buying decision.	
	We associate an image of innovativeness with the seller's brand.	
Customer Integration (Respondents: marketing managers) (according to Homburg/Stock 2004)		.91/.91/.72/–
	Our products/services require the integration of the customer into the value-creating process.	
	Our products/services are strongly influenced by customers during their production.	
	Our products/services require regular discussions with customers during the production process.	
	Our customers are involved in the value-creating process right from the start.	
Firm Size (Respondents: marketing managers)		–/–/–/–
	How large is the sales volume of your company?	
Competitive Intensity (Respondents: marketing managers) (according to Jaworski/Kohli 1993)		.79/.80/.51/–
	In our market, competition is cutthroat.	
	In our market, price competition is very intense.	
	In our market, competitors are extremely active.	
	In our market, major customers are fiercely contested.	
Market-Related Dynamism (Respondents: marketing managers) (adapted from Homburg/Workman/Krohmer 1999)		.83/.84/.52/–
	In our market, major changes occur frequently in the area of …	
	… products offered by our competitors.	
	… market development strategies of our competitors.	
	… customer preferences in product features	
	… customer preferences in product quality/price relationship.	
	… new competitors.	

Construct and Source	Items	α/CR/AVE/r_{wg}
Technological Turbulence (according to Jaworski/Kohli 1993)	(Respondents: R&D managers)	.81/.83/.50/–
	The technology in our industry is changing rapidly.	
	Technological changes provide big opportunities in our industry.	
	It is very difficult to forecast where the technology in our industry will be in the next 2 to 3 years.	
	A large number of new product ideas have been made possible through technological breakthroughs in our industry.	
	Technological developments in our industry are rather minor. (reversed item)	

Notes: Items measured with seven-point rating scales with the anchors 1 = "strongly disagree" and 7 = "strongly agree."
α: Cronbach's alpha; CR: Composite reliability; AVE: Average variance extracted; r_{wg}: Within-group interrater reliability (median), only for customer data.

Exploratory and confirmatory factor analyses ensured the reliability and validity of the reflective multi-item measures (Bagozzi/Baumgartner 1994). For all constructs, Cronbach's alpha clearly exceeded the recommended minimum of .7 (Nunnally 1978), signifying a high degree of internal consistency among the corresponding indicators. Composite reliability was greater than the threshold value of .6 for all constructs, while the values for the average variance extracted exceeded the desired minimum of .5 (Bagozzi/Yi 1988). Besides emphasizing the reliability of the scales, composite reliability and average variance extracted indicated convergent validity in combination with statistically significant factor loadings. In the dataset, all factor loadings were significant at $p < .01$. Altogether, these results suggest strong convergent validity of the employed constructs (Bagozzi/Yi 1988).

The index of within-group interrater reliability (r_{wg}) determined whether aggregation of the various customers' assessments of each company was appropriate (James/Demaree/Wolf 1984). For the customer loyalty construct, the median r_{wg} value exceeds the proposed minimum of .7 (Burke/Finkelstein/Dusig 1999), in support of the data aggregation. The customer responses for each company were therefore averaged into a single composite value for the subsequent data analysis (Van Bruggen/Lilien/Kacker 2002).

Two tests ensured discriminant validity. Chi-square difference tests for each pair of constructs yielded significant values well above the recommended minimum of 3.84 at $p < .05$ (Anderson/Gerbing 1988). In addition, Fornell and Larcker's (1981) rigorous

criterion assessed discriminant validity. As Table 3-3 shows, the diagonal elements representing the square roots of the average variance were greater than the off-diagonal elements. Thus, discriminant validity was not a problem in the study.

Table 3-3: Study 2 – Correlation Matrix and Descriptive Statistics

Variables		1	2	3	4	5	6	7	8	9
1	Customer Loyalty	**.86**								
2	Product Program Newness	-.14	**.82**							
3	Product Program Meaningfulness	.07	.60**	**.76**						
4	Brand Association with Innovativeness	.46**	-.13	-.07	**n/a**					
5	Customer Integration	-.05	.19**	.21**	-.24**	**.85**				
6	Firm Size	.01	.00	-.06	.07	-.21**	**n/a**			
7	Competitive Intensity	-.11	.05	.05	-.02	.13	.19*	**.71**		
8	Market-Related Dynamism	-.29**	.15*	.22**	-.16*	.22**	-.05	.19*	**.72**	
9	Technological Turbulence	-.04	.06	.11	-.03	.18*	-.15	.18*	.33**	**.71**
Mean		5.82	4.26	5.61	4.06	5.48	2.82	6.12	4.19	4.63
Standard Deviation		.89	1.36	1.06	1.38	1.21	2.00	.80	1.14	1.11

Notes: N = 180. Diagonal elements in bold are the square roots of the average variance extracted for constructs measured reflectively with multiple items.
* $p < .05$; ** $p < .01$.

3.4.3 Hypotheses Testing Procedure of Study Framework

Hierarchical moderated regression analysis tested for both direct and moderating effects (Aiken/West 1991). Multiplicative interaction terms resulted from multiplying the values for PPN with the values of brand association with innovativeness and PPM with the values of customer integration. Mean-centering the constituent variables facilitated interpretation (Cohen et al. 2003).

The testing procedure also acknowledged control variables and included industry and firm size as well as three environmental variables, since the success of product innovations also depends on the relative influence of market forces that companies encounter (Gatignon/Xuereb 1997; Zhou/Yim/Tse 2005). Previous studies related to innovation management (e.g., Voss/Voss 2000) suggested controlling for competitive intensity (Jaworski/Kohli 1993), market-related dynamism (Homburg/Pflesser 2000), and technological turbulence (Jaworski/Kohli 1993). These three characteristics are fundamen-

tal since they represent influences of competition, technology, and customers in the market (Li/Calantone 1998).

The initial regression analysis included only the control variables (Model 1). A second step added the independent and moderator variables (Model 2), and the full regression equation included the interaction effects (Model 3).

Multiple procedures diagnosed the potential for multicollinearity (Echambadi/Hess 2007). First, random estimation of subsets of the data (Echambadi et al. 2006) showed stable coefficients across them. Second, while multicollinearity may exist when the determinant of the correlation matrix is near zero (Echambadi/Hess 2007), examination showed this not to be the case for these data. Third, assessment of the variance inflation factors revealed that even the largest value of 1.84 was well below the cutoff value of 10 (Mason/Perreault 1991). Therefore, multicollinearity did not appear to be a problem for the data in this study.

3.5 Results

The first hypothesis suggests a distinction between the constructs of PPN and PPM. Discriminant validity was tested twice, drawing on Anderson and Gerbing (1988) as well as Fornell and Larcker (1981). Regarding the first test, the chi-square difference value (χ^2 = 54.50; $p < .01$) was substantially larger than the required minimum ($\chi^2 = 3.84$; $p < .05$). Since the correlation between the constructs of PPN and PPM ($r^2 = .60$) is less than the square root of the average variance extracted of PPN (.82) and PPM (.76), the requirements of the second test are also satisfied (Fornell/Larcker 1981). Thus, according to the two tests employed, PPN and PPM demonstrate discriminant validity in support of H_3, and these constructs appear to be two distinct dimensions of product program innovativeness.

The hierarchical regression analysis provides results regarding the main and moderating effect hypotheses of the framework. The stepwise development of the full regression model can be traced in Table 3-4. While moving from Model 1 to 3, the predictive power increases significantly with each step. This approach confirmed that adding interaction effects yields a significantly superior model (F-value for incremental $R^2 = 4.13$; $p < .05$). The full regression equation stated in Model 3, which includes control, direct, and interaction effects, results in an explanatory power that is fairly high ($R^2 = .44$) given the triadic nature of the data.

Table 3-4: Results of Regression Analysis on Customer Loyalty

Dependent Variable:	**Customer Loyalty**		
	Model 1	**Model 2**	**Model 3**
Control Variables			
Industry			
Services	-.09	-.10	-.08
Software / IT	.10	.09	.11
Machinery	-.29**	-.33**	-.33**
Electronics	.19*	.23**	.19*
Firm Size	.03	.04	.07
Competitive Intensity	-.07	-.08	-.08
Market-Related Dynamism	-.31**	-.27**	-.26**
Technological Turbulence	.09	.06	.04
Independent Variables			
Product Program Newness		-.24**	-.26**
Product Program Meaningfulness		.26**	.22**
Moderator Variables			
Brand Association with Innovativeness		.46**	.43**
Customer Integration		.12	.11
Interaction Effects			
Product Program Newness x Brand Association with Innovativeness			.15*
Product Program Meaningfulness x Customer Integration			.13*
R^2	.16	.41	.44
Adjusted R^2	.12	.37	.39
F-Value	3.98**	9.77**	9.28**
Incremental R^2	.16	.26	.03
F-Value for Incremental R^2	3.98**	18.16**	4.13*
N	180	180	180

Notes: Standardized regression coefficients are reported.
* $p < .05$; ** $p < .01$.

In support of H_4, PPN has a negative effect on customer loyalty (β = -.26; $p < .01$), a finding that confirms the detrimental effect of this particular dimension. In opposition, H_5 proposes a positive effect of the meaningfulness dimension, which the results confirm as well. PPM positively affects customer loyalty (β = .22; $p < .01$). Both effects are significant at the same level in Models 2 and 3, in support of the stability of the results. Taken together, PPN and PPM not only are distinct dimensions of product

program innovativeness but also have contrasting effects on customer loyalty, which yields interesting implications for the phenomenon of product program innovativeness.

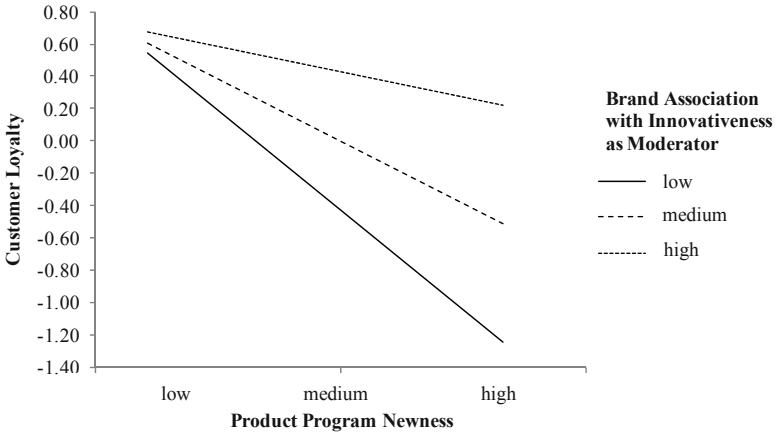
The moderated regression results also confirm the hypotheses. The regression parameter estimate associated with the interaction term between PPN and brand association with innovativeness is positive and significant (β = .15; p < .05), which confirms H_6. This result indicates that a brand's association with innovativeness reduces the negative effect of PPN on customer loyalty. In support of H_7, the interaction term between PPM and customer integration has a significant positive effect on customer loyalty (β = .13; p < .05). That is, a company that integrates customers into its innovation process can strengthen the positive relationship between PPM and customer loyalty. Regarding the direct effects of the moderator variables, the study's results show a significant positive effect of brand association with innovativeness on customer loyalty (β = .43; p < .01), while customer integration is unrelated to loyalty (β = .11; n. s.). This finding suggests that fostering brand association with innovativeness increases customer loyalty both directly and via a moderating effect, thus, offering a strong lever.

Figure 3-2 displays both interaction effects. Panel A reveals the significant interaction between PPN and brand association with innovativeness, emphasizing the potential to almost neutralize the negative effect of PPN on customer loyalty in the case of a strong brand association with innovativeness. Panel B depicts the significant interaction between PPM and customer integration, which reveals the loyalty-enhancing effect of customer integration via PPM. However, the panel also shows that low levels of customer integration radically downgrade the positive effect of PPM on customer loyalty. In addition, Figure 3-2 explains the main effects of PPN and PPM on customer loyalty, which relate to the effects of PPN and PPM on customer loyalty at a medium level of the corresponding moderator variable (Cohen et al. 2003).

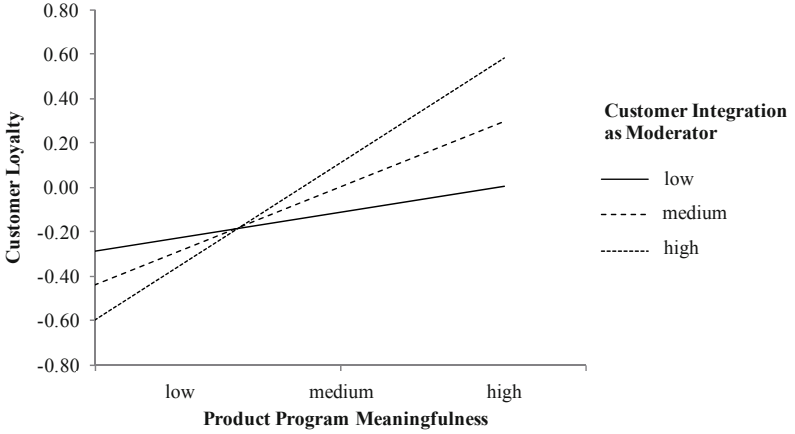
Concerning control variables, the findings overall demonstrate very stable effects for Models 1 through 3. In specific, industry effects exist with regard to the machinery sector (β = -.33; p < .01) and the electronics sector (β = .19; p < .05), where the average loyalty levels seem to differ from the sample mean. In accordance with other studies in the field of customer relationship management, results show that market-related dynamism exerts a negative effect on customer loyalty (β = -.26; p < .01). The other two environmental variables, competitive intensity and technological turbulence, are unrelated to customer loyalty, as is firm size.

Figure 3-2: Moderating Effects

A: PPN and Customer Loyalty Moderated by Brand Association with Innovativeness



B: PPM and Customer Loyalty Moderated by Customer Integration



3.6 Discussion

3.6.1 Research Implications

As an important point of departure from previous investigations, this study notes that companies and academics mostly emphasize the positive performance implications of

product innovativeness and ignore the flip side of the innovativeness coin. However, within the concept of innovativeness, two differential effects emerge: product program meaningfulness enhances customer loyalty, while the frequently demanded characteristic of product program newness actually undermines customer loyalty. These findings expand the understanding of innovativeness and its customer responses and offer several important implications for research.

First, this study introduces a two-dimensional conceptualization of product program innovativeness, which creates synergies among several areas of prior research. In specific, it merges accomplishments of creativity and product innovativeness research, which scholars have failed to capitalize on (Ford 1996). Originating in the creativity literature, the distinction between newness and meaningfulness has been adapted to research on product innovativeness, which still mainly relies on the newness dimension. The results of this study indicate that, since they show discriminant validity, the two dimensions are distinct not only conceptually but also empirically. Another realized synergy relates to the level of innovativeness. Although the creativity literature emerges from studies of individuals' innovative behaviors (Drazin/Glynn/Kazanjian 1999; Woodman/Sawyer/Griffin 1993), researchers have regularly applied the concept of creativity to groups or organizations (Amabile 1988; Sethi/Smith/Park 2001; Woodman/Sawyer/Griffin 1993). However, program-level conceptualizations of innovativeness are scarce, and the few notable exceptions do not draw on multiple dimensions (e.g., Menguc/Auh 2006). Thus, the conceptualization introduced here reveals two conceptual synergies and helps "innovation researchers and creativity researchers to be working hand in hand to solve the mysteries surrounding these complex events" (Ford 1996, p. 1112).

Second, this study offers a potential explanation for the ambiguity created by equivocal empirical results regarding customer responses to innovativeness (e.g., Henard/Szymanski 2001; Szymanski/Kroff/Troy 2007). Most previous studies rely on unidimensional conceptualizations of innovativeness and identify positive, negative, or nonsignificant effects (e.g., Amabile 1988; Langerak/Hultink/Robben 2004). Since newness and meaningfulness evoke different customer responses, scholars should always use measures capable of assessing multiple facets (Sullivan/Ford 2010). In doing so, researchers may be able to clear up some of the contrasting results prior investigations attribute to uni-dimensional conceptualizations and to provide more detailed explanations with regard to the performance outcomes of innovativeness.

Third, the conceptualization and the results of this study have implications for research in terms of customer loyalty. In the marketing literature, customer loyalty is a fundamental customer-related outcome, because retaining customers is much more cost-efficient than winning new customers (Reichheld/Sasser 1990). While previous literature has investigated various antecedents of loyalty, such as customer satisfaction (Lam et al. 2004), researchers have scarcely considered antecedents related to innovation (Durisin/Calabretta/Parmeggiani 2010; Simpson/Siguaw/Enz 2006). By drawing on information economics, this investigation provides insights into how customers derive their expected utility from the relationship with a specific company and as well as how they react in terms of loyalty. From a content perspective, this examination shows that more is not always better in terms of innovativeness—offering more innovations does not necessarily make customers loyal. Instead, the decisive factor is meaningfulness, the qualitative dimension of product program innovativeness. In this finding, this research confirms prior findings that the creation of loyalty requires the fulfillment of customer needs (e.g., Johnson/Herrmann/Huber 2006).

Fourth, this study enhances understanding of the role of product innovativeness in B2B relationships—an area innovation researchers still widely neglect (e.g., LaPlaca/Katrichis 2009). Since B2B relationships usually involve close buyer−seller relationships over a long time (e.g., Stock 2006), researchers investigating these relationships should employ constructs that correspond to this character. Therefore, to provide insights into B2B relationships the results of this study argue for a multidimensional conceptualization of innovativeness at the program level, because it reflects the long-term focus and the complexity of these customer relationships. The finding of both a positive and negative effect of innovativeness reflect the often complex decision processes of B2B customers, which frequently depend on professional purchasing specialists or departments. In line with information economics, the model in this study mirrors the positive and negative signals of a company's product program, which B2B customers evaluate when they are deciding whether to remain as customers or switch suppliers.

3.6.2 Managerial Implications

This study also demonstrates that while handling product program innovativeness is a challenge, companies can manage it appropriately. The results indicate a possible explanation for B2B customers' reservations regarding innovations. Managers responsible for introducing new products cannot simply offer more and more innovations and

assume this volume will lead to ever-increasing customer loyalty. Instead, managers must realize that innovativeness evokes both positive and negative customer responses. Although companies should certainly not endeavor to become less innovative, they must be particularly sensitive to the uncertainty innovativeness evokes in their customers and conduct activities to reduce that uncertainty, such as intensifying communication with customers, simplifying the offer, or training customer-contact employees. Further, companies should make sure that product introductions are not only new but also meaningful for customers. To ensure meaningfulness of their products, companies could conduct market research or establish collaborations with lead users.

The results of this study do not imply that managers should promote innovations less in order to maximize loyalty. Rather, managers should act to mitigate the negative effects of product program newness. Since this study shows that brand association with innovativeness serves as a valuable lever, fostering this association represents an adequate means of buffering the negative effect of product program newness. For example, Apple has successfully established such an association with its brand. Customers generally believe they are buying an innovation when a new Apple product is brought into the market, even though this belief may be ill-founded—for example, several design changes in the iPod relate more to newness than to meaningfulness. Thus, managerial practice can compensate for the negative effect of newness and still focus on delivering innovative products to keep customers loyal.

Along with reducing the negative effect of newness, managers should thoroughly analyze customer needs to push product program meaningfulness and maximize customer loyalty (e.g., Urban/Hauser 2004). The positive effect of PPM should be enhanced by integrating customers into the value-creating process. Particularly in B2B relationships, this integration involves an interaction between exchange partners (Chan/Yim/Lam 2010) that provides important opportunities. Through the interaction, companies receive valuable information about customer needs and have an opportunity to better communicate the meaningfulness of their innovative products to customers (Vargo/Lusch 2004). Hence, fostering product program meaningfulness helps to overcome the negative effects of newness and, thus, to retain customers through an innovative product program.

3.6.3 Limitations and Avenues for Further Research

Despite these contributions, this study has several limitations that suggest directions for further research. First, this investigation represents an initial step in the study of the

relationship between product program innovativeness and customer loyalty, with an emphasis on B2B relationships. Since the long-term focus of B2B customer relationships might differ from that of most business-to-consumer relationships, additional research should examine the consumer side of product program innovativeness. A promising avenue of inquiry would be to identify differences or similarities in the signaling effects of product program innovativeness between business customers and consumers, an investigation that would be particularly valuable for innovative companies that serve both types of customers.

Second, this study does not offer a longitudinal perspective, which would increase understanding of the changes of customer loyalty over time. A longitudinal approach would allow researchers to investigate how specific changes in product program innovativeness lead to positive customer responses, generating knowledge about key success factors of dynamic changes in the innovation strategy of companies.

Third, beyond the selected moderating variables this study considers, further research should examine other conditions to understand the relationships between product innovativeness and customer responses. For example, product program characteristics such as complexity or specificity might be interesting to study in this context. Another approach could be to draw on information economics to elaborate on additional moderators of the relationship between product innovativeness and customer responses.

3.7 Conclusion

The primary contribution of this study lies in its introduction and testing of a two-dimensional conceptualization of product program innovativeness consisting of newness and meaningfulness. This research creates several synergies between product innovativeness and creativity research and shows how the accomplishments of adjacent fields can be put together to contribute to innovation research. The results, which are based on information economics and a triadic dataset from B2B companies and their customers, suggest both a positive and a negative effect of the two different dimensions. The investigated contingencies underline that both effects can be managed adequately to increase customer loyalty. Overall, the study calls for more integrative research between related fields to shed light on the mysteries that still surround the phenomenon of innovativeness. Hopefully, the two-dimensional conceptualization of product program innovativeness will be widely useful and encourage marketing and innovation scholars to undertake additional research.

4 Conclusions of the Thesis

The purpose of this thesis is to enhance knowledge regarding two important phenomena relevant to research and managerial practice. As previous research has largely neglected the investigated phenomena, this thesis aimed to achieve the following major goals on the basis of two empirical studies (see also section 1.2):

- the development of a theory-based taxonomy of companies' innovation orientation and
- the analysis of customer responses to different dimensions of innovativeness.

The results of the two studies allow this thesis to provide overarching conclusions for research and managerial practice. The content-related, conceptual, and methodological research contributions of the thesis are outlined in section 4.1, and concluding remarks for managerial practice are presented in section 4.2.

4.1 Research Contributions of the Thesis

From a *content-related perspective*, the primary contribution of study 1 lies in the identification of patterns of companies' innovation orientation and their related performance outcomes. The employed definition of innovation orientation encompasses the characteristics of a strategic orientation with its focus on organizational strategy and its implementation. This approach reflects a holistic implementation of an organization-wide innovation orientation. By including strategy, structures/processes, HR systems, culture, and leadership, this thesis enables research to broadly capture innovation orientation with respect to its organizational embeddedness. This scope is of fundamental importance given the scarce research to date regarding the implementation of innovation strategies in different organizational variables, especially with respect to HR systems and leadership. To close this gap, this thesis brings together "soft" variables, such as culture and leadership, and the better researched "hard" variables, such as structures and processes, to investigate companies' innovation orientation.

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The empirical results yielded four distinct patterns of innovation orientation. These patterns differ not only in their combinations of distinctive organizational factors; they also vary greatly in terms of product program innovativeness and financial performance. The results partially contradict the common approaches of "the more, the better" in innovation research and draw a more differentiated picture. For very high levels of innovation orientation in all internal arrangements (as shown by the integrated innovator; see section 2.5), results affirm that "as a company increases the pace of innovation, its profitability begins to stagnate or even erode" (Gottfredson/Aspinall 2005, p. 64). Thus, depending on the company's objectives, employing the right combination, or "fit," of organizational factors is more decisive for success than pushing a less focused innovation orientation in all parts of the organization.

These results demonstrate that identification of typical patterns fosters systematization of the complexity of the different variables of companies' innovation orientation. In addition, multivariate configurations of strategic orientations and environmental uncertainty may offer more useful and complete explanations of complex organizations than those provided by simple bivariate descriptions (e.g., Dess/Lumpkin/Covin 1997; Hambrick 1984; Miller 1987). The widely researched bivariate relationships often take a contingency view, which suggests that for a certain set of conditions one optimal strategy exists, that is, "one best way for each given situation" (Ginsberg/Venkatraman 1985, p. 422). However, multivariate configurations overcome the drawbacks of this perspective by allowing different pathways to success, thereby responding to the call for "more rather than less complicated models" in innovation research (Szymanski/Kroff/Troy 2007, p. 50).

The main content-related contribution of study 2 lies in its analysis of customer loyalty responses to different dimensions of product program innovativeness. Reflecting the complex decision processes of B2B customers, the results suggest both a positive and a negative effect of the two different dimensions. While product program meaningfulness is beneficial for customer loyalty, product program newness has a negative effect. However, the investigated contingencies emphasize that companies can manage both effects adequately to increase customer loyalty. Against the background of equivocal empirical findings regarding customer responses toward new products (e.g., Henard/Szymanski 2001; Szymanski/Kroff/Troy 2007), the approach taken in this thesis demonstrates the advantages and disadvantages the adoption of innovations holds for customers, such as required behavioral changes (Lawton/Parasuraman 1980). Thus, this thesis sheds light on the secret of ambiguous customer responses to innovativeness

and calls for more differentiated research that does not classify relationships as black or white.

Overall, the content of the present work contributes by providing new insights while raising multiple questions for further research regarding innovation orientation as well as customer responses to innovativeness, such as how the taxonomy derived compares with existing typologies. In addition, this thesis identifies avenues for further research, such as explorations of how the environment might be an integral part of strategic phenomena instead of playing a secondary role. Scholars are urged to turn to phenomena that have produced contradicting empirical results or theoretical interpretations in prior research, as these investigations offer the potential to yield important knowledge gains in their respective areas.

As the frameworks of study 1 and 2 are both strongly rooted in theory, this thesis also contributes to research from a *conceptual and theoretical perspective*. Taxonomies serve to identify prototypical patterns that reflect reality (e.g., Bunn 1993; Cannon/ Perreault 1999) by empirically deriving schemes that categorize phenomena into mutually exclusive and exhaustive types based on a set of unique and differentiated attributes (e.g., Doty/Glick 1994; Miller 1996). To enrich this purely empirical approach, this thesis follows recommendations in extant literature and combines this procedure with a deductive approach, where the clustering variables of the investigated phenomenon are strongly tied to theory (Ketchen/Thomas/Snow 1993; Rich 1992).

Configuration theory provides a basis for identifying environmental uncertainty as an integral part of companies' patterns of innovation orientation. In contrast to taxonomies in extant literature that usually employ environmental variables as descriptive variables, this thesis considers them to be important determinants of the patterns themselves, an approach consistent with the propositions of configuration theory (Miller 1987; Veliyath/Srinivasan 1995). This approach overcomes the limitations of existing research that does not apply configuration theory according to its holistic definition of configurations, which is especially relevant to the study of organizational strategies and their implementation (Ketchen/Thomas/Snow 1993).

Boundary theory further enriches this theoretical grounding of the patterns of companies' innovation orientation. Boundary theory adds a third dimension, namely boundary-spanning activities, to the conceptualization of the patterns to reflect the interconnection between the organization and its environment. In this way, boundary theory extends the normative proposition of configuration theory. By drawing on

boundary theory, this thesis demonstrates the use of a multi-theory approach to conceptualize complex phenomena.

The primary conceptual contribution of study 2 relates to the introduction and testing of a two-dimensional conceptualization of product program innovativeness consisting of newness and meaningfulness. This conceptualization creates several synergies between product innovativeness and creativity research, and shows how the accomplishments of adjacent fields can be put together to contribute to innovation research. Thus, study 2 not only exemplifies how to integrate findings but also calls for more integrative research between related fields to solve the mysteries that still surround the phenomenon of innovativeness. Hopefully this two-dimensional conceptualization of product program innovativeness will be widely useful and encourage marketing and innovation scholars to undertake additional research.

Another important theoretical implication relates to the use of information economics. While information economics is mainly absent from innovativeness research, it serves well to explain direct and moderator effects of product program innovativeness and its outcomes on customer loyalty. Information economics highlights the signaling effects of innovations and stresses that these effects also prevail in B2B relationships. As this discussion demonstrates, future research should more frequently draw on theories from other fields to provide new insights for innovation research.

From a *methodological perspective*, this thesis makes several contributions. Both studies are based on a sample with a multi-informant design. On the side of the offering companies, marketing and R&D managers are the key informants, and usually at least two customers represent the other side of the relationship. Thus, three types of informants, all highly relevant to the successful generation and introduction of new products, participated in our studies. This design reduces the effects of informant bias (e.g., Kumar/Stern/Anderson 1993) and common method bias (Podsakoff et al. 2003). These reducing effects should be particularly strong for study 2, in which independent and dependent variables are assessed on different sides of the customer relationship dyad. Product program newness and meaningfulness are measured at the offering companies, and customers provided the information regarding their loyalty. Since customers are the most decisive success factor for new product introductions (Hauser/Tellis/Griffin 2006), the approach of collecting multi-informant data from both sides of the customer relationship dyad would greatly increase the validity of innovation research in general. Hence, future research should continue on this path.

Another methodological strength of study 1 is the validation of the central construct of product program innovativeness using multiple sources, an approach referred to as triangulation (Anderson/Narus 1990; Homburg/Schilke/Reimann 2009; Scandura/Williams 2000). To increase the reliability and validity of the construct in focus, a second source outside the offering companies—customers—was asked to assess the constructs measured by marketing managers (Bagozzi/Yi/Phillips 1991). A comparison of the answers of both informants indicated the high validity of the measurement employed in this thesis (see section 2.4.3 for details). Thus, multi-informant approaches not only ask the most knowledgeable informant for a particular construct but also permit researchers to increase measurement validity by using methods such as triangulation. Future research should continue on this avenue to overcome the limitations inherent in single-informant approaches, which still experience widespread use in present innovation research.

As a final step in deriving overarching research conclusions, a comparison of study 1 and 2 demonstrates the uniqueness of this thesis. Table 4-1 depicts a direct comparison of the two studies with regard to the targeted challenge against the background of extant research, the nature of the chosen approach and the unit of analysis, the role of product program innovativeness, the origins of the employed theory or theories, and the key implications regarding the targeted challenge as well as future research.

In summary, a comparison of study 1 and 2 reveals similarities, such as the level of analysis, but also decisive distinctions, which characterize the unique nature of the studies. The investigation of product program innovativeness from an outcome as well as an antecedent perspective is the central connecting element between the two studies, as Figure 1-5 illustrates. Therefore, this thesis clearly contributes an integrative approach to innovation management.

Table 4-1: Comparison of Studies 1 and 2

	Study 1	**Study 2**
Targeted Challenge	Widespread use of "the more, the better" approaches in innovation research	Equivocal empirical results regarding customer responses to new products
Nature of Approach	Exploratory (confirmatory only with regard to the hypotheses outlined in section 2.3.2)	Confirmatory
Unit of Analysis	Companies at the organizational level	Company–customer relationships at the organizational level
Role of Product Program Innovativeness	Outcome	Antecedent
Origins of Theory or Theories Employed	Open systems theory	New institutional economics
Key Implication Regarding the Targeted Challenge	Patterns, i.e., configurations, offer superior explanations of performance compared with single variables	Different dimensions of innovativeness have different performance implications (positive and negative)
Key Implication Regarding Future Research	Call for more research regarding interrelationships between multiple variables, for example by using cluster analysis or qualitative comparative analysis (e.g., Greckhamer et al. 2008)	Call for the use of multiple dimensions (newness and meaningfulness) to conceptualize and measure innovativeness

4.2 Concluding Remarks for Managerial Practice

Beyond making content-related, conceptual, and methodological research contributions, this thesis also offers highly relevant implications for managerial practice. During the past two decades, companies have invested considerable resources in enhancing their innovativeness in an increasingly turbulent environment (e.g., Iyer/Davenport 2008; Kanter 2006). The market is globalizing (Luo/Sivakumar/Liu 2005), customer preferences are dynamic (Swan/Kotabe/Allred 2005), the rate of technology change is increasing, and product life cycles are becoming shorter (Cooper 1996). In this setting, an innovation orientation offers an important means of staying competitive. However, its implementation must be applied in all parts of the organization in a coordinated way. The combination of the degree of innovation orientation in different parts of the organization, environmental uncertainty, and the degree of boundary-spanning activities must match. Thus, managers should choose patterns of innovation orientation for their companies which offer the "right" combination for their specific situations.

Regarding performance outcomes of patterns of innovation orientation, managers should keep in mind that tradeoffs may be involved between innovativeness and financial performance. Therefore, they should balance the weights they assign to innovativeness and financial performance and take these into account when choosing the patterns to strive for. While certain patterns may yield superior financial performance, other patterns will lead to a sustained growth path with the potential for higher returns in the mid- and long-term. In contrast, long-term strategies with an innovation focus may be very costly and impossible to pursue because of resource constraints.

This thesis—in particular study 2—is a call to top-level executives to be more concerned with the management of innovativeness at the program level than with specific products or projects. While managers give much attention to the management of single innovation projects, decisions regarding the management of the product program are influenced by criteria such as market coverage or profit contribution and not by considerations of product program innovativeness. However, program choices determine how companies conduct business in the future and, therefore, determine the long-term success (Cooper/Edgett/Kleinschmidt 1999). Thus, decisions regarding product program innovativeness should receive greater attention in managerial practice.

Furthermore, the program level seems more appropriate to account for the characteristics of B2B relationships, since many B2B customers procure multiple products from the same offering company. In addition, the signaling effect of product program innovativeness is of high relevance with regard to customer responses, as this thesis demonstrates theoretically and empirically. However, product program innovativeness must be managed carefully. Alterations of the product program may take longer, depending on the breadth and depth of the program, and many customers may be lost before the advantages of these changes take effect.

Additionally, recent developments in innovation management offer a new context for interpreting the results of this thesis, especially with respect to the investigated contingencies for the relationships between different dimensions of innovativeness and customer loyalty, i.e., brand association with innovativeness and customer integration. First, customer integration is related to the concept of open innovation (e.g., Chesbrough 2003; Enkel/Gassmann/Chesbrough 2009), which is receiving increasing attention. For example, crowdsourcing (Howe 2008) or customer co-development (e.g., Sánchez-González/González-Álvarez/Nieto 2009) as variants of open innovation are also types of customer integration, despite being on the more extreme end of the spectrum. Thus, these trends should also be taken into account in managerial attempts

to improve the positive effect of product program meaningfulness on customer loyalty. Second, in addition to mitigating the negative effect of product program newness on loyalty, brand association with innovativeness is becoming more important as a competitive advantage. Today, customers can compare product characteristics much more easily owing to the large amount of publicly available information and opinion. For this reason, customers turn to signaling effects, such as brand association with innovativeness, to support their decision making. Recent examples that underline the importance of these signaling effects include very successful companies with strong brands, such as Apple, or the rivalry to acquire companies in possession of brands associated with innovativeness, such as ThinkPad.

In summary, managerial practice should pursue an integrative approach to innovation management by focusing on a holistic implementation of an innovation orientation and by optimizing customer responses to product program innovativeness. If company leaders enable their organizations to follow these paths, they will set their companies on the road to long-term success through innovation.

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