論文 / 著書情報
Article / Book Information

題目(和文)	B2Bにおける戦略的指向性が新商品開発パフォーマンスに与える影響-背景因子の役割
Title(English)	A B2B Perspective on the Effect of Strategic Orientation on New Product Development Performance: The Role of Contextual Factors
著者(和文)	ウィマラチャンドラサカラワッリ アーチャーリゲ ディヌッシュ チャーナカ
Author(English)	S. A. Dinush Chanaka Wimalachandra
出典(和文)	学位:博士(学術), 学位授与機関:東京工業大学, 報告番号:甲第10262号, 授与年月日:2016年3月26日, 学位の種別:課程博士, 審査員:鈴木 定省,梅室 博行,青木 洋貴,妹尾 大,中田 和秀
Citation(English)	Degree:Doctor (Academic), Conferring organization: Tokyo Institute of Technology, Report number:甲第10262号, Conferred date:2016/3/26, Degree Type:Course doctor, Examiner:,,,,
学位種別(和文)	博士論文
Type(English)	Doctoral Thesis

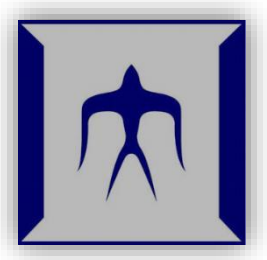
A B2B Perspective on the Effect of Strategic Orientation on New Product Development Performance: The Role of Contextual Factors

By

Dinush Wimalachandra

A dissertation submitted for the Degree of

DOCTOR OF PHILOSOPHY



Supervised by

Associate Professor Sadami Suzuki

Department of Industrial Engineering and Management

Graduate School of Decision Science and Technology

Tokyo Institute of Technology

2016

Abstract

Due to the quick pace of change in many markets, firms face immense pressure to identify correct market needs and deliver the best products that meet these market requirements. In new product development (NPD), firms adopt different NPD strategies to achieve higher market (customer satisfaction and sales) and operational performance (quality, time-to-market, and cost). Customer value creation is one of the main intermediate processes when achieving NPD market performance. In order to achieve NPD performance, firms have been traditionally focusing on developing their internal capabilities. Recently, the importance of drawing external information into NPD processes is in the limelight. However, extant literature does not provide enough evidence on the specific roles played by the sources of external information in the NPD process and the roles of contextual factors in B2B contexts. This dissertation seeks to answer three main research questions: how sources of external information help firms achieve NPD operational performance, how sources of external information help firms create B2B customer value (hedonic, symbolic, functional, and cost), and how contextual factors (product technology, national culture, and supply chain stage) affect the relationship between sources of external information and NPD performance.

To address the research questions discussed, this dissertation defines a complex overall research framework and discusses how "open innovation theory" and "dynamic capability theory" can be extended into NPD in order to understand the process of drawing on external information through NPD strategic orientation in creating B2B customer value and in achieving market and operational performance.

To empirically explore the relationships among the dimensions of the overall research framework, this dissertation utilizes consolidated data from 425 industry experts, representing 228 SBUs (Strategic Business Units) in 25 countries across the supply chain (raw material developers, manufacturers, value adding firms, and trading offices), collected in two stages.

This dissertation explores the effects of different types of NPD strategic orientation on B2B customer value and the effect of supply chain stage on the relationship between B2B customer value and market performance. Proactive needs focus shows a positive effect on intangible

(hedonic and symbolic) customer value, while responsive needs focus shows a positive effect on tangible (functional and cost) customer value. Furthermore, informal (vs. formal) modes of communication shows a positive effect on intangible customer value, while frequent communication shows positive effects on tangible and intangible customer value. Results also show that the effects of B2B functional value on customer satisfaction and sales decrease along the supply chain, whereas the effect of hedonic value on customer satisfaction increases along the supply chain.

A study focusing on the effect of drawing on external information through B2B information base of customer orientation (intuition-based and data-based), B2C market research, B2B communication management, and eco-system orientation (technology, competitor, and manufacturing) on NPD operational performance indicates that intuition-based customer orientation has a positive effect on quality and a negative effect on time-to-market. Moreover, data-based customer orientation shows a positive effect on cost. Even though B2C market research shows a negative effect on quality, it shows a positive effect on quality with the presence of intuition-based customer orientation. Even though technology and competitor orientation do not show any significant effect on quality, manufacturing orientation shows a positive effect on quality, while it shows a negative effect on time-to-market.

This dissertation investigates the influences of B2B and B2C customer involvement types with different motives on NPD operational performance and the differential effects of high vs. low product technology. Results show that B2C customer involvement with market forecast motives does not provide any advantage in achieving quality. B2B customer involvement with economic motives shows a positive effect on quality and a negative effect on time-to-market when firms use both high-tech and low-tech products.

An examination of the effect of national culture on the relationship between B2B customer needs focus and quality shows that effect of proactive needs focus on quality is strongly positive in cultures with high power distance and short-term orientation, while this effect is negative in cultures with low power distance and high long-term orientation. In addition, the effect of responsive needs focus on quality is strongly positive in cultures with low power distance and high long-term orientation, whereas this effect is negative in cultures with high power distance and short-term orientation.

Overall findings of this dissertation have several theoretical contributions and important managerial implications. Results show that firms need to select the best sources of external information and drawing on external information via different types of NPD strategic orientation helps firms in achieving higher NPD market and operational performance. In addition, firms need to understand the important roles played by contextual factors in B2B contexts. This dissertation encourages future research to integrate other sources of external information such as B2C consumer perceived value, consumer perceived satisfaction, and supplier integration into the current conceptual framework.

Acknowledgments

This dissertation showcases not only the research work of 6 long years, but also the unforgettable life-changing experience that I had at Tokyo Institute of Technology, Japan, which is nothing short of amazing. Completion of this journey would not have been possible without the guidance and assistance of several individuals who contributed and extended their kind, valuable support in very many ways throughout the whole process of preparation and completion of this research study.

First and foremost I would like to express my sincere gratitude to Professor Takao Enkawa for allowing me to have the honor of studying in his laboratory as the last international student under his supervision, for guiding me throughout the Master and PhD courses, and for sharing his immense knowledge in many areas. I also would like to express my greatest gratitude to Associate Professor Sadami Suzuki for accepting me as a student in the final year of my PhD after Professor Enkawa's retirement and his kind guidance with valuable comments and insightful questions. My great appreciation goes to Assistant Professor Bjoern Frank for his advice, criticism, encouragement and guidance throughout the whole period. I am also thankful to the doctoral dissertation reviewing committee consisting of Professors Hiroyuki Umemuro, Kazuhide Nakata, Hirotaka Aoki, and Dai Senoo for their insightful comments and suggestions to improve this dissertation. My great appreciation goes to the Ministry of Education, Culture, Sports, Science and Technology in Japan, and the Embassy of Japan in Sri Lanka, for facilitating my study experience in Japan.

I greatly acknowledge all the managers and other officials who supported in various ways in carrying out the survey in 25 countries. Special thanks goes to Mr. August Grupp and Mr. Lal Karunarathne for facilitating the data collection process. I thank all the anonymous reviewers of my research papers for their constructive advice which helped refine my research work. I take this opportunity to sincerely acknowledge all the members of Enkawa and Suzuki laboratories for sharing a wonderful time together at the laboratory. A special note of gratitude goes to Mr. Nayanapriya Gunawardhena for being supportive in very many ways and for being with me from the beginning of this endeavor.

This research study would not have been a reality if not for the enormous support given to me by my parents, siblings and especially my beloved wife, Udara de Silva for being with me in every difficult situation, encouraging me to achieve goals, and for being behind me all the time.

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Chapter 1

Introduction and Research Purpose

Chapter Overview

Many research studies have highlighted the importance of utilizing internal information through various strategies such as involving highly skilled employees in their new product development (NPD) process. Recently, the significance of drawing on external information is in the limelight. However, based on the extant literature, specific roles of the sources of external information (NPD strategic orientation) in the NPD process and the roles of contextual factors in B2B contexts are still not clear. In order to address this gap, this dissertation answers three main research questions:

- How sources of external information help firms achieve NPD operational performance.
- How sources of external information help firms create B2B customer value.
- How contextual factors affect the relationship between sources of external information and NPD performance.

1.1 Research Background and Purpose

The importance of NPD has grown significantly over the last few decades and it has become one of the key drivers of competition among industries. In order to face competition, firms tend to update their product portfolio by aligning their strategies with current market trends. New products emerge as they provide firms first-mover advantage, assure continued growth, and help firms to take advantages of new technological trends (Stephen and Olubusayo, 2013).

Firms' ability to take advantage of emerging new product opportunities largely depends on their NPD strategy and the corresponding ability to gather, create, and apply new knowledge (Lindman, 2002). In the process of building and exploiting knowledge of the new product, many firms have to face the dilemma of management orientation as firms have to choose the best strategy among various methods of searching new information. Adopting a more open or closed innovation strategy is a choice of prime importance in NPD (Nystrom, 1985). A more open strategy allows firms to utilize any information they obtain from external sources instead of depending solely on their internal information. On the contrary, firms use new knowledge generated by internal information when they adopt a more closed strategy (Lindman, 2002). With the increasing debate on inter-firm networking, industrial relationships among competitors and customers, extant literature depicts that the need for openness is significant (Zineldin and Jonsson, 2000).

This dissertation builds on and extends previous literature in four ways. First, this study is the first attempt to examine the effects of different dimensions of NPD strategic openness on the types of NPD performance (operational and market) in B2B contexts. While extant literature concentrated on information search inside the firm (Katila, 2002; Katila and Ahuja, 2002), this dissertation focuses on firms' external information search efforts. The approach of this dissertation centers its attention on firms' search channels, such as customers (as users and buyers) and competitors, which firms use in their search for new opportunities. This approach provides a mechanism to explore the relationship between openness of firms to different types of information domains and their NPD performance. Utilizing external information is vital in B2B contexts. For example, in a typical supply chain, when a new product is initiated from firms at the early stages of the supply chain (raw material developers), it goes through manufacturers and trading offices before it reaches the end consumer. Therefore, in B2B contexts, firms along the supply chain have

to work with numerous B2B customers, who provide various external information. Gathering external information through NPD strategic openness may help firms comprehend changing customer demands and buying patterns, while allowing them to identify any disadvantages of their own new product portfolio. A great number of successful innovations are initiated externally (Koberg et al., 1996), suggesting that boundaries of firms should be permeable, allowing external information to flow inside. According to Neely et al. (2001), innovative firms tend to maintain a close relationship with customers in order to obtain innovative ideas. Therefore, firms who utilize external information can integrate innovative ideas of internal NPD department members with externally obtained ideas, which will finally result in successful new products.

Second, this dissertation examines how different strategies for using external sources of information help firms create different types of B2B customer value in B2B contexts, which is an intermediate stage in achieving firms' market performance. Customer value creation has been a hot topic in the recent past and many studies have examined customer value in general (Blocker et al., 2011). However, in order to obtain a comprehensive view on how each source of external information helps firms create types of B2B customer value, we consider different dimensions of customer value in B2B contexts.

Third, the current study seeks to examine the role of contextual factors on the relationship between sources of external information and NPD performance. Firms may have to face many risks and barriers when they focus on excessive external information. For instance, Enkel et al. (2009) pointed out risks such as loss of competence on internal knowledge, higher coordination cost, loss of control over NPD, and difficulty in finding right partners. This suggests that firms need to utilize external information with extra attention and the advantages of using external information may vary with different contextual factors. Thus, this dissertation empirically investigates how firms can use external information in their NPD process effectively in order to achieve higher NPD performance, and examines the effects of contextual factors on the relationship between sources of external information (NPD strategic orientation) and NPD performance in B2B contexts.

Fourth, the extant literature on information search and NPD has empirically examined relatively little about the ways in which firms draw external ideas into their NPD process. Moreover, these research studies are largely based on patent citations (Klevorick et al, 1995). Most

of the patents are not commercialized and they are only partial indicators of the NPD process. This dissertation is based on a questionnaire survey of industry experts from firms across the supply chain (raw material developers, manufacturers, value adding firms, and trading offices) in various countries, which inquires the sources of external information they rely upon in their NPD process. Thus, our quantitative approach allow us to examine the nature of external information search strategy, which helps firms exploit external sources of information effectively.

Extant literature on the usage of external information in NPD activities proposes two main theories: open innovation theory (Chesbrough, 2003) and dynamic capability theory (Teece et al., 1997). Chesbrough (2003) argued that advantages that firms gain from using internal information have declined. Accordingly, many innovative firms now spend little effort on using internal R&D information and yet they are able to successfully innovate by drawing external knowledge and expertise from a wide range of external sources (Chesbrough, 2003). Open innovation is a process that focuses on how to combine different competencies that reside outside of the firm with internal competencies (Laursen and Salter, 2006). Thus, it is suitable for understanding contexts that draw external information into NPD. Open innovation theory provides a holistic view on knowledge exploration (inventive and absorptive capacity), retention (transformative and connective capacity), and exploitation (innovative and desorptive capacity) (Lichtenthaler and Lichtenthaler, 2009). Thus, open innovation theory is considered well-matched in understanding the effects of using external information on internal NPD performance, where actual new products are created internally.

As products offering superior customer value are substantially more successful in the marketplace (Cooper, 2001), customer value of new products is the key competitive advantage to be achieved in NPD. While many theories have sought to identify how competitive advantage can be achieved and sustained, dynamic capability theory is considered well-suited to rapidly changing, dynamic environment of NPD-intense industries (Deeds et al., 2000). It posits that NPD departments need more than the ability to develop new products (innovative capability) in order to achieve competitive advantage. They also need dynamic abilities to integrate changing external market information into firm-embedded knowledge (absorptive capability) and to align internal resources with changing external demand (adaptive capability) (Wang and Ahmed, 2007). In the process of drawing on external information, dynamic capability theory can be used to understand

situations where firms have rapidly changing environment (Teece et al., 1997), which does not require knowledge retention capabilities.

Firms' ultimate goal of drawing on external information is achieving higher NPD performance. The continuous development and launching of new products is an important determinant of firms' performance (Kotabe, 1990; Zhou et al., 2005; Sorescu and Spanjol, 2008). Difference in orientation for NPD might affect NPD performance significantly (Liu et al., 2005). While new products create new growth opportunities in various market segments, they involve a considerable amount of risk due to potential failure. Firms have been searching for ways to minimize the failure rate of new products, which has remained high over the years. By aligning the NPD process with market requirements, firms may effectively increase the success rate of new products (Ernst, 2002).

In many past studies, since overall NPD strategic orientation is represented by market orientation alone (Atuahene-Gima, 1996; Slater and Narver, 1994), roles of different dimensions of NPD strategic orientation in achieving NPD performance need to be investigated comprehensively, to understand different effects of the sources of external information on internal NPD performance. The NPD process is not a natural state of affairs. It must be encouraged by challenges and threats and therefore requires effective information processing to make firms aware of the need for change. Successful innovations are largely dependent on how external information is obtained through open strategy and is managed internally (Frishammar and Ake, 2005). Thus, in this dissertation, we consider gathering, sharing, and utilizing external information through various dimensions of NPD strategic orientation in NPD.

Existing research has identified three major strategic orientations of firms (customer, competitor, and technology orientation) based on factors that determine the success or failure of new products (Narver and Slater, 1990). Manufacturing orientation is another vital strategy that cannot be neglected in NPD strategy (Hyland and Mellor, 2003). Customer orientation (knowledge of marketing and customers) is one of the key strategic orientations that firms should develop and adopt (Bontis, 1998). Extant studies have shown the positive impact of customer orientation on new product success (Gruner and Homburg, 2000; Im and Workman, 2004; Joshi and Sharma, 2004). Some studies have identified customer integration as an antecedent of NPD performance (Lilien et al., 2002). Even though past studies advance our understanding about the effects of

certain facets of NPD strategic orientation on NPD performance, they fall short of developing an integrated and systematic framework for leveraging different dimensions of NPD strategic orientation in order to achieve higher NPD performance. Figure 1.1 represents the conceptual model we developed in order to understand how NPD strategic orientation helps firms achieve NPD operational performance and helps achieve market performance through customer value creation. Furthermore, we investigated the moderating effects of contextual factors on the relationships between NPD strategic orientation and NPD performance. In this dissertation, we have defined NPD performance as operational performance (quality, time-to-market, and cost) and market performance (customer satisfaction, sales).

1.1.1 Firms' Openness and NPD Operational Performance (based on open innovation theory)

Recent studies have focused on how openness influences firms' ability to innovate (Chesbrough, 2003; Laursen and Salter, 2006). In defining openness, Chesbrough (2003) argues that "open innovation is a paradigm which assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market". Recent trends in the business context such as outsourcing, flexibility, agility have already forced firms to reconsider their strategies and to start becoming network-based firms. Procter and Gamble is one of the early adopters of the open innovation concept. They claimed that they were able to get most of the benefits of using external information (Dodgson et al., 2006). Extant literature on drawing on external information does not provide evidence for the fact that firms' openness to outside information helps improve internally oriented quality management practices and strategies of reducing time-to-market and cost. We argue that by extending "open innovation paradigm" into quality control and areas of reducing time-to-market and cost in NPD, firms can improve their mostly internally oriented practices by using external information. Koschatzky (2001) found that firms which do not cooperate and do not exchange knowledge reduce their knowledge base on a long-term basis and lose the ability to enter into exchange relations with other firms and organizations. Therefore, by being more open to outside capabilities, firms may offer their new products with high quality, high speed, and low cost as firms can obtain current trends in the market and competitor pricing.

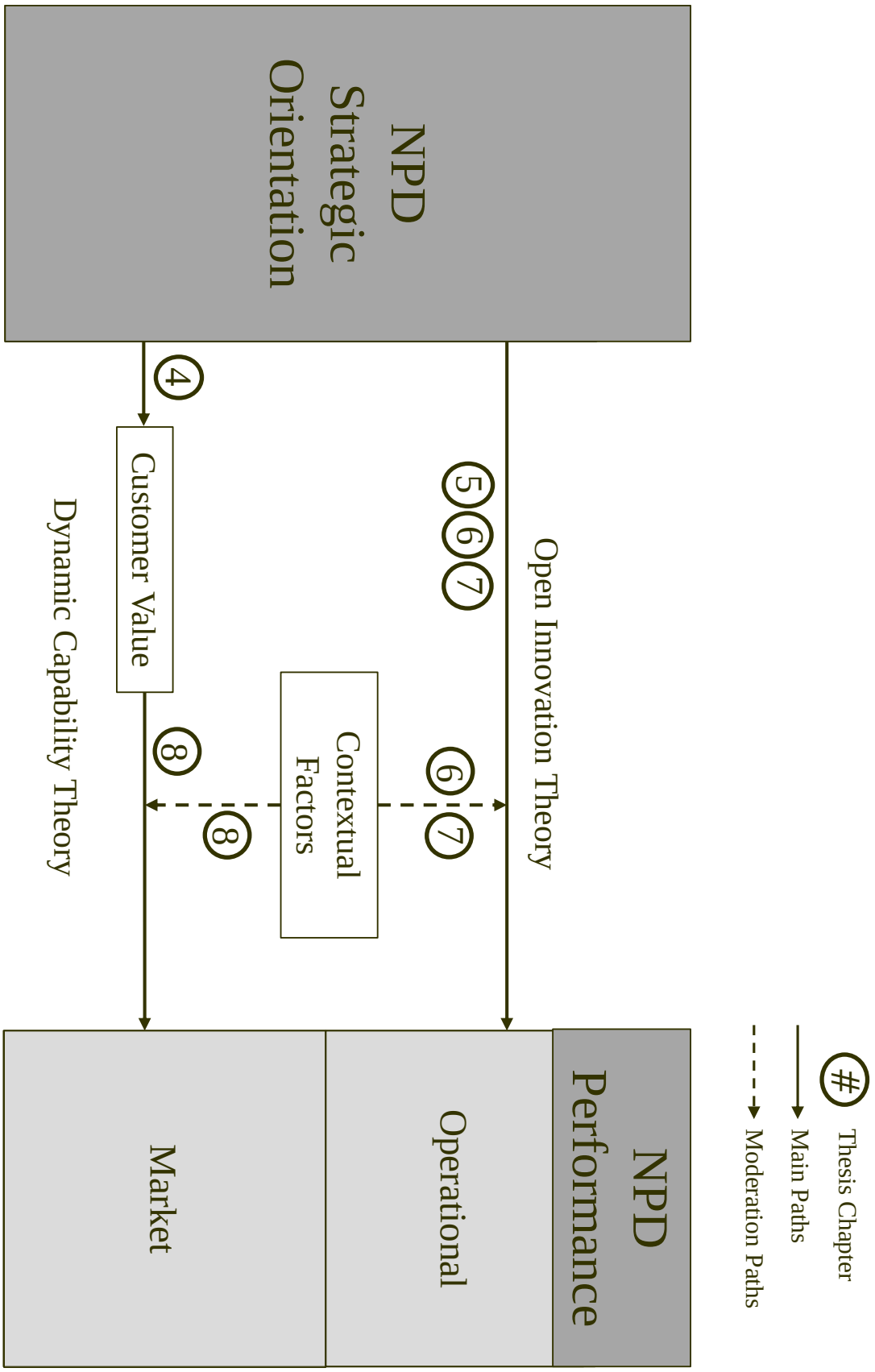


Figure 1.1 - Integrative Summary of the Dissertation

In this dissertation, we argue that accounting for external information in achieving NPD operational performance (quality, time-to-market, cost) is a process of knowledge exploration, retention, and exploitation. Our original claims are that sources of external information such as communication management (absorptive capacity) and needs focus (inventive and innovative capacity) help firms to explore and exploit knowledge by acquiring information on customer needs and to build on acquired knowledge in addressing customer needs (see Chapter 5 and 7). Information management (transformative capacity) as well as customer involvement and eco-system orientation (connective capacity) help firms retain knowledge from past quality-related problems and competitors' best practices (see Chapter 5 and 6). Thus, open innovation theory, which describes knowledge exploration, exploitation, and retention, is well-suited to understand the effect of the sources of external information on NPD operational performance. Achieving high quality, reducing time-to-market, and cost are internal processes of firms and these goals do not change rapidly with the market dynamism. Therefore, compared to dynamic capability theory, which focuses only on knowledge exploration and exploitation, we used open innovation theory to describe our research questions in Chapter 5, 6, and 7, in order to obtain a holistic view.

1.1.2 Firms' Openness in B2B Customer Value Creation and NPD Market Performance (based on dynamic capability theory)

A firm has a competitive advantage when it generates more economic value than the marginal competitor in the market (Peteraf and Barney, 2003). The immediate economic value of NPD is the customer value of newly developed products, whereas profits occur with a time-lag and are also influenced by many other factors. Hence, the overall conceptual framework developed in this dissertation adopts customer value of newly developed products as an intermediate process between NPD strategic orientation and market performance. As customer value carries over to future customer perceptions (Anderson et al., 1994) and leads to customer loyalty (Johnson et al., 2001), customer value even may be considered a sustained competitive advantage that shields firms from risks and competition (Fornell et al., 2006). Dynamic capabilities perpetually create, update, and renew the resources that firms need to create competitive advantage (Teece et al., 1997; Ambrosini and Bowman, 2009). Drawing on dynamic capability theory, this dissertation thus adopts dynamic capabilities as NPD strategies and competitive advantage as customer value.

We argue that by extending "dynamic capability theory" into NPD, effects of the sources of external information (NPD strategic orientation) on B2B customer value creation can be understood, which helps firms achieve higher market performance.

In this dissertation, we argue that accounting for external information in achieving NPD market performance through customer value creation is a process of knowledge exploration and exploitation (absorptive and adaptive capability) (see Chapter 4). Generally, the process of achieving NPD market performance through B2B customer value creation can be identified as a rapidly changing environment since customer value and customer expectations change frequently with time. Therefore, knowledge retention does not play a major role in this context. In order to describe research questions discussed in Chapter 4 and 8, we used dynamic capability theory, which is well-suited to explaining dynamic environments (Deeds et al., 2000).

1.1.3 Contextual Factors

Although the discussions of using external information have started a few years ago, we still lack a proper understanding about how different dimensions of the sources of external information clearly help firms in achieving higher performance. By introducing the open innovation concept, Procter and Gamble announced that they were able to increase their product success rate by 50% and the efficiency of their R&D by 60% (Enkel et al., 2009). However, some firms investing in open innovation have faced risks and barriers that hinder them in profiting from their initiatives. Too much external information can negatively impact firms' long-term innovation success, because it could lead to loss of control and hinder core competences (Enkel et al., 2009). Therefore, NPD strategic orientation, which helps firms obtain external information, may affect NPD performance positively under certain circumstances. Thus, there is a need to investigate the effects of contextual factors on the relationships among different dimensions of NPD strategic orientation and NPD performance. In this dissertation, we mainly considered three different types of contextual factors, which represent three different levels. 1. Country level: national culture (based on Hofstede cultural scores) as it is very well suitable to investigating why certain NPD strategies do not provide best feasible NPD performance within certain national contexts. 2. Product level: product technology (high-tech vs. low-tech) as it is an important product attribute.

3. Firm level: supply chain stage (position of the firm in their supply chain) as B2B customers expect different products from raw material developers, manufacturers, and trading offices. In considering the role of contextual factors, we focused only on the stage where firms achieve NPD performance (operational and market). For instance, we investigated the effects of supply chain on the relationship between B2B customer value and NPD market performance, without focusing on the relationship between NPD strategic orientation and B2B customer value as it is an intermediate stage between NPD strategic orientation and market performance.

1.2 Structure of the Dissertation

This dissertation includes nine chapters grouped in accordance with the overall research objectives that were outlined previously. Figure 1.2 describes the details of each chapter.

Chapter 1: Describes an overview of how firms can use external information through different types of NPD strategic orientation in creating new products in B2B contexts.

Chapter 2: Presents the theoretical background necessary to understand the research studies included in each chapter.

Chapter 3: Describes methodology in general.

Chapter 4: Outlines the effects of NPD strategic orientation on B2B customer value creation.

Chapter 5: Shows the effects of NPD strategic orientation on NPD operational performance (quality, time-to-market, cost).

Chapter 6: Presents the moderating effect of product technology, which is a contextual factor, on the relationships among the dimensions of NPD strategic orientation and NPD operational performance (quality, time-to-market, cost).

Chapter 7: Describes the moderating effect of national culture, which is a contextual factor, on the relationships among the dimensions of NPD strategic orientation and NPD operational performance (quality).

Chapter 8: Shows the moderating effect of supply chain stage, which is a contextual factor, on the relationships among the dimensions of B2B customer value and NPD market performance (customer satisfaction, sales)

Chapter 9: Outlines the conclusions drawn from the dissertation.

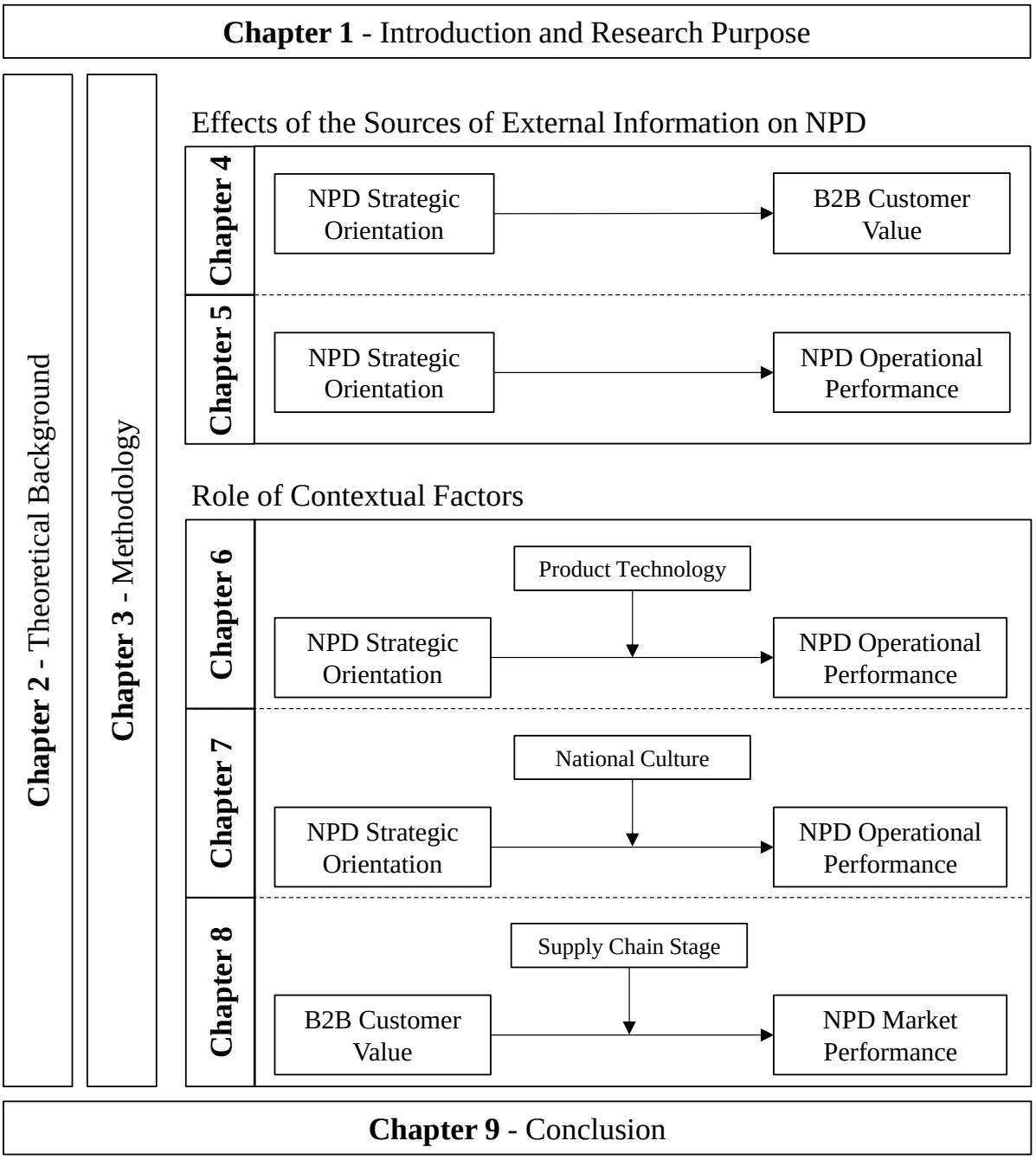


Figure 1.2 - Summary of the Conceptual Framework Shown in Each Chapter

References

Ambrosini, V., and Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1), 29-49.

Anderson, E. W., Fornell, C., and Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: findings from Sweden. *Journal of Marketing*, 58(3), 53-66.

Atuahene-Gima, K. (1996). Market orientation and innovation. *Journal of Business Research*, 35(2), 93-103.

Blocker, C. P., Flint, D. J., Myers, M. B., and Slater, S. F. (2011). Proactive customer orientation and its role for creating customer value in global markets. *Journal of the Academy of Marketing Science*, 39(2), 216-233.

Bontis, N. (1998). Intellectual capital: an exploratory study that develops measures and models. *Management Decision*, 36(2), 63-76.

Chesbrough, H. (2003). *Open Innovation*. Harvard University Press, Cambridge, MA.

Cooper, R. G. (2001). *Winning at New Products: Accelerating the Process from Idea to Launch.* Perseus, Cambridge, MA.

Deeds, D. L., DeCarolis, D., and Coombs, J. (2000). Dynamic capabilities and new product development in high technology ventures: an empirical analysis of new biotechnology firms. *Journal of Business Venturing*, 15(3), 211-229.

Dodgson, M., Gann, D., and Salter, A. (2006). The role of technology in the shift towards open innovation: the case of Procter & Gamble. *R&D Management*, 36(3), 333-346.

Enkel, E., Gassmann, O., and Chesbrough, H. (2009). Open R&D and open innovation: exploring the phenomenon. *R&D Management*, 39(4), 311-316.

Ernst, H. (2002). Success factors of new product development: a review of the empirical literature. *International Journal of Management Reviews*, 4(1), 1-40.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(2), 39-50.

Frishammar, J., and Ake Horte, S. (2005). Managing external information in manufacturing firms: the impact on innovation performance. *Journal of Product Innovation Management*, 22(3), 251-266.

Gruner, K. E., and Homburg, C. (2000). Does customer interaction enhance new product success? *Journal of Business Research*, 49(1), 1-14.

Hyland, P., and Mellor, R. (2003). Performance measurement and new product development: is it linked to manufacturing strategy? Retrieved on 12/5/12 from http://www.bus.uts.edu.au/ANZAM/OMS2003/papers/Hyland%20Mellor.pdf.

Im, S., and Workman Jr, J. P. (2004). Market orientation, creativity, and new product performance in high-technology firms. *Journal of Marketing*, 68(2), 114-132.

Johnson, M. D., Gustafsson, A., Andreassen, T. W., Lervik, L., and Cha, J. (2001). The evolution and future of national customer satisfaction index models. *Journal of Economic Psychology*, 22(2), 217-245.

Joshi, A. W., and Sharma, S. (2004). Customer knowledge development: antecedents and impact on new product performance. *Journal of Marketing*, 68(4), 47-59.

Katila, R. (2002). New product search over time: past ideas in their prime? *Academy of Management Journal*, 45(5), 995-1010.

Katila, R., and Ahuja, G. (2002). Something old, something new: a longitudinal study of search behavior and new product introduction. *Academy of Management Journal*, 45(6), 1183-1194.

Klevorick, A. K., Levin, R. C., Nelson, R. R., and Winter, S. G. (1995). On the sources and significance of interindustry differences in technological opportunities. *Research Policy*, 24(2), 185-205.

Koberg, C. S., Uhlenbruck, N., and Sarason, Y. (1996). Facilitators of organizational innovation: the role of life-cycle stage. *Journal of Business Venturing*, 11(2), 133-149.

Koschatzky, K. (2001). Networks in innovation research and innovation policy: an introduction. In Koschatzky, K., Kulicke, M. and Zenker, A. (eds). *Innovation Networks: Concepts and Challenges in the European Perspective*, Physica Verlag, Heidelberg.

Kotabe, M., (1990). Corporate product policy and innovation behavior of European and Japanese multinationals: an empiric investigation. *Journal of Marketing,* 54(4), 19-33.

Laursen, K., and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), 131-150.

Lichtenthaler, U., and Lichtenthaler, E. (2009). A capability-based framework for open innovation: complementing absorptive capacity. *Journal of Management Studies*, 46(8), 1315-1338.

Lilien, G. L., Morrison, P. D., Searls, K., Sonnack, M., and Hippel, E. V. (2002). Performance assessment of the lead user idea-generation process for new product development. *Management Science*, 48(8), 1042-1059.

Lindman, M. T. (2002). Open or closed strategy in developing new products? A case study of industrial NPD in SMEs. *European Journal of Innovation Management*, 5(4), 224-236.

Liu, P. L., Chen, W. C., and Tsai, C. H. (2005). An empirical study on the correlation between the knowledge management method and new product development strategy on product performance in Taiwan's industries. *Technovation*, 25(6), 637-644.

Narver, J. C., and Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(4), 20-35.

Neely, A., Filippini, R., Forza, C., Vinelli, A., and Hii, J. (2001). A framework for analysing business performance, firm innovation and related contextual factors: perceptions of managers and policy makers in two European regions. *Integrated Manufacturing Systems*, 12(2), 114-124.

Nystrom, H. (1985). Product development strategy: an integration of technology and marketing. *Journal of Product Innovation Management*, 2(1), 25-33.

Peteraf, M. A., and Barney, J. B. (2003). Unraveling the resource-based tangle. *Managerial and Decision Economics*, 24(4), 309-323.

Slater, S. F., and Narver, J. C. (1994). Does competitive environment moderate the market orientation-performance relationship? *Journal of Marketing*, 58(1), 46-55.

Sorescu, A. B., and Spanjol, J. (2008). Innovation's effect on firm value and risk: insights from consumer packaged goods. *Journal of Marketing*, 72(2), 114-132.

Stephen, I. A., and Olubusayo, F. H. (2013). Impact of strategic orientation dimensions on new product development in agro-based Nigerian firms. *Economics and Management Research Projects*, 3(1), 1-8.

Teece, D. J., Pisano, G., and Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Wang, C. L., and Ahmed, P. K. (2007). Dynamic capabilities: a review and research agenda. *International Journal of Management Reviews*, 9(1), 31-51.

Zhou, K. Z., Yim, C. K., and Tse, D. K. (2005). The effects of strategic orientations on technology- and market-based breakthrough innovations. *Journal of Marketing*, 69(2), 42-60.

Zineldin, M., and Jonsson, P. (2000). An examination of the main factors affecting trust/commitment in supplier-dealer relationships: an empirical study of the Swedish wood industry. *TQM Magazine*, 12(4), 245-266.

Chapter 2

Theoretical Background

Chapter Overview

This chapter outlines a brief description of background knowledge related to research studies presented in this dissertation. It elaborates on different dimensions of NPD strategic orientation, types of B2B customer value, NPD performance, and contextual factors.

2.1 Open Innovation and Dynamic Capability Theories

In an era of increasing global competition, the existence of various types of sources of information demands firms to create new ways of managing flows of information in order for them to become more efficient in the NPD process. While extant literature identifies the importance of managing information within the firm, successful NPD largely depends on how external information is managed effectively and is integrated with internal information (Frishammar and Ake, 2005). Exploitation of external information is a mechanism that links firms to its environment and markets.

As the focus of firms gradually shifts from purely internal R&D activities to outside activities, extant literature starts emphasizing the importance of being more open to outside activities (Christensen et al., 2005). The focus on openness suggests that the network of relationships between the firm and its external environment can play an important role. Ahuja (2000) argued that direct and indirect ties between firms and its environment can influence the firms' ability to innovate and the effectiveness of direct ties is moderated by the number of direct ties of the firm. Powel et al. (1996) investigated the importance of inter-organizational collaboration and locus of innovation in biotechnology, which showed that network-oriented firms have a great advantage of increasing their performance. All these extant studies suggest the important role of openness in NPD.

Existing literature on open innovation presents different definitions. Laursen and Salter (2006) linked openness with the number of external sources of innovation, whereas Henkel (2006) focused on openness as revealing ideas previously hidden inside firms. Powell (1990) stressed the importance of networks in knowledge creation in many fields. Langlois (2003) argued that managers must find new ways of innovation as many vertically integrated firms create a richer mix of information sources. Despite of significant investment in R&D and strong internal resources, it is sometimes important for firms to seek new informational sources outside their boundaries. For example, commercial development of the electric bulb was an outcome of recombining the ideas of scientists, engineers, financiers, and people outside the firm (Hargadon, 2003). To summarize, much of the literature views NPD as a process of drawing ideas and resources from external actors.

In the literature on drawing external information into firms, Chesbrough's open innovation strategy is the most commonly used definition in the recent past (Dahlander and Gann, 2010). Chesbrough (2006) defined the term open innovation as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively". This concept is being widely used due to several possible reasons. The concept of open innovation reflects social and economic changes in working environments, where workers, especially in NPD departments, seek new career changes rather than a job with a single firm. Thus, firms need to find new ways of drawing new talents into their NPD departments by searching external talents. Moreover, intellectual property rights allow firms to trade ideas. New technologies also have positively contributed to widely using open innovation as it helps firms to collaborate across geographical distance. This dissertation extends the literature on the role of open innovation in achieving NPD operational performance by being the first to examine differences in the effects of external information (dimensions of NPD strategic orientation) on distinct types of NPD operational performance.

While industrial economics as the dominant management paradigm until the 1980s considered industry-level factors to be the main source of firms' competitive advantage (Porter, 1980), resource-based theory as the current prevailing paradigm views internal resources and capabilities as the main driver of competitive advantage (Barney, 1991; Peteraf, 1993). Its broad and integrative nature has enabled researchers to explain market outcomes across different contexts and to extend the theory to other fields such as marketing and NPD (Kozlenkova et al., 2014). However, the explanatory power of resource-based theory has been questioned for dynamic environments where shifting demand quickly renders resources and capabilities obsolete (Eisenhardt and Martin, 2000). To address this shortcoming, researchers developed dynamic capability theory, an extension of resource-based theory that stresses the importance of dynamic capabilities for dynamic environments such as for the function of NPD, which constantly seeks to renew its physical output in line with shifting demand (Ambrosini and Bowman, 2009).

Dynamic capability theory distinguishes three types of dynamic capabilities: innovative, absorptive, and adaptive capabilities (Wang and Ahmed, 2007). Innovative capability refers to the in-house technical ability to develop new products and is the traditional core capability of NPD departments (Wang and Ahmed, 2007). Absorptive capability refers to the ability to obtain external

information, such as information of changing customer preferences, and to integrate this information into firm-embedded knowledge (Wang and Ahmed, 2007). It helps NPD departments update their knowledge base and sustain the potential to meet changing demand. Adaptive capability refers to the ability to align internal resources and capabilities with changing demand through flexibility and agility (Wang and Ahmed, 2007). It enables NPD departments to act on new knowledge, conceive ideas for new products, and deliver them to customers. Since the role of innovative capabilities at the heart of NPD is well-understood, this dissertation is positioned to explore the role of absorptive and adaptive capabilities at the interface of marketing and innovation. By helping NPD departments keep up with market developments, these dynamic capabilities play a crucial role in customer value creation through NPD, whose success depends on addressing changes in customer needs more quickly than competitors. Dynamic capability theory is considered well-suited to rapidly changing and dynamic environments (Deeds et al., 2000). This dissertation extends the literature on the role of dynamic capabilities in NPD by being the first to examine differences in the effects of dynamic capabilities on distinct types of customer value.

The fundamental problem in the field of strategic management is how firms achieve and maintain competitive advantage. Traditionally, researchers use resource-based theory, which describes that firms require a unique collection of difficult-to-imitate resources, competencies, and capabilities to be competitive (Barney, 1991). Teece et al. (1997) identified major drawbacks of the resource-based theory and introduced dynamic capability theory, which is more suitable when firms operate in rapidly changing environments. Based on the initial idea of dynamic capability theory, Wang and Ahmed (2007) defined three main dynamic capabilities of firms in order to understand the firms' capabilities comprehensively (absorptive, adaptive, and innovative capability). However, dynamic capability theory does not explain some of the dimensions in the knowledge generation process such as knowledge retention. Chesbrough (2003) initiated the idea of open innovation theory, which describes various capabilities of firms (inventive, absorptive, transformative, connective, innovative, and desorptive capacity) for knowledge exploration, retention, and exploitation (Lichtenthaler and Lichtenthaler, 2009).

Apart from dynamic capability and open innovation theories, the concept of absorptive capacity has also been used in many research studies, which also focuses on utilizing external knowledge inside the firm. Cohen and Levinthal (1990) defined absorptive capacity as "a firm's

ability to recognize the value of new information, assimilate it, and apply it to commercial ends". Unlike "learning-by-doing", which allows firms to get better at what they already do, absorptive capacity allows firms to learn to do something quite different. Much of the literature has identified absorptive capacity as a knowledge base (Ahuja and Katila, 2001, Kim 1998). However, this concept has neglected other important knowledge processes such as internal knowledge generation (Lane et al., 2006; Zahra and George, 2002). Zahra and George (2002) extended the concept of absorptive capacity and proposed that absorptive capacity should be defined as a dynamic capability. They proposed two subsets of absorptive capacity: potential absorptive capacity vs. realized absorptive capacity. Potential absorptive capacity enables firm's external information gathering, whereas realized absorptive capacity leverages absorbed knowledge and transform it to innovation outcome. By extending these studies further, Wang and Ahmed (2007) defined dynamic capability as a collection of absorptive capability, adaptive capability, and innovative capability. A dynamic capability is the capacity of an organization to purposely create, extend, or modify its resources (Helfat et al., 2007). Firms need to dynamically develop their knowledge capacities to profit from open innovation (Chesbrough, 2006). Lichtenthaler and Lichtenthaler (2006) defined six knowledge capacities (inventive, absorptive, transformative, connective, innovative, and desorptive capacity), which describe firm's capabilities of managing different capacities and identified knowledge management capacity as a dynamic capability. Therefore, in this dissertation, we adopted open innovation theory and dynamic capability theory in order to understand the contexts of drawing external information into firms (see Chapter 4, 5).

2.2 NPD Performance

Successful new products are critical for many firms since product innovation is significant for helping firms to adapt to changes in markets, technology, and competition (Ledwith et al., 2009). Ledwith et al. (2009) integrated market-level measures, financial measures, customer acceptance measures, product level measures, and timing measures in order to capture NPD performance. These measures can be assessed compared to the main competitor of a particular firm or the original goals of the company (Engelen et al., 2012). Kaplan et al. (2000) introduced four perspectives of NPD performance as learning and growth perspective, internal perspective, customer perspective and financial perspective. Griffin et al.'s (1993) measures have been adopted

in a range of different studies (Huang et al., 2004; Langerak et al., 2004) and are considered to be valid in measuring new product success. Measures of new product performance can be grouped along three categories: (1) customer-based success; (2) financial success; (3) product-level success (Griffin et al., 1993). In this dissertation, we measured NPD performance with NPD operational performance (product level success: quality, time-to-market, cost) and with NPD market performance (customer-based success: customer satisfaction, financial success: sales).

2.1.1 NPD Market Performance (customer satisfaction, sales)

Customer satisfaction is one of the widely used measure for capturing NPD performance (Song et al., 1997). Generally, there are at least two different conceptualizations of customer satisfaction: transaction-specific and cumulative (Boulding et al., 1993). From a transaction-specific perspective, customer satisfaction is viewed as a post-choice evaluation of a specific purchase occasion (Oliver, 1981). In contrast, cumulative customer satisfaction is an overall evaluation based on the total purchase and consumption experience with a product (Fornell et al., 1996). This dissertation uses cumulative customer satisfaction as it motivates firms to invest in customer satisfaction.

NPD performance has been defined as a combination of sales volume, profitability and market share of recently developed products, compared with competitor performance and with the original goals of the company (Engelen et al., 2012). Based on the classification presented by Ledwith et al. (2009), sales volume and market share have been classified as market-level measures, while profitability has been classified as financial level measures. Therefore, this dissertation defines sales as sales volume, profitability and market share of recently developed products compared to the original goals of the firm for their last year.

2.1.2 NPD Operational Performance (time-to-market, quality, cost) and its Relationship with NPD Market Performance

In the modern business contexts, product quality, time-to-market, cost are three of the main concerns of many firms (Millson and Wilemon, 2008). NPD speed is becoming increasingly important for firms to gain and maintain a competitive advantage in the market place in order to sustain high levels of profits and long-term competitiveness. In global and highly competitive markets, firms have been able to reduce the product life cycle, meaning that there is a need for firms to reduce the time-to-market of new products (Afonso et al., 2008). Time-to-market is defined as the elapsed time between product development initiation and product availability in the market (Vesey, 1992). Being the first to market allow firms to establish industry standards and set pricing, thus achieving higher sales and higher customer satisfaction (Calantone et al., 2003).

Product quality has been the focus of many researchers (Jacobson and Aaker, 1987; Sethi, 2000; Morgan and Vorhies, 2001). The focus of product quality has been driven by the enormous increase in production in the early 20th century (Reed et al., 1996). The increasing demand for production has led firms to focus on design and quality specifications in NPD. Product quality derives from firms meeting product performance and quality specifications (Ledwith et al., 2009). Extant research has identified that product quality has a major influence on market performance (Sethi, 2000; Morgan and Vorhies, 2001).

Cost management is one of the key strategies for survival in a highly competitive environment (Kato, 1993). Many firms are looking for ways of reducing their cost, while products are at the development stages. In this dissertation, we used the definition of Gatignon et al. (1997), which is a combination of marketing cost, manufacturing/operations cost, research and development cost, and overall cost. Cost management is one of the key strategies of achieving NPD performance (Afonso et al., 2008).

2.3 Customer Value

The literature harbours two very different meanings of the term customer value (Woodall, 2003): value for the customer and value for the firm. In this dissertation, we focused on the creation of value for the customer. Although scholars agree that generating customer value is crucial to the success of marketing activities, there is no commonly accepted framework conceptualizing B2B customer value. While more recent conceptual studies acknowledged customer value as a multi-dimensional construct, early studies treated B2B customer value as a uni-dimensional construct. Most conceptual studies argued for the existence of four distinct sub-dimensions (Anderson and Narus, 1995; Grönroos, 1997; Möller and Törrönen, 2003; Ravald and Grönroos, 1996; Smith and Colgate, 2007; Wilson and Jantrania, 1994). In addition, most of the extant research related to customer value are theory-based studies, while only a few studies are conducted empirically (see Table 2.1).

Table 2.1 - Summary of the Literature on Different Types of Customer Value

Authors	Value dimensions	Method
Wilson and Jantrania (1994)	Economic value, strategic value, behavioral value	Conceptual
Anderson et al. (1994)	Economic value, technical value, service value, social value	Conceptual
Ravald and Grönroos (1996)	Episode value, relationship value	Conceptual
Grönroos (1997)	Core solution, additional services	Conceptual
Lapierre (2000)	Product-related value, service-related value, relationship-related value	Empirical
Sweeny and Soutar (2001)	Economic value, emotional value, social value	Empirical
Moller and Törrönen (2003)	Efficiency function, effectiveness function, network function	Conceptual
Walter et al. (2003)	Direct function, indirect function	Empirical
Smith and Colgate (2007)	Functional value, hedonic value, symbolic value, cost value	Conceptual

This dissertation is based on the framework of Smith and Colgate (2007), who conceptualized customer value as consisting of the four dimensions of functional value, hedonic value, symbolic value, and cost value. We chose this framework due to its integrative nature and specific descriptions of the distinct dimensions.

Smith and Colgate (2007) described customer value as a combination of four dimensions: functional, cost, hedonic, and symbolic value.

2.3.1 Functional Value

Functional value is the extent to which a product offers right features, superior performance, and high quality. Offering functional value may be more important for raw material developers as manufacturers have to rely on the performance of the parts they used in their new products. For example, in the textile industry, even though elastic tapes are not used in outside of a garment, elastic tape developers need to ensure that the final garment is not damaged when ironing.

2.3.2 Cost Value

Cost value is the extent to which transaction costs involved in purchasing and using the product are considered low. Cost is one of the key factors that customers focus in selecting their suppliers. Thus, in every stage of a supply chain, cost value plays a key role.

2.3.3 Hedonic Value

Hedonic value is the extent to which a product offers positive experiences, feelings, and emotions to customers. Offering hedonic value may be more important for trading offices (customers who are closely working with consumers). For example, in manufacturing umbrellas, these firms use flowers and other decorative items on the umbrella cloth to make customers emotionally attach with their products.

2.3.4 Symbolic Value

Symbolic value is the degree to which customers associate psychological meaning with a product. Firms always try to create their own brand names and try to convince their customers about the importance of the brand. For example, in the automobile industry, Lamborghini car manufactures have been able to maintain a psychological bond with their customers over the years using their unique brand.

Tangible vs. Intangible Customer Value

Since right features, quality parameters, and transaction costs can be easily measured and communicated during transactions (Allee, 2008), we classified functional and cost value as tangible value. By contrast, since emotions, feelings, and psychological meanings are difficult to measure and communicate during transactions (Allee, 2008), we classified hedonic and symbolic value as intangible value.

Scholars have recently started to acknowledge the importance of intangible B2B value. According to Birkner (2013), not only B2C but also B2B customers have a human side. Therefore, B2B customers have emotional and symbolic needs that drive their purchasing behaviour. Moreover, B2B customers usually do not purchase products for themselves but for processing and selling them to their own customers (Gummesson et al., 2009). Thus, B2B customers who are especially close to consumers, tend to account for intangible B2B value as a means to build value for their own customers. Products whose components generate intangible (hedonic, symbolic) customer value attract greater demand from B2C markets, which generates a pull effect on product demand throughout the supply chain. Hence, this dissertation focused on the importance of intangible customer value in B2B markets. It seeks to identify how the effects of dynamic capabilities on tangible and intangible B2B customer value differ in B2B contexts.

Different types of customer value and their effects on customer satisfaction

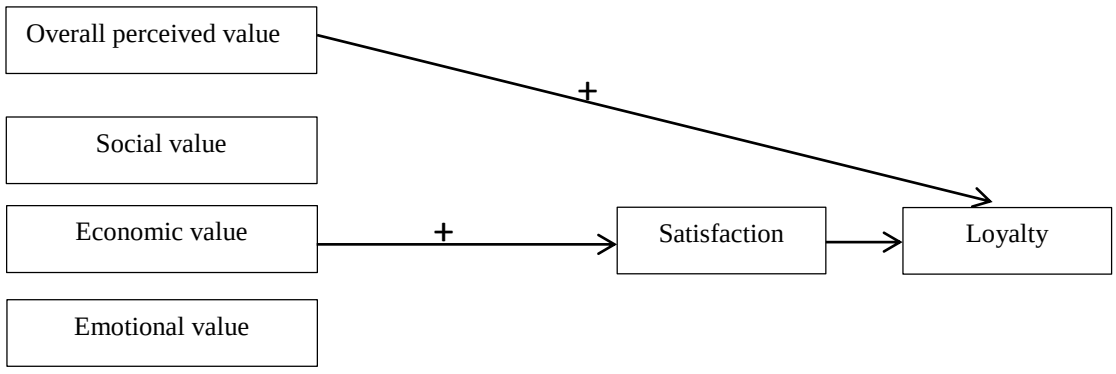


Figure 2.1 - Conceptual Model of Satisfaction and Different Values (Dardak and Habib, 2010)

Dardak and Habib (2010) developed a concpetual model (See Figure 2.1) in order to examine how different types of value affect customer satisfaction and how they affect customer satisfaction. His study showed that economic value has a positive effect on satisfaction, while both emotional and social values have no significant positive effect on customer satisfaction.

2.3 NPD Strategic Orientation

A firm's strategic orientation reflects the strategic direction implemented by a firm to create proper behaviors for continuous superior performance of the business (Narver and Slater, 1990). Based on the literature on NPD strategic orientation, there are four main strategies that help firms collect external information: customer orientation, competitor orientation, technology orientation, and manufacturing orientation (Narver and Slater, 1990; Hyland et al., 2003). Because products must meet the demands of the customer effectively and competitively, firms are expected to quickly assimilate information from these external sources. This dissertation focuses simultaneously on collection, sharing, and use of external information in internal NPD as many studies on NPD literature have only focused on one of the areas such as sharing information (Moenaert et al., 1994; Kahn, 1996).

2.3.1 Customer Orientation (B2B and B2C)

According to Narver and Slater (1990), customer orientation is the sufficient understanding of one's target customers, which enables firms to offer superior service for them continuously. In terms of the firms' innovative behaviour, a customer-oriented firm can be defined as one with the ability and will to identify, to analyse, to understand, and to answer the customer needs. This dissertation includes different dimensions of B2B customer orientation: customer involvement, customer needs focus, customer interaction, information base of customer orientation, and B2C customer orientation (B2C market research), in order to obtain a comprehensive overview of B2B and B2C customer orientation.

2.3.1.1 Market Research (B2C)

Generally, firms conduct market research in order to collect customer information and it can be achieved through regular meetings, discussions, personal interviews, and focus groups (Trott, 2001). Market research enhances NPD advantages because it enables firms to explore innovation opportunities created by emerging market demands and reduce potential risks of misfitting customer needs (Li et al., 1998). In this dissertation, we mainly focused on B2C market research as the main strategy of firms' B2C customer orientation.

2.3.1.2 Customer Involvement (B2B/B2C)

Customer involvement may range from providing minor design suggestions to being responsible for the complete development, design and engineering of a specific part of a product. Some researchers have argued that customer involvement is the most often method used to shorten the NPD cycle (Feng et al., 2012). However, IT implementation can negatively moderates the relationship between customer involvement and time-to-market of new products (Feng et al., 2012). Firms involve B2C customers in order to forecast the future market trends. As the number of buyers in B2B markets is lower than in B2C markets, sellers are mostly depend on buyers. Thus, B2B customer involvement plays a critical role in B2B contexts. Based on the classification by Ernst et al. (2011), we focused on different types of B2B customer involvement motives.

1. **Economic motives**: Motivation of firms to involve B2B customers who could potentially buy large quantities of the new product or are willing to pay premium prices. This information may help firms to identify economically attractive markets.

2. **Informational motives**: Motivation of firms to involve B2B customers who have new ideas for new products, develop these ideas into product concepts or even full products, and assess the commercial viability of a new product idea or concept, especially with regard to its design features and its market potential.

3. **Social influence motives**: Motivation of firms to involve B2B customers who occupy a central position in a relevant social network are the first to communicate their experiences regarding the new product within their social network. This may help firms

build B2B customer knowledge about the new product, which may speed up the diffusion of the new products in the market.

4. **Relational motives**: Motivation of firms to involve B2B customers who maintain a good relationship with the firm. This may help firms to share knowledge between firm and their customers, which will lead to join learning.

2.3.1.3 Information Base of Customer Orientation (B2B)

The key activity of identifying customers and their needs can be accomplished by systematically collecting and disseminating customer information (Jayachandran et al., 2005). Firms first need to collect, comprehend, and use information about their customers to improve NPD performance (Ernst et al., 2011). Activities of firms in responding to their customers fall into two categories: cognitive organizational system and affective organizational system (Homburg et al., 2007). Cognitive organizational system is defined as the degree of customer-related information processing within a firm, whereas affective organizational system is defined as a mechanism that allows for decision making within firms without intensive information processing (Homburg et al., 2007). In this dissertation, we extended Homburg et al.'s (2007) definitions of organizational system and defined two approaches of customer orientation, which are based on customers' information (explicit and implicit information).

1. **Data-based customer orientation**

   We defined data-based customer orientation as the degree of customer-related information processing (generation, dissemination, analysis, and storage) within a firm (mainly explicit information). Cognitive organizational system consists of information generation, dissemination, analysis, and storage. Information generation is a process by which firms first obtain knowledge through means such as market research and published reports. Information dissemination is the process by which this information is distributed within the firm. Information storage refers to the activities connected to the task of establishing an organizational memory (Homburg et al., 2007). Therefore, based on Homburg et al.'s (2007) definition of cognitive organizational system, we defined data-based customer orientation and adopted in this dissertation.

2. Intuition-based customer orientation

We defined intuition-based customer orientation as an approach that goes beyond extensive information processing, which allows firms for faster decision making without much information processing and helps firms collect especially implicit information. Affective organizational system is considered as the extent to which attention to customer needs is anchored in the firm value, belief structure, and norms (Homburg et al., 2007). Affective organizational system reduces the need for organizational mechanisms to generate information and the need for analysing information (Homburg et al., 2007). Therefore, based on Homburg et al.'s (2007) definition of affective organizational system, we defined intuition-based customer orientation and adopted in this dissertation.

2.3.1.4 Customer Needs Focus (B2B)

Market-oriented firms generate and share intelligence about customer needs and take coordinated action to satisfy those needs. However, research exploring how firms learn about and act upon customers' needs has predominately focused on the process for responding effectively to customer's current needs and express needs. In this dissertation, we used two approaches of customer needs focus.

1. Responsive needs focus

Responsive needs focus gives voice to customers' express needs that customers are aware of and actively solicit from firms. Responsive customer orientation helps to achieve higher customer value (Blocker et al., 2011).

2. Proactive needs focus

Responsive needs focus does not address customers' latent needs, but those are potentially important and are difficult for customers to articulate. This is the domain where a proactive customer needs focus play an influential role. Latent needs can be identified through proactive dialogue, lead user research, or ethnographic researches. Proactive needs focus helps firms achieve higher customer value (Blocker et al., 2011).

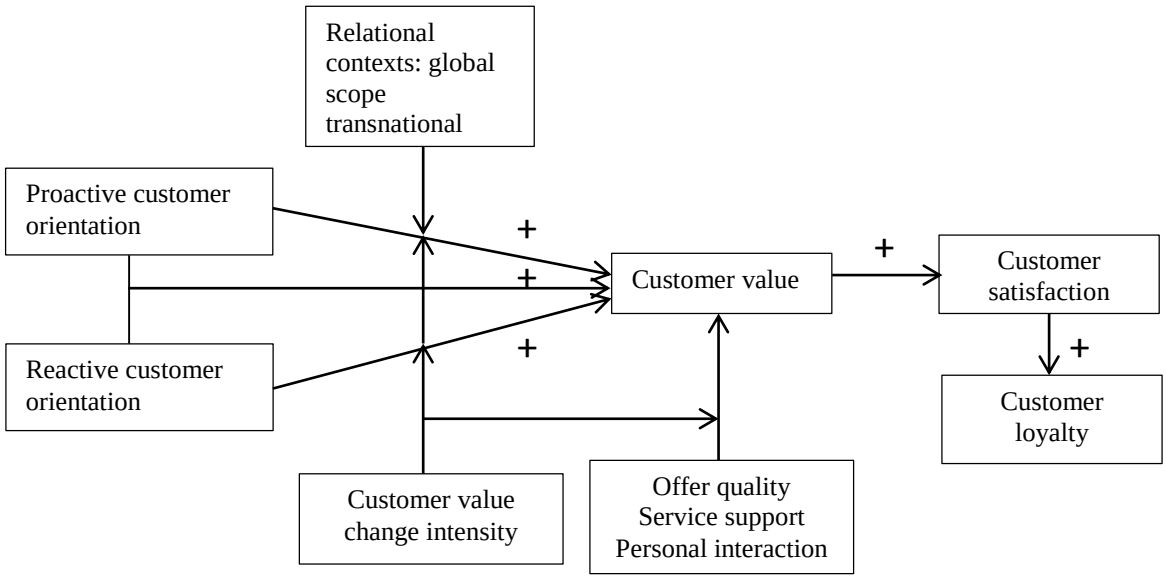


Figure 2.2 - Conceptual Model of Customer Orientation and Value (Blocker et al., 2011)

Blocker et al. (2011) developed a conceptual model (see Figure 2.2) in order to understand the effects of customer needs focus on customer value creation and how these contructs affect customer satisfaction, and customer loyalty. He found that proactive and reactive needs focus have linear effects on customer value. We extended his study and investigated how proactive and responsive needs focus affect different dimensions of B2B customer value in B2B contexts (see Chapter 4). In addition, we examined the effects of different dimensions of B2B customer value on customer satisfcation and how these relationships change along the supply chain (see Chapter 8).

2.3.1.5 Customer Interaction (B2B)

When interacting with customers, frequency and the mode of communication play a major role. Customer interaction is the degree of interaction between potential customers and NPD members and it is bidirectional. It captures customer interaction through different types of channels such as face-to-face and collaborative information exchange (Bonner, 2010).

1. Communication Frequency

This refers to how often firms communicate with their customers. In the context of customer value co-creation, frequency refers to such aspects as the amount of ongoing feedback between firms and its customers (Gustafsson et al., 2012). Communication frequency helps firms solve problems as it strengthen the trust (Gustafsson et al., 2012)

2. Mode of Communication

Timely communication between firms fosters trust because communication helps in solving many problems, while it is important to investigate the role of different types of communication modes that enable effective communication. Some of the common types of communication modes are face-to-face meetings, video conferencing, phone calls, e-mails, fax, and printed materials (McDonough et al., 1999). We defined modes of communication as formal vs. informal.

- Informal Communication: face-to-face, video conferencing, Facebook, and phone calls are classified as informal communication
- Formal Communication: e-mails, fax, and printed materials are classified as formal communication.

2.3.2 Ecosystem Orientation

In a distributed knowledge environment, the existing mechanism should allow firms to benefit from the creativity of customers and other competitors. When there are tremendous changes in the external environment, firms need to interact with stakeholders outside the firm to access their knowledge. Therefore, the focus of strategies shifts from individual firms to network of firms (Velu et al., 2013). Competitor orientation allows firms to keep the network with other firms, while technology and manufacturing orientation allows firms to adjust internal strategies based on the external information collected. In this dissertation, we defined ecosystem orientation as the combination of competitor, technology, and manufacturing orientation.

2.3.3 Competitor Orientation

Competitor orientation is identified as the ability and the will to identify, analyze, and respond to competitors' actions. This includes the identification of competitive advantages available in markets and allows firms to position the new product well in their selected market segments (Narver and Slater, 1990).

2.3.4 Technology Orientation

Technology orientation is defined as the firms' ability and the will to acquire substantial technological background and to use it in the development of new products. Technological orientation is not a part of the definition of the marketing concept. In fact, it can be the result of product-oriented management that focuses on making good products and improving them over time. Most industries where high technology is involved have been accelerating profits (Kelley, 1994). In markets where demand is uncertain, a stronger customer orientation and stronger technology orientation are required than in markets where demand uncertainty is low, to achieve a similar level of performance (Gatignon et al., 1997).

2.3.5 Manufacturing Orientation

Design for manufacturing is an area which has evolved primarily as independent studies in different manufacturing domains. In the process of NPD, it is needed to assess the manufacturability of a product in advance. Manufacturing orientation is the extent to which a firm focuses on the manufacturability approaches. Manufacturability can be assessed in terms of compatibility, complexity, quality, efficiency, and coupling (Parsaei et al., 1993).

Based on the research study of Zhou et al. (2007), which highlighted how strategic orientation helps firm performance, manufacturing orientation has received a significant attention. This article reviews the extant literature with a framework that depicts contemporary work on strategic orientation and the authors presented a framework for future research (see Figure 2.3).

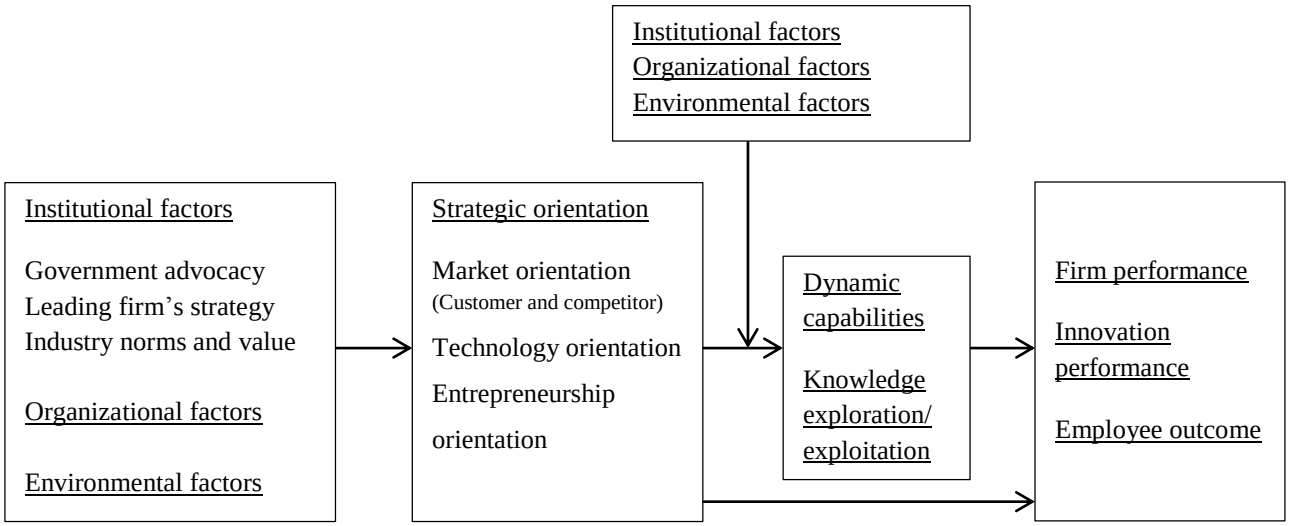


Figure 2.3 - Conceptual Model Based on Strategic Orientation (Zhou et al., 2007)

One of the main drawbacks of the study of Zhou et al. (2007) is the negligence of customer value creation. There is a growing interest in customer value focused strategies in recent years. Huber et al. (2001) stated evidence about many marketing strategists and industrial organization economists emphasizing the creation of superior value as a key element for ensuring firms' success. In this dissertation, we considered the customer value creation as an intermediate stage between NPD strategic orientation and NPD performance.

We used product technology, supply chain stage, and national culture as three contextual factors that can affect the relationship between NPD strategic orientation and NPD performance.

2.4 Product Technology

Several attempts have been made in the marketing and NPD literature in defining product technology (Gardner et al., 2000). In this dissertation, we classify product technology as high-technology (high-tech) vs. low-technology (low-tech). High-tech products employ turbulent technology in their development, manufacturing and distribution, while low-tech products employ familiar and accepted technology that are generally understood (Gardner et al., 2000). Compared to low-tech products, market environment for high-tech products can be identified with shorter

expected life cycle, easier entry into markets, and more diversified suppliers (Gardner et al., 2000). High-tech product development tends to incorporate multidisciplinary knowledge. New products with high technology is influenced by corporation among NPD members with tacit knowledge of a technical sort (Lawson and Lorenz, 1999). In this dissertation, we seek to understand how the effects of B2B customer involvement on NPD operational performance is moderated by product technology (see Chapter 6)

2.5 Supply Chain Stage

In a typical supply chain, raw material suppliers offer their new products to manufacturers, and these products pass through value adding firms, trading offices, and retailers before reaching the final consumer. In this dissertation, we defined supply chain stage as the position of a particular firm in a typical supply chain. A number was given to represent the firm's position in the supply chain (see Figure 2.4). In this dissertation, we examined how the effects of B2B customer value on NPD market performance vary across the supply chain (see Chapter 8).

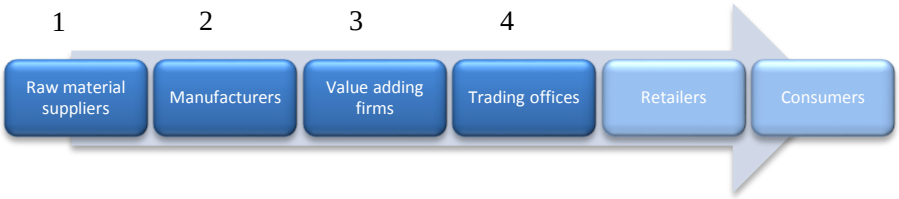


Figure 2.4 - Definition of Supply Chain Stage

2.6 National Culture

Firms increasingly expand their efforts to pursue new opportunities in foreign countries and thus implement NPD activities in different nations. In order to fully understand the differences in NPD strategic orientation among many countries, national culture needs to be examined (Moenaert et al., 1994). This distinction between the national and organizational culture is important as the two are composed of different elements (Hofstede, 1991). Organizational culture is the shared perceptions of daily practices. It is measured on the shared practices among the members of the firm, while national culture is the shared values of people within a certain national contexts (Hofstede, 1991). National culture may have an impact on organizational culture, whereas

organizational culture may have little impact on national culture (Garrett et al., 2006). In this dissertation, we investigated the effect of national culture on the relationships among the dimensions of customer needs focus and product quality (see Chapter 7).

Culture is not directly observable, but is inferable from observed behaviors and statements. Extant literature shows two main contributions in understanding cultural dimensions: Hofstede (1980) and GLOBE (House et al., 2004). Hofstede (1980) defined national culture as a collective programming of mind which distinguishes one national group or category of people from another, while House et al. (2004) defined national culture as shared motives, values, beliefs, identifications, and interpretations of significant events that result from common experiences and are transmitted across age generations. Even though GLOBE dimensions are used by many researchers, this choice entails contingent risk and ambiguities (Smith, 2006), and Minkov and Hofstede (2011) discussed the importance of using Hofstede cultural dimensions over GLOBE. Therefore, in this dissertation, we used Hofstede cultural dimensions for analysis.

The five cultural dimensions that emerged from Hofstede's study are power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation.

1. Power distance

   Power distance is the extent to which less powerful members of organizations and institutions accept and expect that power is distributed unequally (Hofstede, 1980). As high power distance societies display hierarchical systems, NPD would have a high degree of centralization (Hoppe, 1993).

2. Individualism (vs. collectivism)

   Individualism (vs. collectivism) is the degree to which people act toward individual or group goals (Hofstede, 1980). Individualist societies may respond better to formalized mechanisms in which requirements for integration are explicitly stated (Nakata and Sivakumar, 1996).

3. Masculinity (vs. femininity)

   Masculinity (vs. femininity) is the degree to which masculine values such as assertiveness, performance, success, and competition prevail, making individuals more assertive and goal-directed, as opposed to femininity which is reflected by warm and social relationships (Nakata and Sivakumar, 1996).

4. Uncertainty avoidance

   Uncertainty avoidance represents a society's tolerance for uncertainty and ambiguity (Hofstede, 1980). High uncertainty avoidance society members manage unstructured situations through the implementation of strict laws, rules and security measures (Hofstede, 1991).

5. Long-term orientation

   Long-term orientation considers long-term values orientated toward the future, such as thrift, savings, and persistence (Nakata and Sivakumar, 1996).

References

Afonso, P., Nunes, M., Paisana, A., and Braga, A. (2008). The influence of time-to-market and target costing in the new product development success. *International Journal of Production Economics*, 115(2), 559-568.

Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: a longitudinal study. *Administrative Science Quarterly*, 45(3), 425-455.

Ahuja, G., and Katila, R. (2001). Technological acquisitions and the innovation performance of acquiring firms: a longitudinal study. *Strategic Management Journal*, 22(3), 197-220.

Allee, V. (2008). Value network analysis and value conversion of tangible and intangible assets. *Journal of Intellectual Capital*, 9(1), 5-24.

Ambrosini, V., and Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1), 29-49.

Anderson, E. W., Fornell, C., and Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: findings from Sweden. *Journal of Marketing*, 58(3), 53-66.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

Birkner, C. (2013). A simple plan, Marketing News, February, 27-31. Retrieved on 03/04/13 from http://www.marketingpower.com/ResourceLibrary/Publications/MarketingNews/2013/2-13/simple%20plan.pdf.

Blocker, C. P., Flint, D. J., Myers, M. B., and Slater, S. F. (2011). Proactive customer orientation and its role for creating customer value in global markets. *Journal of the Academy of Marketing Science*, 39(2), 216-233.

Bonner, J. M. (2010). Customer interactivity and new product performance: moderating effects of product newness and product embeddedness. *Industrial Marketing Management*, 39(3), 485-492.

Boulding, W., Kalra, A., Staelin, R., and Zeithaml, V. A. (1993). A dynamic process model of service quality: from expectations to behavioral intentions. *Journal of Marketing Research*, 30(1), 7-27.

Calantone, R., Garcia, R., and Dröge, C. (2003). The effects of environmental turbulence on new product development strategy planning. *Journal of Product Innovation Management*, 20(2), 90-103.

Chesbrough, H. (2003). Open Innovation. Harvard University Press, Cambridge, MA.

Chesbrough, H. W., West, J. and Vanhaverbeke, W. (2006). *Open Innovation: Researching a New Paradigm*, Oxford University Press, Oxford, London.

Christensen, J. F., Olesen, M. H., and Kjaer, J. S. (2005). The industrial dynamics of open innovation: evidence from the transformation of consumer electronics. *Research Policy*, 34(10), 1533-1549.

Cohen, W. M., and Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128-152.

Dahlander, L., and Gann, D. M. (2010). How open is innovation? *Research Policy*, 39(6), 699-709.

Dardak, R. A., and Habib, F. Q. (2010). Consumer perceived value, satisfaction and loyalty on agriculture brand. *Economic and Technology Management Review*, 5(1), 79-87.

Deeds, D. L., DeCarolis, D., and Coombs, J. (2000). Dynamic capabilities and new product development in high technology ventures: an empirical analysis of new biotechnology firms. *Journal of Business venturing*, 15(3), 211-229.

Eisenhardt, K. M., and Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10-11), 1105-1121.

Engelen, A., Brettel, M., and Wiest, G. (2012). Cross-functional integration and new product performance-the impact of national and corporate culture. *Journal of International Management*, 18(1), 52-65.

Ernst, H., Hoyer, W. D., Krafft, M., and Krieger, K. (2011). Customer relationship management and firm performance: the mediating role of new product performance. *Journal of the Academy of Marketing Science*, 39(2), 290-306.

Feng, T., Sun, L., Zhu, C., and Sohal, A. S. (2012). Customer orientation for decreasing time-to-market of new products: IT implementation as a complementary asset. *Industrial Marketing Management*, 41(6), 929-939.

Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., and Bryant, B. E. (1996). The American customer satisfaction index: nature, purpose, and findings. *Journal of Marketing*, 60(11), 7-18.

Frishammar, J., and Ake Horte, S. (2005). Managing external information in manufacturing firms: the impact on innovation performance. *Journal of Product Innovation Management*, 22(3), 251-266.

Gardner, D. M., Johnson, F., Lee, M., and Wilkinson, I. (2000). A contingency approach to marketing high technology products. *European Journal of Marketing*, 34(9/10), 1053-1077.

Garrett, T. C., Buisson, D. H. and Yap, C. M. (2006). National culture and R&D and marketing integration mechanisms in new product development: a cross-cultural study between Singapore and New Zealand. *Industrial Marketing Management*, 35(3), 293-307.

Gatignon, H., Robertson, T. S., and Fein, A. J. (1997). Incumbent defense strategies against new product entry. *International Journal of Research in Marketing*, 14(2), 163-176.

Griffin, A., and Page, A. L. (1993). An interim report on measuring product development success and failure. *Journal of Product Innovation Management*, 10(4), 291-308.

Grönroos, C. (1997). Value-driven relational marketing: from products to resources and competencies. *Journal of Marketing Management*, 13(5), 407-419.

Gummesson, E., and Polese, F. (2009). B2B is not an island! *Journal of Business & Industrial Marketing*, 24(5/6), 337-350.

Gustafsson, A., Kristensson, P., and Witell, L. (2012). Customer co-creation in service innovation: a matter of communication? *Journal of Service Management*, 23(3), 311–327.

Hargadon, A. (2003). *How Breakthroughs Happen: The Surprising Truth About How Companies Innovate*. Harvard Business Press, Boston, MA.

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M. A., Singh, H., Teece, D. J., and Winter, S. G. (2007). *Dynamic Capabilities*. Blackwell, Malden, MA.

Henkel, J. (2006). Selective revealing in open innovation processes: the case of embedded Linux. *Research Policy*, 35(7), 953-969.

Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values*, Sage, Beverly Hills, CA.

Hofstede, G. (1991). *Cultures and Organizations: Software of the Mind*, McGraw-Hill, London.

Homburg, C., Grozdanovic, M., and Klarmann, M. (2007). Responsiveness to customers and competitors: the role of affective and cognitive organizational systems. *Journal of Marketing*, 71(3), 18-38.

Hoppe, M. H. (1993). The effects of national culture on the theory and practice of managing R&D professionals abroad. *R&D Management*, 23(4), 313-325.

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., and Gupta, V. (eds). (2004). *Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies*, Sage Publications, CA.

Huang, X., Soutar, G. N., and Brown, A. (2004). Measuring new product success: an empirical investigation of Australian SMEs. *Industrial Marketing Management*, 33(2), 117-123.

Huber, F., Herrmann, A., and Morgan, R. E. (2001). Gaining competitive advantage through customer value oriented management. *Journal of Consumer Marketing*, 18(1), 41-53.

Hyland, P., and Mellor, R. (2003). Performance measurement and new product development: is it linked to manufacturing strategy? Retrieved on 12/05/12 from http://www.bus.uts.edu.au/ANZAM/OMS2003/papers/Hyland%20Mellor.pdf.

Jacobson, R., and Aaker, D. A. (1987). The strategic role of product quality. *The Journal of Marketing*, 51(4), 31-44.

Jayachandran, S., Sharma, S., Kaufman, P., and Raman, P. (2005). The role of relational information processes and technology use in customer relationship management. *Journal of Marketing*, 69(4), 177-192.

Kahn, K. B. (1996). Interdepartmental integration: a definition with implications for product development performance. *Journal of Product Innovation Management*, 13(2), 137-151.

Kaplan, R. S., and Norton, D. P. (2000). *Having Trouble with Your Strategy*? *Then Map it*. Harvard Business School Publishing Corporation, Boston, MA.

Kato, Y. (1993). Target costing support systems: lessons from leading Japanese companies. *Management Accounting Research*, 4(1), 33-47.

Kelley, M. R. (1994). Productivity and information technology: the elusive connection. *Management Science*, 40(11), 1406-1425.

Kim, L. (1998). Crisis construction and organizational learning: capability building in catching-up at Hyundai Motor. *Organization Science*, 9(4), 506-521.

Kozlenkova, I. V., Samaha, S. A., and Palmatier, R. W. (2014). Resource-based theory in marketing. *Journal of the Academy of Marketing Science*, 42(1), 1-21.

Lane, P. J., Koka, B. R., and Pathak, S. (2006). The reification of absorptive capacity: a critical review and rejuvenation of the construct. *Academy of Management Review*, 31(4), 833-863.

Langerak, F., Hultink, E. J., and Robben, H. S. (2004). The impact of market orientation, product advantage, and launch proficiency on new product performance and organizational performance. *Journal of Product Innovation Management*, 21(2), 79-94.

Langlois, R. N. (2003). The vanishing hand: the changing dynamics of industrial capitalism. *Industrial and Corporate Change*, 12(2), 351-385.

Lapierre, J. (2000). Customer-perceived value in industrial contexts. *Journal of Business & Industrial Marketing*, 15(2), 122-145.

Laursen, K., and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), 131-150.

Lawson, C., and Lorenz, E. (1999). Collective learning, tacit knowledge, and regional innovative capacity. *Regional Studies*, 33(4), 305-317.

Ledwith, A., and O'Dwyer, M. (2009). Market orientation, NPD performance, and organizational performance in small firms. *Journal of Product Innovation Management*, 26(6), 652-661.

Lichtenthaler, U., and Lichtenthaler, E. (2009). A capability-based framework for open innovation: complementing absorptive capacity. *Journal of Management Studies*, 46(8), 1315-1338.

Li, T., and Calantone, R. J. (1998). The impact of market knowledge competence on new product advantage: conceptualization and empirical examination. *Journal of Marketing*, 62(4), 13-29.

McDonough, E. F., Kahn, K. B., and Griffin, A. (1999). Managing communication in global product development teams. *IEEE Transactions on Engineering Management*, 46(4), 375-386.

Millson, M. R., and Wilemon, D. (2008). Impact of new product development (NPD) proficiency and NPD entry strategies on product quality and risk. *R&D Management*, 38(5), 491-509.

Minkov, M., and Hofstede, G. (2011). The evolution of Hofstede's doctrine. *Cross Cultural Management: An International Journal*, 18(1), 10-20.

Moenaert, R. K., De Meyer, A., and Clarysse, B. J. (1994). Cultural differences in new technology management, in Souder, W. E. and Sherman, J. D. (eds). *Managing New Technology Development*, McGraw-Hill, New York, 287-314.

Moenaert, R. K., Souder, W. E., De Meyer, A., and Deschoolmeester, D. (1994). R&D-marketing integration mechanisms, communication flows, and innovation success. *Journal of Product Innovation Management*, 11(1), 31-45.

Möller, K. E., and Törrönen, P. (2003). Business suppliers' value creation potential: a capability-based analysis. *Industrial Marketing Management*, 32(2), 109-118.

Morgan, N. A., and Vorhies, D. W. (2001). Product quality alignment and business unit performance. *Journal of Product Innovation Management*, 18(6), 396-407.

Nakata, C., and Sivakumar, K. (1996). National culture and new product development: an integrative review. *Journal of Marketing*, 60(1), 61-72.

Narver, J. C., and Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(4), 20-35.

Oliver, R. L. (1981). Measurement and evaluation of satisfaction processes in retail settings. *Journal of Retailing*, 57(3), 25-48.

Parsaei, H. R. (1993). *Concurrent Engineering: Contemporary Issues And Modern Design Tools*. Springer, New York.

Peteraf, M.A. (1993). The corner-stones of competitive advantage: a resource-based view, *Strategic Management Journal*, 14(3), 179-91.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.

Porter, M.E. (1980). *Competitive Strategy*. Free Press, New York.

Powell, W. (1990). Neither market nor hierarchy. *Research on Organizational Behavior*, 12(1), 295-336.

Ravald, A., and Grönroos, C. (1996). The value concept and relationship marketing. *European Journal of Marketing*, 30(2), 19-30.

Reed, R., Lemak, D. J., and Montgomery, J. C. (1996). Beyond process: TQM content and firm performance. *Academy of Management Review*, 21(1), 173-202.

Sethi, R. (2000). New product quality and product development teams. *Journal of Marketing*, 64(2), 1-14.

Slevin, D. P., and Covin, J. G. (1990). Juggling entrepreneurship style and organizational structure-How to get your act together. *Sloan Management Review*, 31(2), 43-53.

Smith, J. B., and Colgate, M. (2007). Customer value creation: a practical framework. *Journal of Marketing Theory and Practice*, 15(1), 7-23.

Smith, P. B. (2006). When elephants fight, the grass gets trampled: the GLOBE and Hofstede projects. *Journal of International Business Studies*, 37(6), 915-921.

Song, X. M., Souder, W. E., and Dyer, B. (1997). A causal model of the impact of skills, synergy, and design sensitivity on new product performance. *Journal of Product Innovation Management*, 14(2), 88-101.

Sweeny, J., and Soutar, G. (2001). Consumer perceived value: the development of a multiple item scale. *Journal of Retailing*, 77(2), 203-220.

Teece, D. J., Pisano, G., and Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Trott, P. (2001). The role of market research in the development of discontinuous new products. *European Journal of Innovation Management*, 4(3), 117-126.

Velu, C., Barret, M., Kohli R., and Salge, O.T. (2013). *Thriving in Open Innovation Ecosystems: Toward a Collaborative Market Orientation*. University of Cambridge, United Kingdom.

Vesey, J. T. (1992). Time-to-market: put speed in product development. *Industrial Marketing Management*, 21(2), 151-158.

Wang, C. L., and Ahmed, P. K. (2007). Dynamic capabilities: a review and research agenda. *International Journal of Management Reviews*, 9(1), 31-51.

Walter, A., Müller, T. A., Helfert, G., and Ritter, T. (2003). Functions of industrial supplier relationships and their impact on relationship quality. *Industrial Marketing Management*, 32 (2), 159-169.

Wilson, D. T., and Jantrania, S. (1994). Understanding the value of a relationship. *Asia-Australia Marketing Journal*, 2(1), 55-66.

Woodall, T. (2003). Conceptualising value for the customer: an attributional, structural and dispositional analysis. *Academy of Marketing Science Review*, 12(1), 1-42.

Zhou, K. Z., and Li, C. B. (2007). How does strategic orientation matter in Chinese firms? *Asia Pacific Journal of Management*, 24(4), 447-466.

Zahra, S. A., and George, G. (2002). Absorptive capacity: a review, reconceptualization, and extension. *Academy of Management Review*, 27(2), 185-203.

Chapter 3

Methodology

Chapter Overview

This chapter presents the general methodology used in designing the questionnaire, process of data collection, and data validation.

3.1 Questionnaire Design

In order to collect data, we developed a new questionnaire using standard scales which have been already published in international research journals (see Appendix A). Our questionnaire consists of mainly 2 sections with different approaches and different evaluation methods. We designed our questionnaire in English because a single language prevents misunderstandings from slight deviations in meaning across languages. To prevent comprehension problems, we used relatively short sentences with easy-to-understand terminology. We pre-tested the questionnaire by sending it to knowledgeable NPD managers, discussed comprehension issues, and consequently revised the questionnaire slightly. We mainly developed a paper-based and an online version of our questionnaire (https://www.soscisurvey.de/npd/). Paper-based version of the questionnaire was used to collect data from Sri Lanka, while online version of the questionnaire was used to collect data from other countries.

3.1.1 General Questions (Section 1)

At the beginning of the questionnaire, we asked the respondents about the general information.

- **SBU** (Strategic Business Unit): We define SBU as the name of the department or the smallest unit to which the respondent is attached. Generally, in organizational hierarchy, there are several SBUs within one firm and their strategies differ from each other. As data from a single informant often does not validly represent firms as a whole (Van Bruggen et al. 2002), we planned our data collection to cover multiple respondents per SBU. We contacted employees based on SBU level, who are involved in NPD process at any stage. In addition, when SBU level business units are not available, we selected employees based on the smallest working unit to which they are attached. In this manner, we collected data from managers, general managers, and CEOs who are involved in NPD activities.

- **Attributes of the customer**: In order to collect data from firms who do business in B2B contexts and identify their position in their supply chain, we asked the following questions. We did not consider firms which do business directly with B2C customers.

In percentage of total sales volume, what happens with the products your SBU sells?

☐Directly used by B2C customers [private end consumers] _____%

☐Directly used by B2B customers [business end consumers]
(to facilitate their business processes) _____%

☐Processed by B2B customers and sold to their own customers _____%

O At the end of the supply chain, these processed products are consumed by:

☐B2B customers ☐B2C customers

O Number of firms in supply chain between your SBU and the end consumer using the final product: _____

	B2B customers (supply chain)				
Your SBU	1	2	3	……	End (B2B/B2C) consumer

3.1.2 Specific Questions (Section 2)

In order to capture different dimensions of NPD strategic orientation, NPD performance, and B2B customer value, we designed our questionnaire using reflective multi-item scales with a 7-point Likert scale (for question no. 4-1 ~ 14-12, except 6-4 ~ 6-11), except informal (vs. informal) communication mode, which is based on a formative scale (for question no. 6-4 ~ 6-11). In order to make existing scales suitable to our study, we carefully selected relevant scale items and changed the wording slightly to improve the comprehension (e.g., for the scale of data-based customer orientation, we selected 4 items from 13 items of the original scale). Even though some researchers argued that a single-item approach is appropriate in data collection, recent literature recommends that researchers use multi-item scales in questionnaire design (Diamantopoulos et al., 2012).

For example, in order to collect data on data-based customer orientation, we used 4 items as below.

- We systematically gather, analyze, and store B2B customer information.
- We collect and circulate reports, articles, and newsletters that provide relevant information on (current and potential) B2B customers.
- We systematically keep track of B2B customer behavior. After analysis, this information is shared in our company (e.g., through newsletters and reports)
- We collect B2B customer information in a comprehensive and holistic way and periodically analyze it.

3.2 Sample Selection

We collected data in two stages. In the first stage (2012-08 to 2012-10), a single industry was chosen since it may help control for industry effects and avoids the difficulty of comparing the performance of products from different industries directly (Stock et al., 2001). We selected the textile and apparel industry in South and East Asian countries for data collection as it is one of the mature industries especially in South and East Asia (Williams et al., 1995). In this manner, we were able to collect data from 115 SBUs (246 industry experts) in 10 countries (Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam) (see Chapters 4,5, and 6)

In the second stage of data collection (2013-04 to 2014-08), we expanded our data collection process to other industries (automotive, chemistry, construction equipment, consumer goods, electronics, machinery manufacturing, manufacturing equipment, medical, and packaging) and collected data from 113 SBUs (179 industry experts) in 17 countries (Austria, Canada, China, Czech Republic, Germany, Greece, Hungary, India, Italy, Japan, Liechtenstein, Luxembourg, Norway, Poland, Romania, Slovakia, Switzerland, and United Kingdom). We highly appreciate the contribution by Mr. August Grupp, who was an exchange student from ETH Zurich, Switzerland, for assisting us in collecting data especially from European countries.

Ultimately, we were able to collect data from 228 SBUs (425 industry experts), representing 10 industries (automotive, chemistry, construction equipment, consumer goods,

electronics, machinery manufacturing, manufacturing equipment, medical, packaging, and textile) in 25 countries (Austria, Bangladesh, Cambodia, Canada, China, Czech Republic, Germany, Greece, Hong Kong, Hungary, India, Italy, Japan, Liechtenstein, Luxembourg, Norway, Poland, Romania, Slovakia, Sri Lanka, Switzerland, Taiwan, Thailand, United Kingdom, and Vietnam) (see Chapters 7 and 8).

3.3 Data Collection

During the first stage of the data collection process, from national industry associations of 10 countries in South and East Asia, we obtained address lists of major firms in the textile industry and contacted top managers in 548 SBUs with our questionnaire to solicit their participation in our study. We only targeted respondents at the managerial level who are directly involved in NPD processes and have a good command of the English language. Moreover, we only targeted NPD departments that develop their new products themselves, and we excluded NPD departments that merely execute complete specifications provided by customers. We assured these issues through questions at the beginning of our questionnaire.

Typically, for what percentage of designs do you use the following approaches?

☐In-house development without specifications from customers _____%

☐In-house development with partial specifications from customers _____%

☐In-house development with complete specifications from customers _____%

☐Collaborative development with vendor without specifications from customers _____%

☐Collaborative development with vendor with partial specifications from customers _____%

☐Collaborative development with vendor with complete specifications from customers _____%

☐No development _____%

Eventually, our data collection resulted in responses from 246 managers representing 115 SBUs (response rate: 21%) from different stages of the supply chain (66 raw material suppliers, 24 apparel manufactures, 14 apparel printing/dyeing/washing plants, and 11 buying offices) across 10 countries. The average respondent was aged 36 years with 9 years of industry experience.

During the second stage of the data collection process, we obtained address lists of major firms in mainly 9 industries (automotive, chemistry, construction equipment, consumer goods, electronics, machinery manufacturing, manufacturing equipment, medical, and packaging), from national industry associations of 17 countries around the world and from contact details received through Mr. August Grupp. We used our online questionnaire (https://www.soscisurvey.de/npd/) in order to collect data especially from European countries. In designing our online questionnaire, we made all the questions compulsory, except for the questions related to personal details, in order to reduce missing data. We pre-tested the questionnaire with the help of a few selected industry experts before distributing it among firms. Our total data collection resulted in responses from 425 managers representing 228 SBUs (response rate: 16%) across 25 countries (137 raw material suppliers, 39 manufactures, 30 value adding firms, and 22 trading offices). The average respondent was aged 39 years with 14 years of industry experience.

We were able to obtain a relatively high response rate as we continuously followed up the data collection process by sending emails, phone calls, and by using personal contacts. We sent a comprehensive report for all the survey respondents including many managerial implications.

3.4 Data Validation and Analysis

After the data collection process, we performed several data validation tests before proceeding with the data analysis. The following table shows the basic requirements of each test.

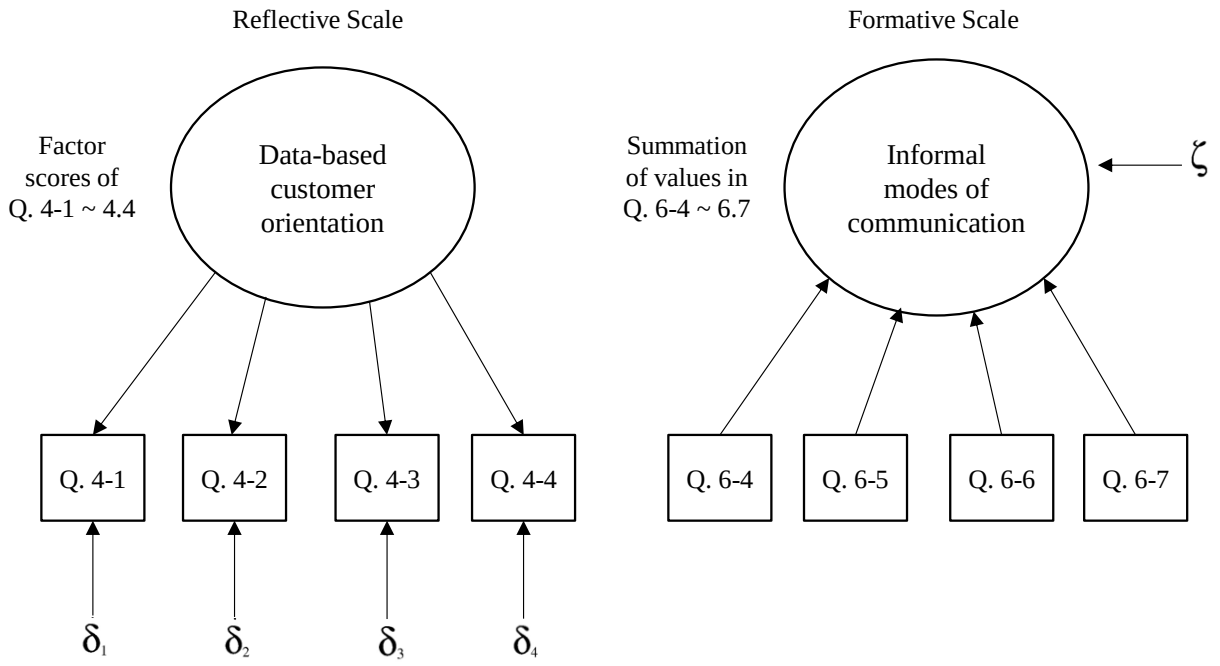
Table 3.1 - Data Validation

Test	Requirements
Model fit	CFI > 0.95, χ^2 /df < 3, and RMSEA < 0.05
Common method bias	Should not exist
Cronbach's alpha	above 0.7
Composite reliability	above 0.7
AVE (Average Variance Extracted)	above 0.5
R_{wg} / ICC(1)	above 0.7 / 0.1

We calculated the model fit using confirmatory factor analysis (CFA) for each the separate study presented in different chapters and all constructs fulfilled the acceptance value (CFI > 0.95, χ^2 /df < 3, and RMSEA < 0.05) (Hair et al., 2010; Kline, 2011). Moreover, we checked for common method bias by a comparison of the standardized regression weights of the CFA model with and without a common latent factor. This comparison did not indicate any significant difference (Podsakoff et al., 2003). Thus, a common method bias does not seem to exist in the data. All constructs fulfilled standard criteria of convergent and discriminant validity (Fornell and Larcker, 1981; Gerbing and Anderson, 1988): Cronbach's $\alpha > 0.7$, average variance extracted (AVE) > 0.5, and AVE > squared correlations of the construct with all other constructs.

We used principle axis factoring for extracting factors and create new variables from each multi-item scale of reflective scales (for question no. 4-1 ~ 14-12, except 6-4 ~ 6-11). Figure 3.1 represents an example of a reflective scale. A reflective scale assumes that causality flows from the construct to the indicators, which means a change in the construct causes a change in the indicators (Coltman et al., 2008). In order to extract factors, exploratory factor analysis is one of the most widely used statistical methods in psychological research (Fabrigar et al., 1999). When conducting an exploratory factor analysis, a researcher can make decisions regarding the number of factors to extract, the rotation method, and the method for calculating such as principle component analysis and principle axis factoring. Researchers have identified the importance of using principle axis factoring over other methods such as principle component analysis (Simpson et al., 1992). Therefore, we used principle axis factoring and extracted factors from each multi-item scale of reflective scales. For an example, we extracted one factor from questionnaire items 4-1 ~ 4-4 using principle axis factoring and labelled that variable as "Data-based customer orientation" (see Figure 3.1). SPSS provides information on factor loadings of each indicator of the multi-item scale on the relevant construct (see Appendix B). After saving the factor score of the extracted factor for each construct, we removed data related to respondents with a lot of missing values for different variables in the database. Thus, we standardized variables (mean value: 0, standard deviation: 1).

We also calculated the sum of items for creating the formative scale (for question no. 6-4 ~ 6-7): informal communication mode (face-to-face meeting, video conferences, social media, and phone calls). Figure 3.1 represents an example of a formative scale. A formative scale assumes



Note: Q. 4-1 ~ Q. 6-7 are question items in the questionnaire (Appendix A)

δ_i & ζ represent error terms

Figure 3.1 - Reflective and Formative Scales

that causality flows from the indicators to the construct, which means a change in the indicators result in a change in the construct (Coltman et al., 2008). After removing missing values in the database, we standardized these formative scales in order to match them with standardized reflective scales.

By calculating mean values across all informants within each SBU, we aggregated individual respondent data (factor scores) to represent SBUs. We calculated inter-rater reliability R_{wg} (James et al., 1984) and the intraclass correlation coefficient ICC(1) (Klein and Kozlowski, 2000) in order to verify our aggregation. R_{wg} represents the proportion of nonerror variance in the ratings with a reliability coefficient and should be > 0.7 (Boyer and Verma 2000). As shown in each chapter, our aggregation fulfilled this criterion. In order to further validate the data aggregation, we considered two different types of intraclass correlation coefficients: ICC(1) and ICC(2). ICC(1) is appropriate for top-down processes (higher-level processes having an impact on lower-level entities), whereas ICC(2) is appropriate for bottom-up processes (lower-level data can be combined to represent phenomena at higher levels). As SBU characteristics (higher level)

influence managerial perceptions of these SBU characteristics (lower level), ICC(1) is the appropriate measure for our data aggregation. ICC(1) represents the proportion of total variance that can be explained by group members (Klein and Kozlowski, 2000). The literature has not proposed any established acceptance criterion for ICC(1). However, ICC(1) provides valuable diagnostic information. According to Bliese (2000), ICC(1) values of merely 0.05 or 0.1 can capture highly important phenomena. However, applied research articles have considered ICC(1) values from 0.1 to 0.5 (Oke and Idagbon-Oke, 2010) or from 0.1 to 0.7 (James et al., 1984) as accepted values.

We tested our hypotheses using hierarchical linear modeling (HLM; Kreft and de Leew, 1998) as we have nested data. Our HLM models consist of three levels. SBUs (level 1) are nested within firms (level 2), which are nested within countries (level 3). In all of our analysis (except Chapter 8), we used three control variables and these control variables represent each of the three levels: industry experience of the respondents (level 1), supply chain stage (level 2), and ease of doing business ranking (level 3). Ease of doing business is an index calculated for countries based on few parameters such as assistance for starting a business, getting electricity, paying taxes, and protecting investors (http://www.doingbusiness.org/rankings).

References

Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability, in Klein, K. J. and Kozlowski, S. W. J. (eds). *Multilevel Theory, Research, and Methods in Organizations*, Jossey-Bass, San Francisco, 349-381.

Boyer, K. K., and Verma, R. (2000). Multiple raters in survey-based operations management research: a review and tutorial. *Production and Operations Management*, 9(2), 128-140.

Coltman, T., Devinney, T. M., Midgley, D. F., and Venaik, S. (2008). Formative versus reflective measurement models: two applications of formative measurement. *Journal of Business Research*, 61(12), 1250-1262.

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., and Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective. *Journal of the Academy of Marketing Science*, 40(3), 434-449.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., and Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, 4(3), 272-299.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(2), 39-50.

Gerbing, D. W., and Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(2), 186-192.

Hair, J. F, Black, W. C., Babin, B. J., and Anderson, R. E. (2010). *Multivariate Data Analysis*. Englewood Cliffs, Pearson, New Jersey.

James, L. R., Demaree, R. G., and Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias, *Journal of Applied Psychology*, 69(1), 85-98.

Klein, K. J., and Kozlowski, S. W. (2000). *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*, Jossey-Bass, San Francisco.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*, Guilford, New York.

Kreft, I., and de Leeuw, J. (1998). *Introducing Multilevel Modeling*, Sage, London.

Oke, A. and Idiagbon-Oke, M. (2010), Communication channels, innovation tasks and NPD project outcomes in innovation-driven horizontal networks. *Journal of Operations Management*, 28(5), 442-453.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.

Simpson, J. A., Rholes, W. S., and Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: the role of attachment styles. *Journal of Personality And Social Psychology*, 62(3), 434.

Stock, G. N., Greis, N. P., and Fischer, W. A. (2001). Absorptive capacity and new product development. *Journal of High Technology Management Research*, 12(1), 77-91.

Van Bruggen, G. H., Lilien, G. L., and Kacker, M. (2002). Informants in organizational marketing research: why use multiple informants and how to aggregate responses. *Journal of Marketing Research*, 39(4), 469-478.

Williams, F. P., D'Souza, D. E., Rosenfeldt, M. E., and Kassaee, M. (1995). Manufacturing strategy, business strategy and firm performance in a mature industry. *Journal of Operations Management*, 13(1), 19-33.

Chapter 4

Leveraging Customer Orientation to Build Customer Value in Industrial Relationships

Chapter Overview

This chapter presents how NPD customer orientation helps firms create B2B customer value. It makes three main contributions.

- This study is original in examining how activities of the NPD department can generate customer value in B2B contexts.
- This study is the first to examine empirically what strategies might influence distinct types of B2B customer value.
- This study is the first to examine the differential effects of needs orientation vs. relationship orientation on customer value.

4.1 Abstract

While the importance of customer value creation has been confirmed in numerous studies in the literature, there is a lack of empirical studies on how new product development may optimize distinct types of B2B customer value. This study develops a conceptual framework considering four dimensions of B2B customer value (functional, cost, hedonic, and symbolic) and two dimensions of B2B customer orientation: needs orientation and relationship orientation. Based on data collected in 10 countries, hierarchical linear modeling is used to test hypotheses on the decomposed effects of these different B2B customer orientation approaches on the creation of each type of B2B customer value. Numerous theoretical contributions and managerial implications are discussed.

4.2 Introduction and Purpose

The creation of customer value has been recognized as a central objective in marketing (Doyle, 2000). Research on new product development (NPD) shows that products offering superior customer value are more successful than products which offer limited value or value already provided by other brands (Cooper, 2001). Firms have a competitive advantage when they possess resources or skills that enable the delivery of customer value which is unique and difficult to imitate (Barney, 1991; Slater, 1996). Generally, firms perform well and create value when they implement strategies that respond to market opportunities by exploiting their internal resources and capabilities. Traditionally, these resources were physical, such as land and machines or financial capital. More recently, the concept of intellectual capital has been identified as a key resource and a driver of customer value creation (Marr et al., 2004). Intellectual capital plays a greater role than physical resources in firms that follow a customer value-based strategy. Most of the top performing firms around the world have focused on understanding their B2B customers and delivering superior B2B customer value (Marr et al., 2004). Therefore, managers need to understand the key drivers of B2B customer value.

This study makes three major contributions to the literature on marketing and new product development. First, our study is original in examining how activities of the NPD department can generate customer value in B2B contexts. While past studies have examined how firms can create

B2B customer value through various general business processes (Blocker et al., 2011), the role of the NPD department in the creation of B2B customer value is still unknown. As products constitute the basis of customer value (Lai, 1995), activities in their development should naturally have great leverage in creating customer value.

Second, although conceptual studies have posited that B2B customer value consists of several distinct dimensions (Anderson and Narus, 1995; Grönroos, 1997; Möller and Törrönen, 2003; Ravald and Grönroos, 1996; Smith and Colgate, 2007; Wilson and Jantrania, 1994), our study is the first to examine empirically what strategies might influence these distinct types of B2B customer value. Such knowledge would enable firms to tailor their NPD strategy to the specific type of B2B customer value that they identify as most important to the market success of a specific product.

Third, our study is the first to examine the differential effects of needs orientation vs. relationship orientation on customer value. Hence, it will help firms decide whether they should allocate more of their limited time and resources to direct communication with customers (relationship orientation) or to fostering internal market intelligence capabilities (needs orientation) in order to create the best customer value.

Therefore, our study will establish and test hypotheses about the effects of relationship orientation and needs orientation on each type of B2B customer value to address a major gap in the marketing literature and to provide managers with actionable knowledge of the effectiveness of NPD strategies. From 10 countries (Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam), we collected data on textile firms across the supply chain, starting from raw material suppliers via manufacturers and printing/dyeing/washing plants to buying offices.

4.3 Literature Review

4.3.1 Competing Frameworks of B2B Customer Value

Although scholars agree that generating customer value is crucial to the success of marketing activities, there is no commonly accepted framework conceptualizing B2B customer value. While early studies treated B2B customer value as a uni-dimensional construct, more recent

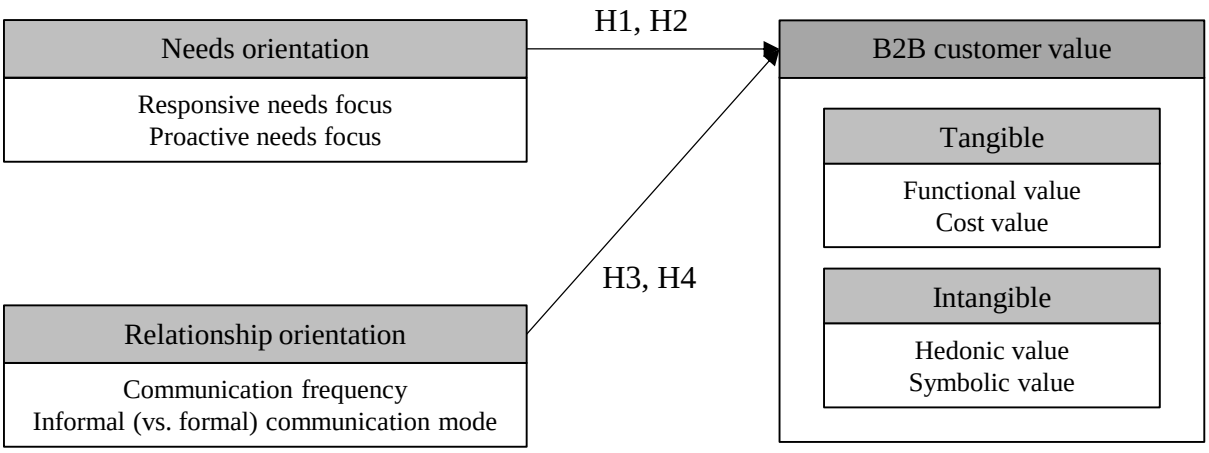


Figure 4.1 - Conceptual Framework: Effects of Needs Orientation and Relationship Orientation on B2B Customer Value

conceptual studies acknowledged its multi-dimensional nature. A few studies separated customer value into the sub-dimensions of product-related and service-related value (Walter et al., 2003) and of direct and indirect value (Lapierre, 2000), but most conceptual studies argued for the existence of four distinct sub-dimensions (Anderson and Narus, 1995; Grönroos, 1997; Möller and Törrönen, 2003; Ravald and Grönroos, 1996; Smith and Colgate, 2007; Wilson and Jantrania, 1994). This study is based on the framework of Smith and Colgate (2007), who conceptualized customer value as consisting of the four dimensions of functional value, hedonic value, symbolic value, and cost value. We chose this framework due to its integrative nature and specific descriptions of the distinct dimensions.

Most research on B2B customer value has focused on its consequences rather than on its formation. For instance, Blocker et al. (2011) found that overall B2B customer value influences customer satisfaction. Studies with a multi-dimensional understanding of B2B customer value examined the effects of functional, social, and emotional value and perceived sacrifices (Wang et al., 2004) and the effects of social value, economic value, and emotional value (Dardak and Habib, 2010) on customer satisfaction. In contrast to these studies on the consequences of customer value, our study will focus on the formation of customer value. We will explore the differential effects of relationship orientation and needs orientation on B2B customer value in order to show managers what strategies are more effective than others.

Relationship orientation and needs orientation play a crucial role in the process of integrating customer needs knowledge into NPD. While relationship orientation enables firms to acquire knowledge of customer needs (absorptive capability), needs orientation enables firms to build on acquired knowledge in addressing customer needs (adaptive capability). Relationship orientation and needs orientation are thus crucial dynamic capabilities (Landroguez et al., 2011, Ramaswami et al., 2009) that help firms address constantly changing customer needs. These capabilities are crucial to customer value creation (Landroguez et al., 2011) during NPD, whose success depends on addressing changes in customer needs more quickly than competitors. Figure 4.1 depicts our conceptual model.

4.3.2 Tangible vs. Intangible B2B Customer Value

While the term customer value has many meanings (Woodall, 2003), it has two dominant facets: value for the customer and value for the firm. In this research study, we focus on the creation of value for the customer. Even though customer value creation is a central concept in the marketing literature, there appears to be little consensus on the set of different strategies used to create customer value in general (Lepak et al., 2007) and, specifically, through NPD activities (Möller and Törrönen, 2003).

During the NPD process, firms should seek to create B2B customer value to enhance their competitiveness in the market because B2B customers usually select their suppliers based on the value proposition (Wise and Morrison, 2000). Typically, firms offer new products to the subsequent firm in the supply chain in order to obtain potential business opportunities in the future. For example, raw material suppliers offer their new products to manufacturers and trade offices before processed versions of these products finally reach end consumers. Hence, B2B value creation is crucial for the success of firms at all stages of the supply chain because firms at each stage compete on customer value in order to sell their products to customers at the subsequent stage.

Smith and Colgate (2007) describe customer value as a combination of four dimensions: functional, cost, hedonic, and symbolic value. Functional value is the extent to which a product offers right features, superior performance, and high quality. Cost value is the extent to which

transaction costs involved in purchasing and using the product are considered low. Since right features, quality parameters, and transaction costs can be measured easily, we classify functional and cost value as tangible value. By contrast, hedonic value is the extent to which a product offers positive experiences, feelings, and emotions to customers. Symbolic value is the degree to which customers associate psychological meaning with a product. Since emotions, feelings, and psychological meanings are difficult to measure, we classify hedonic and symbolic value as intangible value.

While the importance of tangible B2B value has long been recognized, scholars have only recently started to recognize the importance of intangible B2B value. Birkner (2013) reported that U.S. firms have come to realize that not just B2C customers but also B2B customers have a human side and, therefore, have emotional and symbolic needs that drive their purchasing behavior. Moreover, B2B customers usually do not purchase products for themselves but for processing these products and selling these processed products to their own customers. In that sense, B2B customers tend to account for intangible B2B value as a means to build value for their own customers. Products whose components generate intangible (hedonic, symbolic) customer value create greater demand from B2C markets, which generates a pull effect on product demand throughout the supply chain. Hence, our study addresses the increased recognition of the importance of intangible customer value in B2B markets and seeks to understand the differences between the processes of creating tangible and intangible B2B customer value.

4.3.3 B2B Customer Orientation

According to Narver and Slater (1990), customer orientation is the sufficient understanding of target customers' needs and is necessary for creating superior value for these customers. Accordingly, a customer-oriented firm is one with the ability and will to identify, analyze, understand, and answer customer needs. Based on Blocker et al. (2011) and Sin et al. (2005), we classify B2B customer orientation as consisting of needs orientation and relationship orientation.

Customer needs orientation deals with taking coordinated action to satisfy customer needs (Day, 2000; Narver and Slater, 1990). It has two sub-dimensions: responsive and proactive needs focus. Responsive needs focus is a practice seeking to respond quickly to changes in customers'

expressed needs by establishing high flexibility in internal processes. By contrast, proactive needs focus is a practice seeking to identify and respond to latent customer needs through proactive dialogue, lead user research, or ethnographic research. While past research demonstrated that it positively affects overall customer value (Blocker et al., 2011), research has not yet identified its effects on distinct sub-dimensions of customer value, which is a contribution of our study.

Relationship orientation deals with bidirectional communication between firm employees and potential customers. It enables collaborative information exchange with customers (Bonner, 2010). Communication with customers is characterized by frequency and mode of communication. Communication frequency refers to how often firms communicate with their customers. In the context of customer value co-creation, communication frequency refers to such aspects as the amount of ongoing feedback between a firm and its customers (Gustafsson et al., 2012). Frequent communication between firms fosters trust because communication helps solve problems (White, 1992). Mode of communication refers to the channel through which communication occurs. It can be classified into informal into formal modes. Informal common communication modes include face-to-face meetings, video conferencing, social media, and phone calls, whereas formal communication modes include emails, fax, web-based media, and printed materials (McDonough et al., 1999).

4.4 Development of Hypotheses

Our first hypothesis will deal with the influence of the needs orientation approach of B2B responsive needs focus on the creation of tangible (functional and cost) customer value (H1). We will also investigate the influence of the needs orientation approach of proactive needs focus on the creation of intangible (hedonic and symbolic) customer value (H2). Moreover, we will hypothesize how the relationship orientation approaches of B2B communication frequency and informal (vs. formal) communication mode affect the creation of intangible (hedonic and symbolic) customer value (H3, H4).

4.4.1 Needs Orientation

Tangible dimensions of B2B customer value, such as functional and cost value, are tangible because they satisfy needs that customers are aware of and communicate actively and openly (Narver et al., 2004): expressed needs. By contrast, intangible dimensions of B2B customer value, such as emotional and symbolic value, are intangible because they satisfy needs that customers are usually unaware of and, consequently, do not communicate actively and openly (Narver et al., 2004): latent needs.

Therefore, we posit that responsive needs focus, which is meant to optimally satisfy expressed customer needs, is highly effective in creating tangible B2B customer value, (arguably based on expressed needs). However, its focus on responding to expressed customer needs may not be effective in identifying and satisfying latent, unexpressed customer needs which form the basis of intangible B2B customer value. While all customers tend to have latent needs, customers do not consciously communicate these needs and often have a hard time putting them into words (Slater and Narver, 1998). Simply responding to expressed needs should thus not be successful in addressing latent needs. Hence, we do not expect responsive needs focus to be effective in creating intangible B2B customer value (arguably based on latent needs).

Moreover, we posit that proactive needs focus, which is meant to tackle the difficult tasks of identifying and meeting latent customer needs, is highly effective in creating intangible B2B customer value (arguably based on latent needs). It involves guessing latent customer needs with the result of some good guesses meeting latent customer needs but also many bad guesses failing to meet customer needs (Slater and Narver, 1998). Since customers do not have any specific expectations regarding their own latent needs (Slater and Narver, 1998), such failures are not likely to disappoint customers and thus to reduce intangible customer value. However, customers do have specific expectations regarding their own expressed needs. According to expectancy disconfirmation theory (Teas and Palan, 2003), failures to meet these expressed needs thus may reduce tangible customer value. Moreover, when customers express their product requirements clearly, which is usually the case regarding tangible product requirements (Narver et al., 2004), they may be irritated by suppliers bothering them with suggested product features that obviously differ from clearly expressed product requirements. Hence, we do not expect the guessing-based proactive needs focus to be effective in creating tangible B2B customer value.

H1: B2B responsive needs focus has positive impacts on B2B functional and cost value.

H2: B2B proactive needs focus has positive impacts on B2B hedonic and symbolic value.

4.4.2 Relationship Orientation

According to Grönroos (2004), relationship-oriented marketing activities create more value for the customer than do merely transaction-oriented marketing activities. Communication as the focus of relationship orientation is the nervous system that makes organizational units cohere and enables employees to coordinate their work (White, 1992). NPD success depends on market knowledge (Cooper, 1979; Li and Calantone, 1998), which can be gained through direct interaction with B2B customers.

Among the characteristics of communication, we expect communication frequency to most strongly influence customer value creation because it directly regulates the flow (i.e., amount) of need-related information exchanged between the firm and its customers (Gustafsson et al., 2012). This information is essential to developing products that satisfy customer needs and thus provide high customer value (Slater and Narver, 2000).

More frequent communication increases the quantity (Matthing et al., 2004) and quality (Maltz, 2000) of exchanged information on expressed customer needs. Hence, we posit that more frequent communication leads to higher tangible (functional and cost) customer value (arguably based on expressed needs: flow of explicit information). According to the theory of social ties (Granovetter, 1983; Dahlstrom and Ingram, 2003), more frequent communication improves relationships with B2B customers (Lindberg-Repo and Grönroos, 2004) and thus leads to trust, commitment, and satisfaction (Gil-Saura et al., 2009). These relationship characteristics make B2B customers more willing to exchange information beyond the necessary (Cannon and Perreault, 1999), which might provide clues to their latent needs. Moreover, frequent communciation and good relationships enable firms to better understand their customers (Cannon and Homburg, 2001) and thus to better detect the pieces of information that might infer the presence of latent needs. Hence, we also posit that more frequent communication leads to higher intangible (hedonic and symbolic) customer value (arguably based on latent needs: flow of implicit information). Overall,

communication frequency drives the amount of information (explicit, implicit) exchange between firms and customers, and thus helps create customer value.

H3: B2B communication frequency has positive impacts on B2B functional, cost, hedonic, and symbolic value.

Among the characteristics of communication, the use of informal (vs. formal) modes of communication may also enhance the creation of intangible (hedonic and symbolic) B2B customer value. Media richness theory (Daft et al., 1987) established that informal (vs. formal) modes of communication reduce the relational distance among members of communication networks. According to the theory of social ties (Granovetter, 1983; Dahlstrom and Ingram, 2003), not only more frequent communication but also relational distance in the mode of communication improves relationships with B2B customers and thus leads to trust, commitment, and satisfaction (Gil-Saura et al., 2009). These relationship characteristics make B2B customers more willing to exchange information beyond the necessary (Cannon and Perreault, 1999), which might provide clues to their latent needs. Hence, we posit that informal (vs. formal) modes of communication help firms obtain the information necessary to effectively create intangible (hedonic and symbolic) customer value.

H4: The use of informal (vs. formal) modes of communication with B2B customers has positive effects on B2B hedonic and B2B symbolic value.

4.5 Methodology

In order to test these hypotheses, we developed a questionnaire using scales published in the literature to measure the constructs in the conceptual model (Blocker et al., 2011; McDonough et al., 1999; Oke and Idagbon-Oke, 2010; Smith and Colgate, 2007) and test our hypotheses.

In our empirical study, we focused on a single industry because it is difficult to compare the performance of products from different industries directly (Stock et al., 2001). As a suitable context, we chose the textile and apparel industry, which has exhibited a high pace of innovation across all stages of the supply chain in recent years (Williams et al., 1995; Wen-Ying, 2012). In this industry, retailers and end consumers are mainly located in developed countries. By contrast,

raw material suppliers and manufacturers are mainly located in developing countries of South and East Asia where retailers entertain buying offices. These retailers are also supported by private buying offices located in South and East Asian countries (Dicken and Hassler, 2000). Due to the global reach of the supply chain, fierce competition, and low switching costs in this industry, customers tend to purchase from firms offering the best customer value (Woodruff, 1997). Since firms along the supply chain thus compete on customer value through NPD activities, we consider this industry ideal to illuminate the effects of distinct customer orientation approaches on the creation of B2B customer value.

Eventually, our data collection resulted in responses from 246 managers representing 115 SBUs (response rate: 21%) from different stages of the supply chain (66 raw material suppliers, 24 apparel manufactures, 14 apparel printing/dyeing/washing plants, and 11 buying offices) across 10 countries: Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam. The average respondent was aged 36 years with 9 years of industry experience.

A confirmatory factor analysis (CFA) of all latent multi-item constructs satisfied the standard acceptance criteria (Hair et al., 2010; Kline, 2011): CFI > 0.95, $\chi 2$ /df < 3, and RMSEA < 0.05. As shown in Table 4.1 and Table 4.2, all constructs fulfilled standard criteria of convergent and discriminant validity (Fornell and Larcker, 1981; Gerbing and Anderson, 1988): Cronbach's $\alpha > 0.7$, average variance extracted (AVE) > 0.5, and AVE > squared correlations of the construct with all other constructs. In the next step, we aggregated these data to represent SBUs by calculating mean values across all informants within each SBU. We verified the validity of our aggregation by calculating the inter-rater reliability R_{wg} (Boyer and Verma, 2000; James et al., 1984) and the intraclass correlation coefficient ICC(1) (Klein and Kozlowski, 2000) (see Appendix A and Chapter 3 for more details).

Table 4.1 - Correlations

		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
X1	EODB										
X2	Supply chain stage	0.224 *									
X3	Industry experience	0.006	0.122								
X4	B2B responsive needs focus	0.111	0.072	0.083							
X5	B2B proactive needs focus	-0.002	-0.068	0.054	0.464 **						
X6	B2B communication frequency	-0.106	0.025	0.101	0.433 **	0.497 **					
X7	B2B informal (vs. formal) communication mode	0.149	0.105	-0.171	0.054	0.146	-0.014				
X8	B2B functional value	-0.055	-0.283 **	-0.039	0.372 **	0.303 **	0.417 **	-0.016			
X9	B2B hedonic value	0.098	0.356 **	0.138	0.327 **	0.428 **	0.528 **	0.293 **	0.223 *		
X10	B2B symbolic value	-0.167	-0.215 *	0.029	0.234 *	0.515 **	0.538 **	0.056	0.403 **	0.341 **	
X11	B2B cost value	0.033	-0.032	0.058	0.354 **	0.253 **	0.420 **	-0.004	0.227 *	0.268 **	0.330 **

Notes: $^{*}p < 0.05$; $^{**}p < 0.01$. EODB: Ease of doing business – world ranking (http://www.doingbusiness.org/rankings).

Table 4.2 - Descriptive Statistics

Constructs	Mean	Standard deviation	R_{wg}	ICC(1)	AVE	α	CR
EODB	75.752	33.415					
Supply chain stage	1.746	1.011					
Industry experience	9.033	4.372					
B2B responsive needs focus	5.870	0.859	0.866	0.350	0.620	0.867	0.870
B2B proactive needs focus	5.100	0.942	0.884	0.405	0.600	0.850	0.860
B2B communication frequency	6.010	0.878	0.901	0.523	0.720	0.882	0.880
B2B informal (vs. formal) communication mode	48.551	7.872					
B2B functional value	5.620	0.854	0.862	0.385	0.620	0.863	0.870
B2B hedonic value	5.570	0.881	0.882	0.409	0.620	0.867	0.870
B2B symbolic value	5.530	0.964	0.893	0.477	0.690	0.898	0.900
B2B cost value	5.110	0.847	0.896	0.477	0.513	0.780	0.799

Notes: EODB: Ease of doing business – world ranking (http://www.doingbusiness.org/rankings).
R_{wg}: Inter-rater agreement. ICC(1): Intraclass correlation coefficient. AVE: Average variance extracted. CR: Composite reliability.

4.6 Results

We tested the hypotheses using hierarchical linear modeling with B2B functional, cost, hedonic, and symbolic value as dependent variables (HLM; Kreft and de Leeuw, 1998). The HLM models consist of three levels. SBUs (level 1) are nested within firms (level 2), which are nested within countries (level 3). As independent variables, the models included B2B responsive needs focus, B2B proactive needs focus, communication frequency, and informal (vs. formal) modes of communication. To test H1-H4, we included B2B functional value, B2B cost value, B2B hedonic value, and B2B symbolic value as dependent variables (see Table 3). As control variables, our HLM models include the country-specific ease of doing business index (Doing Business, 2013), the average years of respondents' industry experience in a SBU, and a variable describing the supply chain stage: 1 = raw material suppliers, 2 = apparel manufacturers, 3 = printing/washing/dyeing plants, and 4 = buying offices. The independent variables explain 33.2% (R^2), 36.0%, 32.1%, and 35.8% of the variance in B2B functional value, cost value, hedonic value, and symbolic value, respectively (see Table 4.3).

As B2B responsive needs focus shows a significant positive effect on the creation of B2B functional value and B2B cost value, H1 is supported. Since B2B proactive needs focus shows a positive effect on both B2B hedonic value and B2B symbolic value, H2 is supported. Communication frequency shows significant positive effects on all dimensions of customer value: B2B functional, cost, hedonic, and symbolic value. Therefore, H3 is supported. For these effects, the standardized HLM coefficients are very similar to the corresponding non-standardized HLM coefficients (functional: 0.313, cost: 0.285, hedonic: 0.425, and symbolic: 0.410). Hence, the results show based on non-standardized / standardized HLM coefficients that the effects of communication frequency on intangible (hedonic, symbolic) customer value are 31 to 47% / 31 to 49% higher than on tangible (functional, cost) customer value. We thus conclude that communication frequency appears to be more effective in driving the creation of intangible than of tangible customer value. This conclusion is supported by the fact that the ΔR^2 values are twice as high for the effects of communication frequency on intangible (hedonic, cost) than on tangible (functional, cost) customer value. Furthermore, the results indicate that the use of informal (vs. formal) communication modes shows a significant positive effect on B2B hedonic value only. Hence, H4 is partially supported.

Table 4.3 - Effects of Needs and Relationship Orientations on B2B Customer Value Creation

	Dependent variables			
	Types of B2B customer value			
Independent variables	Functional	Cost	Hedonic	Symbolic
Needs orientation				
B2B responsive needs focus	0.265 **	0.210 *	0.014	-0.067
B2B proactive needs focus	-0.142	-0.073	0.187 **	0.315 ***
Relationship orientation				
B2B communication frequency	0.310 ***	0.285 **	0.419 ***	0.405 ***
B2B informal (vs. formal) communication mode	-0.019	-0.044	0.237 ***	0.046
Model fit				
HLM pseudo R^2	0.374	0.378	0.515	0.436

Notes: Hierarchical linear modeling (HLM) analysis: maximum likelihood estimation.
HLM Pseudo R^2 from Kreft and de Leeuw (1998).
$^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Sample size: 115 SBUs / 246 industry experts.
Control variables: supply chain stage, industry experience, EODB (ease of doing business).

In summary, H1 to H3 are fully supported, whereas H4 is only partially supported.

4.7 Conclusion

4.7.1 Discussion and Theoretical Implications

Due to the increased size of a globalized marketplace and switching costs lower than in the past, customer value has become the major selling point in many industries (Woodruff, 1997; Zeithaml et al., 1996). While the concept of customer value originated in the literature on B2C marketing, it has recently transcended the literature on B2B marketing in the form of conceptual studies (Smith and Colgate, 2007). To address the lack of sound empirical research on how to create customer value in B2B contexts, this study used data from the textile industry in 10 countries to test four hypotheses on the roles of needs orientation and relationship orientation as antecedents to B2B customer value. This research adopted Smith and Colgate's (2007) conceptualization of customer value as consisting of four dimensions: functional, cost, hedonic, and symbolic value. We classified these dimensions into tangible (functional and cost value) and intangible (hedonic

and symbolic) customer value. This study was the first to explore the antecedents of these dimensions of customer value in a B2B context.

A very limited number of studies have examined the formation of overall customer value and showed that overall customer value is influenced by customer orientation dimensions such as responsive and proactive needs focus (Blocker et al., 2011) and by aspects of communication (Bonner, 2010). This research extended these studies by arguing that distinct types of customer orientation have completely distinct effects on the sub-dimensions of B2B customer value. Specifically, the results indicate that responsive and proactive needs focus do not uniformly affect B2B customer value. Rather, responsive needs focus impacts only tangible (functional, cost) customer value (H1), whereas proactive needs focus impacts only intangible (hedonic, symbolic) customer value (H2). Explaining H1, tangible (functional, cost) customer value arises from the satisfaction of needs that customers realize and consciously communicate to their suppliers (Slater and Narver, 1998). Responsive needs focus is a strategy for quickly adapting NPD processes to expressed customer needs (Narver et al., 2004). Hence, responsive needs focus excels at creating tangible (functional, cost) customer value (H1). Explaining H2, intangible (hedonic, symbolic) customer value arises from the satisfaction of latent needs that customers do not openly communicate to suppliers because they are often not aware of these needs and because they are not used to putting these needs into words (Slater and Narver, 1998). As responsive needs focus merely responds to expressed needs (Narver et al., 2004), this strategy does not sufficiently address unexpressed, latent needs and thus does not lead to the creation of intangible (hedonic, symbolic) customer value. By contrast, proactive needs focus is a strategy where firms guess customers' unexpressed, latent needs and come up with products that customers have not specifically requested (Narver et al., 2004). Hence, this strategy is genuinely adapted to the creation of intangible (hedonic, symbolic) customer value (H2). However, its focus on unexpressed, latent needs does not make it effective in addressing customers' expressed needs and in creating tangible (functional, cost) customer value.

These results showcase the entirely distinct roles of responsive and proactive needs focus. They demonstrate that a focus on overall customer value, rather than tangible vs. intangible customer value, is not appropriate because it masks the differential roles of distinct types of customer orientation in the customer value creation process. The results also indicate that while

frequent communication is important to the creation of all types of customer value (H3), it is particularly crucial to the creation of intangible customer value. Hence, communication frequency also differentially affects the creation of tangible vs. intangible customer value. Moreover, the results indicate that firms can generate hedonic customer value more successfully (H4) when using informal (face-to-face meetings, video conferencing, social media, and phone calls), rather than formal (emails, fax, web-based media, and printed materials), modes of communication with B2B customers.

For both marketing theory and practice, it may be valuable to compare the effectiveness of relationship orientation, which concerns direct communication with B2B customers, with needs orientation, which concerns internal market intelligence capabilities. The results indicate that relationship orientation and needs orientation are of similar importance for creating tangible (functional, cost) customer value. By contrast, relationship orientation appears to be more important for creating intangible (hedonic, symbolic) value.

This research was also the first to focus on relationship orientation and needs orientation of the NPD department as opposed to the firm in general (e.g., marketing department, etc.). While Blocker et al. (2011) found for the firm in general that proactive customer orientation and responsive customer orientation affect customer value, the results indicate that customer orientation approaches of the NPD department differentially affect the creation of each type of customer value. Therefore, the findings of this research have more practical implications than firm-level findings.

4.7.2 Managerial Implications

Traditionally, firms have focused on creating tangible (functional, cost) customer value in B2B contexts (Huber et al., 2001). In this environment, firms have fostered skills needed to respond quickly and flexibly to customer changes. Responsive needs focus has turned out to be an important source of competitive advantage (Martin and Grbac, 2003). However, industry has seen a steady increase in the importance of intangible (hedonic, symbolic) value as a source of competitive advantage (Chitturi et al., 2007). This research demonstrates that under such conditions, responsive needs focus is not sufficient because it does not help firms create intangible

customer value. To successfully create intangible customer value, firms need to adopt a proactive needs focus, which is an entirely different strategic orientation. Implementing both a responsive and proactive needs focus may pose a major challenge to firms (Tuli et al., 2007), but it is necessary for creating both high tangible and intangible customer value at a time. Furthermore, the trend towards intangible customer value requires firms to adapt their communication practices. The results indicate that firms will need to enhance the frequency of their communication with customers and increasingly use informal (e.g., face-to-face meetings) rather than formal (e.g., emails) modes of communication. Adopting informal modes of communication may be a challenge for firms communicating over long distances and for firms with a long tradition of highly formal interactions and thus may require the willingness to break with traditions and enter new ground.

This discussion reveals that firms may have a hard time to optimize their customer orientation so that they can achieve both high tangible and intangible customer value at the same time. Therefore, we encourage firms to assess the importance of tangible vs. intangible customer value that best fits the intended market positioning of a certain product. Based on this positioning, we advise firms to choose the specific type of customer orientation most effective in achieving the intended type of customer value. For example, a manufacturer of tubes may find intangible customer value less important than tangible customer value and thus may want to adopt a responsive needs focus (see results in Table 4.3). By contrast, a consulting company may attribute greater importance to intangible customer value and may thus be advised to adopt a proactive needs focus and informal modes of communication with customers. These examples illustrate that firms should adopt a specific type of customer orientation based on the intended market positioning of their product.

4.8 Limitations and Future Research

Since the current study collected data from managers who have a thorough knowledge of the NPD process and of the English language, the results might not be without bias. However, the focus on knowledgeable managers assured high-quality survey responses and assured that we capture best practices. Thanks to these advantages of our method, we are confident that the final outcome is more fruitful for practitioners. At the same time, future research might seek to adopt

another methodology in order to complement our efforts. Smith and Colgate's (2007) framework does not discuss contexts where B2B customers appreciate the less time they have to spend for further developing their own products by using parts collected from different suppliers. We encourage future research to integrate these kind of additional types of customer value into consideration. We encourage future research to integrate these kind of additional types of customer value into consideration. While we focused on a single industry in this study, we recognize the necessity for replications in other industries. Hence, we recommend that future research collects further data from other industries and, if possible, also from other countries. Moreover, it may be interesting to investigate whether the effectiveness of the customer orientation approaches in our model depends on the type of organizational culture that firms have fostered over the years.

References

Anderson, J. C., and Narus, J. A. (1995). Capturing the value of supplementary services. *Harvard Business Review*, 73(1), 75-83.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

Birkner, C. (2013). A simple plan, *Marketing News*, February, 27-31. Retrieved on 03/04/03 from http://www.marketingpower.com/ResourceLibrary/Publications/MarketingNews/2013/2-13/simple%20plan.pdf.

Blocker, C. P., Flint, D. J., Myers, M. B., and Slater, S. F. (2011). Proactive customer orientation and its role for creating customer value in global markets. *Journal of the Academy of Marketing Science*, 39(2), 216-233.

Bonner, J. M. (2010). Customer interactivity and new product performance: moderating effects of product newness and product embeddedness. *Industrial Marketing Management*, 39(3), 485-492.

Boyer, K. K., and Verma, R. (2000). Multiple raters in survey-based operations management research: a review and tutorial. *Production and Operations Management*, 9(2), 128-140.

Cannon, J. P., and Homburg, C. (2001). Buyer-supplier relationships and customer firm costs. *Journal of Marketing*, 65(1), 29-43.

Cannon, J. P., and Perreault, W. D. (1999). Buyer-seller relationships in business markets. *Journal of Marketing Research*, 36(4), 439-460.

Chitturi, R., Raghunathan, R., and Mahajan, V. (2007). Form versus function: how the intensities of specific emotions evoked in functional versus hedonic trade-offs mediate product preferences. *Journal of Marketing Research*, 44(4), 702-714.

Cooper, R. G. (1979). The dimensions of industrial new product success and failure. *Journal of Marketing*, 43(3), 93-103.

Cooper, R. G. (2001). *Winning at New Products: Accelerating the Process from Idea to Launch*. Persus Books, Cambridge, London.

Daft, R.L., Lengel, R. H., and Trevino, L. K. (1987). Message equivocality, media selection and manager performance: Implications for information systems. *MIS Quarterly*, 11(3), 355-368.

Dahlstrom, R., and Ingram, R. (2003). Social networks and the adverse selection problem in agency relationships. *Journal of Business Research*, 56(9), 767-775.

Dardak, R. A., and Habib, F. Q. (2010). Customer perceived value, satisfaction, and loyalty on agricultural brands. *Economic and Technology Management*, 5(1), 79-87.

Day, G. S. (2000). Managing market relationships, *Journal of the Academy of Marketing Science*, 28(1), 24-30.

Dicken, P., and Hassler, M. (2000). Organizing the Indonesian clothing industry in the global economy: the role of business networks. *Environment and Planning*, 32(2), 263-280.

Doing Business (2013). *Ease of doing business*, [www] Doing business. Retrieved on 03/04/13 from http://www.doingbusiness.org/rankings.

Doyle, P. (2000). Value-based marketing. *Journal of Strategic Marketing*, 8(4), 299-311.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(2), 39-50.

Gerbing, D. W., and Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(2), 186-192.

Gil-Saura, I., Frasquet-Deltoro, M., and Cervera-Taulet, A. (2009). The value of B2B relationships. *Industrial Management and Data Systems*, 109(5), 593-609.

Granovetter, M. (1983). The strength of weak ties: a network theory revisited. *Sociological Theory*, 1(1), 201-233.

Grönroos, C. (1997). Value-driven relational marketing: From products to resources and competencies. *Journal of Marketing Management*, 13(5), 407-419.

Grönroos, C. (2004). The relationship marketing process: communication, interaction, dialogue, value. *Journal of Business & Industrial Marketing*, 19(2), 99-113.

Gustafsson, A., Kristensson, P., and Witell, L. (2012). Customer co-creation in service innovation: a matter of communication? *Journal of Service Management*, 23(3), 311-327.

Hair, J. F, Black, W. C., Babin, B. J., and Anderson, R. E. (2010). *Multivariate Data Analysis*. Englewood Cliffs, NJ.

Huber, F., Herrmann, A., and Morgan, R. E. (2001). Gaining competitive advantage through customer value oriented management. *Journal of Consumer Marketing*, 18(1), 41-53.

James, L. R., Demaree, R. G., and Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 69(1), 85-98.

Klein, K. J., and Kozlowski, S. W. (2000). *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*. Jossey-Bass, San Francisco.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*. Guilford, New York.

Kreft, I., and de Leeuw, J. (1998). *Introducing Multilevel Modeling*. Sage Publications, London.

Lai, A. W. (1995). Consumer values, product benefits and customer value: a consumption behavior approach. *Advances in Consumer Research*, 22(1), 381-388.

Landroguez, S. M., Castro, C. B., and Cepeda-Carrion, G. (2011). Creating dynamic capabilities to increase customer value. *Management Decision*, 49(7), 1141-1159.

Lapierre, J. (2000). Customer-perceived value in industrial contexts. *Journal of Business & Industrial Marketing*, 15(2), 122-145.

Lepak, D. L., Smith, K. G., and Taylor, S. M. (2007). Value creation and value capture: a multilevel perspective. *Academy of Management Review*, 32(1) 180-194.

Li, T., and Calantone, R. J. (1998). The impact of market knowledge competence on new product advantage: conceptualization and empirical examination. *Journal of Marketing*, 62(4), 13-29.

Lindberg-Repo, K., and Grönroos, C. (2004). Conceptualizing communications strategy from a relational perspective. *Industrial Marketing Management*, 33(3), 229-239.

Maltz, E. (2000). Is all communication created equal? an investigation into the effects of communication mode on perceived information quality. *Journal of Product Innovation Management*, 17(2), 110-127.

Marr, B., Schiuma, G., and Neely, A. (2004). The dynamics of value creation: mapping your intellectual performance drivers. *Journal of Intellectual Capital*, 5(2), 312-325.

Martin, J. H., and Grbac, B. (2003). The effects of supplier focus, customer responsiveness and strategy type on growth in a transition economy. *Journal of Marketing Theory and Practice*, 11(2), 43-55.

Matthing, J., Sanden, B., and Edvardsson, B. (2004). New service development: learning from and with customers. *International Journal of Service Industry Management*, 15(5), 479-498.

McDonough, E. F., Kahn, K. B., and Griffin, A. (1999). Managing communication in global product development teams. *IEEE Transactions on Engineering Management*, 46(4), 375-386.

Möller, K. E., and Törrönen, P. (2003). Business suppliers' value creation potential: a capability-based analysis. *Industrial Marketing Management*, 32(2), 109-118.

Narver, J. C., and Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(1), 20-35.

Narver, J. C., Slater, S. F., and MacLachlan, D. L. (2004). Responsive and proactive market orientation and new product success. *Journal of Product Innovation Management*, 21(5), 334-347.

Oke, A., and Idiagbon-Oke, M. (2010). Communication channels, innovation tasks and NPD project outcomes in innovation-driven horizontal networks. *Journal of Operations Management*, 28(5), 442-453.

Ramaswami, S. N., Srivastava, R. K., and Bhargava, M. (2009). Market-based capabilities and financial performance of firms: Insights into marketing's contribution to firm value. *Journal of the Academy of Marketing Science*, 37(2), 97-116.

Ravald, A., and Grönroos, C. (1996). The value concept and relationship marketing. *European Journal of Marketing*, 30(2), 19-30.

Sin, L. Y., Tse, A. C., Yau, O. H., Chow, R. P., and Lee, J. S. (2005). Market orientation, relationship marketing orientation, and business performance: the moderating effects of economic ideology and industry type. *Journal of International Marketing*, 13(1), 36-57.

Slater, S. F. (1996). The challenge of sustaining competitive advantage. *Industrial Marketing Management*, 25(1), 79-86.

Slater, S. F., and Narver, J. C. (1998). Research notes and communications customer-led and market-oriented: let's not confuse the two. *Strategic Management Journal*, 19(10), 1001-1006.

Slater, S. F., and Narver, J. C. (2000). Intelligence generation and superior customer value. *Journal of the Academy of Marketing Science*, 28(1), 120-127.

Smith, J. B., and Colgate, M. (2007). Customer value creation: a practical framework. *Journal of Marketing Theory and Practice*, 15(1), 7-23.

Stock, G. N., Greis, N. P., and Fischer, W. A. (2001). Absorptive capacity and NPD. *Journal of High Technology Management Research*, 12(1), 77-91.

Teas, R. K., and Palan, K. M. (2003). Disconfirmed expectations theory of consumer satisfaction: an examination of representational and response language effects. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, 16, 81-105.

Tuli, K. R., Kohli, A. K., and Bharadwaj, S. G. (2007). Rethinking customer solutions: from product bundles to relational processes. *Journal of Marketing*, 71(3), 1-17.

Walter, A., Müller, T. A., Helfert, G., and Ritter, T. (2003). Functions of industrial supplier relationships and their impact on relationship quality. *Industrial Marketing Management*, 32(2), 159-169.

Wang, Y., Lo, P. H., Chi, R., and Yang, Y. (2004). An integrated framework for customer value and customer relationship-management performance: a customer-based perspective from China. *Managing Service Quality*, 14(2/3), 169-182.

Wen-Ying, C. S. (2012). Fashion competitive strategies: two-fold NPD, Retrieved on 03/04/13 from http://process.arts.ac.uk/sites/default/files/claire-shih-fashion-competitive-strategies.pdf.

White, H. C. (1992). *Identity and Control: A Structural Theory of Social Action*, Princeton University Press, New Jersey.

Williams, F. P., D'Souza, D. E., Rosenfeldt, M. E., and Kassaee, M. (1995). Manufacturing strategy, business strategy and firm performance in a mature industry. *Journal of Operations Management*, 13(1), 19-33.

Wilson, D. T., and Jantrania, S. (1994). Understanding the value of a relationship. *Asia-Australia Marketing Journal*, 2(1), 55-66.

Wise, R., and Morrison, D. (2000). Beyond the exchange: the future of B2B. *Harvard Business Review*, 78(6), 86-96.

Woodall, T. (2003). Conceptualising value for the customer: an attributional, structural and dispositional analysis. *Academy of Marketing Science Review*, 12(1), 1-42.

Woodruff, R. B. (1997). Customer value: the next source for competitive advantage. *Journal of the Academy of Marketing Science*, 25(2), 139-153.

Zeithaml, V. A., Berry, L. L., and Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of Marketing*, 60(2), 31-46.

Chapter 5

Strategic Openness in Maximizing NPD Operational Performance (Quality, Time-to-market, and Cost)

Chapter Overview

This chapter presents 2 sections.

Section 1. Strategic openness in maximizing product quality.

Section 2. Strategic openness in reducing time-to-market and cost.

'Open innovation' paradigm shows that firms' openness to its external environment helps firms improve their ability to innovate. However, whether such openness help internal quality control, process of reducing time-to-market and cost, is still questionable. This study makes two main contributions.

- This study seeks to build on and extend the open innovation paradigm to the area of product quality control practices and to the process of reducing time-to-market and cost in NPD.
- This research is the first study to empirically investigate the main and moderating effects of B2C market research on the formation of NPD operational performance in B2B contexts.

5.1 Abstract

Many firms have shifted to an 'open innovation' strategy by integrating external information into new product development (NPD). This study extends the open innovation paradigm to the area of product quality control practices, process of reducing time-to-market and cost in NPD (operational NPD objectives). An emerging area in the literature on NPD deals with strategies adopted by firms in maximizing NPD operational performance. Most of the past research in this area has not focused on the overall picture of the operational NPD objectives. Using data collected in 10 countries, this study investigates the role of external information acquired through B2B/B2C customer, competitor, technology, and manufacturing orientation in meeting quality and performance specifications, and achieving goals of reducing time-to-market and cost of newly developed products. It also illuminates the interconnected roles of B2B and B2C customer orientation in meeting these specifications and goals. Contrary to conventional wisdom, the results show that leveraging a variety of external information sources indeed helps firms improve internal product quality control practices and process of reducing time-to-market and cost in NPD.

5.2 Introduction and Purpose

With a growing level of competition across the industries, new products are increasingly viewed as crucial for businesses in maintaining a competitive edge in the long run. In the literature on NPD, researchers have predominantly focused on identifying various determinants of a firm's performance. In the modern business contexts, enhancing product quality and reducing time-to-market, cost are three of the main concerns of many firms (Chen and Huang, 2006). Maximizing product quality has been identified as one of the key NPD operational objectives and many researchers focused on product quality with the enormous increase in production in the early 20th century (Reed and Lemak, 1996). Therefore, we have divided this chapter into two sections and discussed how NPD strategic orientation helps firms maximize product quality (section 1) and how NPD strategic orientation helps firms reduce time-to-market and cost (section 2) separately in order to understand the role of NPD strategic orientation in achieving operational NPD objectives effectively.

5.2.1 Adjusting NPD strategic orientation to maximize product quality

Research has identified product quality as one of the key determinants of NPD performance (Sethi, 2000). Due to growing competition in most industries, managers thus have come to regard the quality of newly developed products as crucial for maintaining a competitive edge in the long run (Juran, 2004). Research based on Chesbrough's (2003) 'open innovation' paradigm indicates that firms' openness to its external environment can improve their ability to innovate by enabling them to leverage outside capabilities and follow changes in the environment (Laursen and Salter, 2006), but it remains unknown whether such openness might also help firms improve their mostly internally oriented quality management practices. Hence, our study seeks to verify whether the open innovation paradigm can be extended to the area of product quality control practices in NPD. Moreover, our study aims to identify the types of external information acquired through NPD strategies (B2B/B2C customer, competitor, technology, and manufacturing orientation) that best help firms meet quality and performance specifications of newly developed products in B2B contexts.

Our original claim is that accounting for external information during quality control can help firms to minimize the reoccurrence of past quality-related problems detected by B2B customers, to minimize manufacturing problems, to improve the effectiveness of early-stage prototype testing, and to learn from competitors' best practices in quality control. Hence, we argue that many firms would profit from greater openness in quality management. Firms in B2B markets may benefit from integrating external information on B2B customers and on their eco-system, which includes product technology, manufacturing techniques, and competitor strategies. As information on B2C customers at the end of the supply chain is not directly related to immediate concerns of internal quality control in B2B contexts, we argue that accounting for this type of information directly may be problematic. However, firms might learn to leverage such information to improve prototype testing in collaboration with B2B customers. Hence, even information on B2C customers may be beneficial to firms' quality control practices in B2B contexts if such information is handled appropriately.

5.2.2 Adjusting NPD strategic orientation to reduce time-to-market and cost

An emerging area in the literature on NPD deals with strategies adopted by firms minimize time-to-market and cost of new products (operational NPD objectives). The current study contributes to the literature in four ways. First, based on extant studies on strategic orientation and NPD performance, our research is the first study to empirically investigate the effect of manufacturing orientation on NPD operational performance. Strategic orientation is a significant indicator of a firm's performance. Strategic orientation includes market orientation (customer and competitor), technology orientation, and manufacturing orientation. However, in most studies, manufacturing orientation has not been taken into consideration (Zhou et al., 2007).

Second, our research is the first study to empirically investigate the main and moderating effects of B2C market research on the formation of NPD operational performance in B2B contexts. The debate on the use of B2C market research in NPD is long-standing and controversial. For many large multi-product firms, it seems that the use of B2C market research is based on accepted practice. However, the problem lies in deciding the correct situation to conduct B2C market research and then justifying this decision to senior managers (Trott, 2001). Especially in discontinuous product development, where no market exists, potential B2C customers are unable to understand the product adequately. Therefore, information from B2C customers can negatively affect NPD process.

Third, this study helps understand strategic trade-offs in obtaining different types of NPD objectives. Firms are always under pressure to develop new products faster, cheaper, and with better quality. Although speed has become a strategic weapon in the NPD process, there are two other main factors to be considered. These are the product quality and cost of new products (Gupta et al., 1992).

Fourth, as a secondary contribution to the literature, the current study investigates interrelationships among different types of NPD operational performance. According to the literature, time-to-market of new products negatively affects cost, whereas product quality negatively affects time-to-market and cost of new products (Kessler et al., 2002; Harter et al., 2000; Phillips et al., 1983). However, some past studies have investigated the relationships among time-to-market, quality, and cost of new products and have obtained different results (Afonso et

al., 2008; Stanko et al., 2012). Hence, these relationships require further attention (Chen et al., 2005).

To examine the effectiveness of strategic openness in quality control, process of reducing time-to-market, cost and thus provide industrial engineers with actionable knowledge of how to improve internal practices, our study establishes hypotheses about the influence of externally oriented NPD strategies on NPD operational performance. To test these hypotheses empirically, we collected data from 10 countries (Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam) in the textile and apparel industry, covering firms across the supply chain starting from raw material suppliers via manufacturers and value-adding firms (printing/dyeing/washing) to buying offices. As our study is based on statistical analyses, confirmed hypotheses are valid and can be generalized to the entire population of firms from which our firm sample was drawn. Thus, our study is not simply a case study. Rather, it derives generalizable insights that can be applied across different contexts.

In order to understand how NPD strategic orientation helps firms maximize product quality (section 1) and how NPD strategic orientation helps firms reduce time-to-market and cost (section 2) separately, we have divided this chapter into two sections and discussed each section in details.

5.3 Section 1: Strategic Openness in Maximizing Product Quality

5.3.1 Literature Review

Strategic orientation plays a crucial role in guiding NPD practices towards successful outcomes (Shekar, 2011). Our conceptual model in Figure 5.3.1 predicts that product quality is influenced by externally directed NPD strategic orientation, which consists of B2B customer orientation, B2C customer orientation, and eco-system orientation (Zhou and Li, 2007).

Product quality is defined by meeting product performance and quality specifications (Ledwith and O'Dwyer, 2009). Based on Moore's (1996) definition of business eco-systems, we define eco-system orientation as consisting of competitor, technology, and manufacturing orientation. Regarding B2C customer orientation, we focus on B2C market research, which has been shown to be relevant in B2B contexts for predicting how B2C customer demand impacts B2B customer preferences (Dant and Brown, 2008). It can be implemented through regular meetings, discussions, personal interviews, and focus groups (Trott, 2001). We define B2B customer orientation as consisting of information base of customer orientation and customer communication management. Customer communication enables firms to involve customers in product quality testing, whereas information base of customer orientation enables firms to internally process and exploit feedback from customers. Regarding information base of customer orientation as the first aspect of B2B customer orientation, we focus on the sub-dimensions of data-based and intuition-based customer orientation. B2B data-based customer orientation is the degree to which B2B customer-related information processing takes place within a firm through information generation, dissemination, analysis, and storage (Homburg et al., 2007). Hence, data-based customer orientation deals with systematic data collection and processing. By contrast, B2B intuition-based customer orientation refers to the extent to which attention to B2B customer needs is anchored in the firms' values, belief structure, and norms. This can be regarded as a mechanism that allows for capturing information on customer needs without intensive information processing (Homburg et al., 2007). Regarding customer communication management as the second aspect of B2B customer orientation, we focus on frequency and mode of communication, which influence outcomes of communication with customers (Oke and Idiagbon-Oke, 2010). B2B communication frequency affects the intensity of communication with B2B customers, whereas communication modes refer to the type of communication channel (McDonough et al., 1999). We classify communication

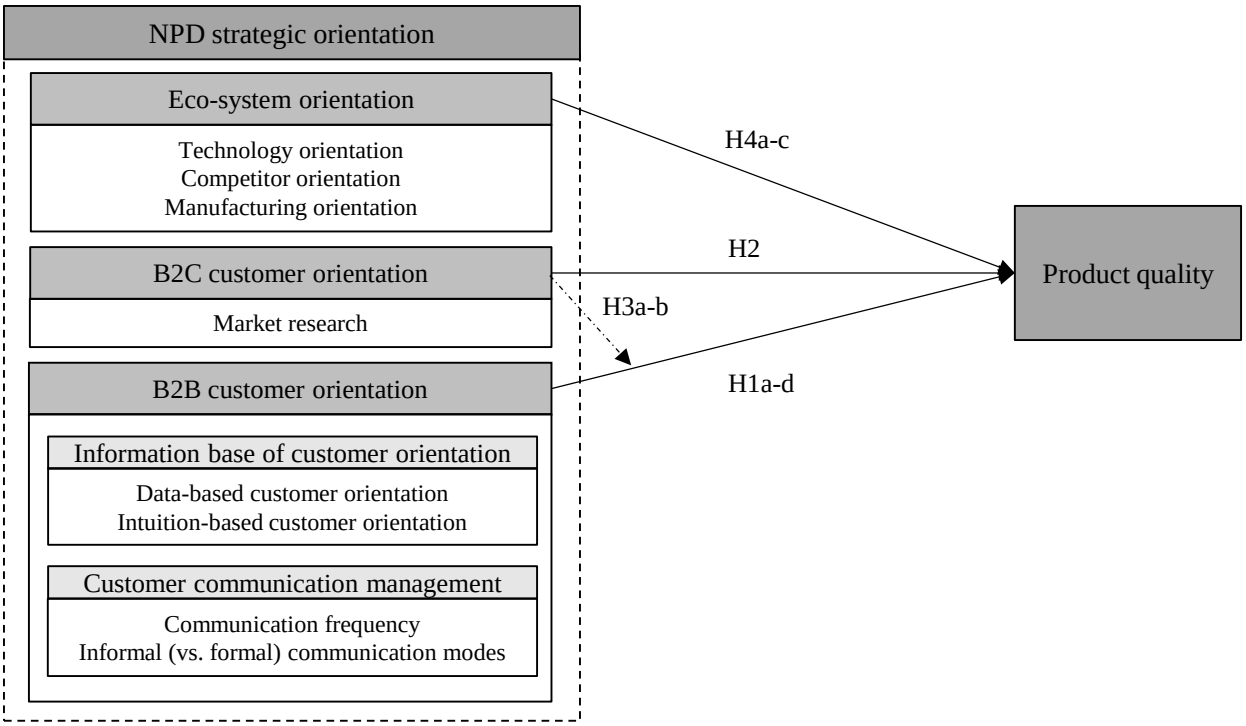


Figure 5.3.1 - Conceptual Framework: Effects of Eco-System Orientation, B2C Customer Orientation, and B2B Customer Orientation on Product Quality

modes as formal vs. informal modes. Formal communication modes include e- mails, fax, and printed material, whereas informal communication modes include face-to-face meetings, video conferencing, social networks, and phone calls.

Using this conceptual model, the current study investigates how external information obtained through NPD strategic orientation (orientation towards B2B/B2C customers, competitors, technology trends, and manufacturing requirements) helps meet quality and performance specifications of newly developed products.

5.3.2 Development of Hypotheses

In this section, we develop hypotheses on how external information can help NPD departments improve product quality by avoiding the reoccurrence of past quality-related problems, preventing manufacturing problems, improving prototype testing, and learning from competitors' best practices. Our hypotheses thus concern the effects of B2B customer orientation

(H1a-d), B2C customer orientation (H2, H3a-b), and eco-system orientation (H4a-c) on product quality (see Figure 5.3.1).

5.3.2.1 B2B Customer Orientation

B2B customer orientation enables NPD departments to obtain and process information from B2B customers (Zhu and Nakata, 2007). As new products meeting customer needs tend to be more successful in the marketplace, the importance of information on B2B customers' needs for developing successful new products has long been recognized. However, we argue that information obtained from B2B customers is also valuable in quality control because it helps NPD departments meet internal quality specifications of newly developed products. While customer communication management enables firms to get into touch with information from B2B customers (Selnes, 1998), information base of customer orientation enables NPD to departments capture and store information of relevance to NPD (Zahay et al., 2004).

First, we argue that both data-based and intuition-based types of customer orientation positively affect product quality. Data-based customer orientation enables firms to store and analyze information on B2B customers and to provide filtered information to NPD team members when needed (Homburg et al., 2007). As such information includes B2B customer feedback on past quality-related problems, data-based customer orientation can help NPD departments minimize the reoccurrence of past problems in the process of meeting quality and performance specifications. By contrast, intuition-based customer orientation improves relationships with B2B customers, increases customer-related responsiveness (Sawhney and Parikh, 2001), and thus helps NPD departments garner valuable information from B2B customers. Such information may include knowledge of competitors' best practices in quality management, which B2B customers acquire in the process of discussing quality-related problems with various suppliers. NPD departments can imitate competitors' best practices and thus improve their internal capabilities in order to better meet quality and performance specifications. Such information may also include B2B customers' implicit feedback in prototype testing. This type of feedback enables NPD departments to adjust internal processes involved in meeting quality and performance specifications.

H1a: B2B data-based customer orientation positively affects the quality of new products.

H1b: B2B intuition-based customer orientation positively affects the quality of new products.

Second, customer communication management helps firms get in touch with information from B2B customers (Selnes, 1998), which NPD departments can leverage to improve quality control practices. The frequency of communication with B2B customers drives the amount of B2B customer information that NPD departments can access (Matthing et al., 2004) and leverage to enhance product quality internally. Similarly, informal (vs. formal) modes of communication help reduce the relational distance between NPD departments and their B2B customers (Daft et al., 1987), which enhances the amount of implicit, difficult-to-obtain information that NPD departments may collect from B2B customers (Oke and Idiagbon-Oke, 2010). Such information may include B2B customers' reports of quality problems during product use, B2B customers' feedback in prototype testing, or B2B customers' knowledge of competitors' best practices in quality control. These clues can help NPD departments improve internal processes to better meet quality and performance specifications of newly developed products.

H1c: B2B communication frequency positively affects the quality of new products.

H1d: Using B2B informal (vs. formal) communication modes positively affects the quality of new products.

5.3.2.2 B2C Customer Orientation

B2C market research is valuable in developing new products because B2C customers' needs at the end of the supply chain are a predictor of B2B customers' future needs and because products accounting for these future needs can be sold more successfully (see Chapter 4). We argue that using B2C customer-related information in quality control has benefits and drawbacks. Regarding the drawbacks, industrial products need to fulfill quality specifications set in collaboration with B2B customers (Harvey and Green, 1993). B2C customers often focus more on product utility and may overlook technical quality aspects of crucial importance to B2B customers

(Zaltman, 2003). Therefore, relying solely on B2C customer feedback can mislead the process of meeting quality and performance specifications in B2B contexts.

H2: B2C market research negatively affects the quality of new products in B2B contexts.

By contrast, B2C customer-related information may also have benefits for quality control. While B2B intuition-based customer orientation and B2B informal (vs. formal) communication help NPD departments obtain implicit feedback (Homburg et al., 2007; Oke and Idiagbon-Oke, 2010) on product quality from B2B customers, such feedback remains difficult to understand (Kristensson et al., 2008). As a potential solution to this problem, we posit that B2C market research aids NPD departments in interpreting B2B customers' implicit feedback on product quality. When NPD departments combine the B2B customer orientation approaches of intuition-based customer orientation and of using informal communication modes with B2C market research, comparisons between B2B and B2C customers' implicit feedback on product quality may help them improve prototype testing. In this manner, NPD departments would be able to more effectively use customer feedback for meeting quality and performance specifications.

H3a: The positive effect of B2B intuition-based customer orientation on product quality is stronger when more B2C market research is conducted.

H3b: The positive effect of using B2B informal (vs. formal) communication modes on product quality is stronger when more B2C market research is conducted.

5.3.2.3 Eco-System Orientation

Moreover, we argue that integrating external information on competitors, technology, and manufacturing from the eco-system of NPD departments into internal processes of NPD departments has differential effects on product quality. Competitor knowledge plays a significant role in diagnostic benchmarking (Dickson, 1992). The information received through competitor orientation can be used to increase product quality internally by adjusting internal processes of NPD departments, in line with competitors' best practices in quality control. Technology orientation causes firms to adopt the latest product technology and is beneficial from the perspective of enhancing the functionality of new products (Srinivasan et al., 2002). By contrast,

it may cause difficulties in meeting quality and performance specifications of newly developed products because NPD departments need to get used to these new technologies and learn how to use them. Therefore, during the first stages of technology adoption, firms might produce defective products and may find it difficult to meet quality specifications. Finally, manufacturing orientation causes NPD departments to consider the resources available to manufacturing (Parsaei, 1993), which takes place outside NPD departments, during the development of new products. As manufacturing orientation leads NPD departments to predict manufacturing problems, we posit that it minimizes the occurrence of defects during manufacturing and thus helps meet quality and performance specifications of new products.

H4a: Competitor orientation positively affects the quality of new products.

H4b: Technology orientation negatively affects the quality of new products.

H4c: Manufacturing orientation positively affects the quality of new products.

5.3.3 Methodology

With growing competition and low switching costs in textile and apparel industry, consumers tend to purchase from firms offering the highest product quality (Tsiotsou, 2006). Thus, firms along the supply chain compete on product quality and use product quality to sustain business performance (Maani et al., 1994). Therefore, we consider this industry ideal for studying the effects of distinct strategic orientations on the creation of product quality.

We collected data from Southern, Eastern, and Southeast Asia. We were able to collect data from 246 managers (Southern Asia: 180, Eastern Asia: 53, Southeast Asia: 13) representing 115 SBUs from different stages of the supply chain (66 raw material suppliers, 24 apparel manufactures, 14 apparel printing/dyeing/washing plants, and 11 buying offices) across 10 countries: Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam. We achieved a high response rate (21%) because of continuous follow-ups and reminders.

Before analyzing the data, we performed several data validation tests. A confirmatory factor analysis (CFA), which tested the quality of our measurement approach, satisfied the standard acceptance criteria of CFI > 0.95, χ^2 /df < 3, and RMSEA < 0.05 (Hair et al., 2010; Kline, 2011). As shown in Table 5.3.1 and Table 5.3.2, all constructs fulfilled standard criteria of convergent and discriminant validity (Gerbing and Anderson, 1988): Cronbach's α > 0.7, average variance extracted (AVE) > 0.5, and AVE > squared correlations of the construct with all other constructs. To verify whether multiple informants in each SBU provided consistent responses, we calculated the inter-rater reliability Rwg (James et al., 1984) and the intraclass correlation coefficient ICC(1) (Klein et al., 2000). Both satisfied the acceptance requirements of R_{wg} > 0.7 and ICC(1) > 0.1 (Boyer and Verma, 2000; James et al., 1984). As informants within each SBU thus provided consistent responses, the mean score of their responses can validly represent their SBU (see Appendix A and Chapter 3 for more details).

Table 5.3.1 - Correlations among Constructs

	Constructs	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
X1	EODB											
X2	Supply chain stage	0.22 *										
X3	Industry experience	0.01	0.12									
X4	Data-based customer orientation	-0.19	0.06	-0.03								
X5	Intuition-based customer orientation	-0.19 *	0.13	0.20 *	0.60 **							
X6	frequency	-0.11	0.10	0.03	0.37 **	0.44 **						
X7	Informal (vs. formal) communication modes	0.15	-0.17	0.11	-0.10	0.08	-0.01					
X8	Market research	-0.15	-0.16	-0.06	0.31 **	0.30 **	0.42 **	-0.11				
X9	Competitor orientation	-0.24 **	0.15	-0.12	0.47 **	0.40 **	0.49 **	-0.19 *	0.51 **			
X10	Technology orientation	-0.16	0.03	-0.22 *	0.19 *	0.09	0.36 **	-0.19 *	0.36 **	0.47 **		
X11	Manufacturing orientation	-0.20 *	0.21 *	-0.08	0.23 *	0.23 *	0.55 **	0.05	0.27 **	0.50 **	0.59 **	
X12	Product quality	0.01	0.09	0.04	0.27 **	0.34 **	0.52 **	0.19 *	0.10	0.31 **	0.12	0.42 **

Notes: $^{*}p < 0.05$; $^{**}p < 0.01$. EODB: Ease of doing business – world ranking (Doing Business, 2013).

Table 5.3.2 - Descriptive Statistics

Constructs	Mean	SD	R_{wg}	ICC(1)	α	AVE	CR
EODB	75.75	33.42					
Supply chain stage	1.75	1.01					
Industry experience	9.03	4.37					
Data-based customer orientation	4.68	1.12	0.91	0.53	0.88	0.65	0.88
Intuition-based customer orientation	5.85	0.87	0.88	0.35	0.82	0.54	0.82
Communication frequency	6.01	0.88	0.90	0.52	0.88	0.72	0.88
Informal (vs. formal) communication modes	48.55	7.87					
Market research	4.75	1.30	0.90	0.69	0.90	0.76	0.90
Competitor orientation	5.27	0.91	0.89	0.45	0.86	0.67	0.86
Technology orientation	5.40	0.93	0.85	0.26	0.89	0.75	0.90
Manufacturing orientation	5.69	0.80	0.85	0.26	0.89	0.62	0.89
Product quality	5.96	0.89	0.87	0.45	0.85	0.74	0.85

Notes: EODB: Ease of doing business – world ranking (Doing Business, 2013).
R_{wg}: Inter-rater agreement. ICC(1): Intraclass correlation coefficient (1).
AVE: Average variance extracted. CR: Composite reliability. SD: Standard deviation.

5.3.4 Results

In order to cope with our hierarchically structured data, we tested our hypotheses using hierarchical linear modeling (HLM) with product quality as dependent variable. The HLM model consists of three levels. SBU data (level 1) are nested within firm data (level 2), and firm data (level 2) are nested within country data (level 3). We used three dummies as control variables. 1) Supply chain stage: I-raw material suppliers, II-apparel manufacturers, III-printing/washing/dyeing plants, IV-buying offices. 2) Ease of doing business (Doing Business, 2013). 3) Industry experience. We used the backward selection method to optimize our results. The independent variables explain 31.2% (R^2) of the variance in product quality (see Table 5.3.3). As a consequence of using statistical techniques to analyze data, only statistically significant ($p < 0.05$) or marginally significant ($0.05 < p < 0.1$) results can be generalized and are thus important to industrial engineers in different fields of application. Based on our results, B2B data-based customer orientation does not show a positive effect on product quality (H1a not supported), whereas B2B intuition-based customer orientation shows a marginally significant positive effect on product quality (H1b marginally supported). In addition, communication frequency and use of informal (vs. formal) communication modes exert significant and marginally significant positive effects on product quality, respectively (H1c supported, H1d marginally supported). B2C market research negatively affects product quality, which supports H2. The results show that the positive

Table 5.3.3 - Effects of Different Types of NPD Strategic Orientation on Product Quality

	Dependent variable		
Independent variables	Product quality	Hypotheses	Supported
Main effects			
B2B customer orientation			
Data-based customer orientation		H1a (+)	No
Intuition-based customer orientation	0.147 †	H1b (+)	Yes
Communication frequency	0.503 ***	H1c (+)	Yes
Informal (vs. formal) communication modes	0.150 †	H1d (+)	Yes
B2C customer orientation			
Market research (B2C MR)	-0.179 **	H2 (-)	Yes
Eco-system orientation			
Competitor orientation		H4a (+)	No
Technology orientation		H4b (-)	No
Manufacturing orientation	0.169 †	H4c (+)	Yes
Moderating effects			
B2C MR × data-based customer orientation			
B2C MR × intuition-based customer orientation	0.202 **	H3a (+)	Yes
B2C MR × communication frequency			
B2C MR × informal (vs. formal) communication		H3b (+)	No
Model fit (HLM pseudo R^2)	0.312		

Notes: Hierarchical linear modeling analysis: maximum likelihood estimation. Backward selection of independent variables.
$^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Sample size: 115 SBUs / 246 industry experts.
Control variables: supply chain stage, industry experience, ease of doing business (Doing Business, 2013).

effect of B2B intuition-based customer orientation on product quality is stronger when firms conduct more B2B market research. B2C market research positively moderates the effect of B2B intuition-based customer orientation on product quality (H3a supported). However, the results show that the positive effect of B2B informal (vs. formal) communication on product quality is not stronger when firms conduct more B2C market research. B2C market research does not moderate the effect of using informal (vs. formal) communication modes on product quality (H3b not supported). Competitor and technology orientation do not show any significant effects, whereas manufacturing orientation shows a marginally significant positive effect on product quality (H4a-b not supported, H4c supported).

5.3.5 Conclusion

5.3.5.1 Discussion and Theoretical Contribution

The open innovation paradigm has made NPD managers understand that information external to NPD departments can aid in the development of new products by enabling NPD teams to integrate customer need knowledge and innovative capabilities present in the market (Cohen and Levinthal, 1990; Chesbrough, 2003). By extending the open innovation paradigm to the area of quality control, our study makes the original claim that accounting for external information is also beneficial as a means of enhancing internal product quality. We explored whether and how different types of strategic external orientation (B2B/B2C customer, competitor, technology, and manufacturing orientation) help NPD departments meet quality and performance specifications of newly developed products. Our study used data from the textile industry in 10 countries to test these hypotheses.

As our study confirmed that some, but not all, types of external information can help NPD departments enhance product quality internally, we demonstrated that the open innovation paradigm can be extended to the area of quality control. Regarding techniques to process B2B customer information, B2B data-based customer orientation does not affect product quality (H1a). While past studies have shown benefits of adopting a data-based customer orientation approach (Davenport, 2006; Jaturanonda, 2011), these benefits do not seem to extend to the area of quality control. However, as we hypothesized, B2B intuition-based customer orientation helps meet quality and performance specifications, thus increasing product quality (H1b). Among aspects of communication with B2B customers, both communication frequency (H1c) and use of informal (vs. formal) communication modes (H1d) help acquire crucial information that can be leveraged to improve product quality, with communication frequency being the most important driver of product quality among the aspects explored in our study. Among types of eco-system orientation, only manufacturing orientation helps improve product quality (H4c), whereas competitor orientation (H4a) and technology orientation (H4b) do not seem to play any role.

Supplementing B2B intuition-based customer orientation with information collected through B2C research indeed helps NPD departments leverage implicit feedback from B2B customers to achieve higher product quality (H3a). By contrast, B2C market research does not seem to support efforts to enhance product quality through the use of informal (vs. formal)

communication modes (H3b). A possible reason for this can be found in the resource-based view (RBV) of firms (Barney, 1991). Resources are the stock of available factors owned or controlled by firms, whereas capabilities refer to the capacity to deploy resources, using organizational processes (Amith and Scoemaker, 1993). According to the RBV, intuition-based customer orientation is a capability of a firm, whereas informal (vs. formal) communication mode is a resource that firms use to facilitate this capability. Thus, we can state that B2C market research is more effective in combination with capabilities than with resources when NPD teams seek to enhance product quality.

5.3.5.2 Industry Applications

NPD teams that focus only on internal information risk ignoring essential information resting outside the boundaries of their department. Recent research on open innovation by Chesbrough (2003) suggests that advantages firms gain from internal information have declined. Accordingly, many innovative firms now rely less on internal information, and yet they are able to successfully innovate by drawing in knowledge and expertise from a wide range of external sources. Our article suggests that a similar strategic shift from internal to external orientation would help enhance operational product quality. Firms historically accumulated intellectual property to be used for improving product quality. However, a vast majority of patents are never used by the firm that holds them. Sakkab (2002) states that less than 10% of Procter and Gamble's patents were utilized within the firm. Later, Procter and Gamble has shifted its strategy toward 'connect and develop' rather than focusing on internal information of the NPD department (Laursen and Salter, 2006). NPD departments that focus on external information can gain knowledge through collaboration with stakeholders and leverage intellectual property more effectively to enhance product quality. One example of the effectiveness of open innovation is the ability of Cisco to keep up with its direct competitor Lucent. While Lucent devoted enormous resources to making fundamental discoveries, Cisco used only little internal information and rather adapted external information to compete in the marketplace (Chesbrough, 2006). In early product life cycle stages, few stakeholders have a sound understanding of potential problems related to product quality, prototype testing, and manufacturing. In order to build a solid understanding of potential threats to quality, NPD teams need to draw on a wider range of knowledge sources,

including knowledge sources outside their department. In this quest for information, NPD teams are advised to adopt an intuition-based, rather than data-based, style of customer orientation. That is, implementing a culture of attentiveness to customer views on potential quality problems among NPD team members is more effective than implementing complex database systems for storing and processing customer data. Also, we advise industrial engineers to maintain frequent and informal communication with B2B customers in order to secure an influx of information that may contain hints to meeting quality and performance specifications. These communication approaches enable firms to acquire implicit feedback during prototype testing in early stages of NPD.

Contrary to conventional wisdom, we advise NPD departments in B2B contexts to adopt B2C customer orientation (B2C market research) in addition to B2B customer orientation, but to be aware of the pitfalls of wrongly accounting for B2C customer information. When firms conduct B2C market research, B2B intuition-based customer orientation becomes more successful in obtaining quality-related cues from B2B customers and, eventually, in securing high product quality. However, following B2C customer information in isolation may reduce product quality. Hence, industrial engineers need to be aware of the differential effects of B2C customer orientation and its interactions with B2B customer orientation. As the coordination between marketing and NPD departments is extremely important during the stages of market opportunity analysis, development, and pretesting (Song et al., 1998), we advise industrial engineers to focus on B2B and B2C customer orientation especially in these NPD stages.

Despite several advantages of openness, NPD teams need to be cautious when adopting new product technologies from the outside because technology orientation does not help increase quality. Moreover, although studies have found that competitor orientation positively affects NPD success (Harrison-Walker, 2001; Wong and Tong, 2012), competitor orientation does not affect product quality. In line with past research studies (Swink and Calantone, 2004), we advise firms to become more manufacturing-oriented in order to increase product quality. Based on Song et al.'s (1998) findings on the importance of coordination between manufacturing and NPD departments during the stages of product development (market opportunity analysis, planning, development, pretesting, and product launching), we further advise industrial engineers to stress manufacturing orientation during the stages of planning, development, and product launching.

5.3.6 Limitations and Future Research

Since our survey was carried out in English across all countries, our results might not be without bias. As our study focused on merely a single industry, we also recognize the need for replications in other industries. Hence, we recommend that future research collects further data from other industries and, if possible, also from other countries. Moreover, it may be interesting to investigate whether the effectiveness of the different types of NPD strategic orientation in our model depends on the type of organizational culture.

5.4 Section 2: Strategic Openness in Reducing Time-to-market and Cost

5.4.1 Literature Review

We develop a conceptual model, shown in Figure 5.4.1, which includes different dimensions of B2B/B2C customer orientation, eco-system orientation, and different types of NPD operational performance. We define the different types of NPD operational performance as quality, time-to-market, and cost of new products. Product quality derives from firms meeting product performance and quality specifications (Ledwith et al., 2009). Time-to-market is defined as the elapsed time between product development initiation and product availability in the market (Vesey, 1992). Cost is a combination of marketing cost, manufacturing/operations cost, research and development cost, and overall cost (Gatignon et al., 1997). In line with most studies in the literature, we argue that when firms improve product quality, they can save a lot of time since rework percentage is reduced. At the same time, offering high-quality products helps maintain trust among the firms with whom B2B transactions are carried out (So et al., 2002). Hence, product quality negatively affects time-to-market of new products since firms can convince B2B customers with relatively short discussions and quick negotiations. Product quality also negatively affects the cost of new products as a result of the reduction of rework and reproduction. Firms adopt parallel works to reduce time-to-market of new products, but parallel works are costly (Roemer et al., 2000). Therefore, generally, time-to-market of new products is costly.

We broadly classify the dimensions of strategic orientation as eco-system orientation, B2C customer orientation, and B2B customer orientation (see Section 1 for more details).

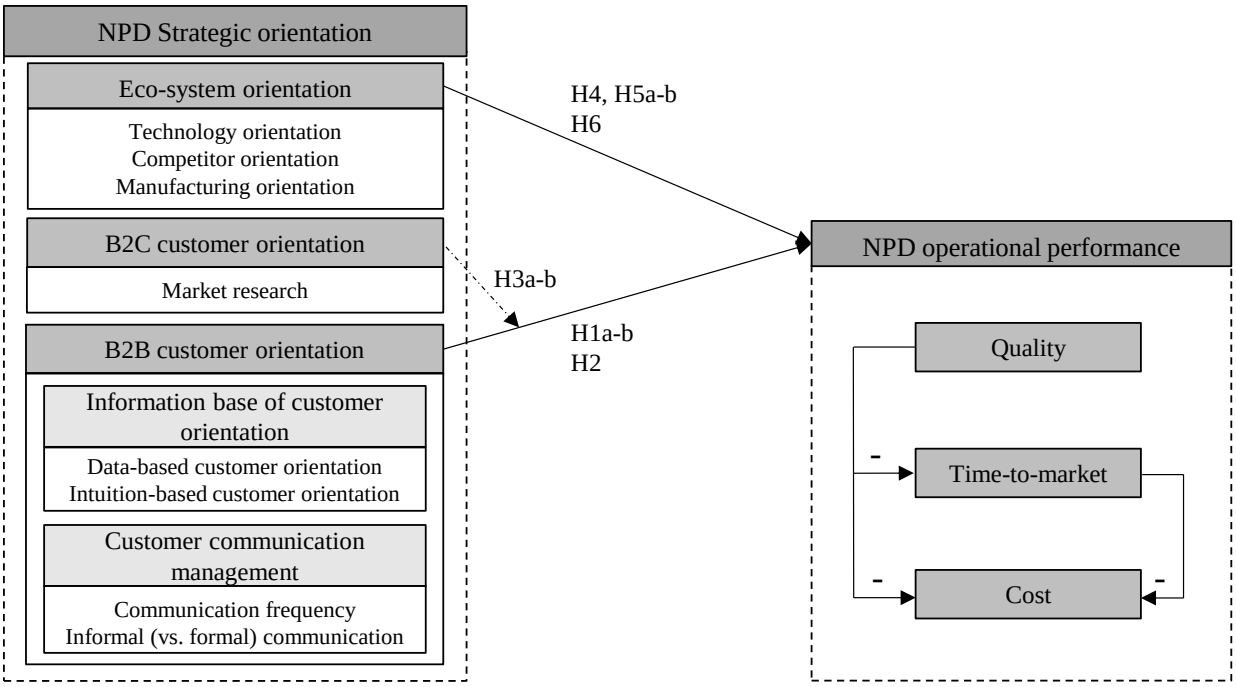


Figure 5.4.1 - Conceptual Framework: Effects of Eco-System Orientation, B2C Customer Orientation, and B2B Customer Orientation on Time-to-Market and Cost

5.4.2 Hypotheses Development

In this section, we develop hypotheses about the effects of different dimensions of strategic orientation on different types of NPD operational performance and about the moderating effects of B2C market research on the relationships between B2B customer orientation and different types of NPD operational performance. We summarize our hypotheses according to the conceptual model. 1) B2B customer orientation: H1a-H2. 2) B2C customer orientation: H3a-b. 3) Eco-system orientation: H4-H6.

5.4.2.1 B2B Customer Orientation

Information systems are always costly, and it is quite hard to estimate the cost at the beginning. Generally, the cost of information systems become much higher than initially anticipated due to various reasons (Lederer et al., 1990). Firms collect and circulate information regarding B2B customers to keep track of B2B customer behavior. In order to perform these tasks,

firms have to allocate extra resources such as labor and time. In most situations, B2B customer contact personnel encounters situations with high need for spontaneous decisions without in-depth information processing. With a B2B intuition-based customer orientation approach, decisions can be taken within a short span of time (Homburg et al., 2007), which speeds up the NPD process.

H1a: B2B data-based customer orientation positively affects the cost of new products.

H1b: B2B intuition-based customer orientation negatively affects the time-to-market of new products.

B2B communication frequency creates satisfaction among firms and B2B customers (Mohr et al., 1990), which helps reduce additional marketing cost for promotions of new products in B2B contexts.

H2: B2B communication frequency negatively affects the cost of new products.

5.4.2.2 B2C Customer Orientation

Since firms have frequent business transactions with B2B customers, firms conduct B2B information management more than B2C market research. Therefore, firms share the resources of B2B data-based information with B2C market research. When more B2C market research is conducted, firms need to further allocate resources for B2C market research, which may already be used for B2B data-based customer orientation. Therefore, B2B data-based customer orientation becomes more costly (e.g., due to extra working hours). When less B2C marketing research is conducted, firms might not have to allocate extra resources, which may reduce the cost.

H3a: The positive effect of B2B data-based customer orientation on cost is stronger when more B2C market research is conducted.

When more B2C market research is conducted, B2B customers can obtain information on how B2C customers think of new products. With this information, firms can easily convince B2B customers about new products since frequent communication with B2B customers becomes more effective. Thereby, firms are able to save an additional marketing cost. When less B2C market

research is conducted, firms might have to incur an additional cost to convince B2B customers about new products.

H3b: The negative effect of B2B communication frequency on cost is stronger when more B2C market research is conducted.

5.4.2.3 Eco-System Orientation

Competitor knowledge plays a significant role in diagnostic benchmarking (Dickson, 1992). Therefore, information received through competitor orientation can be used to speed up NPD processes. Competitor orientation also helps learn new strategies to speed up the NPD process.

H4: Competitor orientation negatively affects the time-to-market of new products.

Technology orientation may create uncertainty for potential B2B customers (Cannon et al., 1999). Hence, in order to convince B2B customers, lengthy discussions and negotiations might be needed, which ultimately delay the NPD process. When firms adopt new technologies, they have to first get used to the new technologies, learn how to use them, and prepare for process selection and machine set-up. Technology orientation may give rise to opportunistic behavior for B2B customers since B2B customers may switch to competitors who maintain stable technology throughout their NPD process (Cannon et al., 1999). Therefore, firms may have to incur an additional marketing cost to retain B2B customers. At the same time, firms have to incur an extra investment for new technologies.

H5a: Technology orientation positively affects the time-to-market of new products.

H5b: Technology orientation positively affects the cost of new products.

Manufacturing orientation considers the available resources for manufacturing (Parsaei, 1993). Therefore, firms can understand possible manufacturing problems in advance, which helps rectify the occurrence of probable defects. Manufacturing orientation also reduces preparation time for ease of handling, selecting the best processes, and reducing material wastage.

H6: Manufacturing orientation negatively affects the time-to-market of new products.

5.4.3 Methodology

In order to test our hypotheses, we designed a questionnaire using standard scales which have been already published in the literature. Using a paper-based and an online version of the same questionnaire, we collected data from the textile and apparel industry in 10 countries (Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam) from August to October 2012. In order to cover the whole supply chain, we collected data from 246 industry experts including 115 customer business units (SBUs) representing different stages of the supply chain. The reflective scales fulfill basic psychometric acceptance criteria: Cronbach's $\alpha > 0.7$, average variance extracted > 0.5, and average variance extracted > largest squared correlation between constructs. As the inter-rater agreement requirements were fulfilled, we aggregated our data to the SBU level and used these aggregated data for further analysis. The model fit fulfills the standard acceptance criteria CFI > 0.95, $\chi^2/df < 3$, and RMSEA < 0.05. We also found that common method bias does not exist in the data (see Appendix A and Chapter 3 for more details).

5.4.4 Results

We tested our hypotheses using hierarchical linear modeling (HLM) with quality, time-to-market, and cost as dependent variables. The HLM model consists of three levels. SBU data (level 1) are nested within firm data (level 2) and firm data (level 2) are nested within country data (level 3). We used three dummies as control variables. 1) Supply chain stage: I-raw material suppliers, II-apparel manufacturers, III-printing/washing/dyeing plants, IV-buying offices. 2) Ease of doing business. 3) Industry experience. We used backward selection method to optimize results. The independent variables explain 31.4%, and 50.6 % of the variance in time-to-market and cost respectively (see Table 5.4.1). Based on the results, B2B data-based customer orientation shows a positive effect on cost. B2B intuition-based customer orientation shows a negative effect on time-to-market. Therefore, H1a and H1b are supported. In addition, H2 is supported as hypothesized. B2C market research moderates the relationships between B2B data-based customer orientation and cost, and B2B communication frequency and cost. Therefore, H3a-b are supported. Competitor orientation has not shown any significant effect on time-to-market, which does not support H4. Technology orientation show significant positive effects on time-to-market and cost,

Table 5.4.1 - Effect of Strategic Orientation on NPD Operational Performance

	Dependent variables		
	Types of NPD operational performance		
Independent variables	Time-to-market	Cost	Hypotheses
Main effects			
B2B customer orientation			
B2B data-based customer orientation		0.368 ***	H1a (+)
B2B intuition-based customer orientation	-0.236 ***		H1b (-)
B2B communication frequency		-0.241 **	H2 (-)
B2B informal (vs. formal) communication			
B2C customer orientation			
B2C market research (B2C MR)			
Eco-system orientation			
Competitor orientation			H4 (-)
Technology orientation	0.195 **	0.261 **	H5a (+) / H5b (+)
Manufacturing orientation	-0.322 ***		H6 (-)
Interrelationships among types of NPD performance			
Time-to-market		-0.286 ***	
Quality	-0.254 ***	-0.224 **	
Moderating effects			
B2C MR × B2B data-based orientation		0.252 ***	H3a (+)
B2C MR × B2B intuition-based orientation			
B2C MR × B2B communication frequency		-0.207 **	H3b (-)
B2C MR × B2B informal (vs. formal)			
Model fit			
HLM pseudo R^2 (Kreft and de Leeuw, 1998)	0.314	0.506	

Notes: Hierarchical linear modeling (HLM) analysis: maximum likelihood estimation.
Results of backward selection of independent variables.
$^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Sample size: 115 SBUs / 246 industry experts.
Control variables: supply chain stage, industry experience, ease of doing business (http://www.doingbusiness.org/rankings).

which support H5a-b. Finally, as predicted by H6, manufacturing orientation shows a negative effect on time-to-market.

5.4.5 Conclusion

5.4.5.1 General Discussion

We empirically explored the relationships between different dimensions of strategic orientation and different types of NPD operational performance. As we hypothesized, B2B data-based customer orientation increases the cost of new products. However, B2B intuition-based customer orientation helps shorten the time-to-market of new products without compromising the lower cost. Therefore, findings of this research are extremely important for managers to understand

the benefits of B2B intuition-based customer orientation in B2B context. B2B communication frequency is another important approach which helps reduce the cost of new products. Firms need to pay extra attention when they adopt new technologies as technology orientation neither helps reduce time-to-market of new products no reduces the cost of new products. Competitor orientation will not be beneficial for obtaining any NPD operational performance. Based on the results, we suggest firms to focus more on manufacturing orientation since it reduces time-to-market of new products. According to the findings, B2C market research alone will not be beneficial for firms. Nevertheless, when firms conduct more B2C market research, the effect of B2B communication frequency on cost becomes lower. Therefore, findings of this research are extremely important to managers for understanding the differential effects of B2C market research and B2B customer orientation on product cost. We suggest firms which have regular B2B transactions to conduct B2C market research in addition to B2B customer orientation in order to offer low cost products to customers. Our results also show that product quality negatively affects time-to-market and cost of new products, whereas time-to-market negatively affects cost of new products. These operational NPD objectives can be achieved simultaneously without compromising any objective.

5.4.5.2 Limitation and Future Research

Our research may be extended to other industries as the current research focus is limited to a single industry. Future research may focus on investigating industry-wise differences and examining necessary changes.

References

Afonso, P., Nunes, M., Paisana, A., and Braga, A. (2008). The influence of time-to-market and target costing in the new product development success. *International Journal of Production Economics*, 115(2), 559-568.

Amit, R., and Schoemaker, P. J. H. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(1), 33-46.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

Boyer, K. K., and Verma, R. (2000). Multiple raters in survey-based operations management research: a review and tutorial. *Production and Operations Management*, 9(2), 128-140.

Cannon, J. P., and Perreault, W. D. (1999). Buyer-seller relationships in business markets. *Journal of Marketing Research*, 36(4), 439-460.

Chen, K.S. and Huang, M.L. (2006). Performance measurement for a manufacturing system based on quality, cost and time. *International Journal of Production Research*, 44, 11, 1–23.

Chen, J., Reilly, R. R., and Lynn, G. S. (2005). The impacts of speed-to-market on new product success: the moderating effects of uncertainty. *IEEE Transactions on Engineering Management*, 52(2), 199-212.

Chesbrough, H. (2003). *Open Innovation*. Harvard University Press, Cambridge, MA.

Chesbrough, H. (2006). *Open Innovation: Researching a New Paradigm*. Oxford University Press, Boston, MA.

Cohen, W. M., and Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35, 128-152.

Daft, R. L., Lengel, R. H., and Trevino, L. K. (1987). Message equivocality, media selection, and manager performance: implications for information systems. *MIS Quarterly*, 11(3), 355-368.

Dant, R. P., and Brown, J. R. (2008). Bridging the B2C and B2B research divide: the domain of retailing literature. *Journal of Retailing*, 84(4), 371-397.

Davenport, T. H. (2006). Competing on analytics. *Harvard Business Review*, 84(1), 98-107.

Dickson, P. R. (1992). Toward a general theory of competitive rationality. *Journal of Marketing*, 56(1), 69-83.

Doing Business (2013). *Ease of doing business*. [www] Doing business. Retrieved on 03/04/13 from http://www.doingbusiness.org/rankings.

Gatignon, H., Robertson, T. S., and Fein, J. A. (1997). Incumbent defense strategies against new product entry. *International Journal of Research in Marketing*, 14(2), 163-176.

Gerbing, D. W., and Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25(2), 186-192.

Gotteland, D., and Boule, J. M. (2006). The market orientation-new product performance relationship: redefining the moderating role of environmental conditions. *International Journal of Research in Marketing*, 23(2), 171-185.

Gupta, A. K., and Govindarajan, V. (1991). Knowledge flows and the structure of control within multinational corporations. *Academy of Management Review*, 16(4), 768-792.

Gupta, A. K., Brockhoff, K., and Weisenfeld, U. (1992). Making trade-offs in the new product development process: a German/USA comparison. *Journal of Product Innovation Management*, 9(1), 11-18.

Hair, J. F., Black, W. C., Babin, B. J., and Anderson, R. E. (2010). *Multivariate Data Analysis*. Prentice-Hall, Englewood Cliffs, New Jersey.

Harrison-Walker, L. J. (2001). The measurement of a market orientation and its impact on business performance. *Journal of Quality Management*, 6(2), 139-172.

Harter, D. E., Krishan, M. S., and Slaughter, S. A. (2000). Effects of process maturity on quality, cycle time, and effort in software product development. *Management Science*, 46(4), 451-466.

Harvey, L., and Green, D. (1993). Defining quality. *Assessment and Evaluation in Higher Education*, 18(1), 9-34.

Homburg, C., Grozdanovic, M., and Klarmann, M. (2007). Responsiveness to customers and competitors: the role of affective and cognitive organizational systems. *Journal of Marketing*, 71(3), 18-38.

Homburg, C., Grozdanovic, M., and Klarmann, M. (2007). Responsiveness to customers and competitors: the role of affective and cognitive organizational systems. *Journal of Marketing*, 71(3), 18-38.

James, L. R., Demaree, R. G., and Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 69(1), 85-98.

Jaturanonda, C., and Nanthavanij, S. (2011). Analytic-based decision analysis tool for employee-job assignments based on competency and job preference. *International Journal of Industrial Engineering: Theory, Applications and Practice*, 18(2). Retrieved on 03/11/13 from http://journals.sfu.ca/ijietap/index.php/ijie/article/view/375.

Juran, J. M. (2004). *Architect of Quality*. McGraw-Hill, New York.

Kessler, E. H., and Bierly, P. E. (2002). Is faster really better? an empirical test of the implications of innovation speed. *IEEE Transactions on Engineering Management*, 49(1), 2-12.

Klein, K. J. and Kozlowski, S. W. (2000). *Multilevel Theory, Research, and Methods in Organizations: Foundations, Extensions, and New Directions*. Jossey-Bass, San Francisco.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*. Guilford, New York.

Kristensson, P., Matthing, J., and Johansson, N. (2008). Key strategies for the successful involvement of customers in the co-creation of new technology-based services. *International Journal of Service Industry Management*, 19(4), 474-491.

Laursen, K., and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), 131-150.

Lederer, A. L., Mirani, R., Neo, B. S., Pollard, C., Prasad, J., and Ramamurthy, K. (1990). Information system cost estimating: a management perspective. *MIS Quarterly*, 14(2), 159-176.

Ledwith, A., and O'Dwyer, M. (2009). Market orientation, NPD performance, and organizational performance in small firms. *Journal of Product Innovation Management*, 26(6), 652-661.

Ledwith, A., and O'Dwyer, M. (2009). Market Orientation, NPD performance, and organizational performance in small firms. *Journal of Product Innovation Management*, 26(6), 652-661.

Li, T., and Calantone, J. (1998). The impact of market knowledge competence on new product advantage: conceptualization and empirical examination. *Journal of Marketing*, 62(4), 13-29.

Maani, K. E., Putterill, M. S., and Sluti, D. G. (1994). Empirical analysis of quality improvement in manufacturing. *International Journal of Quality and Reliability Management*, 11(7), 19-37.

Matthing, J., Sanden, B., and Edvardsson, B. (2004). New service development: learning from and with customers. *International Journal of Service Industry Management*, 15(5), 479-498.

McDonough, E. F., Kahn, K. B., and Griffin, A. (1999). Managing communication in global product development teams. *IEEE Transactions on Engineering Management*, 46(4), 375-386.

Mohr, J., and Nevin, J. R. (1990). Communication strategies in marketing channels: a theoretical perspective. *Journal of Marketing*, 54(4), 36-51.

Moore, J. F. (1996). *The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems.* HarperBusiness, New York.

Oke, A., and Idiagbon-Oke, M. (2010). Communication channels, innovation tasks and NPD project outcomes in innovation-driven horizontal networks. *Journal of Operations Management*, 28(5), 442-453.

Parsaei, H. I. (1993). *Concurrent Engineering: Contemporary Issues and Modern Design Tools*. Chapman and Hall, London.

Phillips, L. W., Chang, D. R., and Buzzell, R. D. (1983). Product quality, cost position, and business performance: a test of some key hypotheses. *Journal of Marketing*, 47(2), 26-43.

Reed, R., Lemak, D. J., & Montgomery, J. C. (1996). Beyond process: TQM content and firm performance. *Academy of management review*, 21(1), 173-202.

Roemer, T. A., Ahmadi, R., and Wang, R. H. (2000). Time-Cost trade-offs in overlapped product development. *Operations Research*, 48(6), 858-865.

Sakkab, N. Y. (2002). Connect and develop complements research & develop at P&G. *Research-Technology Management*, 45(2), 38-45.

Sawhney, M., and Parikh, D. (2001). Where value lives in a networked world. *Harvard Business Review*, 79(1), 79-90.

Selnes, F. (1998). Antecedents and consequences of trust and satisfaction in buyer-seller relationships. *European Journal of Marketing*, 32(3/4), 305-322.

Sethi, R. (2000). New product quality and product development teams. *Journal of Marketing*, 64(2), 1-14.

Shekar, A. (2011). An empirical study of important dimensions of new product development practices in small and medium enterprises in New Zealand. *International Journal of Industrial Engineering: Theory, Applications and Practice*, 18(2). Retrieved on 03/11/13 from http://journals.sfu.ca/ijietap/index.php/ijie/article/view/404.

So, M. W., and Sculli, D. (2002). The role of trust, quality, value and risk in conducting e-business. *Industrial Management and Data System*, 102(9), 503-512.

Song, X. M., Thieme, R. J., and Xie, J. (1998). The impact of cross-functional joint involvement across product development stages: an exploratory study. *Journal of Product Innovation Management*, 15(4), 289-303.

Srinivasan, R., Lilien, G. L., and Rangaswamy, A. (2002). Technological opportunism and radical technology adoption: an application to e-business. *Journal of Marketing*, 66(3), 47-60.

Stanko, M. A., Molina-Castillo, F. J., and Munuera-Aleman, J. L. (2012). Speed to market for innovative products: blessing or curse? *Journal of Product Innovation Management*, 29(5), 751-765.

Swink, M. L., and Calantone, R. (2004). Design-manufacturing integration as a mediator of antecedents to new product design quality. *IEEE Transactions on Engineering Management*, 51(4), 472-482.

Trott, P. (2001). The role of market research in the development of discontinous new products. *European Journal of Innovation Management*, 4(3), 117-126.

Tsiotsou, R. (2006). The role of perceived product quality and overall satisfaction on purchase intentions. *International Journal of Consumer Studies*, 30(2), 207-217.

Vesey, J. T. (1992). Time-to-market: put speed in product development. *Industrial Marketing Management*, 21(2), 151-158.

Wong, S. K. S., and Tong, C. (2012). The influence of market orientation on new product success. *European Journal of Innovation Management*, 15(1), 99-121.

Zahay, D., Griffin, A., and Fredericks, E. (2004). Sources, uses, and forms of data in the new product development process. *Industrial Marketing Management*, 33(7), 657-666.

Zaltman, G. (2003). *How Customers Think-Essential Insights into the Mind of the Market*, Harvard Business School Press, Boston, MA.

Zhou, K. Z., and Li, C. B. (2007). How does strategic orientation matter in chinese firms? *Asia Pacific Journal of Management*, 24(4), 447-466.

Zhu, Z., and Nakata, C. (2007). Reexamining the link between customer orientation and business performance: the role of information systems. *Journal of Marketing Theory and Practice*, 15(3), 187-203.

Chapter 6

Enhancing NPD Operational Performance through B2B and B2C Customer Involvement for Varying Degrees of Product Technology

Chapter Overview

This chapter presents how external information collected through B2B customer involvement helps firms achieve different dimension of NPD operational performance. This research study makes two main contributions.

- This study is the first study to empirically analyze the effect of B2C customer involvement motives on the dimensions of NPD operational performance in the B2B context.
- This research is the first attempt to empirically analyze the moderating effects of high vs. low product technology on the relationships between different types of customer involvement motives and different dimensions of NPD operational performance.

6.1 Abstract

The present article addresses how different types of B2B customer involvement motives and B2C customer involvement motives affect different dimensions of new product development (NPD) operational performance in the B2B context. This study also explores the moderating effects of high vs. low product technology on the relationships between different types of customer involvement motives and different dimensions of NPD operational performance. Based on data collected from the textile and apparel industry in 10 countries, the current study illustrates that B2C customer involvement has a greater impact than B2B customer involvement on time-to-market. Nevertheless, B2B customer involvement plays an important role as it contributes more to quality than does B2C customer involvement. In addition, the study explains the different strategies that should be adopted in B2B and B2C customer involvement when high vs. low product technology is present.

6.2 Introduction and Purpose

NPD is an important determinant of future business opportunities (Sorescu and Spanjol, 2008). However, since the failure rate of new products has remained high over the years (Crawford and DiBenedetto, 2003), firms are searching for ways to address this problem. Some studies have shown a positive effect of customer involvement on NPD success which reduces the failure rate in NPD (Alam, 2006; Cooper, 2001; Christopher, 2007). However, there are only a few studies which have investigated the effects of different types of customer involvement on different dimensions of internal NPD performance (NPD operational performance). Work in relationship marketing suggests that interaction between business partners may not always be beneficial (Von Hippel, 1988). Partner attributes tend to have an impact on cooperative outcomes (Doney and Cannon, 1997; Gansen, 1994). Extant studies on customer involvement and NPD typically evaluate the impact of individual measures of NPD performance such as sales and market share. A more robust model would include a broader range of performance criteria (Menor and Sutherland, 1998). Therefore, a further investigation of how different types of customer involvement motives affect different dimensions of NPD operational performance is important.

This study contributes to the literature in two ways. First, the current research is the first study to empirically analyze the effect of B2C customer involvement motives on the dimensions of NPD operational performance in the B2B context. The main difference between B2B and B2C customers is the greater degree of interdependence between buyers and sellers in the former. The number of buyers in B2B markets is lower than in B2C markets, making sellers more dependent on buyers (Lusch and Stephen, 2006). Therefore, B2B customer involvement plays a major role in the B2B context. B2C customers are willing to support NPD more than B2B customers and facilitate the development of successfully commercialized products (Morrison and Midgle, 2004). However, some past studies have focused only on the effect of B2B customer involvement on NPD success (Gruner and Homburg, 2000; Bonner and Walker, 2004; Athaide and Klink, 2009). Therefore, investigating the effects of both B2B as well as B2C customer involvement motives on NPD performance is extremely vital in the B2B context.

Second, this research is the first attempt to empirically analyze the moderating effects of high vs. low product technology on the relationships between different types of customer involvement motives and different dimensions of NPD operational performance. Newness of technology embedded in a product creates inefficiencies in the development process because tasks are less straightforward and are non-routine (Song and Montoya-Weiss, 2001). When technology is new, NPD managers struggle to simply understand the technology and its application (Carbonell et al., 2009). When technology experiences rapid changes, it is imperative for firms to interact with customers since customer needs and preferences can provide direction for a changing product market (Narver and Slater, 1990).

In summary, the findings of this research help managers select the appropriate type of customer involvement to achieve a specific type of NPD operational performance. Our research also helps managers understand the different roles of B2B and B2C customer involvement for high vs. low product technology.

6.3 Literature Review

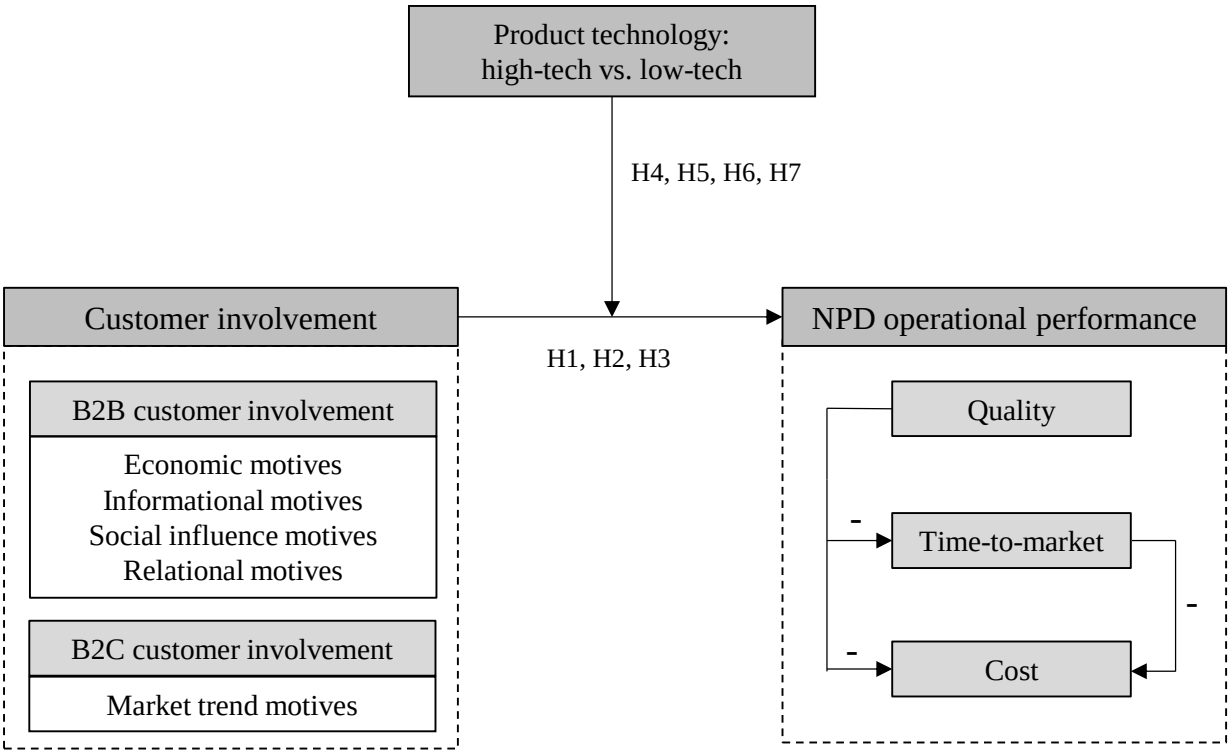


Figure 6.1 - Conceptual Framework: Moderating Effect of Product Technology on the Relationship between B2B/B2C Customer Involvement and NPD Operational Performance

In order to address the research questions discussed, we develop a conceptual model, shown in Figure 6.1, which includes different dimensions of customer involvement, NPD operational performance, and product technology. Based on the studies of Ernst et al. (2011) and Gruner and Homburg (2000), we define different types of B2B customer involvement motives. 1. Economic motives: motivation of a firm to involve B2B customers who could potentially buy large quantities of the new product or are willing to pay premium prices. 2. Informational motives: motivation of a firm to involve B2B customers who have new ideas for new products, develop these ideas into product concepts, and assess their commercial viability. 3. Social influence motives: motivation of a firm to involve B2B customers who occupy a central position in a relevant social network and are the first to communicate their experiences regarding the new product within their social network. 4. Relational motives: motivation of a firm to involve B2B customers who maintain a good relationship with the firm. We define the B2C customer involvement motives of a firm as market forecast motives.

We define different types of NPD operational performance as quality, time-to-market, and cost. Product quality can be defined as a combination of meeting performance specification and meeting quality specification (Ledwith and O'Dwyer, 2009). Time-to-market is generally defined as the elapsed time between product initiation and product availability in the market (Vesey, 1992). Cost is a combination of marketing cost, manufacturing/operations cost, research and development cost, and overall cost (Gatingnon et al., 1997). According to the literature, time-to-market negatively influences cost, whereas quality negatively influences time-to-market and cost (Kessler and Bierly, 2002; Harter et al., 2000; Phillips et al., 1983). We collected data from 10 countries, covering firms across the supply chain starting from raw material suppliers via manufacturers and printing/dyeing/washing plants to buying offices.

6.4 Development of Hypotheses

In this section, we develop hypotheses about the effects of different types of customer involvement motives on NPD operational performance and about the moderating effects of high vs. low product technology on these relationships. H1 to H3 represent main effects, whereas H4 to H7 represent moderating effects.

6.4.1 Main Effects

B2B customers have technical knowledge about specifications, testing requirements, and standards of new products. Generally, B2B customers keep records of past quality performance in order to deliver high-quality products to the customer. However, B2C customers do not have similar knowledge and facility. Therefore, B2C customer involvement does not positively affect the quality of new products. Firms can obtain price premiums for high-quality products by involving economically attractive B2B customers. Price premiums prompt high-quality products (Shapiro, 1983) since firms can invest more in operations that improve the quality. Moreover, this type of customers may generally produce in large numbers. Consequently, firms can obtain quality-related information from previous products. B2B customer involvement with informational motives provides unique knowledge and new ideas. B2B customers with social influence character give advice to consumers, facilitating them to buy high-quality products, and

distribute product-related information to consumers. Customers with social influence character are also considered having high knowledge of local needs (Chakravarthy and Prasad, 2011). B2B customer involvement with relational motives enables firms to learn jointly and to access resources which are not in-housed.

H1: B2B customer involvement types with economic (H1a), informational (H1b), social influence (H1c), and relational (H1d) motives positively affect the quality of new products.

B2C customers have the latest information on market trends, which helps firms speed up their product launch. B2B customers express obvious information which is easily reachable for a firm. B2C customer knowledge of market trends can be explained by customer value change intensity (CVCI). CVCI is defined as a rate of customer value change (Flint et al., 2002). CVCI has inner and external drivers (Jia and Zhang, 2008). External drivers can be macro-environmental change, technology innovation, and alternatives appearance. Inner drivers can be customer demand and motivation change, customer experience in buying, personality, and life style change. External drivers may be common to both B2B and B2C customers. Nevertheless, inner drivers of CVCI mainly affect B2C customers. Therefore, we can argue that B2C customers have up-to-date knowledge about market trends.

H2: B2C customer involvement negatively influences time-to-market of new products.

It is extremely difficult to involve real users in NPD due to demographic reasons. Therefore, B2C customer involvement creates high marketing and R&D cost. B2B customer involvement types with economic, social influence, and informational motives do not have to incur an extra cost as firms have regular discussions with customers. However, B2B customer involvement with relational motives may create an extra meeting cost as customers with a favorable relationship may come to suspect that their trust is being taken advantage of, thereby souring their relationship (Grayson and Ambler, 1999). Therefore, firms organize various activities to strengthen the relationship.

H3: B2C customer involvement and B2B customer involvement with relational motives positively affect the cost of new products.

6.4.2 Moderating Effects

High-technology product development tends to incorporate multidisciplinary knowledge. Groups of individuals with tacit knowledge of a technical sort are favorable for developing high-technology products (Lawson and Lorenz, 1999). B2B customer involvement with informational motives can negatively affect the quality in low-technology product development as high-technical knowledge can mislead the firm.

H4: The higher the product technology, the more positive the relationship between B2B customer involvement with informational motives and the quality of new products.

B2B customer involvement with relational motives can create disadvantages in certain situations. Especially, in high-technology product development, confidential information can be disclosed and competitors can speed up their development process. In the case of low-technology product development, market information provided by B2B customer involvement with relational motives helps speed up the product development process.

H5: The higher the product technology, the more positive the relationship between B2B customer involvement with relational motives and time-to-market of new products.

Compared to low-technology products, high-technology products are at an early stage of the product life cycle and have been in the market for a relatively short period of time (Gardner et al., 2000). Therefore, B2B customers who are involved with social influence motives have limited time to communicate regarding new products within their social network. As a result, in high-technology product development, firms have to incur an extra cost to educate these customers. Nevertheless, in low-technology product development, firms may find it easy to find customers who have social influence character with basic technical knowledge.

H6: The higher the product technology, the more positive the relationship between B2B customer involvement with social influence motives and the cost of new products.

Generally, B2C customer involvement is costly, but setting a false trend is even more costly. Therefore, in high-technology product development, trend-related information from B2C customers may reduce cost. “Push” marketing strategies with an emphasis on personal selling should be used by the marketer of high-technology products (Dunn et al., 1991). Involving B2C customers facilitates personalized selling as they understand the consumer needs and prevailing

trends in the market. "Pull" strategies with an emphasis on advertising and sales promotion are effective in marketing low-technology products (Dunn et al., 1991) Therefore, B2C customer involvement is an extra cost in low-technology product development.

H7: The higher the product technology, the less positive the relationship between B2C customer involvement and NPD cost.

6.5 Methodology

In order to test our hypotheses, we designed a questionnaire using standard scales which have been already published in the literature (Ernst et al., 2011; Ledwith and O'Dwyer, 2009; Gatignon et al., 1997; Gottelamd and Boule, 2006). Using a paper-based and an online version of the same questionnaire, we collected data from textile and apparel industry in 10 countries (China, India, Taiwan, Hong Kong, Sri Lanka, Bangladesh, Cambodia, Vietnam, Japan, and Thailand) from August to October 2012. In order to cover the whole supply chain, we collected data from 246 industry experts including 115 customer business units (SBUs) representing different stages of the supply chain. The reflective scales of customer involvement, product technology, and NPD operational performance fulfill basic psychometric acceptance criteria: Cronbach's $\alpha > 0.7$, average variance extracted > 0.5, and average variance extracted > largest squared correlation between constructs. As the inter-rater agreement requirements were fulfilled, we aggregated data to the SBU level and used them for further analysis. The model fit fulfills the standard acceptance criteria CFI > 0.95, $\chi^2/df < 3$, and RMSEA < 0.05. We also found that common method bias does not exist in the data (see Appendix A and Chapter 3 for more details).

6.6 Results

We tested our hypotheses using hierarchical linear modeling with quality, time-to-market, and cost as dependent variables. The HLM model consists of three levels. SBU data (level 1) are nested within firm data (level 2) and firm data (level 2) are nested within country data (level 3). We used three dummies as control variables. (1) Supply chain stage: I-raw material suppliers, II-

Table 6.1 - Effects Customer Involvement on NPD Operational Performance

	Dependent variables				
Independent variables	Quality	Time-to-market	Cost	Hypotheses	Supported
Main effects					
B2B customer involvement with					
Economic motives	0.260 **	-0.143	0.152	H1a (+)	Yes
Informational motives	0.083	0.144	-0.117	H1b (+)	No
Social influence motives	-0.108	0.012	-0.093	H1c (+)	No/No
Relational motives	0.228 †	-0.000	0.221 †	H1d (+) / H3 (+)	Yes/Yes
B2C customer involvement with					
Market forecast motives	0.039	-0.280 **	0.172 **	H2 (-) / H3 (+)	Yes/Yes
Product technology (PT)		0.095	0.020		
Quality		-0.355 ***	-0.277 **		
Time-to-market			-0.265 **		
Moderating effects					
PT × B2B customer involvement with					
Economic motives	0.038	-0.079	-0.138		
Informational motives	0.210 **	-0.059	0.104	H4 (+)	Yes
Social influence motives	0.004	-0.163	0.250 **	H6 (+)	Yes
Relational motives	-0.205 †	0.347 **	-0.076	H5 (+)	Yes
PT × B2C customer involvement with					
Market forecast motives	0.018	-0.011	-0.239 **	H7 (-)	Yes
Model fit					
HLM pseudo R^2	0.382	0.455	0.576		

Note: Hierarchical linear modeling (HLM) analysis: maximum likelihood estimation.
HLM Pseudo R^2 from Kreft and de Leeuw (1998).
†$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Sample size: 115 (SBUs) / 246 (industry experts).
Control variables: supply chain stage, industry experience, EODB (ease of doing business).

apparel manufacturers, III-printing/washing/dyeing plants, IV-buying offices, (2) ease of doing business, and (3) industry experience. The independent variables explain 38.2% (R^2), 45.5%, and 57.6 % of the variance in quality, time-to-market, and cost respectively (see Table 6.1). The results indicate that B2B customer involvement types with economic motives and relational motives positively affect quality, whereas types with informational motives and social influence motives do not show any significant effect. This partially supports H1. B2C customer involvement with market forecast motives shows a positive significant effect on time-to-market, whereas B2B customer involvement does not show any significant effect. This supports H2. B2B customer involvement with relational motives and B2C customer involvement with market forecast motives show a positive effect on cost, which supports H3. As predicted by H4-H7, product technology exerts significant moderating effects on the influences of B2B customer involvement types with

Table 6.2 - Overall Effects of B2B and B2C Customer Involvement

	Dependent variables: Types of NPD Operational Performance					
	Quality		Time-to-market		Cost	
Independent variables	High-tech	Low-tech	High-tech	Low-tech	High-tech	Low-tech
B2B customer involvement with						
Economic motives	0.260	0.260	-0.092	-0.092	-0.047	-0.047
Informational motives	0.210	-0.210	-0.075	0.075	-0.038	0.038
Social influence motives					0.250	-0.250
Relational motives	0.022	0.433	0.339	-0.501	0.125	0.233
B2C customer involvement with						
Market forecast motives			-0.280	-0.280	0.006	0.485
Product technology					-0.183	-0.183
Quality			-0.355	-0.355	-0.277	-0.277
Time-to-market					-0.265	-0.265

Note: High-tech: product technology = 1. Low-tech: product technology = -1.
Overall effects = main effects + mediating effect whose $p < 0.1$.

informational, relational, and social influence motives on quality, time-to-market, and cost. Finally, the moderating effect of product technology on the influence of B2C customer involvement with market forecast motives on cost is positive, which supports H7. Further, we investigate overall effects consisting of main effects and mediating effects in order to identify the impact of high vs. low product technology on the success of B2B and B2C customer involvement with different motives (see Table 6.2).

6.7 Conclusion

6.7.1 General Discussion

We empirically explored the influences of B2B and B2C customer involvement types with different motives on NPD operational performance and the differential effects of high vs. low product technology. In general, our results suggest that B2B customer involvement alone will not be beneficial for a firm in gaining NPD advantages. Even though B2C customer involvement with market forecast motives is costly, it plays a major role in reducing the time-to-market of new products. However, B2C customer involvement with market forecast motives does not provide any advantage in achieving high product quality. Based on overall effects, B2B customer involvement with economic motives shows a negative effect on time-to-market and a positive

effect on quality. Therefore, we suggest that firms can gain high product quality and short time-to-market in NPD by involving B2B customers with economic attractiveness. Firms need to pay extra attention when involving B2B customers with informational benefits as this type of customer involvement enhances performance only in high-technology product development. B2B customer involvement with social influence motives provides neither high quality nor short time-to-market. B2B customer involvement with relational motives facilitates the achievement of high quality for both high and low product technology, whereas it contributes to short time-to-market only in low-technology product development.

6.7.1 Limitations and Future Research

Our research may be extended to other industries as the current research focus is limited to a single industry.

References

Alam, I. (2006). Removing the fuzziness from the fuzzy-end of service innovations through customer interaction. *Industrial Marketing Management*, 35(4), 468-480.

Athaide, G. A., and Klink, R. R. (2009). Managing seller-buyer relationship during new product development. *Journal of Product Innovation Management*, 26(5), 566-577.

Bonner, J. M., and Walker, O. C. (2004). Selecting influential business-to-business customers in new product development: relational embeddedness and knowledge heterogeneity considerations. *Journal of Product Innovation and Management*, 21(3), 155-169.

Carbonell, P., Escudero, R., and Pujari, D. (2009). Customer involvement in new service development: an examination of antecedents and outcomes. *Journal of Product Innovation Management*, 26(5), 536-550.

Chakravarthy, S., and Prasad, G. B. (2011). The impact of opinion leader on consumer decision making process. *International Journal of Management and Business Studies*, 1(3), 61-64.

Christopher, L. (2007). User involvement competence for radical innovation. *Journal of Engineering and Technology Management*, 24(1), 53-75.

Cooper, R. G. (2001). *Winning at New Products*. Perseus, Cambridge, MA.

Crawford, M. C., and DiBenedetto, A. (2003). *New Products Management*. Irwin/McGraw-Hill, Boston, MA.

Doney, P. M., and Cannon, J. P. (1997). An examination of the nature of trust in buyer-seller relationships. *Journal of Marketing*, 61(2), 35-51.

Dunn, D. T., Friar, J. H., and Thomas, C. A. (1991). An approach to selling high-tech solutions. *Industrial Marketing Management*, 20(2), 149-159.

Ernst, H., Hoyer, W. D., and Krafft, M. (2011). Customer relationship management and company performance: the mediating role of new product performance. *Journal of the Academy of Marketing Science*, 39(2), 290-306.

Flint, D. J., Woodruff, R. B., and Gardial, S. F. (2002). Exploring the phenomenon of customers' desired value change in a business-to-business context. *Journal of Marketing*, 66(4), 102-117.

Gansen, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of Marketing*, 58(2), 1-19.

Gardner, D. M., Johnson, F., Lee, M., and Wilkinson, I. (2000). A contingency approach to marketing high technology products. *European Journal of Marketing*, 34(9/10), 1053-1077.

Gatignon, H. T., Robertson, S., and Fein, J. A. (1997). Incumbent defense strategies against new product entry. *International Journal of Research in Marketing*, 14(2), 163-176.

Gotteland, D., and Boule, J. M. (2006). The market orientation-new product performance relationship: redefining the moderating role of environmental conditions. *International Journal of Research in Marketing*, 23(2), 171-185.

Grayson, K. T., and Ambler, T. (1999). The dark side of long-term relationships in marketing services. *Journal of Marketing Research*, 36(1), 132-141.

Gruner, E. K., and Homburg, C. (2000). Does customer interaction enhance new product success. *Journal of Business Research*, 49(1), 1-14.

Harter, D. E., Krishan, M. S., and Slaughter, S. A. (2000). Effects of process maturity on quality, cycle time, and effort in software product development. *Management Science*, 46(4), 451-466.

Jia, W., and Zhang, M. (2008). Study on customer desired value change in a business-to-business market. *In Proc. 4th Annu. Conf. ITNG*, Las Vegas, 851-856.

Kessler, E. H., and Bierly, P. E. (2002). Is faster really better? an empirical test of the implications of innovation speed. *IEEE Transactions on Engineering Management*, 49(2), 2-12.

Lawson, C., and Lorenz, E. (1999). Collective learning, tacit knowledge, and regional innovative capacity. *Regional Studies*, 33(4), 305-317.

Ledwith, A., and O'Dwyer, M. (2009). Market orientation, NPD performance, and organizational performance in small firms. *Journal of Product Innovation Management*, 26(6), 652-661.

Lusch, R. F., and Stephen, L. V. (2006). *The Service-Dominant Logic of Marketing: Dialog, Debate, and Directions*. ME Sharpe, New York.

Menor, L. J., and Sutherland, D. J. (1998). New service development: areas of exploitation and exploration. *Journal of Production Innovation Management*, 20(2), 135-157.

Morrison, P. R., and Midgle, D. (2004). The nature of lead users and measurement of leading edge status. *Research Policy*, 33(2), 351-336.

Narver, J. C., and Slater, S. F. (1990). The effect of market orientation on business profitability. *Journal of Marketing*, 54(3), 20-35.

Phillips, L. W., Chang, D. R., and Buzzell, R. D. (1983). Product quality, cost position, and business performance: a test of some key hypotheses. *Journal of Marketing*, 47(2), 26-43.

Shapiro, C. (1983). Premiums for high quality products as returns to reputations. *Quarterly Journal of Economics*, 98(4), 659-680.

Song, M., and Montoya-Weiss, M. (2001). The effect of perceived technological uncertainty on Japanese new product development. *Academy of Management Journal*, 44(1), 61-80.

Sorescu, A. B., and Spanjol, J. (2008). Innovation's effect on firm value and risk: insights from consumer packaged goods. *Journal of Marketing*, 72(2), 114-132.

Vesey, J. T. (1992). Time-to-market: put speed in product development. *Industrial Marketing Management*, 21(2), 151-158.

Von Hippel, E. (1988). Lead users: a source of novel product concepts. *Management Science*, 32(7), 791-805.

Chapter 7

Assuring Product Quality through Customer Needs Focus in New Product Development: The Role of National Culture

Chapter Overview

This chapter seeks to understand how external information collected through B2B customer needs focus helps firms achieve product quality in NPD. A large number of innovative firms have shifted to an open innovation strategy, while firms traditionally focused on internal information. This study makes two main contributions.

- This study is original in arguing that external information acquired through B2B customer needs focus can be utilized in meeting quality and performance specifications of new products through exploratory and exploitative learning of NPD department members.
- This study is original in considering national culture as a moderating variable for investigating how the effects of proactive and responsive needs focus on product quality vary by the culture of the country where firms carry out NPD.

7.1 Abstract

While traditional innovation strategy relies on using internal information of new product development (NPD) departments, many innovative firms have shifted to an 'open innovation' strategy using a wide range of external information. This article tests and demonstrates that the external information acquired through B2B customer needs focus can be utilized in enhancing product quality through exploratory and exploitative learning of NPD department members. In addition, the current study considers national culture as a moderating variable for investigating how the effects of customer needs focus on product quality vary by the culture of the country where firms carry out NPD. Using data collected in 25 countries, this study finds that proactive and responsive needs focus positively influence product quality on average. While the effect of proactive needs focus on product quality is strongly positive in cultures with high power distance and short-term orientation, it is negative in cultures with low power distance and high long-term orientation. Furthermore, the effect of responsive needs focus on product quality is strongly positive in cultures with low power distance and high long-term orientation, whereas it is negative in cultures with high power distance and short-term orientation.

7.2 Introduction and Purpose

Product quality has been the focus of researchers and practitioners for many years (Jacobson and Aaker, 1987; Morgan and Vorhies, 2001; Sethi, 2000). Product quality is considered a major contributing factor to business success (Agus et al., 2000; Deming, 2000; Juran, 2004). Generally, the creation of product quality starts with the NPD process. Morgan and Vorhies (2001) found that new product quality has a major influence on both market success and profitability. In order to help firms enhance product quality, extant studies have investigated the benefits of using internal information of NPD departments by activities such as involving team members who have vast knowledge and experience (Olson et al., 1995). A recent book by Chesbrough (2003) suggests that many innovative firms have spent little attention on internal activities of the NPD department, and yet they are able to successfully innovate by drawing in knowledge and expertise from a wide range of external sources, which is defined as 'open innovation'. A large number of innovative firms have shifted to an open innovation strategy, while firms traditionally focused on internal

information (Chesbrough, 2003). Firms' openness to its external environment can improve their ability to control outside capabilities and follow changes in the external environment (Laursen and Salter, 2006).

The open innovation paradigm can be extended to the area of product quality control practices by investigating what type of external information acquired through NPD strategic orientation helps firms meet quality and performance specifications of newly developed products (see Chapter 5). B2B customer needs orientation, which is an extremely important dimension of NPD strategic orientation, deals with taking coordinated action on external information to satisfy customer needs (Narver and Slater, 1990). In general, researchers recognize that B2B customer needs orientation is a learning process to acquire and exploit new knowledge (Narver et al., 2004). Firms' learning process may change with the national culture of the country where firms carry out their operations (Yoo and Torrey, 2002). It is unclear how different types of NPD department members' learning through B2B customer needs focus help improve their internally oriented quality management in different cultures. Our study builds on and extends the open innovation paradigm to the area of NPD department members' learning through B2B customer needs focus in product quality control. It investigates how the culture of the country where firms carry out NPD affects different types of learning that help firms better meet quality and performance specifications of newly developed products.

We argue that external information acquired through B2B customer needs focus can be utilized in meeting quality and performance specifications of new products through exploratory and exploitative learning of NPD department members. The NPD literature has increasingly used national culture as a mediating, moderating, or explanatory variable (Garret et al., 2006). We consider national culture as a moderating variable for investigating how the effects of proactive and responsive needs focus on product quality vary by the culture of the country where firms carry out NPD.

We will establish and test hypotheses on the effects of B2B customer needs focus on product quality to address a major gap in the quality management literature and to provide practitioners with actionable knowledge of the effectiveness of customer needs focus strategies in NPD process. We collected data from 25 countries in 10 industries, covering firms across the

supply chain starting from raw material suppliers via manufacturers and value-adding firms (e.g., in the textile field: printing /dyeing/washing) to trading offices.

7.3 Literature Review

We develop a conceptual model, shown in Figure 7.1, which includes different dimensions of B2B customer needs focus (proactive and responsive), national culture, and product quality. Product quality derives from firms meeting product performance and quality specifications (Ledwith and O'Dwyer, 2009). Customer needs orientation deals with taking coordinated action to satisfy customer needs (Day, 2000; Narver and Slater, 1990). It has two sub-dimensions: responsive and proactive needs focus. Responsive needs focus is a practice seeking to respond quickly to changes in customers' expressed needs by establishing high flexibility in internal processes. By contrast, proactive needs focus is a practice seeking to identify and respond to latent customer needs through proactive dialogue, lead user research, or ethnographic research.

Researchers recognize that two types of learning processes can affect NPD performance: exploration and exploitation (Atuahene-Gima and Murray, 2007). In the context of NPD, explorative learning is defined as organizational learning by searching for technology and market information that is new to the firm, which exposes the firm to far beyond its current experience (Rowley et al., 2000). In contrast, exploitative learning is defined as organizational learning by searching information within well-defined and limited space closely related to the firm's previous experience (Rowley et al., 2000).

The current study extends the open innovation paradigm to the area of NPD department members' learning in product quality control. It investigates how national culture affects different types of NPD department members' learning that help them better meet quality and performance specification of newly developed products. To fully examine the differences in NPD behavior among national environments, national culture needs to be examined (Moenaert et al., 1994). Although national culture may have an impact on organizational culture, organizational culture may have little impact on national culture (Garrett et al., 2006). In the current study, we investigate the effect of national culture on the relationships among the dimensions of customer needs focus and product quality. Hofstede (1980) defined national culture as a collective programming of mind

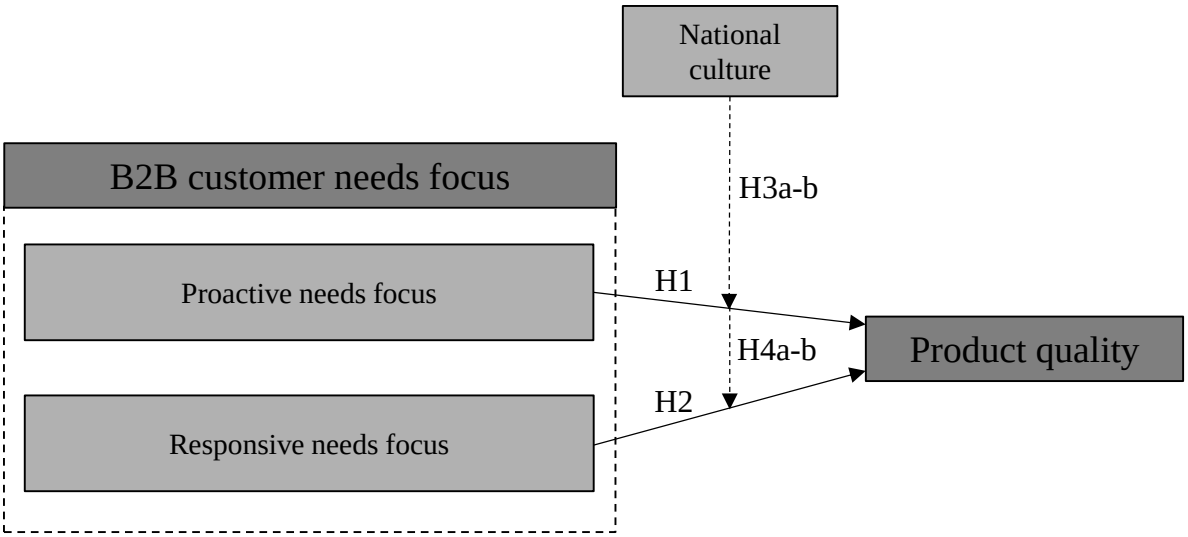


Figure 7.1 - Conceptual Framework: Moderating Effect of National Culture on the Relationship between B2B Customer Needs Focus and Product Quality

which distinguishes one national group or category of people from another. National culture implies that shared values impact the behavioral patterns of distinct groups. The five cultural dimensions that emerged from Hofstede's study are power distance, individualism, masculinity, uncertainty avoidance, and long-term orientation. Power distance is the extent to which less powerful members of organizations and institutions accept and expect that power is distributed unequally (Hofstede, 1980). As high power distance societies display hierarchical systems, NPD would have a high degree of centralization (Hoppe, 1993). Individualism (vs. collectivism) is the degree to which people act toward individual or group goals (Hofstede, 1980). Individualist societies may respond better to formalized mechanisms in which requirements for integration are explicitly stated (Nakata and Sivakumar, 1996). Masculinity (vs. femininity) is the degree to which masculine values such as assertiveness, performance, success, and competition prevail, making individuals more assertive and goal-directed, as opposed to femininity which is reflected by warm and social relationships (Nakata and Sivakumar, 1996). Uncertainty avoidance represents a society's tolerance for uncertainty and ambiguity (Hofstede, 1980). High uncertainty avoidance society members manage unstructured situations through the implementation of strict laws, rules and security measures (Hofstede, 1991). Long-term orientation considers long-term values orientated toward the future, such as thrift, savings, and persistence (Nakata and Sivakumar, 1996). Using our proposed conceptual model, the current study investigates how external information

obtained through B2B customer needs focus (proactive and responsive) helps firms meet quality and performance specifications of newly developed products through exploitative and exploratory learning of NPD department members.

7.4 Development of Hypotheses

In this section, we develop hypotheses on how external information from B2B customer needs focus can help NPD departments improve product quality through exploitative and exploratory learning of the NPD department members. In addition, we develop hypotheses on how national culture moderates the relationships among the dimensions of B2B customer needs focus and product quality.

7.4.1 Main Effects

NPD strategic orientation helps firms gather external information, which can be used internally to improve product quality (see Chapter 5). B2B customer needs orientation, which is an extremely important dimension of NPD strategic orientation (Narver and Slater, 1990) is a learning process (Narver et al., 2004). Our original claim is that accounting for external information from B2B customer needs focus through NPD department members' learning helps firms meet performance and quality specifications.

First, we argue that proactive needs focus positively affects product quality. Proactive needs focus helps firms achieve high NPD success (Narver et al., 2004). Proactive needs focus concentrates largely on the external information from customer latent needs (Slater and Naver, 1994). Focusing on B2B customers' latent needs increases the firms' ability to add new variants of market information, thereby increasing problem solving capacity of NPD members (Levinthal and March, 1993). Collecting new market information related to product quality and information on competitors' best quality control practices may help firms enhance NPD department members' exploratory learning, by exposing the firm too far beyond its current experience. This may help solve quality-related problems internally. Moreover, proactive needs focus may alert firms about new technology developments (Atuahene-Gima and Murray, 2007). In order to adopt new

technologies, firms may have to seek additional knowledge besides NPD department members' existing knowledge, which will enhance their exploratory learning. Exploratory learning related to new technologies may help NPD departments to introduce new quality control processes. For example, Toyota's suppliers have turned to a diverse network to learn about new trends in technologies, which have opened new directions in their quality control practices (Dyer and Nobeoka, 2002). We suggest that B2B proactive needs focus helps NPD departments effectively use external information related to product quality in meeting performance and quality specifications through exploratory learning of their team members.

H1: B2B proactive needs focus positively affects the quality of new products.

Second, we suggest that responsive needs focus positively affects product quality. Responsive needs focus helps firms achieve high NPD success (Narver et al., 2004). Responsive needs focus concentrates largely on external information from customer expressed needs (Slater and Naver, 1994). Focusing on customer expressed needs makes future information search more predictable and reliable, which makes product development less complex and thereby reduces the likelihood of errors in problem solving (Atuahene-Gima et al., 2005). When firms focus on B2B customer expressed needs related to product quality, NPD department members can use their current experience in quality control, thus enhancing NPD department members' exploitative learning. Exploitative learning helps firms gain deeper knowledge in a particular area (Rowley et al., 2000). This may uplift NPD department members' existing competencies and may reduce errors in quality-related problem solving. We posit that B2B responsive needs focus helps NPD departments effectively use external information related to product quality in meeting performance and quality specifications through exploitative learning of their team members.

H2: B2B responsive needs focus positively affects the quality of new products.

7.4.2. Moderating Effects

As explained in H1, B2B proactive needs focus helps firms meet performance and quality specification through exploratory learning of NPD department members. However, excessive proactive needs focus may carry high risks because of inefficiency associated with unfamiliar information and knowledge (Levinthal and March, 1993). In addition, NPD teams may acquire information that is too distinct from current and future B2B customer needs (Ulwick, 2002). Even though we hypothesize that B2B proactive needs focus helps firms meet performance and quality specification through exploratory learning of NPD department members (H1), exploratory learning of NPD department members could produce uncertain results (Atuahene-Gima and Murray, 2007) under certain circumstances such as different cultures. Under such circumstances, exploratory learning of NPD department members through proactive needs focus may have a negative effect on product quality.

We posit that proactive needs focus may positively affect the ability to meet quality and performance specifications in cultures with high power distance. Cultures with high power distance display hierarchical systems where NPD would have a high degree of centralization. Thus, higher levels of management tend to be responsible for decision making (Nakata and Shivakumar, 1996). Generally, higher levels of management take the whole business, rather than only a particular aspect of the business, into consideration when making decisions (Dutton et al., 1997). Thus, there is a low risk of entering unfamiliar information into the product quality process. This may help firms to strategically avoid acquiring information that is too distinct from B2B customer needs, thereby reduce any uncertain results of exploratory learning. In cultures with high power distance, NPD departments can reduce the possibility of using unfamiliar information and knowledge obtained through a B2B proactive needs focus, which will reduce the negative effect of exploratory learning on product quality. Thus, in cultures with high power distance, proactive needs focus (through exploratory learning) will help firms solve problems effectively in order to meet quality and performance specifications. On the contrary, we posit that proactive needs focus may negatively affect the ability to meet quality and performance specifications in cultures with low power distance. Low power distance cultures display decentralized management systems and lower levels of management may take critical decisions (Nakata and Shivakumar, 1996). Generally, lower levels of management take a specific aspect of the business, rather than the whole

business, into consideration when making decisions (Dutton et al., 1997). Consequently, there is a high risk of entering unfamiliar information into the product quality process. Thus, the risk of acquiring information that is too distinct from B2B customer needs in quality control is high, which might increase the negative effect of exploratory learning on product quality. Hence, in cultures with low power distance, proactive needs focus (through exploratory learning) will negatively affect the ability to meet quality and performance specifications.

H3a: The effect of proactive needs focus on product quality is strongly positive in cultures with high power distance, while this effect is negative in cultures with low power distance.

We argue that the effect of proactive needs focus on product quality is strongly positive in cultures with short-term orientation. As explained in H1, B2B proactive needs focus helps firms meet performance and quality specifications through exploratory learning of NPD department members. However, since proactive needs focus may expose the firm to unfamiliar information and knowledge (Levinthal and March, 1993), and exploratory learning could produce uncertain results (Atuahene-Gima and Murray, 2007), proactive needs focus may negatively affect product quality control under certain conditions. Long-term orientation is related to a culture's orientation towards the future. Cultures with long-term orientation incorporate persistence and perseverance towards slow results, while cultures with short-term orientation expect quick results (Dwyer et al., 2005). Thus, in cultures with short-term orientation, firms may regularly check problems in product quality control and may correct and identify unfamiliar information and knowledge immediately. In cultures with short-term orientation, NPD departments can reduce the frequency of using unfamiliar information and knowledge from B2B proactive needs focus, which will reduce the negative effect of exploratory learning on product quality. In addition, cultures with short-term orientation are more likely to adopt new product technological innovations than are high long-term-oriented cultures (Dwyer et al., 2005). Therefore, in short-term-oriented cultures, NPD department members can further improve their exploratory leaning behavior by comparing technological information collected through B2B proactive needs focus with existing technological capabilities, which will increase the ability to meet quality and performance specifications. However, we posit that proactive needs focus may negatively affect the ability to meet quality and performance specifications in cultures with high long-term orientation. Since

cultures with high long-term orientation expect slower results compared to short-term-oriented cultures (Dwyer et al., 2005), NPD department members may not perform regular checkups on the quality control process. In cultures with long-term orientation, NPD departments may use unfamiliar information and knowledge from B2B proactive needs focus, which will increase the negative effect of exploratory learning on product quality. Hence, B2B proactive needs focus (through exploratory learning) may negatively affect the ability of quality-related problem solving in short-term-oriented cultures.

H3b: The effect of proactive needs focus on product quality is strongly positive in cultures with short-term orientation, while this effect is negative in cultures with high long-term orientation.

As explained in H2, B2B responsive needs focus helps firms meet performance and quality specifications through exploitive learning of NPD department members. However, excessive responsive needs focus may carry high risks due to the possibility of using ambiguous personal experiences to respond to complex situations (Levinthal and March, 1993; March, 1991). Even though we hypothesize that B2B responsive needs focus helps firms meet performance and quality specification through exploitative learning of NPD department members (H2), exploitative learning of NPD department members could produce vague results (Atuahene-Gima and Murray, 2007) under certain circumstances such as different cultures. Hence, exploitative learning of NPD department members through responsive needs focus may have a negative effect on product quality.

We hypothesize that the effect of responsive needs focus on product quality is strongly positive in cultures with low power distance. Low power distance cultures display decentralized management systems (Garret et al., 2006), where NPD department members can fully engage in the decision making process, thereby enabling them to share previous quality-related experience. Consequently, in low power distance cultures, NPD department members can compare the shared previous quality-related experience with ambiguous personal experiences, which will reduce the negative effect of exploitative learning on product quality. Thus, in cultures with low power distance, responsive needs focus (through exploitative leaning) will help firms reduce errors in quality-related problem solving. Conversely, we argue that the effect of responsive needs focus on product quality is strongly negative in cultures with high power distance. High power distance

cultures show centralized management systems, where most of the critical decisions are taken by higher levels of management (Garret et al., 2006). Hence, NPD department members have less opportunity to share previous quality-related experience, which will increase negative effect of exploitative learning on product quality. Therefore, responsive needs focus (through exploitative leaning) may increase the errors in quality-related problem solving in high power distance cultures.

H4a: The effect of responsive needs focus on product quality is strongly positive in cultures with low power distance, whereas this effect is negative in cultures with high power distance.

Finally, we suggest that the effect of responsive needs focus on product quality is strongly positive in cultures with high long-term orientation. As explained in H2, B2B responsive needs focus helps firms meet performance and quality specifications through exploitive learning of NPD department members. However, due to the possibility of using ambiguous personal experiences of NPD department members to respond to complex situations, excessive responsive needs focus may carry high risks (Levinthal and March, 1993; March, 1991). Cultures with high long-term orientation consider persistence and perseverance towards slow and steady results, while cultures with short-term orientation expect quick results (Dwyer et al., 2005). Cultures with high long-term orientation value solidity and cooperation (Dwyer et al., 2005). In high long-term oriented cultures, the effect of B2B responsive needs focus on product quality may increase as exploitative learning of NPD members is further enhanced by strong cooperation among NPD team members. In this manner, NPD team members can share previous quality-related experience of other members in meeting performance and quality specification, which will reduce negative effect of exploitative learning on product quality. Thus, in cultures with high long-term orientation, responsive needs focus (through exploitative leaning) will help firms reduce errors in quality-related problem solving. However, we posit that responsive needs focus may negatively affect the ability to meet quality and performance specifications in cultures with short-term orientation. Cultures with short-term orientation tend to have less cooperation (Dwyer et al., 2005). Thus, NPD department members may not freely share their previous quality-related experience, which will increase negative effect of exploitative learning on product quality. Therefore, responsive needs focus (through exploitative leaning) may increase the errors in quality-related problem solving in short-term-oriented cultures.

H4b: The effect of responsive needs focus on product quality is strongly positive in cultures with high long-term orientation, whereas this effect is negative in cultures with short-term orientation.

7.5 Methodology

We developed a new questionnaire using scales obtained from the literature to measure the constructs in the conceptual model (Homburg et al., 2007; Ledwith and O'Dwyer, 2009) by adapting different approaches and different evaluation methods.

Our data collection resulted in responses from 425 managers representing 228 SBUs (response rate: 16%) across 25 countries: Austria, Bangladesh, Cambodia, Canada, China, Czech Republic, Germany, Greece, Hong Kong, Hungary, India, Italy, Japan, Liechtenstein, Luxembourg, Norway, Poland, Romania, Slovakia, Sri Lanka, Switzerland, Taiwan, Thailand, United Kingdom, and Vietnam. We used Hofstede's cultural scores in order to analyze the effect of national culture on the relationship between customer needs focus and product quality.

We performed several data validation tests in order to proceed with data analysis. We checked the standard acceptance criteria (CFI > 0.95, χ^2/df < 3, and RMSEA < 0.05) of confirmatory factor analysis (CFA) of all latent multi-item constructs and all of them fulfilled standard criteria. All constructs satisfied standard criteria of convergent and discriminant validity: Cronbach's $\alpha > 0.7$, average variance extracted (AVE) > 0.5, and AVE > squared correlations of the construct with all other constructs. We also found that common method bias does not exist in the data. We aggregated these data to represent SBUs by calculating mean values across all informants within each SBU after calculating the inter-rater reliability R_{wg} and the intraclass correlation coefficient ICC(1) (see Appendix A and Chapter 3 for more details).

7.6 Results

In order to test our hypotheses, we used hierarchical linear modeling (HLM) with product quality as the dependent variable. The HLM model consists of three levels. SBU data (level 1) are nested within firm data (level 2), and firm data (level 2) are nested within country data (level 3). We used supply chain stage (I-raw material suppliers, II-manufacturers, III-value adding firms, IV-trading offices), ease of doing business index (Doing Business, 2013), and industry experience as control variables.

The independent variables explain 43.5 % (R^2) of the variance in product quality (see Table 7.1). Based on the results, B2B proactive needs focus and B2B responsive needs focus show positive effects on product quality on average (H1 and H2 supported). The results show that the effect of proactive needs focus on quality is strongly positive in cultures with high power distance and short-term orientation, while this effect is negative in cultures with low power distance and high long-term orientation (H3a and H4a supported). In addition, the effect of responsive needs focus on quality is strongly positive in cultures with low power distance and high long-term orientation, whereas this effect is negative in cultures with high power distance and short-term orientation (H3b and H4b supported). Uncertainty avoidance, individualism, and masculinity did not show any moderating effect on the relationship between customer needs focus and product quality.

In order to better understand how firms adapt proactive, responsive needs focus, and how well they have achieved product quality when they operate in various countries, we compared mean values of the measured variables (see Figure 7.2). Moreover, we measured the variance between Asian and non-Asian countries, and between lower-income and higher-income countries by performing an ANOVA test (see Table 7.2 & 7.3).

Table 7.1 - Effect of B2B Customer Needs Focus on Product Quality

Independent variables	Dependent variable Product quality	Hypotheses	Supported
Main effects			
B2B customer needs focus			
Proactive needs focus	0.199 **	H1 (+)	Yes
Responsive needs focus	0.164 **	H2 (+)	Yes
National culture (Hofstede)			
Power distance (PD)	0.062		
Long-term orientation (LO)	-0.088		
Uncertainty avoidance (UA)	0.295		
Individualism (I)	-0.171		
Masculinity (M)	0.041		
Moderating effects			
PD × proactive needs focus	0.477 **	H3a (+)	Yes
LO × proactive needs focus	-0.340 †	H3b (-)	Yes
PD × responsive needs focus	-0.442 **	H4a (-)	Yes
LO × responsive needs focus	0.600 **	H4b (+)	Yes
Model fit (HLM pseudo R^2)	0.435		

Notes: Hierarchical linear modeling analysis: maximum likelihood estimation.
$^{\dagger}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Sample: 228 SBUs / 425 industry experts.
Control variables: supply chain stage, industry experience, ease of doing business index.

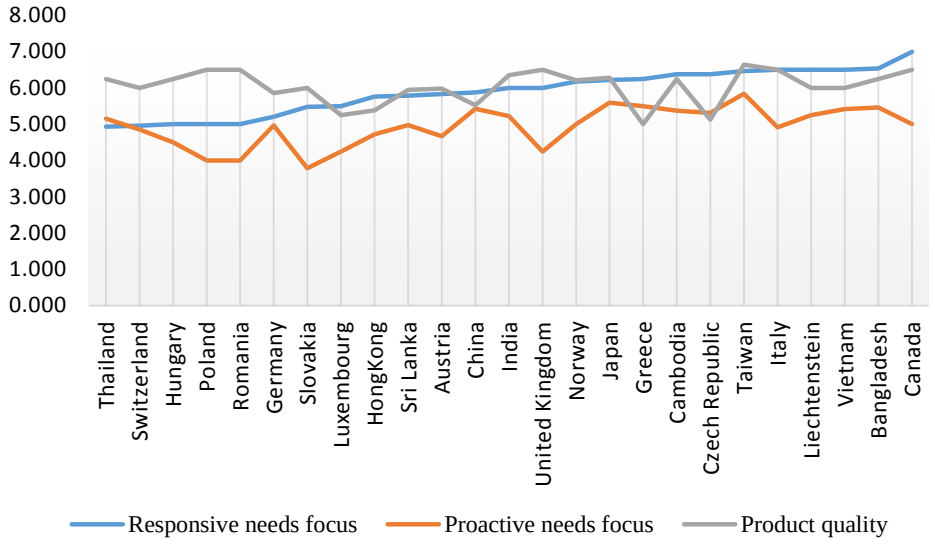


Figure 7.2 - Mean Value Comparison of Variables

Table 7.2 - Analysis of Variance in Asian and Non-Asian Countries

Group	Responsive needs focus	Proactive needs focus	Product quality
Mean value			
Asian countries	5.867	5.109	5.980
Non-Asia countries	5.562	4.792	5.940
F value	8.630**	2.687†	0.004

Notes: Asian countries: Sri Lanka, China, Hong Kong, India, Japan, Taiwan, Thailand, Cambodia, Bangladesh, Vietnam (n=123).
Non-Asian countries: Austria, Czech Republic, Germany, Greece, Hungary, Italy, Liechtenstein, Luxembourg, Norway, Poland, Slovakia, Switzerland, Romania, United Kingdom, Canada (n=105).
†$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-sided).

Table 7.3 - Analysis of Variance in Lower and Higher-Income Countries

Group	Responsive needs focus	Proactive needs focus	Product quality
Mean value			
Lower-income countries	6.107	5.196	5.967
Higher-income countries	5.894	5.094	5.952
F value	6.451*	0.512	0.022

Notes: Lower-income countries: Sri Lanka, Hong Kong, India, Taiwan, Thailand, Cambodia, Bangladesh, Vietnam (n=109).
Upper-income countries: Austria, China, Czech Republic, Germany, Greece, Hungary, Japan, Italy, Liechtenstein, Luxembourg, Norway, Poland, Slovakia, Switzerland, Romania, United Kingdom, Canada (n=119).
Source: http://data.worldbank.org/about/country-and-lending-groups
†$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$ (two-sided).

7.7 Conclusion

7.7.1 General Discussion

By extending the open innovation paradigm to the area of NPD department members' learning in product quality control, our study makes the original claim that accounting for external information through exploitive and exploratory learning in B2B customer needs focus is beneficial as a means of enhancing internal product quality. In order to address the gap in empirical research

on how to produce high-quality products in different geographical locations by using different dimensions of B2B customer needs focus, our study used data from industries in 25 countries to test hypotheses on dimensions of customer needs focus as antecedents to product quality. Based on our findings, B2B proactive needs focus and B2B responsive needs focus are beneficial in meeting quality and performance specifications. However, firms need to pay extra attention to the national culture in which NPD departments operate because culture moderates the relationships between the dimensions of customer needs focus and product quality. Especially, firms need to consider power distance and long-term orientation of the cultures of the countries in which they are going to locate their NPD department or carry out NPD activities. In order to help firms meet performance and quality specifications, we suggest managers to adopt proactive needs focus when they operate in cultures with high power distance and short-term orientation, while firms should adopt responsive needs focus when they operate in cultures with low power distance and high long-term orientation.

Generally in B2C contexts, there is a relationship between uncertainty avoidance and new product acceptance (Singh, 2006). Consumers in high uncertainty avoidance cultures exhibit a lower tolerance for ambiguity (Hofstede, 1991). Anne et al. (2007) discussed that consumers in high uncertainty avoidance cultures appreciate high product quality, more than consumers in low uncertainty avoidance cultures. The strong positive effect of uncertainty avoidance cultures on product quality (not significant) of our results shows that there is a similar tendency in B2B contexts as well. However, this needs to be further verified.

Mean value comparison shows that generally firms adapt responsive needs focus more than proactive needs focus. A lower gap of mean values between responsive and proactive needs focus shows in Thailand and Germany, whereas a larger gap shows in Canada, United Kingdom, and Italy. ANOVA test results show that firms in Asian countries adapt responsive needs focus and proactive needs focus more than firms in non-Asian countries. Moreover, firms in lower-income countries adapt responsive needs focus more than firms in higher-income countries. Asian and lower-income countries show a similar tendency to use high responsive needs focus. Based on our findings, we recommend managers to pay extra attention on countries with high power distance culture in Asia (e.g., China) and in lower-income countries (e.g. Vietnam) as high power distance culture negatively moderate the relationship between responsive needs focus and product quality. Product quality did not show any statistically significant difference between groups.

7.7.2 Limitations and Future Research

Since our survey was carried out in English across all countries and since data were collected from managers who have a thorough knowledge of the NPD process, our results might not be without bias. However, our focus on knowledgeable managers assured high-quality survey responses and assured that we capture best practices. We recommend the future research investigate whether the effectiveness of the B2B customer orientation approaches in our model depends on the type of organizational culture that firms have fostered over the years.

References

Agus, A., Krishnan, S. K., and Kadir, S. L. S. A. (2000). The structural impact of total quality management on financial performance relative to competitors through customer satisfaction: a study of Malaysian manufacturing companies. *Total Quality Management*, 11(4-6), 808-819.

Anne Lee, J., Garbarino, E., and Lerman, D. (2007). How cultural differences in uncertainty avoidance affect product perceptions. *International Marketing Review*, 24(3), 330-349.

Atuahene-Gima, K., and Murray, J. Y. (2007). Exploratory and exploitative learning in new product development: a social capital perspective on new technology ventures in China. *Journal of International Marketing*, 15(2), 1-29.

Atuahene-Gima, K., Slater, S. F., and Olson, E. M. (2005). The contingent value of responsive and proactive market orientations for new product program performance. *Journal of Product Innovation Management*, 22(6), 464-482.

Chesbrough, H. (2003). *Open Innovation*, Harvard University Press, Cambridge, MA.

Day, G. S. (2000). Managing market relationships. *Journal of the Academy of Marketing Science*, 28(1), 24-30.

Deming, W. E. (2000). *The New Economics: For Industry, Government, Education*. MIT Press, Cambridge, MA.

Doing Business (2013). *Ease of doing business*. [www] Doing business, Retrieved on 03/04/13 from http://www.doingbusiness.org/rankings.

Dyer, J., and Nobeoka, K. (2002). Creating and managing a high performance knowledge-sharing network: the Toyota case. *Strategic Management Journal*, 21(3), 345-367.

Dutton, J. E., Ashford, S. J., O'Neill, R. M., Hayes, E,. and Wierba, E. E. (1997). Reading the wind: how middle managers assess the context for selling issues to top managers. *Strategic Management Journal*, 18(5), 407-425.

Dwyer, S., Mesak, H., and Hsu, M. (2005). An exploratory examination of the influence of national culture on cross-national product diffusion. *Journal of International Marketing*, 13(2), 1-27.

Garrett, T. C., Buisson, D. H., and Yap, C. M. (2006). National culture and R&D and marketing integration mechanisms in new product development: a cross-cultural study between Singapore and New Zealand. *Industrial Marketing Management*, 35(3), 293-307.

Hofstede, G. (1980). *Culture's Consequences: International Differences in Work-Related Values.* Sage, Beverly Hills, CA.

Hofstede, G. (1991). *Cultures and Organizations: Software of the Mind*. McGraw-Hill, London.

Homburg, C., Grozdanovic, M., and Klarmann, M. (2007). Responsiveness to customers and competitors: the role of affective and cognitive organizational systems. *Journal of Marketing*, 71 (3), 18-38.

Hoppe, M. H. (1993). The effects of national culture on the theory and practice of managing R&D professionals abroad. *R&D Management*, 23(4), 313-325.

Jacobson, R., and Aaker, D. A. (1987). The strategic role of product quality. *Journal of Marketing*, 51(4), 31-44.

Juran, J. M. (2004). *Architect of Quality*: *The Autobiography of Dr. Joseph M. Juran*. McGraw-Hill, New York.

Laursen, K., and Salter, A. (2006). Open for innovation: the role of openness in explaining innovation performance among UK manufacturing firms. *Strategic Management Journal*, 27(2), 131-150.

Ledwith, A., and O'Dwyer, M. (2009). Market orientation, NPD performance, and organizational performance in small firms. *Journal of Product Innovation Management*, 26(6), 652-661.

Levinthal, D. A., and March, J. G. (1993). The myopia of learning. *Strategic Management Journal*, 14(S2), 95-112.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71-87.

Moenaert, R. K., De Meyer, A., and Clarysse, B. J. (1994). Cultural differences in new technology management, in Souder, W. E. and Sherman, J. D. (eds). *Managing New Technology Development*, McGraw-Hill, New York, 287-314.

Morgan, N. A., and Vorhies, D. W. (2001). Product quality alignment and business unit performance. *Journal of Product Innovation Management*, 18(6), 396-407.

Nakata, C., and Sivakumar, K. (1996). National culture and new product development: an integrative review. *Journal of Marketing*, 60(1), 61-72.

Narver, J. C., and Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54(1), 20-35.

Narver, J. C., Slater, S. F., and MacLachlan, D. L. (2004). Responsive and proactive market orientation and new-product success. *Journal of Product Innovation Management*, 21(5), 334-347.

Olson, E. M., Walker Jr., O. C., and Ruekert, R. W. (1995). Organizing for effective new product development: the moderating role of product innovativeness. *Journal of Marketing*, 59(1), 48-62.

Rowley, T., Behrens, D., and Krackhardt, D. (2000). Redundant governance structures: an analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal*, 21(3), 369-386.

Sethi, R. (2000). New product quality and product development teams. *Journal of Marketing*, 64(2), 1-14.

Singh, S. (2006). Cultural differences in, and influences on, consumers' propensity to adopt innovations, *International Marketing Review*, 23(2), 13-191.

Slater, S. F., and Narver, J. C. (1994). Does competitive environment moderate the market orientation-performance relationship? *Journal of Marketing*, 58(1), 46-55.

Ulwick, A. W. (2002). Turn customer input into innovation. *Harvard Business Review*, 80(1), 91-98.

Yoo, Y., and Torrey, B. (2002). National culture and knowledge management in a global learning organization, in Choo, C. W. and Bontis, N. (eds). *The Strategic Management of Intellectual Capital and Organizational Knowledge*, Oxford University Press, Oxford, England, 421-434.

Chapter 8

The Effect of B2B Customer Value on Market Performance: Evolution along the Supply Chain

Chapter Overview

This chapter presents how B2B customer value helps firms to achieve different types of NPD market performance. This study makes two main contributions.

- This is the first study to empirically investigate the effects of different dimensions of B2B customer value on market performance (customer satisfaction and sales) in B2B contexts.
- This is the first study to empirically investigate the evolution of the effects of different dimensions of B2B customer value on market performance along the supply chain.

8.1 Abstract

In order to investigate how B2B customer value creation helps firms achieve higher market performance and how this influence evolves along the supply chain, the current research develops a conceptual model consisting of different dimensions of B2B customer value and market performance (customer satisfaction, sales). Based on data collected from 10 industries in 25 countries, this research shows that the effects of B2B functional value on customer satisfaction and sales decrease along the supply chain, whereas the effect of B2B hedonic value on customer satisfaction increases along the supply chain. Several managerial implications and theoretical contributions are discussed.

8.2 Introduction and Purpose

Firms consider customer value as a key factor when looking for new ways to be more competitive. Firms achieve competitive advantage through various new product designs, new production processes, and new marketing approaches (Porter, 2011). In new product development (NPD), customer value creation has been identified as a main source of competitive advantage (Woodruff, 1997), which may help firms achieve higher market performance.

The current study contributes to the literature in two ways. First, based on extant studies on customer value creation, our research is the first study to empirically investigate the effects of different dimensions of B2B customer value on market performance (customer satisfaction and sales) in B2B contexts.

Second, our research is the first study to empirically investigate the evolution of the effects of different dimensions of B2B customer value on market performance along the supply chain.

Our original claim is that product complexity (structural and functional) increases when products evolve along the supply chain. Structural product complexity is the number of components used in a product (Barclay & Dann, 2000). It refers to tangible functions of the product. Functional product complexity is related to appearance (Barclay & Dann, 2000). It refers to intangible functions of the product.

Generally, raw material suppliers develop various components of a product, and manufacturers use these distinct components in developing their new products (Shin et al., 2009). B2B customers produce their own products with the help of purchased products or use purchased products as parts of their own products, which move forward along the supply chain (Karkkainen et al., 2001). As the number of unique parts in a product increases along the supply chain, structural product complexity increases.

B2C customers consider aesthetic properties more important than basic attributes (quality) (Creusen and Schoormans, 2005). Thus, in the supply chain, firms close to B2C customers consider the appearance of products besides basic attributes. In this manner, functional product complexity increases along the supply chain.

In summary, this research seeks to help managers understand how the effects of different types of B2B customer value on customer satisfaction and sales evolve along the supply chain in B2B contexts.

8.3 Literature Review

In order to address the research questions discussed, we develop a conceptual model, shown in Figure 8.1, which includes different dimensions of B2B customer value (functional, cost, hedonic, and symbolic) and market performance (customer satisfaction and sales). Although scholars agree that generating customer value is crucial to the success of marketing activities, there is no commonly accepted framework conceptualizing B2B customer value. While early studies treated B2B customer value as a uni-dimensional construct, more recent conceptual studies acknowledged its multi-dimensional nature. A few studies separated customer value into the sub-dimensions of product-related and service-related value (Walter et al., 2003) and of direct and indirect value (Lapierre, 2000), but most conceptual studies argued for the existence of four distinct sub-dimensions (Moller and Torronen, 2003; Smith and Colgate, 2007). This study is based on a framework that conceptualized customer value as consisting of four dimensions of functional value, hedonic value, symbolic value, and cost value (Smith and Colgate, 2007). We chose this framework due to its integrative nature and specific descriptions of the distinct dimensions. Functional value is the extent to which a product offers right features, superior performance, and high quality (Smith and Colgate, 2007). Cost value is the extent to which

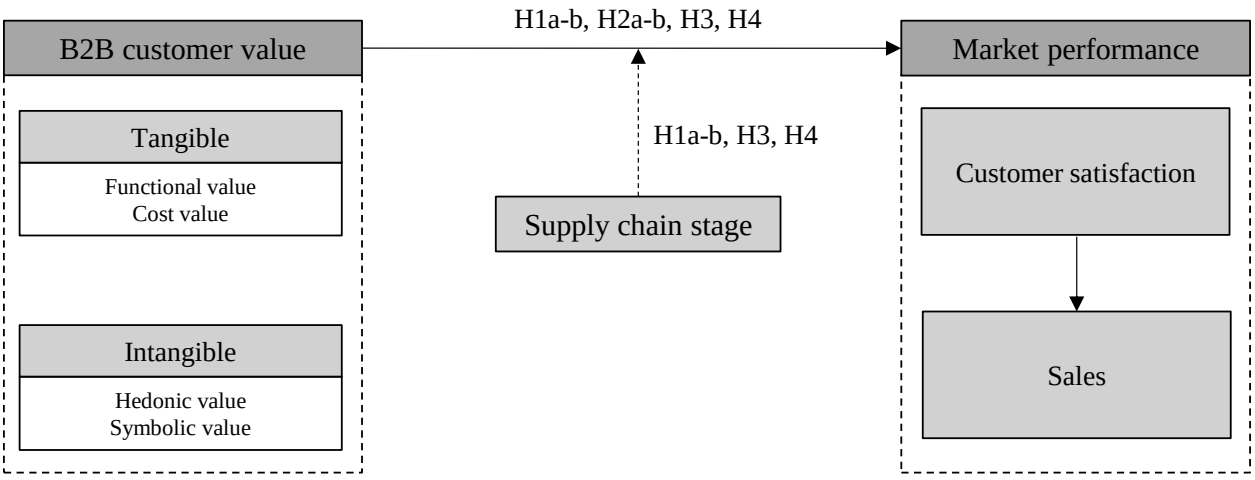


Figure 8.1 - Conceptual Framework: Moderating Effect of Supply Chain Stage on the Relationship between B2B Customer Value and NPD Market Performance

transaction costs involved in purchasing and using the product are considered low (Smith and Colgate, 2007). Since right features, quality parameters, and transaction costs can be measured easily, we classify functional and cost value as tangible value. By contrast, hedonic value is the extent to which a product offers positive experiences, feelings, and emotions to customers (Smith and Colgate, 2007). Symbolic value is the degree to which customers associate psychological meaning with a product (Smith and Colgate, 2007). Since emotions, feelings, and psychological meanings are difficult to measure, we classify hedonic and symbolic value as intangible value.

Market performance can be identified through customer satisfaction and sales. Satisfied customers are likely to buy frequently and in greater volume (Reichheld and Sasser, 1989). This is true not only in B2C contexts, but also in B2B contexts. Satisfying B2B customers increases repurchase intentions, which increases firms' sales (Molinari et al., 2008).

8.4 Development of Hypotheses

We develop hypotheses about the effects of different dimensions of B2B customer value on market performance (customer satisfaction and sales) and about how these effects evolve along the supply chain.

B2B functional value is related to search attributes that customers use in order to evaluate the suppliers' ability to perform specific tasks (Molinari et al., 2008). B2B customers do not have

the motivation to continue a relationship merely for the sake of the relationship unless they receive a product that meets their standards (Cater and Cater, 2010). Thus, B2B functional value may increase B2B customer relationship quality, which increases customer satisfaction (Gil-Saura et al., 2009). Sometimes, B2B customers buy products in order to offer right features to their final customers even though they are not fully satisfied with the product, which may increase sales. Hence, B2B functional value also may increase sales directly, independent of customer satisfaction.

Functional product complexity (appearance) increases along the supply chain (Barclay and Dann, 2000; Creusen and Schoormans, 2005). Aesthetic responses of the customer derive from the design and sensory properties of the product, rather than from its performance and functional attributes (Bloch, 1995). Therefore, along the supply chain, B2B customers who are closer to B2C customers consider functional value less important. This may decrease the effects of B2B functional value on customer satisfaction and sales.

H1a-b: B2B functional value has positive effects on (a) customer satisfaction and (b) sales. These effects decrease along the supply chain.

When a product does not have the power to motivate B2B customers, firms reduce price as B2B customers' goal is to earn money through cost savings (Webster and Keller, 2004). Price-related cognitions have been identified by several researchers and "price-consciousness" is defined as the degree to which customers focus exclusively on paying a low price (Lichtenstein et al., 1993). Sometimes, B2B customers buy products in order to offer low cost products to their final customers even though they are not fully satisfied with the product. B2B customers consistently rank cost as a central criterion for making buying decisions (Williamson and Zeng, 2009). Thus, we do not expect supply chain stage to moderate the relationships among B2B cost, customer satisfaction, and sales.

H2a-b: B2B cost value has positive effects on (a) customer satisfaction and (b) sales.

In B2B contexts, B2B customers evaluate products, which are finally delivered to B2C customers. Aesthetic responses of the customer derive from the design and sensory properties of the product, rather than its performance or functional attributes (Bloch, 1995). B2C customers are more concerned with the appearance than the durability of the product (Creusen and Schoormans,

2005). Appearance is one of the major aspects of hedonic value (Gacula et al., 2008). Thus, products which appeal to emotions will satisfy customers.

Firms mainly at the early stages of the supply chain develop products according to B2B customers' desires (Gummesson and Polese, 2009), which are mostly related to basic attributes. Generally, B2C customers consider aesthetic properties more important than basic attributes (e.g., quality) (Creusen and Schoormans, 2005). Hence, firms at the later stages of the supply chain, closer to B2C customers, may be satisfied more with hedonic value, which may be more effective in satisfying their clients.

H3: B2B hedonic value has a positive effect on customer satisfaction. This effect increases along the supply chain.

Offering symbolic value creates a "halo effect" which is defined as one's response to a particular attribute influenced by the general impression of the overall object (Hutton, 1997). Hence, when customers have a favorable brand image, which is a type of symbolic value, B2B customers may buy products even though they are not fully satisfied.

Along the supply chain, structural product complexity increases (Barclay and Dann, 2000). B2B customers are most likely to select well-known and reliable brands when the product is complex (Hutton, 1997), which may increases sales.

H4: B2B symbolic value has a positive effect on sales. This effect increases along the supply chain.

8.5 Methodology

We designed a questionnaire using standard scales which have already been published in the literature. From 10 industries (automotive, chemistry, construction equipment, consumer goods, electronics, machinery manufacturing, manufacturing equipment, medical, packaging, and textile) in 25 countries (Austria, Bangladesh, Cambodia, Canada, China, Czech Republic, Germany, Greece, Hong Kong, Hungary, India, Italy, Japan, Liechtenstein, Luxembourg, Norway, Poland, Romania, Slovakia, Sri Lanka, Switzerland, Taiwan, Thailand, United Kingdom, and

Table 8.1 - Effects of B2B Customer Value on Market Performance

Independent variable	Dependent variables: Customer satisfaction	Dependent variables: Sales	Hypotheses
Effect of customer satisfaction:			
Customer satisfaction		.397 ***	
Effects of B2B customer value:			
Functional value	.397 ***	.105 †	H1a-b: +
Cost value	.184 **	.238 ***	H2a-b: +
Hedonic value	.316 ***	.105	H3: +
Symbolic value	.070	.104 **	H4: +
Effects of supply chain stage:			
Supply chain stage (SCS)	-.055	-.137 **	
SCS × Functional value	-.098 †	-.130 **	H1a-b: -
SCS × Cost	.003	.006	
SCS × Hedonic value	.241 **	-.016	H3: +
SCS × Symbolic value	-.031	.139 **	H4: +
SCS × Customer satisfaction		.027	
HLM pseudo R^2	.388	.548	

Notes: Hierarchical linear modeling (HLM) analysis: maximum likelihood estimation.
$^{\dagger}p < .1$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$ (two-sided). Sample size: 228 SBUs / 425 industry experts.
Hypothesized effects marked in gray color.

Vietnam), we collected data by using a paper-based and an online version of the same questionnaire. In order to cover the whole supply chain, we collected data from 425 industry experts including 228 strategic business units (SBUs) representing different stages of the supply chain. The reflective scales fulfill basic psychometric acceptance criteria: Cronbach's $\alpha > 0.7$, average variance extracted > 0.5, and average variance extracted > largest squared correlation between constructs. As the inter-rater agreement requirements were fulfilled, we aggregated our data to the SBU level and used these aggregated data for further analysis. The model fit fulfills the standard acceptance criteria CFI > 0.95, χ^2 /df < 3, and RMSEA < 0.05. We also found that common method bias does not exist in the data (see Appendix A and Chapter 3 for more details).

8.6 Results

We tested our hypotheses using hierarchical linear modeling (HLM) with customer satisfaction and sales as dependent variables. The HLM model consists of three levels. SBU data (level 1) are nested within firm data (level 2), and firm data (level 2) are nested within country

data (level 3). We used industry type (high-tech: automotive, construction equipment, electronics, machinery manufacturing, manufacturing equipment, medical vs. low-tech: chemistry, consumer goods, packaging, textile), ease of doing business index (Doing Business, 2013), and industry experience as control variables. The independent variables explain 38.8% (R^2) of the variance in customer satisfaction and 54.8% (R^2) of the variance in sales (see Table 8.1 for results).

8.7 Conclusion

8.7.1 General Discussion

We empirically explored the relationships between different dimensions of B2B customer value and market performance in B2B contexts. Our results show how tangible and intangible types of value positively influence customer satisfaction and sales in B2B contexts. These findings extend the past research on B2C contexts, which has also identified the benefits of different dimensions of customer value. For example, tangible and intangible types of B2C customer value positively influence customer satisfaction, whereas only tangible (functional) value helps achieve higher customer relationship management performance (Wang et al., 2004).

Moreover, our findings show that the effects of B2B functional value on customer satisfaction and sales decrease along the supply chain, whereas the effect of B2B hedonic value on customer satisfaction increases along the supply chain. Based on our findings, we encourage firms to assess the importance of tangible vs. intangible customer value that best fits the intended market positioning of a certain product based on the supply chain position of the firm. For example, raw material suppliers should focus more on the functional value, whereas trading offices (close to B2C customers) should focus more on hedonic and symbolic value creation to achieve higher customer satisfaction and sales.

8.7.1 Limitations and Future Research

Our research may be extended to investigate how the findings change with industry type (e.g., high-tech vs. low-tech)

References

Barclay, I., and Dann, Z. (2000). New-product-development performance evaluation: a product-complexity-based methodology. *IEEE Transactions on Engineering Management*, 147(2), 41-55.

Bloch, P. H. (1995). Seeking the ideal form: product design and consumer response. *Journal of Marketing*, 59(3), 16-29.

Cater, T., and Cater, B. (2010). Product and relationship quality influence on customer commitment and loyalty in B2B manufacturing relationships. *Industrial Marketing Management*, 39(8), 1321-1333.

Creusen, M. E., and Schoormans, J. P. (2005). The different roles of product appearance in consumer choice. *Journal of Product Innovation Management*, 22(1), 63-81.

Doing Business (2013). *Ease of doing business*, [www] Doing business, Retrieved on 03/04/13 from http://www.doingbusiness.org/rankings.

Gacula, M., Mohan, P., Faller, J., Pollack, L., and Moskowitz, H. R. (2008). Questionnaire practice: what happens when the JAR scale is placed between two 'overall' acceptance scales? *Journal of Sensory Studies*, 23(1), 136-147.

Gil-Saura, I., Frasquet-Deltoro, M., and Cervera-Taulet, A. (2009). The value of B2B relationships. *Industrial Management and Data Systems*, 109(5), 593-609.

Gummesson, E., and Polese, F. (2009). B2B is not an island! *Journal of Business and Industrial Marketing*, 24(5/6), 337-350.

Hutton, J. G. (1997). A study of brand equity in an organizational-buying context. *Journal of Product and Brand Management*, 6(6), 428-439.

Kärkkäinen, H., Piippo, P., and Tuominen, M. (2001). Ten tools for customer-driven product development in industrial companies. *International Journal of Production Economics*, 69(6), 161-176.

Lapierre, J. (2000). Customer-perceived value in industrial contexts. *Journal of Business and Industrial Marketing*, 15(2), 122-145.

Lichtenstein, D. R., Ridgway, N. M., and Netemeyer, R. G. (1993). Price perceptions and consumer shopping behavior: a field study. *Journal of Marketing Research*, 234-245.

Molinari, L. K., Abratt, R., and Dion, P. (2008). Satisfaction, quality and value and effects on repurchase and positive word-of-mouth behavioral intentions in a B2B services context. *Journal of Services Marketing*, 22(5), 363-373.

Möller, K. E., and Törrönen, P. (2003). Business suppliers' value creation potential: a capability-based analysis. *Industrial Marketing Management*, 32(2), 109-118.

Porter, M. E. (2011). *The Competitive Advantage of Nations*, Simon and Schuster, New York.

Reichheld, F. F., and Sasser, W. E. (1989). Zero defections: quality comes to services. *Harvard Business Review*, 68(5), 105-111.

Shin, H., Benton, W. C., and Jun, M. (2009). Quantifying suppliers' product quality and delivery performance: a sourcing policy decision model. *Computers and Operations Research*, 36(8), 2462-2471.

Smith, J. B., and Colgate, M. (2007). Customer value creation: a practical framework. *Journal of Marketing Theory and Practice*, 15(2), 7-23.

Walter, A., Müller, T. A., Helfert, G., and Ritter, T. (2003). Functions of industrial supplier relationships and their impact on relationship quality. *Industrial Marketing Management*, 32(3), 159-169.

Wang, Y., Lo, H. P., Chi, R., & Yang, Y. (2004). An integrated framework for customer value and customer-relationship-management performance: a customer-based perspective from China. *Managing Service Quality*, 14(2/3), 169-182.

Webster, F. E., and Keller, K. L. (2004). A roadmap for branding in industrial markets. *Journal of Brand Management*, 11(5), 388-402.

Williamson, P. J., and Zeng, M. (2009). Value-for-money strategies for recessionary times. *Harvard Business Review*, 87(3), 66-74.

Woodruff, R. B. (1997). Customer value: the next source of competitive advantage. *Journal of the Acedmy of Marketing Science*, 25(2), 139-153.

Chapter 9

Conclusion

This chapter presents the overall contribution of this dissertation, managerial implications, and future research opportunities.

9.1 General Discussion

Firms increasingly draw external information into their NPD process. With growing levels of competition among firms, understanding specific roles of different sources of external information is of prime importance. In order to deepen our understanding of how firms achieve their NPD performance by drawing on external information, this dissertation sought to answer three main research questions. 1. How sources of external information help firms achieve NPD operational performance. 2. How sources of external information help firms create B2B customer value and achieve NPD market performance. 3. How contextual factors affect the relationship between the sources of external information and NPD performance. We built on and extended two main theories (open innovation and dynamic capability) into the area of NPD processes and discussed how these theories can be used to understand the overall conceptual framework introduced (see Figure 1.1, page 7).

As Chesbrough (2006) suggested, firms may miss many opportunities when they have a strong internally focused strategy because many valuable informational sources are available outside the firm. Lack of openness to the external environment may reflect organizational fear, which may trigger an overemphasis on internal informational sources. The overall findings of this dissertation posited that drawing on external information via different types of NPD strategic orientation helps firms achieve NPD operational and market performance. In addition, the overall results suggested that firms need to pay extra attention to the roles of contextual factors. In this dissertation, we presented how NPD strategic orientation helps firms create B2B value (Chapter 4) and NPD operational performance (Chapter 5). Moreover, we examined the effects of product technology (Chapter 6) and national culture (Chapter 7) on the relationship between NPD strategic orientation and NPD operational performance, and the effect of supply chain stage (Chapter 8) on the relationships between B2B customer value and NPD market performance.

In order to fulfill the research objectives, we collected data in two stages. In the first stage, we collected data from 10 countries (Bangladesh, Cambodia, China, Hong Kong, India, Japan, Sri Lanka, Taiwan, Thailand, and Vietnam), representing firms across the supply chain in the textile industry (raw material developers, manufactures, value adding firms, trading offices). As this dissertation is based on statistical analyses, confirmed hypotheses (in Chapter 4, 5, and 6) are valid

and can be generalized to the entire population of firms from which our firm sample was drawn. Thus, this study derives generalizable insights that can be applied across different contexts.

In the second stage of data collection, we collected data from another 17 countries, making the total number 25 countries (Austria, Bangladesh, Cambodia, Canada, China, Czech Republic, Germany, Greece, Hong Kong, Hungary, India, Italy, Japan, Liechtenstein, Luxembourg, Norway, Poland, Romania, Slovakia, Sri Lanka, Switzerland, Taiwan, Thailand, United Kingdom, and Vietnam). In order to collect data, we used a paper-based and an online questionnaire (https://www.soscisurvey.de/npd/). We mainly contacted experienced NPD members who have sound experience in the NPD process and who are involved in the NPD process at different stages.

Generally, in extant literature, researchers have conducted empirical studies by considering firm as the unit of analysis. However, in practice, firms have different types of SBUs (Strategic Business Units), which cater to different customer requirements. Therefore, findings based on the SBU level have more practical implications than findings based on firm level. Findings of our dissertation can be easily adopted by managers of each SBU in order to make their new products successful.

Contributions of each chapter is presented and discussed separately in respective chapters. As this dissertation has numerous contributions, this chapter will present the overall contribution of this dissertation and a comprehensive summary of each chapter.

Chapter 1: presents the field of NPD and firms' performance in general, discussed research gap and the overall effort in achieving the research objectives by designing a conceptual framework. We highlighted the importance of firms' openness towards its external environment, while integrating external information into their internal NPD activities.

Chapter 2: introduced basic theories adopted in this dissertation and background information of different types of NPD strategic orientation (B2B customer needs focus, B2B customer involvement, B2B information base of customer orientation, B2B customer communication management, and B2C market research), NPD operational (quality, time-to-market, cost) and NPD market (customer satisfaction, sales) performance.

Chapter 3: discussed general information about questionnaire design, sample selection, data collection, data validation, and data analysis.

Chapters 4 and 5: present the effects of external information collected through NPD strategic orientation on B2B customer value and NPD operational performance. In **Chapter 4**, we discussed the role of B2B needs focus (proactive, responsive) and B2B relationship orientation (communication frequency, informal modes of communication) in creating B2B customer value creation. We extended dynamic capability theory into customer value creation in B2B contexts and presented how firms should focus on their dynamic capabilities (absorptive and adaptive) in creating each type of B2B customer value (functional, cost, hedonic, and symbolic). In **Chapter 5**, by extending the open innovation paradigm into quality control practices and into the process of reducing time-to-market and cost, we highlighted the importance of eco-system orientation (technology, competitor, manufacturing), B2C customer orientation (market research), and B2B customer orientation (information base of customer orientation: data-based, intuition-based; communication management: communication frequency, informal modes of communication) in achieving NPD operational performance. In line with Kitala and Ahuja (2002) who stressed that over search of external information may hinder NPD performance, our findings also showed that some of the sources of external information should be utilized with extra attention. For example, information from B2C market research can negatively affect product quality, while this effect becomes positive with the presence of B2B intuition-based customer orientation.

Chapters 6, 7, and 8: show the effects of contextual factors (product technology: high-tech vs. low-tech, national culture, supply chain stage) on NPD operational and market performance. Researcher have recognized that firms' success and performance can be achieved in more than one way (Zeithaml et al., 1998). Each way is not equally effective under all conditions. The contingency theory states that firms must match its structure to its contingent factors and, thus, to its environment (Galbraith, 1973). Combination of all implicit and explicit circumstances that impact the situation of a process can be termed as a context in which a business process is embedded (Rosemann et al., 2008). In order to analyze the impact of the context on performance indicators, it is necessary to operationalize the context in the form of contextual factors (Banker and Natarajan, 2008). As contextual factors have many facets both in terms of their origin as well as their characteristics, firms always find it difficult to correctly deal with them. Few extant

research studies have focused on the importance of contextual factors in achieving higher performance (Rosemann et al., 2008; Ramos et al., 2010). In selecting contextual factors, degree of dynamic of a contextual factor is one of the important aspects that a firm should pay attention (Kronsbein et al., 2014). The degree of dynamic states how often a certain contextual factor changes its attributes (Kronsbein et al., 2014). Due to the lack of a comprehensive framework, which focuses on contextual factors at different broader levels, and based on high degree of dynamic of the contextual factors, we focused three main contextual factors representing three levels. 1. Country level: national culture, which helps firms understand why certain NPD strategies do not provide best feasible NPD performance within certain national contexts. Attributes of national culture drastically change with the geographical location and firms have to swiftly adjust to those conditions in order to be successful. 2. Product level: product technology, which is one of the most important product attributes. The technology involved in products changes frequently based on the dynamic market needs. 3. Firm level: supply chain stage, which showcases different B2B customer requirements at different positions of the supply chain (e.g., B2B customers generally expect different products from raw material developers, manufactures etc.). Many contingency approaches emphasize moderating effects of environmental characteristics on the relationship between strategy and performance (Zeithaml et al., 1998). Based on the contingency theory, we argue in this dissertation that the impact of a firm's strategic orientation on NPD performance largely depends on the moderating effects product technology, supply chain stage, and national culture on the relationship between strategic orientation and NPD performance.

In **Chapter 6**, we discussed the importance of different types of external information collected through B2B customer involvement motives (economic motives, informational motives, social influence motives, and relational motives) and B2C customer involvement motive, in achieving NPD operational performance. In addition, this chapter presented the role of high-tech vs. low-tech product technology in achieving each type of NPD operational performance. In **Chapter 7**, we discussed the effects of external information obtained through B2B customer needs focus (proactive, responsive) on product quality, and the moderating effect of national culture on these relationships. **Chapter 8** depicts how the effects of B2B customer value (functional, cost, hedonic, and symbolic) on NPD market performance vary along the supply chain.

9.2 Managerial Implications

Findings of this dissertation have important implications for managerial practice. We recommend that managers and practitioners incorporate external information into their NPD process especially in decision making. Possessing reasonable market knowledge and identifying real customer needs have been generally considered one of the key success factors (Griffin and Hauser, 1996). Collection and dissemination of external information could be a costly process unless firms use it effectively. Since managers have to take non-programmed decisions based on available information, information about customers, competitors and technology is vital. Drawing on external information may help firms minimize the risk of depending too much on internal capabilities. Due to changes in social conditions and economic situations, employees do not tend to work in one firm for a long period of time. Thus, firms cannot get long-term benefits by providing training and technical knowledge to their employees. However, by drawing on external knowledge, firms can invest less in developing their internal capabilities, while involving best capable expertise in their NPD process.

Based on specific findings we obtained in answering the three main research questions discussed in this dissertation, we suggest the following managerial implications, which are useful for managers and practitioners involved in the NPD processes.

We recommend that managers and practitioners draw external information into their NPD process during different stages: when creating B2B customer value, when achieving NPD market performance, and when achieving NPD operational performance. We also recommend that managers and practitioners pay extra attention on the role of product technology, national culture, and supply chain stage during the NPD process.

First, we recommend that managers and practitioners draw external information into their NPD process during the customer value creation process (see **Chapter 4**) and when achieving NPD market performance (see **Chapter 8**). While traditionally, firms have focused on creating tangible (functional, cost) customer value in B2B contexts (Huber et al., 2001), many firms have recognized the importance of intangible (hedonic, symbolic) value as a source of competitive advantage (Chitturi et al., 2007). Our results showed that responsive needs focus and proactive needs focus are important in creating B2B customer value. Firms need to adopt a proactive needs

focus in order to create intangible customer value, while they need to adopt a responsive needs focus to create tangible customer value. Implementing both a responsive and proactive needs focus is a challenging task (Tuli et al., 2007). Therefore, we recommend that managers assess the importance of tangible vs. intangible customer value that best fits the intended market positioning of a certain product. For example, a raw material developer (at the early stage of the supply chain) may find intangible customer value less important than tangible customer value and thus may want to adopt a responsive needs focus. By contrast, a trading office may attribute greater importance to intangible customer value and may thus be advised to adopt a proactive needs focus. In addition, we encourage managers to enhance the frequency of their communication with customers for creating tangible and intangible customer value. We also recommend that managers increasingly use informal (e.g., face-to-face meetings) rather than formal (e.g., emails) modes of communication to create intangible customer value.

Second, we advise managers and practitioners to draw external information into their NPD process through information base of customer orientation, market research, communication management, and eco-system orientation when achieving NPD operational performance. Drawing on external information helps firms increase knowledge through collaboration with stakeholders and leverage intellectual property more effectively to enhance product quality, reduce time-to-market, and cost (see **Chapter 5**). Firms have to draw on a wider range of external information to understand potential threats to their quality control since only few stakeholders have a sound understanding of potential problems in early stages of the product development. Based on our results, we encourage managers to adopt an intuition-based, rather than data-based, style of customer orientation. We recommend that managers implement a customer focused culture to understand quality related problems, rather than incurring huge investments on complex database management systems. Based on our findings, B2B intuition-based customer orientation helps firms shorten time-to-market of their products. B2B data-based customer orientation increases NPD cost. We advise managers to maintain frequent and informal (vs. formal) communication with customers to increase product quality. Frequent communication with customers help firms obtain quality-related hints and it also helps reduce cost of the new products. Moreover, we recommend that managers adopt B2C customer orientation (B2C market research) with extra attention. Even though direct usage of B2C market research may reduce product quality, B2B intuition-based customer orientation becomes more successful in creating high quality products when it is used

with B2C market research. Furthermore, the effect of B2B communication frequency on cost become lower, when firms conduct B2C market research. Despite several advantages of drawing on external information, we advise managers to be cautious when obtaining information through technology orientation and competitor orientation. Adopting new product technologies from outside may negatively affect the product quality. Technology orientation neither reduces time-to-market, nor reduces the cost of new products. Based on our findings, we encourage managers to focus more on manufacturing orientation in order to achieve high quality products and reduce time-to-market.

Third, we recommend that managers and practitioners consider the influence of product technology when achieving NPD operational performance through customer involvement. Firms can enjoy different advantages of collecting external information through B2B and B2C customer involvement. In this dissertation, we explored the effects of various types of B2B (economical, informational, social influence, and relational) and B2C (market forecast) customer involvement types with different motives on NPD operational performance and the differential effects of high vs. low product technology (see **Chapter 6**). Based on our results, we advise managers to pay an extra attention in adopting B2C customer involvement with market forecast motives. Even though B2C customer involvement with market forecast motives does not help firms in achieving high quality, it helps firms reduce time-to-market of their product. However, managers need to consider the additional cost that they have to incur in involving B2C customers. We encourage managers to involve B2B customers with economic attractiveness as they help firms gain high quality and short time-to-market in both high and low technology product developments. Managers need to pay extra attention when involving B2B customers with informational benefits as this type of customer involvement enhances performance only in high technology product developments. We also recommend that managers involve B2B customers with relational motives for achieving high quality in both high and low technology product developments. However, they should involve B2B customers with relational motives to shorten time-to-market only in low technology product developments. Further, based on our findings, we advise managers not to involve B2B customers with social influence motives as it does not provide any advantage.

Fourth, we advise managers to consider the influence of national culture when developing their new products at different geographical locations (see **Chapter 7**). Based on our findings,

both B2B proactive needs focus and B2B responsive needs focus help firms create high quality products. However, managers need to pay extra attention on the national culture in which they carry out NPD activities as culture moderates the relationships between the dimensions of customer needs focus and product quality. We recommend that managers consider power distance and long-term orientation of the cultures of the countries where they are going to start developing their new products. We suggest managers to adopt proactive needs focus when they operate in cultures with high power distance and short-term orientation. In this manner, firms can reduce the risk of entering unfamiliar information into their product development process and can correct and identify these unfamiliar information immediately. We also suggest managers to adopt responsive needs focus when they operate in cultures with low power distance and high long-term orientation, which helps share previous quality-related experience among the members of the NPD department.

Fifth, we advise managers to consider the influence of supply chain stage when developing their new products at different stages of the supply chain. Our findings show that the effects of B2B functional value on customer satisfaction and sales decreases along the supply chain, whereas the effect of B2B hedonic value on customer satisfaction increases along the supply chain (see **Chapter 8**). Therefore, we encourage raw material developers to focus more on the functional value creation, whereas trading offices to focus more on hedonic and symbolic value creation to achieve higher customer satisfaction and sales.

9.3 Limitations and Future Research

Although the current study utilized data from managers who have a thorough knowledge of the NPD process and of the English language, our results might not be without bias. However, our focus on knowledgeable managers assured high-quality survey responses and assured that we capture best practices. Thanks to these advantages of our method, we are confident that the final outcome of this dissertation is more fruitful for practitioners. At the same time, future research might seek to adopt another methodology in order to complement our efforts. In this dissertation, we could not use objective data to capture NPD performance (e.g. sales) as almost all the respondents did not want to disclose these hidden information. In addition, since information on financial performance is generally disclosed in financial statements based on firm level (not SBU

level), we could not use those actual data available. In order to address this issue, we have asked respondents to mention their financial performance in relation to their original goals. Generally in literature, financial performance is measured either compared to competitor performance (which might provide misleading information) or compared to firm's own original goal. Therefore, in this dissertation, we captured SBU's financial performances in relation to the original goals of firms. In this dissertation, we have defined the terms data-based customer orientation and intuition-based customer orientation based on the scales used in the study of Homburg et al. (2007), which describes cognitive and affective organizational systems. However, there might be a slight overlap between the intuition-based customer orientation scale and other scales used to capture customer needs. In order to address this issue, we did not use intuition-based customer orientation scale and other potentially overlapping scales in one chapter. This dissertation contributes to the literature by examining how different activities of the NPD department generate customer value in B2B contexts. We encourage future research to consider B2C customer value creation and investigate how strategies of NPD departments should be changed based on the business context (B2B or B2C). Organizational culture plays a key role in customer orientation (Deshpande et al. 1993) and a good fit between organizational culture and market orientation is of prime importance (Yarbrough et al. 2011). Thus, it may be interesting to investigate whether the effectiveness of customer orientation approaches in our conceptual model depends on the type of organizational culture that firms have fostered over the years. In this dissertation, we mainly focused on firms' NPD strategies in B2B contexts. We encourage future research to integrate B2C aspects such as consumer perceived value, consumer perceived quality, and consumer perceived satisfaction into the current conceptual method. Apart from NPD strategic orientation, firms can collect external information through supplier orientation. Thus, we encourage future research to explore the importance of supplier orientation when drawing on external information in NPD activities. Finally, we recommend that future research investigates the effect of contextual factors on the relationship between NPD strategic orientation and B2B customer value, which is an intermediate stage when achieving NPD performance.

References

Banker, R. D., and Natarajan, R. (2008). Evaluating contextual variables affecting productivity using data envelopment analysis. *Operations research*, 56(1), 48-58.

Chesbrough, H., Vanhaverbeke, W., and West, J. (eds) (2006). *Open Innovation: Researching a New Paradigm*. Oxford University Press, Oxford, London.

Chitturi, R., Raghunathan, R., and Mahajan, V. (2007). Form versus function: how the intensities of specific emotions evoked in functional versus hedonic trade-offs mediate product preferences. *Journal of Marketing Research*, 44(4), 702-714.

Deshpande, R., Farley, J. U., and Webster, F. E. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. *Journal of Marketing*, 57(1), 23-37.

Galbraith, J. 1973. *Designing complex organizations*. MA: Addison-Wesley.

Griffin, A., and Hauser, J. R. (1996). Integrating R&D and marketing: a review and analysis of the literature. *Journal of Product Innovation Management*, 13(3), 191-215.

Huber, F., Herrmann, A., and Morgan, R. E. (2001). Gaining competitive advantage through customer value oriented management. *Journal of Consumer Marketing*, 18(1), 41-53.

Katila, R., and Ahuja, G. (2002). Something old, something new: a longitudinal study of search behavior and new product introduction. *Academy of Management Journal*, 45(6), 1183-1194.

Kronsbein, D., Meiser, D., and Leyer, M. (2014). Conceptualisation of contextual factors for business process performance. *In Proceedings of the International MultiConference of Engineers and Computer Scientists*, Hong Kong.

Ramos, E., Santoro, F., and Baiao, F. (2010). Process improvement based on external knowledge context. *In Proceedings of the 21th Australasian Conference on Information Systems*, Brisbane.

Rosemann, M., Recker, J., and Flender, C. (2008). Contextualisation of business processes. *International Journal of Business Process Integration and Management*, 3(1), 47-60.

Tuli, K. R., Kohli, A. K., and Bharadwaj, S. G. (2007). Rethinking customer solutions: from product bundles to relational processes. *Journal of Marketing*, 71(3), 1-17.

Yarbrough, L., Morgan, N. A., & Vorhies, D. W. (2011). The impact of product market strategy-organizational culture fit on business performance. *Journal of the Academy of Marketing Science*, 39(4), 555-573.

Zeithaml, V. A., Rajan Varadarajan, P., and Zeithaml, C. P. (1988). The contingency approach: its foundations and relevance to theory building and research in marketing. *European Journal of Marketing*, 22(7), 37-64.

Appendix A

(Survey Questionnaire)

Survey of customer orientation and new product development performance

This survey is a part of an international research project that explores the relationships between customer orientation, customer value creation, and new product development performance. This survey is being conducted in Sri Lanka, China, Taiwan, Thailand and few other countries. It takes about 15 minutes to fill out this questionnaire. Your answers are valuable and will help advancing the research field of new product development. All responses will be treated anonymously, will not be used for any commercial purposes, and will not be shared with any third-parties under any circumstances. This survey is being supervised by **Prof. Takao Enkawa** and **Assistant Prof. Bjoern Frank** at the **Tokyo Institute of Technology, Japan**. Thank you in advance for your cooperation in this survey.

1. Company-related information

1-1. Country where you work: _____ 1-2. Company name: _____

2. Personal information

2-1. Industry experience: _____ years 2-2. Experience in the current company: _years

2-3. Designation/Job title: _____

2-4. Name of the **SBU** for which you are working: _____
(SBU = Strategic Business Unit: name of the department or smallest work unit to which you are attached)

2-5. What are the main products of your SBU? _____

(Sales volume: sum=100%)

2-6. In **percentage of total sales** volume, what happens with the **products** your SBU sells?

☐**Directly used** by **B2C** customers [private end consumers] _____%
☐**Directly used** by **B2B** customers [business end consumers] (to facilitate their business processes) _____%
☐**Processed** by **B2B** customers and **sold** to their **own customers** _____%

- At the **end** of the **supply chain**, these processed products are consumed by:
  - ☐B2B customers ☐B2C customers
- **Number of firms** in supply chain **between** your **SBU and** the **end consumer** using the final product: _____

	B2B customers (supply chain)				
Your SBU	1	2	3	……	End (B2B/B2C) consumer

3. New product development information

(Sum of all answers: 100%)

Typically for what percentage of designs do you use the following approaches?

☐In-house development "without specs from customers" _____%
☐In-house development "with partial specs from customers" _____%
☐In-house development "with complete specs from customers" _____%
☐Collaborative development with vendor "without specs from customers" _____%
☐Collaborative development with vendor "with partial specs from customers" _____%
☐Collaborative development with vendor "with complete specs from customers" _____%
☐No development _____%

The following sections evaluate the strategic orientation of your SBU. Please indicate to what extent you agree with the following sentences.

4. B2B information base of customer orientation (note: B2B: Business to Business) *(Homburg et al., 2007, JM) (1-completely disagree, 7-completely agree)*

Data-based customer orientation

4-1. We systematically **gather, analyze, and store** B2B customer information.

4-2. We **collect and circulate** reports, newsletters, etc. that provide relevant B2B customer information.

4-3. We systematically **keep track** of B2B customer behavior. After **analysis**, this information is **shared** in our company using newsletters, reports, etc.

4-4. We **collect** B2B customer information in a **comprehensive** and **holistic way** and periodically **analyze** it.

Intuition-based customer orientation

4-5. We are aware that the B2B customer is an **important factor** which influences the success of our company.

4-6. We **emphasize** B2B customer-related **activities** and their success.

4-7. We have a **strategy** that is based on the **understanding** of B2B customers.

4-8. We have **realized** that B2B customer **needs** are **consistently evolving** and it is necessary to be informed about **trends** and B2B customer **demands**.

5. B2B customer need focus *(Blocker et al., 2011, JAMS) (1-completely disagree, 7-completely agree)*

Responsive needs focus

5-1. We always **respond effectively** when B2B customers ask to **make changes**.

5-2. We always **try** to fully **accommodate** B2B customer requests for **changes**.

5-3. We always **react quickly** to B2B customer requests for **changes**.

5-4. We are always **flexible** and **adapt to changes** which B2B customers ask from us.

Proactive needs focus

5-5. We excel at **anticipating changes** in what B2B customers **need** from us **before** they ask.

5-6. We present **new solutions** to B2B customers which they **did not think** of themselves.

5-7. When dealing with B2B customers, we look for **clues** that might **change** our **priorities**.

5-8. We spend time **studying changes** in the customer business environment, so that we can have **better foresight** of customers' **future needs**.

6. B2B customer interaction *(Sin et al., 2005, JM; Oke et al., 2010, JOM) (1-completely disagree, 7-completely agree)*

Frequency of communication

6-1. We **frequently communicate** with B2B customers and **express** our **opinions** to them.

6-2. We work in **close cooperation** with B2B customers and **keep in touch constantly**.

6-3. We **exchange** information **with B2B customers frequently** in a **timely manner**.

To what extent do you use following communication channels for communicating with B2B customers?

(Sum of all answers: 100%) *(McDonough et al., 1999)*

Modes of communication

6-4. Face-to-face meetings:	_____%	6-5. Video conferences:	_____%
6-6. Social media (Facebook etc.):	_____%	6-7. Phone calls:	_____%
6-8. E-mails:	_____%	6-9. Fax:	_____%
6-10. Web-based media (blogs etc.):	_____%	6-11. Printed materials:	_____%

7. New product development performance *(Sales: Engelen et al., 2012, JIM/Cost: Gatignon et al., 1997, IJRM/Time: Ledwith et al., 2009, JPIM/CS: Song et al., 1997, JPIM/Quality: Ledwith et al., 2009, JPIM) (1-completely disagree, 7-completely agree) (7-1 to 7-7: 1-Extremely low, 7-Extremely high)*

In relation to our <u>original goals</u>, …

Sales

7-1. …what is the **sales volume** of our recently developed products/services?

7-2. …what is the **profitability** of our recently developed products/services?

7-3. …what is the **market share** of our recently developed products/services?

Cost

7-4. …what is the **R&D cost** of our recently developed products/services?

7-5. …what is the **marketing cost** of our recently developed products/services?

7-6. …what is the **manufacturing cost** of our recently developed products/services?

7-7. …what is the **overall cost** of our recently developed products/services?

Time-to-market

7-8. …our recently developed products/services are **launched on time**.

7-9. …our recently developed products/services have **shorter time to market**.

7-10. …our recently developed products/services have **shorter development cycle time**.

7-11. Our **recently developed products** are **well-accepted** in the marketplace.	CS
7-12. Our B2B and B2C **customers** are **happy with** our **recently developed products** and **love** our products.	
7-13. Our B2B and B2C **customers** give **positive feedback** on our products frequently.	
7-14. Our recently developed products meet **performance specifications**.	Quality
7-15. Our recently developed products meet **quality specifications**.	

8. B2B customer value creation *(Smith et al., 2007, JMTP) (1-completely disagree, 7-completely agree)*

For our <u>B2B customers</u>, …	
8-1. …our SBU **competes** with others by offering products with the right **features** or **attributes**.	Functional
8-2. …our SBU **competes** with others by offering products with **superior performance** or **outcomes**.	
8-3. …our SBU is making **useful products**.	
8-4. …our SBU is making **quality products**.	
For our <u>B2B customers</u>, …	
8-5. …the products of our SBU are **fun, interesting, or exciting** and provide an **outstanding customer experience**.	Hedonic
8-6. …a big part of the appeal of our SBU's products is **their ambiance, feel, or aesthetic experience**.	
8-7. …our SBU **competes** mainly by offering a **desired experience**.	
8-8. …the products offered by our SBU have a **strong sensory appeal**.	
For our <u>B2B customers</u>, …	
8-9. …the products of our SBU **allow** B2B customers to **express** their own **attitudes, interests**, or **opinions**.	

8-10. …the **brands** of our SBU have **strong meaning**.

8-11. …the **brand names** of our SBU are considered by many to be **prestigious** or **reflective of status**.

8-12. …the products of our SBU help **enhance** B2B customer **self-concepts**.

Symbolic

For our <u>B2B customers</u>, …

8-13. …a key benefit of the products offered by our SBU is their **lower cost**.

8-14. …the products offered by our SBU are **positioned** as being a **"good deal"**.

8-15. …the **product warranty**, service terms, of our SBU helps reduce the **perceived risk** of buying our products.

8-16. …our SBU promotes **flexible return policies** or other warranties aimed at reducing **the perceived risk** of buying our products.

Cost

9. B2C customer/end consumer involvement *(Feng et al., 2011, IMM) (1-completely disagree, 7-completely agree)*

When developing new products, …

9-1. …we **often hear** B2C customers' opinions.

9-2. …we **involve** B2C customers.

9-3. **...**we have a strong consensus in our SBU that B2C **customer involvement** is needed.

9-4. …we **listen** to B2C customers' ideas.

B2C involvement

10. B2C customer/end consumer market research *(Li et al., 1998, JM) (1-completely disagree, 7-completely agree)*

When developing new products, …

10-1. …we regularly **use research procedures**, e.g. personal interviews, focus groups, to **gather** B2C **customer information**.

10-2. …we systematically **process** and **analyze** B2C **customer information**.

10-3. …we regularly **study** B2C customers' **taste** and **behavior**.

B2C market research

11. Competitor orientation *(Gotteland et al., 2006, IJRM) (1-completely disagree, 7-completely agree)*

11-1. Our **salespeople** regularly **collect and share information** concerning **competitors' strategies**.

11-2. We **rapidly respond** to **competitive actions** that threaten us.

11-3. We **target competitors** from whom we can have an opportunity for **competitive advantage**.

Competitor orientation

12. Technology orientation *(Gotteland et al., 2006, IJRM) (1-completely disagree, 7-completely agree)*

12-1. Our SBU uses **sophisticated** product-related **technologies**.

12-2. Our **products** are always at the **state of the art of the technology**.

12-3. Our SBU **adapts** its products as **new technologies become available**.

Technology orientation

13. Manufacturing orientation *(Handbook of concurrent engineering by Hamid R. Parasaei and William G. Sullivan, 1993) (1-completely disagree, 7-completely agree)*

During the development process, the development team…

13-1. …**considers** the **availability** of **resources** for manufacturing. (processing technology, equipment, skilled labor, etc.)

13-2. …**considers** the **ability** of the **manufacturing process** to generate the desired **production rate**.

13-3. …**considers ease** of **handling** (feeding, initial set up of the machines, etc.) in manufacturing.

13-4. …**tries to minimize** all **unnecessary operations** in manufacturing.

13-5. …**selects the best process** to **minimize material wastage** in manufacturing.

Manufacturing orientation

14. Strategic B2B customer involvement *(Ernst et al., 2011, JAMS) (1-completely disagree, 7-completely agree)*

In developing new products, we strategically involve B2B customers…

14-1.	…who are **economically attractive** with respect to **past** business.	Economic
14-2.	…who are **economically attractive** with respect to **present** business.	
14-3.	…who are **economically attractive** with respect to **future** business.	
14-4.	…who **recognize problems early**.	Informational
14-5.	…who have a high degree of **technical knowledge**.	
14-6.	…who have **application knowledge** as a product user.	
14-7.	…who talk about **new products** in their **communication networks** very often.	Social influence
14-8.	…who distribute **a lot of information** on new products to their **communication networks.**	
14-9.	…who are often used as a **source of advice** by **members** of their **communication networks**.	
14-10.	…who have a **long-term relationship** with us.	Relational
14-11.	…who have **frequent contacts** with us.	
14-12.	…who are **satisfied with the relationship** with our SBU.	

Thank you very much.

Your cooperation in this survey research is greatly appreciated.

Journal	Abbreviation
Journal of Marketing	JM
Journal of the Academy of Marketing Science	JAMS
Journal of Product Innovation Management	JPIM
Industrial Marketing Management	IMM
Journal of Marketing Theory and Practice	JMTP
International Journal of Research in Marketing	IJRM
Journal of International Management	JIM

Appendix B

Factor Loadings Related to Multi-Item Scales

Questionnaire label	Questionnaire items	Factor loadings				
		X 1	X 2	X 3	X 4	X 5
B2B data-based customer orientation	4-1 ~ 4-4	0.77	0.75	0.85	0.80	
B2B intuition-based customer orientation	4-5 ~ 4-8	0.68	0.79	0.75	0.78	
B2B responsive needs focus	5-1 ~ 5-4	0.82	0.74	0.84	0.83	
B2B proactive needs focus	5-5 ~ 5-8	0.73	0.74	0.76	0.70	
B2B communication frequency	6-1 ~ 6-3	0.88	0.85	0.82		
Sales	7-1 ~ 7-3	0.78	0.75	0.84		
Cost	7-4 ~ 7-7	0.81	0.79	0.85	0.87	
Time-to-market	7-8 ~ 7-10	0.75	0.74	0.87		
Customer satisfaction	7-11 ~ 7-13	0.87	0.89			
Quality	7-14 ~ 7-15	0.86	0.86			
B2B functional value	8-1 ~ 8-4	0.75	0.73	0.78	0.77	
B2B hedonic value	8-5 ~ 8-8	0.73	0.90	0.75	0.90	
B2B symbolic value	8-9 ~ 8-12	0.69	0.82	0.85	0.83	
B2B cost value	8-13 ~ 8-16	0.67	0.76	0.69	0.64	
B2C involvement	9-1 ~ 9-4	0.76	0.65	0.75	0.83	
B2C market research	10-1 ~ 10-3	0.77	0.76	0.82		
Competitor orientation	11-1 ~ 11-3	0.85	0.86	0.82		
Technology Orientation	12-1 ~ 12-3	0.87	0.82	0.88		
Manufacturing orientation	13-1 ~ 13-5	0.80	0.83	0.75	0.85	0.83
B2B customer involvement with economic motives	14-1 ~ 14-3	0.75	0.85	0.83		
B2B customer involvement with informational motives	14-4 ~ 14-6	0.79	0.86	0.91		
B2B customer involvement with social infleunce motives	14-7 ~ 14-9	0.89	0.91	0.86		
B2B customer involvement with relational motives	14-10 ~ 14-12	0.86	0.88	0.86		