

Anna Dubiel

**Successful New Product Development for
International Markets**

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Published by Anna Dubiel

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Academic research on new product development (NPD) has been largely conducted in the domestic context in the past. This contrasts sharply with the importance of international sales markets for today's business. Moreover, developing successful products for less familiar overseas markets is difficult, as most companies have aligned their NPD to domestic customers' expectations. This empirical study is one of the firsts to systematically analyze direct and indirect determinants of international NPD (INPD) performance. The impact of some selected success drivers is further examined with regard to individual NPD process stages. Finally, using the example of so-called emerging markets, the relevance of the identified success factors is discussed contingent upon such a different market type. Thus the study is of interest to both practitioners aiming to improve their firm's INPD performance and academics who plan further research in this field.

I conducted this research project while working at the Chair for Technology and Innovation Management at the WHU – Otto Beisheim School of Management in Vallendar. During this time I have experienced the support of numerous people. First and foremost, I would like to thank my first advisor Prof. Holger Ernst (WHU) for his helpful insights, comments, and suggestions throughout the project. His generous support allowed me to participate in many academic conferences which also yielded valuable feedback for my work. I also would like to acknowledge the supportive contributions and guidance of my second advisor, Prof. Lutz Kaufmann (WHU). Further, I would like to thank Prof. Mohan Subramaniam (Boston College, MA, USA) for his advice and invitations to spend some weeks as a visiting researcher at his department. Finally, the study would not have been possible without the support of 193 managers from different German manufacturing companies who spent collectively 90 hours filling out my questionnaire. I hope very much that the results of the study provide them with some fresh ideas for the daily management of NPD aiming at foreign markets.

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Moreover, I would like to thank my parents for their endless support and ongoing motivation. Last but not least, I am indebted to Volker. He tirelessly encouraged and supported me over the last years. Thus I am dedicating this work to him and our relationship.

Anna Dubiel

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A. INTRODUCTION

“... competitive advantage in today’s marketplace increasingly relies on effective management of global product innovation and launch for corporate survival.”

Calantone and Griffith (2007), p. 417

“The rules to innovate globally are different from those to innovate locally...”

Fallah and Lechler (2008), p. 60

1. Relevance of the Subject

Internationalization is affecting nearly every company in the competitive marketplace. This also holds true for the new product development (NPD) domain which has for long been regarded as a predominantly home market centered activity. This perception was reflected by Vernon’s (1979) influential product life-cycle model. It assumed that products were developed for domestic markets and potentially exported later on – at best with some minor adjustments to accommodate foreign markets’ wants and needs. If exporting new products with small adaptations can be defined as a first humble wave of NPD internationalization, the second far more meaningful started with the growing global distribution of R&D sites. Together with the already internationally scattered marketing and production facilities they constitute the cornerstone of international new product development (INPD) activities. Yet, also this evolution was rarely truly global in scope. Most of NPD-related activities were confined to the so-called Triad region (Europe, Japan, and North America). In the last decade, however, it seems that a third wave of NPD internationalization takes place as several emerging economies like Brazil, China or India are joining the competitive scene.

This development does not make the process of designing successful new products for international markets any easier. Managerial practice reports an array of failed product introductions to foreign markets. The reasons range from unmet customer demand through unsuitable technological solutions to uncompetitive price tags (Deloitte, 2006). In order to succeed companies have to realign their NPD capabilities with changing market conditions (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997). However, such transformation of NPD activities from the domestic to the international

setting is not a trivial task (Rothaermel & Hess, 2007). For instance, GE Healthcare found it tough to sell medical equipment designed in the USA in the Indian market. In order to offer locally successful products – for example, a portable ultrasound device being six times cheaper than conventional machines – the company had to undergo a deep change in terms of strategy, organization and processes (Immelt, Govindarajan, & Trimble, 2009).

International aspects of NPD even though increasingly relevant in an ever-globalizing world are still a minor research stream within the NPD literature. In their detailed review Page and Schirr (2008) have found that only 13 out of 815 articles on NPD published in leading academic journals between 1989 and 2004 – that is less than 2 percent – were primarily dealing with international or global NPD. Another 19 articles were classified as having global NPD as a secondary focus. This limited number of studies might at first glance cast some doubts on the distinctiveness of international as opposed to domestic NPD. Especially, as the latter has been extensively studied in the last 30 years (Ernst, 2002).

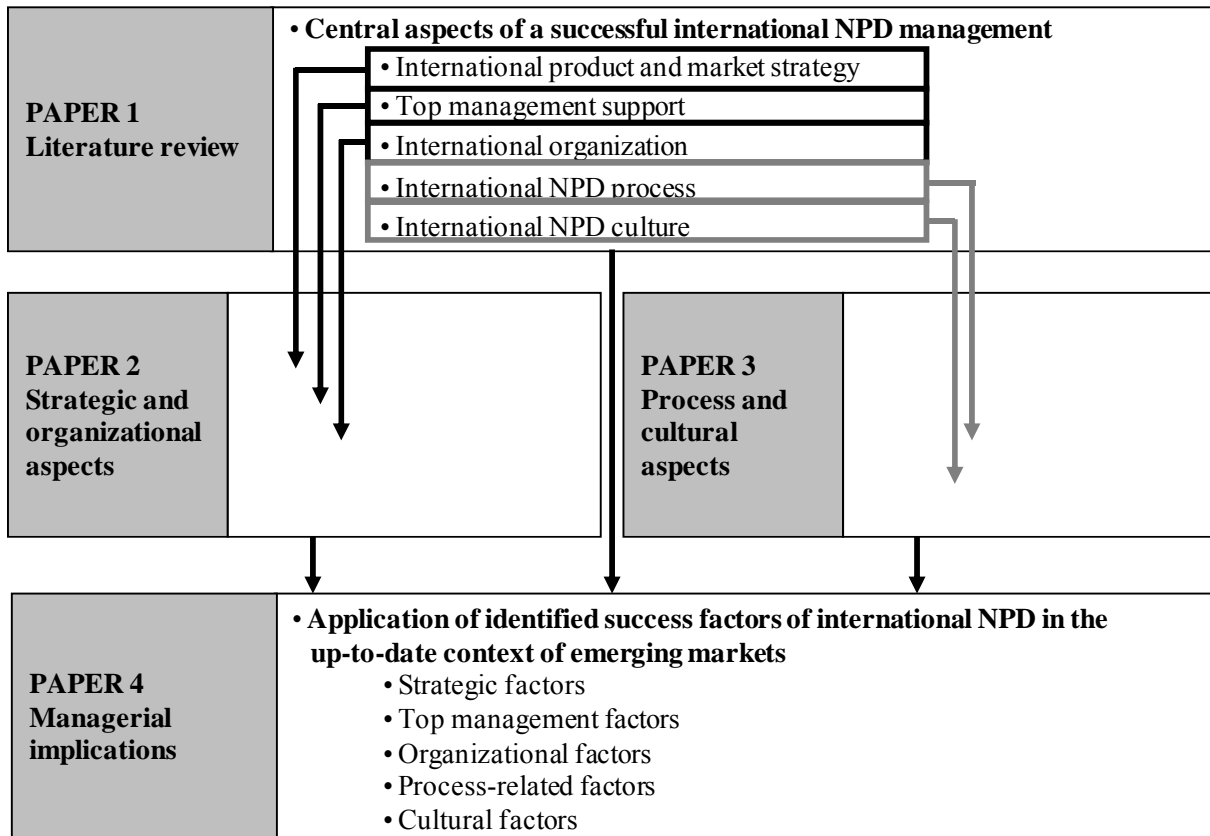
A closer look at some recent NPD literature, however, reveals a growing interest of the research community in NPD internationalization. A number of special issues of different academic journals were devoted to this topic in the last few years. The most prominent were issues of the *Journal of Product Innovation Management* in 2000 and 2007 (Vol. 17, Issue 5; Vol. 24, Issue 5), the *International Marketing Review* in 2003 (Vol. 20, Issue 4) as well as the *Journal of Engineering and Technology Management* in 2008 (Vol. 25, Issue 1-2). Altogether the respective articles underscore the distinctiveness of INPD and repeatedly point to the need for more systematic research on this topic. Thus even though the research base is narrow, there is plenty of evidence to believe that developing products for foreign markets is much more than a routine spin-off of domestic NPD activities. A thorough investigation of the existing literature also reveals that the majority of domestic studies were not designed to address the specific issues concerning NPD for international markets. Because of this there is lots of room left for new research endeavors in this under-researched area.

2. Contribution and Outline of the Study

This PhD thesis seeks to explore some aspects that have so far received less attention than merited and thus to contribute to narrowing the existing research gap. The central questions addressed in the subsequent paper series are:

- What factors influenceable by a company's management positively affect INPD performance? Are they similar or different from those already known from domestic NPD?
- Why is an international orientation so important for INPD performance?
- What are the most important drivers of international orientation of a company?
- In which stage of the NPD process does international market information play a crucial role for INPD success? Is the pattern similar or different from the domestic setting?
- What can companies do in order to enhance international market information integration in the decisive NPD process stages?
- To what extent do so-called emerging markets pose special challenges on companies willing to succeed with their new products locally?

This PhD thesis consists of four papers in the area of INPD. The papers cover a range of INPD topics building on literature reviews, large-scale empirical samples as well as case studies and provide unique insights into the issues raised. They contribute both to enhancing the understanding of INPD in the academic world as well as offer a number of managerial implications. Figure 1 provides an overview of the structure of the dissertation and the interrelationships between the distinct papers.

Figure 1: Structure of the PhD Thesis

Source: Own illustration.

The first paper titled “*Managing International New Product Development: Literature Review and Success Factors*” analyzes and synthesizes the current thinking about INPD. There is a growing body of research concerning this topic but a common understanding is often lacking. In order to allow for a more systematic discussion, the paper starts with defining INPD on the basis of existing literature as one involving NPD activities taking place across national boundaries prior to the product’s actual launch abroad. It further goes on to discuss the motivations and barriers of NPD internationalization. Next, it examines the main success factors of developing products for foreign markets. In doing so it chooses to follow an established classification of success factors into strategic, top management-related, organizational, process-related, and cultural determinants. Finally, the results are discussed and an agenda for future research is presented. The subsequent empirical papers address some of the issues raised.

The second paper titled *“Leaving the Home Turf: International Orientation, its Antecedents and Impact on Innovation”* examines the concept of international orientation – a firm’s capability at recognizing and availing of opportunities outside its country borders – as well as its antecedents and consequences for innovation. To manifest an international orientation a firm needs to: 1) acquire knowledge about overseas opportunities, so as to identify and be aware of them, 2) share that knowledge internally, so as to assimilate and absorb the promise behind those opportunities, and 3) use that knowledge, so as to really act upon and benefit from the perceived opportunities. Using multiple informant data from 138 business units from five export-intensive German industries the paper finds that a firm’s international orientation is an important prerequisite for its innovation performance in international markets. What’s more, the study identifies three factors strongly influencing international orientation namely, a firm’s strategic intent, top manager’s international exposure, and intercultural training of employees.

The third paper titled *“Integration of International Market Information in New Product Development – A Stage-specific View”* addresses the issue of international market information processing in INPD. It offers a detailed perspective of international markets’ contribution by zooming into three generic NPD process stages namely, concept development, product development and commercialization. Through an analysis of 138 business units from five German industries the paper finds that integrating international market information in the concept and product development stages is most beneficial for INPD performance thus the hypothesized “hour-glass shape” model of international market information processing in NPD i.e. one where integrating international market information in the early and late stages is most useful for NPD performance abroad is not supported. These results indicate that products for foreign markets have to be designed from scratch with these markets in mind and later adjustments will not considerably influence NPD performance overseas. Further results of the analysis indicate that international innovation culture and international company experience positively influence integration of international market information, however, not in all NPD process stages.

Finally, the fourth paper titled *“Incredible Innovations – How to Succeed with New Products in Emerging Markets”* takes on a managerial perspective. It gives recommendations on how to

develop successful new products for markets like China and India increasingly gaining in importance for Western companies. It especially focuses on the middle and lower segments of these markets. The paper employs a case study based methodology to enumerate the eight most important factors which help companies to develop new products for emerging markets. To succeed companies should adjust their NPD strategy, focus on their new customer segments, offer totally new price-performance ratios, apply a so-called “Gandhian” engineering approach, localize R&D activities, adapt marketing and sales measures, introduce new business models, and co-operate with local partners. What’s more, NPD activities in emerging markets can help multinational corporations (MNCs) to build a truly global mindset as well as generate innovations that against widespread believes may be very attractive in developed markets, too.

3. Conclusion

The last decade has witnessed an above average increase in the internationalization scope due to new country markets entering the competitive landscape. This opened up an abundance of new NPD-related opportunities for companies like new sales markets, new knowledge clusters, new skilled labor sources or cost-saving options. However, INPD is no low hanging fruit. It requires the development of new capabilities and the full backing of the company management. It is not just a temporary mood but a far-reaching strategic commitment. This thesis aims at contributing to this highly up-to-date and complex topic of interest to both academia and practice. In doing so, it presents four papers building on strong literature foundations as well as primary data from a questionnaire and personal interviews. It further sketches new ideas and research directions that can serve as the basis of new studies to further our understanding of this extremely interesting research area.

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B. MANAGING INTERNATIONAL NEW PRODUCT DEVELOPMENT: LITERATURE REVIEW AND SUCCESS FACTORS

“... the lack of attention devoted by scientific research to the management of international innovation contrasts sharply with the importance attached to it as a cornerstone of international business success.”

Moenaert, Caeldries, Lievens and Wauters (2000), p. 360

“Well-established firms typically must unlearn routines rooted in domestic operations before new, internationally oriented routines can be learned.”

Knight and Cavusgil (2004) p. 128

1. Introduction

Internationalization has a profound impact on new product development (NPD) activities of firms today. It is apparent both on the input and output sites of the NPD process. The input is internationalizing since relevant knowledge sources become more dispersed, foreign markets more accessible, and company subsidiaries more experienced (Boutellier, Gassman, & von Zedtwitz, 2008; Doz, Santos, & Williamson, 2001; Hedlund & Ridderstråle, 1995). Thus the worldwide scope of innovation stimuli is rapidly increasing. On the output site companies have to satisfy an ever-growing variety of customers from all corners of the globe. Markets so far under the radar of numerous companies become increasingly attractive due to their higher solvency (Gadiesh, Leung, & Vestring, 2007; Goldman Sachs, 2008; Immelt, Govindarajan, & Trimble, 2009). Research and managerial practice indicate that customer tastes and needs worldwide are often heterogeneous and require far-reaching product adaptation or totally different product designs (Deloitte, 2006; Golder, 2000; MacPherson, 2000). This runs counter to the provocative statements of international management scholars in the 1980s prophesying hegemony of “global products” (Levitt, 1983; Ohmae, 1989). Thus

companies have not only a growing number of markets to serve but also a growing product portfolio to manage.

For many years, however, internationalization seemed not to affect directly NPD activities in most companies (Devinney, 1995). It undeniably opened up new markets but most firms reacted to it by simply replicating what they have done at home and exported existing products or their slight modifications. In fact, the process of developing products for foreign buyers started with the needs of domestic customers (Davidson & Harrigan, 1977; Ronkainen, 1983). Exports were an add-on considered later in a product's life cycle (Vernon, 1979).

Not surprisingly thus, NPD internationalization was a marginal issue in the literature till the end of the 1970s and in the following decade mostly part of (international) marketing and international management literature (Bartlett & Ghoshal, 2002; Davidson & Harrigan, 1977; Levitt, 1983; Ohmae, 1989; Takeuchi & Porter, 1986). The majority of insights into this topic was based on anecdotal evidence and seemed to be a side-effect of international management research. It was not until the late 1980s when researchers turned their attention to the growing physical R&D presence abroad (de Meyer & Mizushima, 1993; Håkanson & Zander, 1988). Simultaneously, the advent of the NPD research domain awaked interest in its internationalization aspects (Kleinschmidt & Cooper, 1988). Nevertheless, it was not carried on in great detail until the end of the 1990s when virtual NPD teams (McDonough, Kahn, & Barczak, 2001), global NPD structure (Gassmann & von Zedtwitz, 1998; Nobel & Birkinshaw, 1998) and transnational NPD processes (Subramaniam, Rosenthal, & Hatten, 1998) caught the attention of scholars.

Given that for most companies NPD for international markets is one of the main drivers of business success today (de Brentani & Kleinschmidt, 2004) it is surprising how little systematic research looks at this subject (Jeong, 2003; Moenaert, Caeldries, Lievens, & Wauters, 2000; Perks & Wong, 2003). It strikes especially in comparison with the impressive body of literature dealing with domestic NPD (Ernst, 2002; Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994). Nevertheless, over the years the number of publications in this field has been growing – for instance,

through special issues of leading scientific journals¹ – however, a common understanding in the research community is still lacking.

Especially the two scientific domains predestined to conduct research on this topic – namely international management (IM) as well as technology and innovation management (TIM) – have somewhat different perceptions and priorities. IM examines how a company manages its international expansion (Bartlett & Ghoshal, 2002; Porter, 1986). This is usually done by studying the internationalization of the value chain either by single functions like marketing or by single support activities like HR management. NPD as a cross-functional activity does not fit perfectly into this perspective. Frequently companies start internationalizing by leveraging home-based advantages like new products (Porter, 1986). Thus launch tactics and product taxonomies along the standardization-localization continuum have been subject to much IM research scrutiny (Bartlett & Ghoshal, 2002; Levitt, 1983; Takeuchi & Porter, 1986). Typologies however, even though of great importance, have a more static character thus are not fully accommodating the more process-oriented and dynamic nature of NPD. What's more, they focus on the outcome or last steps of the NPD process and not that much on activities preceding product launch. The TIM research domain in contrast is very specialized. Many studies in this field examine activities and success determinants along the entire NPD process – from product inception to launch (Ernst, 2002; Henard & Szymanski, 2001). However, so far TIM exhibits mostly a domestic perspective. The existing international studies further rarely demonstrate a direct link between the examined managerial practices and international new product development (INPD) success (Bruce, Daly, & Kahn, 2007; Hoegl, Ernst & Proserpio, 2007). Several typologies of international R&D (Kuemmerle 1997; von Zedtwitz & Gassmann 2002) again look through the lens of a single department. To sum up, firstly, studies being both international in scope and integrating pre-launch activities are missing. Secondly, INPD studies in the TIM domain rarely use findings from the IM domain. Thirdly, most studies define INPD individually. Finally, large-scale empirical examinations on INPD are missing.

¹ For example, *International Marketing Review* Vol. 20, Issue 4; *Journal of Engineering and Technology Management* Vol. 25, Issues (1-2); *Journal of Product Innovation Management* Vol. 24, Issue 5; *Journal of Product Innovation Management* Vol. 17, Issue 5.

The purpose of our analysis is thus to synthesize and categorize the existing body of research about INPD at the firm level. We focus on the internationalization of the product generating activities, not the R&D function per se. We turn our attention especially to large-scale empirical examinations, however, as research on INPD is limited, we also include some compelling case studies on specific INPD projects to provide a more detailed picture of the field. This paper is structured as follows. We start with defining INPD and answer the question of *what* is meant by this term. Then we highlight the most important motivations and barriers of NPD internationalization. Next, we present the five key managerial issues of INPD namely, strategy, top management support, organization, process, and culture which provide evidence on *how* to successfully conduct INPD. Afterwards, we go on to discuss the body of empirical work into INPD. Last but not least, we mention some limitations and offer directions for further research.

2. Defining INPD

Is INPD truly different from its domestic counterpart? Is the lack of constant scientific attention to this topic a proof of lacking distinctiveness? A closer look at the respective research domain seems not to confirm this. The limited INPD research might be for instance explained by the fact that most studies were conducted in the USA and Canada with the former being a huge market by itself. Thus foreign markets have been playing a subordinate role for the studied companies and consequently for academicians, too. Until a minimal level of foreign operations is not exceeded, companies tend not to adapt offerings and structures to serve overseas markets which remain appendages to domestic operations (Gomes & Ramaswamy, 1999).

In the case however, when foreign markets' importance increases, companies have to cope with distinct international demand to a higher extent. Local variations of taste, infrastructure, and economic wealth make it necessary to align new products with often unknown expectations of foreign buyers (Bruce et al., 2007; Theodosiou & Leonidou, 2003; Townsend, Cavusgil, & Baba, 2010; von Zedtwitz, Gassmann, & Boutellier, 2004). And this is not easy as high product failure rates in unfamiliar settings demonstrate (Souder & Song, 1998). Indeed, strong interfirm discrepancies with regard to success of new products abroad can be observed (Deloitte, 2006). Especially, home-made

products exported to culturally distant countries remain unsuccessful (Gadiesh et al., 2007; Immelt et al., 2009). This is because domestic demand may not always provide a robust indicator of foreign market conditions (MacPherson, 2000; Townsend et al., 2010). Export markets are less familiar and more expensive to research and administer (Ayal & Raban, 1990). Consequently, NPD for foreign markets does not equal NPD for domestic markets (Fallah & Lechler, 2008). Changing a company's NPD capabilities is by no means an automatism, too, as most of them have been built on the basis of home-market demand (Craig & Douglas, 2000; MacPherson, 2000). Thus to successfully offer new products in a foreign business environment it is critical for firms to adjust their NPD capabilities to the international domain (Persaud, 2005; Kleinschmidt, de Brentani, & Salomo, 2007). Existing research demonstrates for instance, that such a transformation requires a systematic learning of new international skills like foreign market knowledge competence (Li & Cavusgil, 2000), global orientation (Townsend et al., 2010) and border-spanning capabilities (Craig & Douglas, 2000).

Existing literature defines INPD in a number of ways (see Table 1 for an overview).

Table 1: Overview of Perspectives on INPD

Study	Definitions of INPD	Dimension
Bartlett and Ghoshal, 2002, p. 147	“ Transnational innovation processes use linkages among dispersed units of the organization to leverage existing resources and capabilities, irrespective of location, to exploit any new opportunity that arises anywhere in the company.”	Strategy, organization, process
Bruce et al. 2007, p. 457	“The process of global product launch is the company's ability to understand key design issues per each global region respectively and to respond to pressing global region differences by customizing the total product offering to meet the needs of that global region.”	Strategy, process
BusinessWeek Research, 2006, p. 5	“ Global Product Development is typically defined as a unified product development process where design teams work collaboratively on a single process or product across multiple geographic locations.”	Organization, process
Chiesa, 2000, p. 341	“ Global R&D projects are projects leading to innovations to be exploited in multiple countries.”	Strategy
De Brentani, Kleinschmidt and Salomo, 2010, p. 146	“... what we label a global product harmonization strategy is called for to exploit global economies and central knowledge integration while also providing for adaptation of products and marketing effort to local conditions when needed.”	Strategy

Study	Definitions of INPD	Dimension
Eppinger and Chitkara, 2006, p. 23	“ Global Product Development is a single, coordinated product development operation that includes distributed teams in more than one country utilizing a fully digital and connected collaborative product development process. This may include third parties that provide engineering or design capacity, or it may be an entirely captive, company-owned operation.”	Organization, process
Fallah and Lechler, 2008, p. 73	“ Global innovation paradigm could be characterized as: a market model of serving many countries with diverse needs, with a distributed R&D organization close to customers without a centralized bias, high velocity innovation processes, and cultural integration.”	Strategy, organization, process, culture
Graber, 1996, p. 485	“The global product road (...) is geared towards identifying common product needs and opportunities across the various regions of the world.”	Strategy
Hedlund and Ridderstråle, 1995, p. 163	“ International development project is a project aiming at the development of a specific product, for a wide international market, and involving strategic development resources in several countries.”	Strategy, organization, process
Kleinschmidt and Cooper, 1988, p. 57	“ Internationally oriented new product strategy means products designed and developed for international applications and uses.”	Strategy
MacPherson, 2000, p. 167	“ International design orientation is defined as initiating the design process with respect to the needs of foreign buyers.”	Strategy
Moenaert et al., 2000, p. 361	“An international product innovation project is defined as an innovation project for which the functional responsibilities of R&D, production and marketing are not concentrated in one single country.”	Organization, process
Santos, Doz and Williamson, 2004, p. 31	“... some companies have managed to assemble an integrated “innovation chain” that is truly global (...) a process for innovating that transcends local clusters and national boundaries, becoming what we dub ‘metanational innovators’.”	Strategy, process
Subramaniam, 2006, p. 545; Subramaniam and Venkatraman, 2001, p. 361	“We define transnational new product development capability as the ability to consistently and successfully introduce new products simultaneously in multiple country markets.”	Strategy
Townsend et al., 2010, p. 54; Townsend, Yenyurt, Deligonul, & Cavusgil, 2004, p. 7	“ Global new product development process is defined as the activities related to understanding the global customer needs, and shaping new product development and global brand creation processes according to those needs.”	Process

Study	Definitions of INPD	Dimension
Zander, 1999, p. 195	“ Globally integrated innovation projects involve cross-fertilization between geographically dispersed units engaged in similar types of innovation activities as well as the integration and recombination of distinct technological capabilities into significantly new products or complex systems.”	Organization, process

The first common denominator between the reviewed studies is clearly the fact that international products are distinct from domestic ones because they are launched abroad (Chiesa, 2000; Subramaniam 2006). This distinction although accurate might be too simplistic as it says nothing about the way these products come into being. Other studies suggest that the mere selling of a product abroad is a necessary but not sufficient precondition for INPD. There rather has to be an intention of the company to sell the product abroad from the very beginning of its development (Graber, 1996; Kleinschmidt & Cooper, 1988; MacPherson, 2000). This means designing it in such a way as to meet foreign customers' demand (Ronkainen, 1983). This intention may for instance, manifest itself through a higher proportion of NPD-related activities conducted abroad (Kleinschmidt & Cooper, 1988) or key decisions in the NPD program being multinational in scope (Ronkainen, 1983). To put it differently, a truly INPD is characterized by some degree of internationalization of NPD activities conducted prior to a product's launch which usually also takes place abroad² (Berggren, 2004; Eppinger & Chitkara, 2006; Fallah & Lechler, 2008; Hedlund & Riddersrale, 1995; Perks & Wong, 2003; Sakakibara, 1995; Townsend et al., 2004).

A further look at Table 1 indicates that INPD touches a number of different dimensions i.e. an international product strategy, an internationally dispersed organization, processes linking dispersed company resources and capabilities as well as an INPD culture. The strategic dimension sets the base for NPD actions. It dictates the degree to which a company orients its NPD activities towards the needs of foreign buyers, to which it gears towards standardizing or adapting its products across markets as well as the mode of international product roll-out it envisions. The organizational

² There also exists the option of launching a product developed internationally for instance, in a company's foreign subsidiary, in a company's home market. However, we do not include this subgroup in our analysis as the focus of this PhD thesis is on the development of new products for foreign markets thus explicitly presuming their launch abroad.

dimension should reflect the intended strategy. A majority of studies implies that an international R&D and marketing organization is necessary for INPD as it allows tapping into distinct local resources (Moenaert et al., 2000). Also the process dimension plays a vital role. Not only because NPD is usually conceptualized as a sequence of activities carried out in different stages by different company departments (Cooper, 2008) but also because it acts as a link between the distinct organizational units often scattered around the world. Last but not least, an INPD culture supports the intra-organizational unity even further. A successful INPD is thus influenced by all these dimensions.

Building on the existing literature, we define *INPD as one involving NPD activities taking place across national boundaries prior to the product's actual launch abroad*. As such it is decisive that pre-development and/or development activities like idea generation, concept development or prototype development and testing (Cooper, 2008) encompass international elements before the product is finally launched abroad. For instance, market research can be conducted internationally in order to create a broad product prototype in the company's headquarters for future local market adaptations as was the case with P&G's cosmetics (Bartlett, 2003). A different example is GE which fully localized the development of some medical equipment devices for worldwide markets in its Indian subsidiary (Immelt et al., 2009).

We use the term "INPD" in the remainder of this article instead of "global NPD" because the latter might be seen as synonymous to worldwide homogenous products which are only one possible outcome of INPD (Levitt, 1983; Ohmae, 1989). Additionally, not all companies are necessarily active worldwide³. Furthermore, we emphasize that activities leading to the development of new products for international markets are not confined to the R&D department. We thus do not equate "INPD" with "international R&D" (Gerybadze & Reger, 1999). As such we are in line with the NPD literature's common sense that NPD is a cross-functional endeavor (Ernst, 2002).

³ For instance, the results of our survey introduced in the subsequent empirical papers show that the respondent German manufacturing companies are on average active in 58 countries while their answers vary between three and 200 countries.

3. Motivations and Barriers of NPD Internationalization

A number of studies have elaborated on the different motivations and barriers associated with the internationalization of NPD activities (Boutellier et al., 2008; Fallah & Lechler, 2008; Gassmann & Han, 2004; Gassmann & von Zedtwitz, 1998; The Economist, 2004). We adapt the basic classification approach of Gassmann and colleagues as it has been refined over a decade of various study settings and mirrors the most recent developments in NPD internationalization, for instance, taking into account specificities of emerging markets. We confine ourselves to motivations and barriers lying within the company. We thus for instance, do not discuss business-ecological motivations like peer pressure or inter-organizational barriers like uncertainty in legal changes.

3.1 Motivations

Input-oriented motivations. Companies internationalize their NPD activities to tap new sources of scientific and technology knowledge (Chiesa, 2000; Chiesa, 1996; Eppinger & Chitkara, 2006; Hitt, Hoskisson, & Kim, 1997; Kafouros, Buckley, Sharp, & Wang, 2008; Kuemmerle, 1999; von Zedtwitz, Gassmann, & Boutellier, 2004; Zander & Sölvell, 2000). And these increasingly pop up at unexpected locations. Who would for instance guess two decades ago that Brazilian banks would become leaders in internet banking at the end of the 1990s (Sharma & Nakamura, 2003) or Chinese R&D employees would develop award winning medical equipment successfully selling both in China and in Germany (Bartsch, 2009)? What's more, these clusters are today easily accessible for companies due to rapid technological advancement in communication and transportation (Fallah & Lechler, 2008; Jeong, 2003; von Zedtwitz et al., 2004).

Some firms, mainly from smaller countries, internationalize to overcome shortcomings of their domestic knowledge bases (Gerybadze & Reger, 1999; Zander & Sölvell, 2000). Especially the globalization of R&D departments has been rapidly progressing (Boutellier et al., 2008; INSEAD, 2006; Ogbuehi & Bellas, 1992; The Economist, 2004). Local R&D presence helps to enter scientific and industry networks as well as access local talent pools (Boutellier et al., 2008; Gassmann & von Zedtwitz, 1998; The Economist, 2004). It is vital for NPD success to gain foreign research experience

and local know-how first hand – both cannot be accumulated by downloading information from the internet.

What's more, fishing in the same knowledge pond with competitors restricts the exclusivity of NPD ideas thus limits the sustainability of competitive advantages (Doz et al., 2001; Santos et al., 2004). Pooling R&D efforts across markets provides firms with a configural advantage relatively to those with a narrower geographical scope of operations (Craig & Douglas, 2000). A higher international firm diversification clearly leads to greater learning and experiential opportunities hence higher NPD performance (Barlett & Ghoshal, 2002; Hitt et al., 1997; Jeong, 2003).

Output-oriented motivations. Internationalization can increase sales and profits by exploiting growth opportunities in diverse international markets. In particular, a fast global rollout of products enhances success via economies of scale/scope, exploitation of windows of opportunities, and first-mover advantages (de Brentani et al., 2010). Some companies increasingly cross borders as competition at home grows due to foreign entrants (Kleinschmidt & Cooper, 1988; MacPherson, 2000). And it is very difficult for firms to sell products abroad without any adaptation – especially in culturally distant markets. Deep local market know-how is thus of uttermost importance (Chiesa, 1996; Santos et al., 2004; Subramaniam, 2006; Subramaniam & Venkatraman, 2001). It is best collected, processed and embedded into products by local NPD employees familiar with local demand patterns, beliefs and norms (Eppinger & Chitkara, 2006; Kuemmerle, 1999; Ogbuehi & Bellas, 1992). On-site presence of NPD activities accelerates the speed of product commercialization across markets increasingly important in times of tough competition (Chrysochoidis & Wong, 1998). Some companies engage in local NPD to strengthen their local citizen image (Boutellier et al., 2008; Ogbuehi & Bellas, 1992). Furthermore, existing global customers request local NPD support overseas (Boutellier et al., 2008).

Efficiency-oriented motivations. Internationalization of NPD is also necessary because domestic markets often turn out to be too small to support development and commercialization expenses of new products (Hitt et al., 1997; Oakley, 1996; Ohmae, 1989; Yenyurt, Townsend, & Talay, 2007). Spreading development among several R&D sites also allows dividing the associated risks (Boutellier et al., 2008). Additionally, allocating R&D activities in the vicinity of manufacturing

operations allows shorter coordination times (Gassman & von Zedtwitz, 1998). INPD can additionally provide some leeway to optimize development costs in a number of areas like lower-cost labor or cheaper land and office rentals (Boutellier et al., 2008; Eppinger & Chitkara, 2006; Fallah & Lechler, 2008; Kafouros et al., 2008; The Economist, 2004). However, these potential savings have to be offset by a number of hidden costs incurring during the coordination of dispersed teams and locations (de Brentani et al., 2010; Gassmann & von Zedtwitz, 1998). Moreover, the labor and resource based savings are often temporary. In summary, most companies internationalize NPD to look out for talent and to better access local markets (Eppinger & Chitkara, 2006).

3.2 Barriers

Knowledge gaps. Internationalization of NPD is by far not straightforward due to a company's imperfect knowledge about the target market (de Brentani et al., 2010; Moenaert, de Meyer, Souder, & Deschoolmeester, 1995). This may well increase the likelihood of new product failure. The greater the differences in language, education, business practices, culture and industrial development – the so-called psychic distance between the domestic and the foreign market – the higher the uncertainty accompanying NPD and the higher the costs of local knowledge acquisition (Johanson & Vahlne, 1977). What's more, assessing the value of local knowledge, leveraging and re-using it across a dispersed network may pose severe problems for companies (INSEAD, 2006; Gerybadze & Reger, 1999; Santos et al., 2004) especially when it is idiosyncratic (Subramaniam, 2006). International experience and continuous learning about foreign markets can help to alleviate these problems at least partly (Johanson & Vahlne, 1977; Li & Cavusgil, 2000; Yenyurt et al., 2007).

Long distances. Distance inherent to INPD impacts the frequency and quality of communication, raises transaction costs, and introduces principal-agent related difficulties (von Zedtwitz & Gassmann, 2002). The more autonomous the distinct nodes in the network are, the fewer incentives they usually have to share information with each other. This increases the probability of intended or unintended duplication of development efforts leading to inefficiencies and loss of NPD focus (Boutellier et al., 2008; Zander, 1999). There are also voices stating that long distances between internationally scattered NPD operations impede the creation of breakthrough innovations which build

on close collaboration and intense knowledge exchange favored by face-to-face contact (Allen, 1977; Berggren, 2004; Zander & Sölvell, 2000).

Complexity. An internationally dispersed portfolio of NPD activities is likely to impose coordination challenges, additional costs, time delays and organizational conflicts lowering innovation performance (Boutellier et al., 2008; de Brentani et al., 2010; Gerybadze & Reger, 1999; Hitt et al., 1997; Jeong, 2003; Kafouros et al., 2008; Ogbuehi & Bellas, 1992). Especially as the number of overseas locations participating in the NPD process grows, the managerial challenges increase (Hedlund & Ridderstråle, 1995; Zander & Sölvell, 2000). A greater amount of interfaces to manage complicate the whole undertaking (Berggren, 2004). Therefore, new management skills to handle people, processes, and knowledge are needed and not all executives are up to this task (Kuemmerle, 1997).

Employees' attitudes. Even though some executives fear losing central control over NPD by delegating tasks to overseas locations (Bartlet & Ghoshal, 2002; Boutellier et al., 2008), studies show that NPD internationalization is often more prevalent at upper hierarchy levels (Berggren, 2004). On the operational level, where most of the work has to be done, less international spirit may be noticeable. A widespread challenge poses the so-called not-invented-here syndrome (NIH) describing the reluctance of R&D employees to use knowledge developed in other NPD locations (INSEAD, 2006; von Zedtwitz et al., 2004). What's more, avoiding it may come at the expense of coping with the not-invented-anywhere syndrome (Berggren, 2004). In this case the INPD project may become "nobody's baby" and "die in exile" deemed too insignificant to many of the units taking part in the venture (Berggren, 2004: 127). Finally, negative sentiments towards NPD internationalization among R&D employees in Triad countries may be fueled by their fear of losing jobs to lower-cost regions (Eppinger & Chitkara, 2006).

Intellectual property (IP) leakage. Carrying out NPD activities outside of the central R&D department necessitates the transfer of confidential information out of the company headquarters. This makes it difficult to fully control the secrecy of intra-company knowledge especially in countries with weak IP protection (Boutellier et al., 2008; Eppinger & Chitkara, 2006; The Economist, 2004).

4. Managing INPD

4.1 Scope of Analysis

In our previous discussion we have tried to delineate how the term INPD is defined in the scientific literature. Most researchers agree that a truly INPD shows some degree of internationalization already during NPD activities carried out prior to a product's actual launch overseas.

In the following, we analyze studies examining factors determining NPD success abroad – as the final desirable outcome of NPD are successful products. We limit our analysis to those works which look at INPD performance in a stricter sense i.e. we exclude studies which dependent variables relate to patent citations (Mudambi, Mudambi, & Navarra, 2007), effectiveness and budget efficiency of international R&D units (Brockhoff & Medcof, 2007) or R&D intensity (Hitt et al., 1997) as proxies of NPD performance abroad. We further exclude studies that simply compare NPD practices and success factors in different countries (Ozer & Chen, 2006; Song & Parry, 1997) as they are in fact national in scope. Similarly, we leave apart analyses of drivers of international R&D (Kuemmerle, 1999) and taxonomies of foreign R&D labs (Chiesa, 1996) as they mostly do not intent to measure INPD outcome but focus on characteristics and management aspects of international R&D networks. We also do not take into account studies examining international new product success as a building block of composite performance measures in international markets (Knight & Cavusgil, 2004⁴).

In order to structure our presentation we build on previous literature reviews of NPD in the domestic context (Cooper & Kleinschmidt, 1995; Ernst, 2002; Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994) and group the identified success factors in five categories namely, strategy, top management's role and commitment, organization, process, as well as an innovation-friendly company culture. We also follow the recommendations of the aforementioned authors and focus on success determinants that can be influenced by senior management at the firm/strategic business unit level. This level of analysis has traditionally been called the NPD program level (de Brentani & Kleinschmidt, 2004) and can be defined as a coherent set of overlapping and/or sequential projects in a

⁴ Only one out of five items of the composite construct "Performance in international markets" relates to the success of the new product in its main export market and is further aggregated into the overall construct during the subsequent statistical analyses.

specific product line (Moenaert et al., 2000). We focus on this level as a sustainable competitive advantage is usually built through several NPD projects (Moenaert et al., 2000).

Primarily, we center on relatively large sample empirical studies examining causal relationships between different internal organizational factors and INPD performance. We also attach great importance to choose studies containing explicit information about the significance of their results. However, because there is only a limited number of large-scale empirical analyses – probably due to the novelty of the topic – we also take into account a number of conceptual, case-based works to broaden the radius of our investigation.

In the following, we present the findings of the empirical studies summarized in tables. The tables include important information about the studies, especially about the sample, the measurement of INPD performance as well as a summary of the most important findings. Because of this, we will not discuss each study separately again in the text. We rather restrict ourselves to commenting on the respective tables. Furthermore, we will complement the empirical findings by observations from case studies.

4.2 INPD Strategy

Every company needs a coherent long-term NPD strategy to offer direction for its NPD efforts (see Ernst, 2002, for a review). In fact, apart from market indicators, the relative success or failure of a firm's NPD activities can be gauged only in relation to the vision it intended to achieve (Iyer, LaPlaca, & Sharma, 2006). The need for an *ex ante* strategic guideline becomes even more severe in the hypercompetitive global marketplace (Eppinger & Chitakara, 2006; Fallah & Lechler, 2008; Harvey & Griffith, 2007). Table 2 makes clear that companies need coherent NPD strategies determining the right degree of internationalization in terms of both market coverage and product offerings.

Table 2: Empirical Results – INPD Strategy

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Chryssochoidis and Wong (2000)	Product, n = 30	Electronics; UK	5 int'l* new product financial performance measures (aggregated): 1. Sales 2. ROI 3. Customer acceptance 4. Product development budget costs	1. Customization of product technology (-) 2. Number of country markets at which the new product has been targeted (+) 3. Timeliness in multi-country rollout (+)
Chryssochoidis and Wong (1998)	Product, n = 30	Electronics; UK	Timeliness in int'l new product rollout (INPR): 1. Length of <u>planned</u> and <u>actual</u> time for rolling out the new product across key and all European markets Success of new product rollout: 1. Financial performance (sales, customer acceptance, ROI, technical performance) 2. Timely NPD	Significant differences between “simultaneous” (+) and “sequential” (-) INPR with regard to on-time product launch. Significant differences between “timely” (+) and “delayed” (-) int'l rolled-out products. In particular positive correlations between timely INPR and sales, ROI, timeliness in NPD.
De Brentani et al. (2010)	Program, n = 432	Mixed industries; Europe, N. America**	3 success dimensions: 1. Financial outcome 2. Time to market 3. Windows of opportunity	1. Global presence strategy (+, 2, 3) 2. Global product harmonization strategy (+, 1, 3)
Jeong (2003)	Firm, n = 429	Mixed industries; China, USA	4 dimensions assessing the worldwide performance of new products over the last 3 years (averaged): 1. Customer acceptance 2. Sales contribution 3. Technical performance 4. Profitability	Int'l diversification (expansion) has the following impact: • For US-American firms (+, linear relationship) • For Chinese firms (+/-, nonlinear relationship)
Kleinschmidt and Cooper (1988)	Product, n = 203	Mixed industries; probably Canada	5 product performance measures: 1. Financial success vs. failure 2. Overall profitability 3. Payback period in years 4. Market share after 3 years in domestic and foreign market 5. Sales and export growth	Significant differences between “int'l” (+, 1,2,3,4) and “domestic” (-,1,2,3,4) oriented products: • Striving for success in world markets • Designing for int'l use

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Oakley (1996)	Product, n = 30	Electronics; UK	Product success 1 year after launch calculated as the sum of 4 variables: <ul style="list-style-type: none"> • Relative market share • Total sales • Months to break-even • Served market size 	Significant differences between “best” and “poorest” launches : <ol style="list-style-type: none"> 1. Much faster introduction to overseas markets (+)

* int'l = international

**N. America = USA and Canada

International presence / Simultaneous launch. A higher international market diversification can have both advantages and disadvantages for companies (see above). It seems however, that operating at the more highly diversified end of the market strategy spectrum i.e. a high degree of international presence, is linked to INPD performance – at least for companies from industrialized countries (Chrysochoidis & Wong, 2000; de Brentani et al., 2010; Jeong, 2003). A widespread international market presence is more likely by means of simultaneous rather than sequential international new product launch strategy (Craig & Douglas, 2000). Studies argue and empirically demonstrate that a fast (or concurrent) introduction of new products into overseas markets characterizes successful, on-time launches (Chrysochoidis & Wong, 2000; Chrysochoidis & Wong, 1998; Oakley, 1996). This provides evidence that first mover advantages seem to outweigh higher costs and complexity associated with simultaneous international launches (Chrysochoidis & Wong, 1998; Harvey & Griffith, 2007; Oakley, 1996). The notion of a simultaneous launch is also echoed by a company's international design orientation. Firms exhibiting it develop products with foreign markets in mind right from the start (Cooper & Kleinschmidt, 1988; MacPherson, 2000; Ó Cinnéide, 1993; Sakakibara, 1995). Thus the strategy of first designing products for domestic use and later on export them overseas (Vernon, 1979) might be detrimental nowadays (MacPherson, 2000).

Product standardization vs. adaptation. The results concerning an international product strategy are mixed. In particular, physical product standardization or adaptation across markets has received considerable research attention producing very inconclusive performance implications (see Theodosiou & Leonidou, 2003, for a review). While standardization enhances economies of

scale/scope, protection of proprietary knowledge, a coordinated commercialization effort, faster time to market, and a more highly leveraged brand name/company reputation, adaptation allows access to specialized knowledge and talent overseas, keeping pace with local competition, greater dedication of local employees, and proximity to customers (Bartlett & Ghoshal, 2002).

Most studies examining this problem are grounded in the domain of international marketing and rarely explicitly look at INPD performance as an outcome variable. Nevertheless, they make clear that the choice of international product strategy largely depends on circumstances within a given target market a company faces at a specific point of time (e.g. sales channels parameters, country mores, language and colloquialisms, technology infrastructure). Greater differences across global regions mandate more customized decisions per each of them (Bartlett & Ghoshal, 2002; Bruce et al., 2007; Calantone, Daekwan, Schmidt, & Cavusgil, 2006). Therefore a “coalignment” between international product strategy and the context in which this strategy is implemented is decisive for success (de Brentani et al., 2010; Cavusgil & Zou, 1994). There also seem to be industries or product categories like consumer electronics which are more predestined for international homogenization (Bartlett & Ghoshal, 2002; Chryssochoidis & Wong, 2000; Golder, 2000; Levitt, 1983; Ohmae, 1989).

There is also a third middle-ground approach represented in the literature. It suggests that an exclusive use of either a pure standardized or customized strategy is too extreme to be practical and products comprising both standardized and customized elements help to capture benefits from both solutions (Bartlett & Ghoshal, 2002; Bruce et al., 2007; Subramaniam & Hewett, 2004; Takeuchi & Porter, 1986). De Brentani et al. (2010) for instance, show that a flexible, but “at-the-globalized-end-of-the-spectrum” approach leads to success. Similarly, Subramaniam and Hewett (2004) demonstrate that a balance between standardization and adaptation increases product performance in subsidiary markets. Also the case study of Bartlett (2003) implies such a product strategy. It is further worth noting that all three international product strategies are not necessarily exclusive (Bartlett & Ghoshal, 2002).

4.3 Top Management Factors

Linked to product strategy are undoubtedly top management issues. Table 3 summarizes the studies' results with regard to top management support and adequate resource allocation for INPD.

Table 3: Empirical Results – Role and Commitment of Top Management

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Chryssochoidis and Wong (1998)	Product, n = 30	Electronics; UK	2 timeliness in int'l* new product rollout (INPR) measures: 1. Length of <u>planned</u> and <u>actual</u> time for rolling out the new product across key and all European markets 2. Adherence of new products to rollout schedules	Positive correlation with timeliness in INPR (+, 1, 2): 1. Sufficiency of R&D and marketing resources
De Brentani and Kleinschmidt (2004)	Program, n = 252	Mixed industries; N. America**	Cluster analysis based on 4 success dimensions: 1. Financial performance 2. Time efficiency 3. Windows of opportunity 4. Success rate	Significant characteristics of "best performers" (+, 1, 2, 3, 4): <ul style="list-style-type: none"> • Resource commitment to the int'l NPD effort • Senior manager objectives tied to performance in int'l NPD program • Very high levels of top management involvement
Kleinschmidt et al. (2007)	Program, n = 387	Mixed industries; Europe, N. America	2 success dimensions: 1. Financial performance 2. Windows of opportunity	1. Resource commitment (+, 1) 2. Top management involvement (-, 1)
Li (1999)	Product, n = 130	Software; USA	New product performance in export markets assessed with 2 items: 1. Firm's actual product market share in the served market 2. Pre-tax profit margin of the new product	Level of R&D investment (+)

* int'l = international

**N. America = USA and Canada

The findings differentiate between management's monetary (i.e. commitment of sufficient resources) and non-monetary (i.e. personal involvement, serving as champions) support. However, it

seems that this distinction is rather artificial. After all, support for INPD must incorporate appropriate resources otherwise ideational support may soon be nothing more than lip-service (Ernst, 2002).

All studies in Table 3 present a positive relationship between INPD performance and sufficient resources devoted to this task. Also case-based evidence points in this direction (Hedlund & Ridderstråle, 1995). However, only Chrysochoidis and Wong (1998) explicitly mention marketing resources in their analysis. Marketing resources seem to be at least equally important as R&D funds because in the international arena companies cannot build on internally well-known customer and competitor profiles. And after all, no company can design successful new products without a solid understanding of the expectations of their end users. Also Ayal and Raban (1990), MacPherson (2000) as well as Oakley (1996) demonstrate that substantial investment in export marketing intelligence is a key feature of successful firms.

With regard to non-monetary aspects, Eppinger and Chitkara (2006) make clear that INPD must enjoy visible management priority. They mention that some companies even appoint a corporate executive responsible for INPD. Top management is expected to define the framework for global NPD processes and commit to it (von Zedtwitz et al., 2004). Before introducing new products to a foreign market the company's executives have to ensure that local demand is satisfactory to meet scale and profitability goals (Yeniyurt et al., 2007).

Finally, de Brentani and Kleinschmidt (2004) mention the necessity of making senior managers accountable for the INPD outcome. For instance, their objectives could be tied directly to performance of the INPD program. What's more, senior managers should be involved in INPD personally also in terms of regular progress control (Berggren, 2004; Hedlund & Ridderstråle, 1995; Kleinschmidt et al., 2007; Ó Cinnéide, 1993).

4.4 International Organization

For several companies, the INPD challenge relates to the question of centralization versus decentralization of company resources (Devinney, 1995; Ogbuehi & Bellas, 1992). Table 4 illustrates the findings of INPD studies with regard to organizational aspects.

Table 4: Empirical Results – International Organization Aspects

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Chrysochoidis and Wong (1998)	Product, n = 30	Electronics; UK	Timeliness in int'l new product rollout (INPR): 1. Length of <u>planned</u> and <u>actual</u> time for rolling out the new product across key and all European markets 2. Adherence of new products to rollout schedule	Positive correlation with timeliness in INPR: 1. Cross-functional integration (+, 1, 2) 2. Use of “softer” coordination mechanisms (+, 1, 2)
Li (1999)	Product, n = 130	Software; USA	New product performance in export markets assessed with 2 items: 1. Firm's actual product market share in the served market 2. Pre-tax profit margin of the new product	Intense communication and cooperation between the R&D and marketing functions during the NPD process (+)
Li and Cavusgil (2000)	Product, n = 172	Software; N. America*	2 success dimensions: 1. New product advantage in host countries 2. New product market performance in host countries	1. Intense communication and cooperation between the R&D and marketing functions during the NPD process (+, 1, 2)
Persaud (2005)	R&D units, n = 79	Mixed industries; Europe, Japan, N. America	Synergistic innovative capacity of an int'l** R&D unit collaborating with other R&D units in an int'l network assessed with 4 success dimensions however, only 3 direct NPD performance dimensions: 1. Strategic R&D 2. Knowledge Management 3. Innovative Proficiency	1. Autonomy of the R&D unit (+, 1, 3) 2. Formalization of relationships between HQ*** and R&D unit (-, 3) 3. Socialization between R&D units (+, 2) 4. Inter-R&D-units communication – electronic (+, 2) 5. Inter-R&D-units communication – in-person (+, 1, 2) 6. Communication HQ-R&D unit – electronic (+, 2) 7. Communication HQ-R&D unit – in-person (+, 3)

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Subramaniam (2006)	Product category, n = 90	Mixed industries; mostly USA, single companies from Europe, Japan, S. Korea	Transnational new product development capability assessed with 6 items: 1. Frequency of new global product introductions 2. Being first in the market with new product introductions 3. Ability to introduce new versions simultaneously in several markets 4. Ability to respond to unique requirements of different countries 5. Ability to price competitively 6. Ability to penetrate new overseas markets	1. Integration of cross-national knowledge via intense cross-national collaboration (+)
Subramaniam and Hewett (2004)	Product, n = 128	Probably mixed industries; USA	Product performance in subsidiary markets i.e. market share of the product over the most recent annual period	1. Balance between standardization and adaptation in new products shaped through direct face-to-face contact between HQ and subsidiary managers (+)
Subramaniam and Venkatraman (2001)	Product category, n = 90	Mixed industries; mostly USA, single companies from Europe, Japan, S. Korea	Transnational new product development capability assessed with 6 items: 1. Frequency of new global product introductions 2. Being first in the market with new product introductions 3. Ability to introduce new versions simultaneously in several markets 4. Ability to respond to unique requirements of different countries 5. Ability to price competitively 6. Ability to penetrate new overseas markets	A "fit" between the extent of tacitness in overseas information acquired and the use of: <ul style="list-style-type: none"> • Cross-national teams (+) • Teams with domestic members who have prior overseas experience (+) • Teams whose members communicate frequently with overseas managers (+)

* N. America = USA and Canada

** int'l = international

*** HQ = headquarters

The studies provide a fairly consistent picture of important organizational success factors. These are (1) cross-functional NPD teams; (2) cross-national NPD teams; (3) direct face-to-face communication in NPD teams; (4) empowerment of the project organization; (5) different coordination mechanisms; (6) involvement of foreign subsidiaries; (7) an appropriate “bricks-and-mortar” international R&D structure.

- (1) NPD teams should be **cross-functional** in order to succeed overseas (Bartlett, 2003; Berggren, 2004; Chrysochoidis & Wong, 1998; Hedlund & Ridderstråle, 1995). This means that in line with the domestic context, R&D, marketing and production departments should cooperate while performing NPD tasks (Hedlund & Ridderstråle, 1995; Li, 1999; Li & Cavusgil, 2000). Hedlund and Ridderstråle (1995) notice that functional divisions seem to create more problems for an effective management of INPD projects than national divisions within the same function. Functions seem to define employees’ jobs much clearer than the country where the person is positioned or the business area in which one is working. Subramaniam et al. (1998) further observe that the source of tacit knowledge determines which overseas functional manager should join the NPD team.
- (2) **Cross-national collaboration** in NPD teams is widely regarded as a precondition of success however this statement is rarely backed by solid empirical results (Bartlett & Ghoshal, 2002; Chiesa, 2000; Eppinger & Chitkara, 2006; Harvey & Griffith, 2007; Santos et al., 2004). An exception are Hoegl et al. (2007) as well as Siebdrat, Hoegl and Ernst (2009) who demonstrate that internationally dispersed teams can indeed outperform colocated ones under specific conditions i.e. when displaying high levels of teamwork quality. Studies of Subramaniam and colleagues (Subramaniam & Hewett, 2004; Subramaniam & Venkatraman, 2001) also show that cross-national teams help incorporating tacit knowledge from overseas sources. The extent of cross-nationality, however, depends on the type of knowledge which has to be transferred. The more tacit it is, the more important the deployment of cross-border teams becomes (Subramaniam & Venkatraman, 2001; Subramaniam et al., 1998). However, there are voices challenging NPD team cross-nationality as a warrantor of success. Berggren (2004) for instance, introduces projects in the heavy machinery industry where internationally

successful products have been developed in a very domestic-focused way. This might be due to the fact that interaction and knowledge exchange often benefit from geographical proximity (Allen, 1977). Virtual teams therefore might reach their limits when it comes to radical innovations (Lindqvist, Sölvell, & Zander, 2001; Zander & Sölvell, 2000). There exists some anecdotal evidence that INPD teams might be best suited for incremental development projects where tasks can be subdivided and interdependencies restricted (Berggren, 2004; Boutellier et al., 2008). A thorough consideration between likely efficiency losses due to their virtual character on the one hand and possible benefits from unlocking different knowledge sources on the other hand is indispensable (Chiesa, 2000; Harvey & Griffith, 2007; McDonough et al., 2001; Sakakibara, 1995; Thomke, 2002). Thus involving only the absolutely necessary participant countries and project members can keep complexity manageable (Berggren, 2004; Golder, 2000; Moenaert et al., 2000).

- (3) Even though virtual communication is omnipresent today, research consistently points to the need of **direct face-to-face communication** for successful NPD at least at the project's start via personal kick-off meetings (Berggren, 2004; Hedlund & Riddersale, 1995; Thomke, 2002). This helps to build trust, understanding and team spirit among project members and is undoubtedly a good investment into the future product's success (von Zedtwitz et al., 2004). Persaud (2005) supports this by empirically demonstrating that personal communication between units involved in INPD is crucial for their success. Direct and personal communication is an important building block of teamwork quality being in turn an important prerequisite for success of dispersed NPD teams (Hoegl et al., 2007; Siebdrat et al., 2009). Face-to-face communication is especially important in case of tacit knowledge inherent to many INPD projects (Hedlund & Riddersale, 1995; Lindqvist et al., 2001; Subramaniam, 2006). The communication type also varies over the length of the NPD process. At the beginning and at the end there is a comparatively high proportion of distant communication whereas in the middle there is a much higher dependency on face-to-face contacts (Chiesa, 2000; Lindqvist et al., 2001).

- (4) In INPD a pivotal role is assigned to an **empowered project management** (Berggren, 2004; Boutellier et al. 2008; Hedlund & Ridderstråle, 1995) with heavyweight team leaders (Moenaert et al., 2000; Ó Cinnéide, 1993; Thomke, 2002). This helps to guard the project's immunity from the line organization and thus very often its effectiveness (Hedlund & Ridderstråle, 1995). This is even more important in the international than domestic context because in the former it is more difficult to complement the formal "boxes and arrows" structure with more organic systems of authority and coordination (Hedlund & Ridderstråle, 1995: 178). For instance, the "permanent boss" is usually next door in terms of geography while the temporary project leader may be thousands of miles away (Hedlund & Ridderstråle, 1995: 178).
- (5) An important **coordination mechanism** are "parallel structures" i.e. structures operating analogous to the formal hierarchy and structures (Boutellier et al., 2008). They encompass international steering committees and diverse meetings – ideally not only at the executive level (Berggren, 2004; Chiesa, 2000; Gregory & Sohal, 2002; Hedlund & Ridderstråle, 1995; Moenaert et al., 2000; Ó Cinnéide, 1993; Thomke, 2002). Useful are also softer coordination mechanisms like informal communication, lateral cross-departmental relations and socialization among managers (Chrysochoidis & Wong, 1998; McDonough & Kahn, 1996; Persaud, 2005). Personal relationships between internationally scattered NPD employees should be ideally nurtured via reciprocal visits, joint training, and time-restricted relocation between different company sites (Chiesa, 2000; Eppinger & Chitkara, 2006; Gassmann & von Zedtwitz, 1998).
- (6) Securing **involvement of foreign subsidiaries** is a reoccurring theme in INPD research (Berggren, 2004; Golder, 2000). It assures local input into the NPD process, pushes new product sales and clarifies the ownership of the product during its life-cycle. The deployment of strong (local) product champions and international brand custodians is also recommended (Golder, 2000). Overseas subsidiaries should be involved as early as possible in the decision-making and funding issues to strengthen their identification with the outcomes (Berggren, 2004; Boutellier et al., 2008; Chiesa, 2000; Hedlund & Ridderstråle, 1995; Takeuchi &

Porter, 1986). Foreign subsidiaries can be motivated in a number of ways to innovate faster and support headquarters during NPD activities (Birkinshaw & Fry, 1998; Birkinshaw & Hood, 2001). Subsidiaries and headquarters should for instance, collaborate in several activities carried out in the course of the NPD process (Subramaniam, 2006). Further, project lead should be assigned to a subsidiary, if it is objectively better suited than headquarters (Bartlett, 1993; Ó Cinnéide, 1993; Sakakibara, 1995). Firms with more successful overseas products delegate more marketing management responsibility to foreign affiliates (Ayal & Raban, 1990).

- (7) With regard to the **“bricks-and-mortar” R&D structure** most suitable for INPD the literature provides rudimental insights. A number of typologies mostly referring to international R&D units have been introduced, however, with no direct links to new product performance (Bartlett & Ghoshal, 2002; Boutellier et al., 2008; Chiesa, 2000; Chiesa 1996; Kuemmerle, 1997). As an exception, Persaud (2005) presents some evidence which characteristics of an international R&D network support INPD. He shows that a greater autonomy in decision-making for international R&D units increases their innovation output and proficiency. Likewise, too much formalization in the relationship between headquarters and international R&D units hampers the innovative proficiency of the latter. Altogether, it seems undisputed in the literature that there is nothing like a “best” organizational form. Different conditions like R&D capabilities concentration within the company or the degree of product differentiation demanded by target markets have to determine the optimal INPD structure (Chiesa, 2000). What is unquestionable is also the fact that clear roles and responsibilities should be assigned to international R&D units to enhance coordination and cooperation (Boutellier et al., 2008; Chiesa, 2000; Hedlund & Ridderstråle, 1995; Kuemmerle, 1997; Ó Cinnéide, 1993). Finally, some anecdotal evidence points to the supremacy of matrix structures (Thomke, 2002).

4.5 INPD Process

Table 5 summarizes the results of studies concerning processes providing the necessary linkages between functional departments, subsidiaries as well as external partners.

Table 5: Empirical Results – INPD Process

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Ayal and Raban (1990)	Product, n = 51	Electronics, chemicals; Israel	Subjective success of the project abroad	Market research and planning conducted very early in the NPD process (+)
Chryssochoidis and Wong (2000)	Product, n = 30	Electronics; UK	5 int'l* new product financial performance measures (aggregated): 1. Sales 2. ROI 3. Customer acceptance 4. Product development budget costs	Timeliness in NPD (+)
Chryssochoidis and Wong (1998)	Product, n = 30	Electronics; UK	2 timeliness in int'l new product rollout (INPR) measures: 1. Length of <u>planned</u> and <u>actual</u> time for rolling out the new product across key and all European markets 2. Adherence of new products to rollout schedules	Positive correlation with timeliness in INPR (+, 1, 2): 1. Proficient execution of the NPD process 2. Protocol/early target identification
Kleinschmidt et al. (2007)	Program, n = 387	Mixed industries; Europe, N. America**	2 success dimensions: 1. Financial performance 2. Windows of opportunity	1. Global NPD process capabilities / routines, especially regarding the following aspects: • Global knowledge integration (+, 2) • Homework activities (+, 2) • Launch preparation (+, 1) 2. NPD process formality (-, 2)

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
Kleinschmidt and Cooper (1988)	Product, n = 203	Mixed industries; probably Canada	5 product performance measures: 1. Financial success vs. failure 2. Overall profitability 3. Payback period in years 4. Market share after 3 years in domestic and foreign market 5. Sales growth and export growth	Significant differences between “int’l” (+, 1, 2, 3, 4) and “domestic” (-, 1, 2, 3, 4) oriented products: <ul style="list-style-type: none"> Featuring a much higher proportion of the market activities conducted in or for foreign markets, namely market research, customer testing, trial selling, and market launch efforts
Li and Cavusgil (2000)	Product, n = 172	Software; N. America	2 success dimensions: 1. New product advantage in host countries 2. New product market performance in host countries	1. Intense export customer learning process i.e. customer information acquisition, interpretation, and integration (+, 1, 2) 2. Intense export competitor learning process i.e. competitor information acquisition, interpretation, and integration (+, 1, 2)
Li et al. (1999)	Product, n = 130	Software; USA	New product success in host country market assessed by 4 items: 1. Sales relative to its stated objective 2. Market share relative to its stated objective 3. Profit margin relative to its stated objective 4. ROI relative to its stated objective	1. Intense export customer learning process i.e. customer information acquisition, interpretation, and integration (+) 2. Intense export competitor learning process i.e. competitor information acquisition, interpretation, and integration (+)

* int’l = international

**N. America = USA and Canada

Also in this case some success accelerators can be identified. They are (1) high proportion of international market research activities; (2) proficient execution of the INPD process, especially the predevelopment activities; (3) some degree of NPD process formalization; (4) support via a communication infrastructure.

- (1) Studies point to the fact that successful INPD has to be rooted in the target market as early as possible (Kleinschmidt & Cooper, 1988; MacPherson, 2000). Adjusting already developed products to foreign markets can lead to failures (Deloitte, 2006). Thus a **high proportion of market research activities** like customer and competitor intelligence, prototype testing with

lead users and trial selling has to be conducted abroad (Bartlett, 2003; Doz et al., 2001; Kleinschmidt & Cooper, 1988; Kleinschmidt et al., 2007; Li & Cavusgil, 2000; Li et al., 1999; Subramaniam, 2006). With regard to the intensity of using international market information in distinct stages of the NPD process different results can be found. While some studies present evidence that international input is particularly strong in the early and late stages of the NPD process (Bartlett, 2003; Chiesa, 2000; Lindqvist et al., 2001; Takeuchi & Porter, 1986; Zander & Sölvell, 1999) others show an international scope at the beginning and a local focus at the end (Hedlund & Ridderstråle, 1995). Again others demonstrate that successful INPD projects focus on research and market planning as early as possible during concept and product development (Ayal & Raban, 1990). Finally, Boutellier et al. (2008) state that the internationalization degree increases with the project preceding. However, they add that the beginning of the process can become more international depending on the extent of global stimuli it receives. Studies do not differentiate in detail between diverse customer roles and input types along the NPD process. Some superficially mention lead customer integration (Berggren, 2004; Hedlund & Ridderstråle, 1995), the importance of site visits of important customers (MacPherson, 2000) as well as tests with customers in lead markets in different stages of the NPD process (Ó Cinnéide, 1993; Thomke, 2002).

- (2) A **proficient execution of the INPD process** is decisive for success. Particular attention should be directed towards so-called predevelopment/homework activities (Chrysochoidis & Wong, 1998; Hedlund & Ridderstråle, 1995; Kleinschmidt et al., 2007; Ó Cinnéide, 1993) and launch preparation (Kleinschmidt et al., 2007). The development stage seems to be the most difficult to manage and coordinate on a global basis (Chiesa, 2000). Consistent linkages between different stages of INPD projects should be provided so that the projects are never “homeless” or “thrown over the wall” of functional departments (Hedlund & Ridderstråle, 1995). This is particularly important, as employees working on the project are frequently based in different countries and belong to different organizational entities often pursuing conflicting objectives.

- (3) There are inconsistent findings regarding the INPD **process formalization degree**. While Kleinschmidt et al. (2007) find a negative relationship with INPD program performance, Hedlund and Ridderstråle (1995), Moenaert et al. (2000) as well as Chiesa (2000) recommend more standardized and recorded procedures at all company sites. In an international environment, higher formalization may help overcoming cultural barriers that impede information exchange (Townsend et al., 2010). As INPD often spans locations, the practices and methods must be consistent and the standards for each work element explicit in order to minimize output variability (Boutellier et al., 2008; Eppinger & Chitkara, 2006). Eppinger and Chitkara (2006) further express the need for a methodology to segregate the work packages for global distribution.
- (4) Finally, the role of **IT and communication infrastructure** has to be mentioned as it is a central enabler of virtual collaboration for numerous researchers (Eppinger & Chitkara, 2006; McDonough & Kahn, 1996; von Zedtwitz et al., 2004). Studies clearly point to the need of applying common operating systems, databases and development tools among involved company units as well as the deployment of a state-of-the art communication infrastructure consisting of video conferencing, email, live-chat and so on (Boutellier et al., 1998; Eppinger & Chitkara, 2006; Gregory & Sohal, 2002; Moenaert et al., 2000; Ó Cinnéide, 1993; Sakakibara, 1995). However, it is important to emphasize that technological infrastructure alone will not guarantee INPD success and miraculously bridge cultural, geographic or time barriers (Zander & Sölvell, 2000). People have to use it and they will intensively do so when they know and trust each other. Thus even the most sophisticated IT support will not substitute for personal contacts (see above).

4.6 INPD Culture

Finally, Table 6 puts together the findings concerning the link between company culture and INPD performance.

Table 6: Empirical Results – International Culture Aspects

Study	Level of Analysis, n	Industry, Country	Success Measure	Main Results
De Brentani and Kleinschmidt (2004)	Program, n = 252	Mixed industries; N. America*	Cluster analysis based on 4 success dimensions: 1. Financial performance 2. Time efficiency 3. Windows of opportunity 4. Success rate	Significant characteristics of “best performers” (+): • Fostering a truly global innovation culture • Encouraging entrepreneurial endeavors
De Brentani et al. (2010)	Program, n = 432	Mixed industries; Europe, N. America	3 success dimensions: 1. Financial outcome 2. Time to market 3. Windows of opportunity	1. Global innovation culture (+, 1, 2, 3)
Kleinschmidt et al. (2007)	Program, n = 387	Mixed industries; Europe, N. America	2 success dimensions: 1. Financial performance 2. Windows of opportunity	1. Global innovation culture (+, 1, 2)

*N. America = USA and Canada

There are only a few studies taking this determinant into account. De Brentani and Kleinschmidt (2004) unmistakably identify the need for more “softer” coordination mechanisms in the INPD activities of companies. Studies of Kleinschmidt and colleagues try to differentiate between an innovation-friendly culture in general and a global innovation culture (de Brentani & Kleinschmidt, 2004; de Brentani et al., 2010; Kleinschmidt et al., 2007). Both have a positive impact on INPD success. Also case-based studies accentuate the beneficial impact of creating and diffusing an international culture among R&D managers. Such a culture helps to make employees feel part of one international organization (Chiesa, 2000; Moenaert et al., 2000; Thomke, 2002). It also helps to avoid the so-called “not-invented-here” syndrome or “not-invented-anywhere” syndrome inhibiting cooperation in an international network (Berggren, 2004; Thomke, 2002) (see above).

5. Discussion and Outlook

5.1 Discussion

A thorough *content* analysis of the existing NPD literature reveals that it is still dominated by a home centric view and seems not to fully keep pace with the managerial relevance of international markets. There is further no universal definition of INPD even though most studies underscore that it

is much more than just commercializing new products abroad. Building on the existing literature we thus define INPD as one involving NPD activities taking place across national boundaries prior to the product's launch abroad. And this final step in a NPD process can be more or less successful as examples of companies demonstrate. This might be due to the fact that not all of them possess equal capabilities of adjusting their NPD to the international domain.

Tables 2 to 6 summarize existing large-scale empirical research on INPD and demonstrate that most studies look at success factors similar to those examined in the domestic context (Ernst, 2002; Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994). Especially, the pioneers of INPD research like Kleinschmidt and colleagues demonstrate that some domestic NPD success factors like a well-executed NPD-process are valid in the international arena, too (Kleinschmidt et al., 2007). This is good news for companies, as it proves that some of their NPD routines are universally applicable.

Existing large-scale studies further provide some hints on more context-specific international success factors. Most of them, however, still heavily build solely on TIM literature, for instance by adding the adjective "international" in front of well-known domestic success factors (de Brentani & Kleinschmidt, 2004; Kleinschmidt et al., 2007). For sure this is a logical first step in internationalizing NPD but it lacks a deeper conceptual adjustment. Accordingly, an international NPD strategy aims at products designed for foreign markets. Top management has to show both resource and personal commitment to the firm's INPD program. From the organizational point of view, the focus should be on INPD team composition, cross-border coordination mechanisms and an appropriate international organizational structure. International market input should be further clearly defined along the INPD process. Last but not least, the NPD culture should become international.

What is striking in all this reasoning, yet, is the fact that most studies randomly at best use well-established IM literature as a source of potential success factors even though new challenges in INPD necessitate an expansion and adaptation of NPD parameters (Fallah & Lechler, 2008). Some of the case-based or conceptual studies provide a first guidance on these additional, international domain specific challenges in NPD (Berggren, 2004; Boutellier et al., 2008; Hedlund & Ridderstråle, 1995).

It is plausible that INPD faces all the challenges associated with traditional NPD plus those stemming from multiculturalism and geographical distance (McDonough & Kahn, 1996). The INPD

strategy's central challenge thus seems to be the management of multiple sources of innovation as a portfolio of opportunities (Fallah & Lechler, 2008). It should lay down an optimal mix between centralization and decentralization of NPD activities worldwide and the resulting adaptation of products to local markets. Even more attention of top management might be necessary to overcome political pressure within large corporations as well as to allocate roles and funds to different organizational units on the basis of clear business considerations (Hedlund & Ridderstråle, 1995). Kuemmerle (1997) additionally raises doubts, if all executives have the right mindset and personality to manage cross-border activities.

Internationalization of NPD usually implies additional coordination layers, namely within functional departments located in different countries, between functional departments in different countries and between business units in different countries. Clearly, more structural barriers are in place and the process becomes more complex. Concurrent management of both cross-functionality and cross-nationality is a serious challenge even for experienced companies (Berggren, 2004). Therefore more stress should be put on project management to overcome organizational interfaces and efforts orchestrating the international company network (Boutellier et al., 2008). Another international issue is the future ownership of the product. Especially, if the product life-cycle is long, the division of tasks between sites will influence future ownership of technologies and subsystems between locations. As numerous sites become the rule not the exception the question arises of who is developing what, when and for whom. Furthermore, companies should take advantage of the cultural strengths of their often multicultural staff to develop products best meeting diverse market needs. However, this NPD team multiculturalism can both help and hinder the team performance (Fallah & Lechler, 2008).

Market orientation – a matter of course in domestic NPD– can be more cumbersome abroad as target markets are less familiar, new skills required and new partners necessary (Iyer et al., 2006). Acquiring, understanding, processing and using foreign market information seems to be more costly and time-consuming (Ayal & Raban, 1990). Developing foreign market knowledge competencies is difficult in an international environment due to the differences between overseas and national markets (Li et al., 1999; Townsend et al., 2010). As INPD team members often work on a virtual basis with each other a greater formalization of the NPD process might be necessary as is the case in purely

national settings. Additionally, distinct teamwork skills seem to be helpful (Hoegl et al., 2007; Siebdrat et al., 2009).

Finally, an INPD culture is not a matter of course (de Brentani & Kleinschmidt, 2004). It can take years to develop and consolidate.

To sum up, existing studies in INPD provide important first information about the management of NPD in the international domain and constitute a valuable basis for further more context-specific examinations. Table 7 demonstrates this by summarizing existing findings and raising still open questions.

Table 7: Findings and Implications of Current INPD Research

Studied Success Factors of INPD	Open Questions Regarding INPD Success
STRATEGY	
<ul style="list-style-type: none"> • Homogenization of products across markets • Simultaneous roll-out across markets • On-time launch across-markets • High international market diversification • International design orientation 	<ul style="list-style-type: none"> • Transformation of a domestic NPD strategy into an INPD strategy • Types/characteristics of international NPD strategies depending on MNCs* target vs. home markets
TOP MANAGEMENT	
<ul style="list-style-type: none"> • Senior management resource and personal commitment • Senior managers' objectives tied to INPD performance 	<ul style="list-style-type: none"> • Type of mindset, background, skills, training of top managers • Responsibility for INPD in the hands of a C-level executive/Existence of a Chief Innovation Officer • Geographical location of top manager responsible for INPD
ORGANIZATION	
<ul style="list-style-type: none"> • Cross-functional INPD teams • Cross-national NPD teams • Face-to-face communication in INPD teams • Empowerment of project organization • "Hard" and "soft" coordination mechanisms • Early involvement of foreign subsidiaries • "Best" R&D structure dependant on firm's internal/external factors 	<ul style="list-style-type: none"> • Impact of international R&D structure type on INPD performance • Confrontation of cross-functionality and cross-nationality in NPD teams • Performance of INPD teams depending on project newness/radicalness, product type/industry • Optimal international reward systems, training, careers paths • Assignment of INPD project lead to HQ**/regional HQ/subsidiary • Division and coordination of tasks across an INPD network
PROCESS	
<ul style="list-style-type: none"> • High and early input of international markets • Proficient execution of INPD tasks • Some degree of NPD process formalization • State-of-the-art communication infrastructure 	<ul style="list-style-type: none"> • Input sources (e.g. customers) along the INPD process • Intensity of foreign markets' input across different stages of the INPD process

Studied Success Factors of INPD	Open Questions Regarding INPD Success
CULTURE	
<ul style="list-style-type: none"> • International innovation culture 	<ul style="list-style-type: none"> • Drivers of an INPD culture • Types/characteristics of INPD cultures

*MNC = multinational corporation

**HQ = headquarters

Regarding *methodological* issues, the discussed INPD studies are diverse. Most of them, however, are anecdotal and single case based as is popular with relatively new research streams where detailed understanding of phenomena, their complexity and interlinkages is the premier consideration (Chryssochoidis & Wong, 2000). Several of these conceptual studies lack an empirical verification (Harvey & Griffith, 2007; Iyer et al., 2006). Or they examine a few INPD projects but lack generalizable implications (Lindqvist et al., 2001; Moenaert et al., 2000). Direct links of internal company parameters to INPD performance on the basis of large-scale empirical data sets are rare as our analysis demonstrates. All 16 empirical studies presented in Tables 2 to 6 are in fact based only on eleven⁵ different samples which are all at least ten years old. What's more, most of them are conducted by only four research groups namely, Kleinschmidt and colleagues, Chryssochoidis and Wong, Li and colleagues and Subramaniam and colleagues. Interestingly, these groups represent slightly different research streams, namely "classic" NPD, international marketing and international management. Consequently, they focus on somewhat different facets of INPD. Kleinschmidt and colleagues look at factors traditionally regarded as beneficial for domestic NPD success and apply them to the international setting. Li and colleagues emphasize international market information processing while Chryssochoidis and Wong stress international launch tactics. Finally, Subramaniam and colleagues look at intra-organizational knowledge transfer and the roles of foreign subsidiaries. Not surprisingly however, also within this subgroup of large-sample INPD studies methodologies regarding data collection and evaluation differ to a great extent.

Concerning data collection all studies use cross-sectional data. Most focus on manufacturing companies from a mix of industries. Nearly all collected data in the Triad countries. Slightly more samples seem to be not-random with most researchers justifying their decision with the necessity to

⁵ In the case of Li (1999) and Li et al. (1999) on the one hand and Li and Cavusgil (2000) on the other hand, it is very probable that the data sets were the same thus limiting the number of existing large-scale samples to ten.

precisely identify firms conducting INPD. All but one study applies data from key informants⁶ with the preferred respondent being a senior manager closely involved in INPD usually with a marketing or R&D background. As a result, these studies cannot rule out well-known biases like informant or common-source bias (CMB) (Ernst, 2002). Altogether, the shortcomings like lack of longitudinal data or the use of single informants are common in NPD research in general, however, partly approached in other related disciplines like marketing.

Regarding data evaluation in INPD research there are issues of interest concerning both the measurement and the structural models. Broadly, existing studies can be subdivided along these lines in two groups. The one encompassing studies to a high extent using single items and non-causal evaluation methods like tests of differences/similarities (e.g. ANOVA) or measures of dimensionality (e.g. cluster analysis). And the one consisting of studies mostly building on multi-item scales and statistically interpreting parameters (e.g. structural equation modeling (SEM)). The first group mostly consists of the older studies (Ayal & Raban, 1990; Kleinschmidt & Cooper, 1988; Oakley, 1996), the second of the more recent ones (Chrysochoidis & Wong, 1998, 2000; Persaud 2005; Subramaniam 2006). Studies using multi-item measurement models – which in nearly all cases are reflective in nature – typically provide detailed information on the technical implementation of construct development and report reliability measures. Unfortunately, they often do not ground the applied constructs in thorough theoretical considerations⁷. Nevertheless, they are plausible and display a clear practical relevance. In addition, INPD performance is captured at varying levels i.e. project and program as well as with regard to different time-lags after product launch. There exist both subjective and objective INPD performance measurements. The same success dimension would allow comparing results in more detail.

Further, as a rule the examined structural models test only for linear relationships although non-linear relationships are also plausible from a theoretical standpoint⁸. For instance, top

⁶ Studies of Chrysochoidis and Wong (1998, 2000) seem to use multiple informants. However, they are not precise about what kind of data comes from what kind of respondent. They also do not use data coming from different sources for any kind of comparative analysis. Thus in fact their data resembles single source data.

⁷ An exception are Kleinschmidt et al. (2007) and de Brentani et al. (2010) who use the resource-based view or Subramaniam and colleagues who use information processing theory.

⁸ An exception is Jeong (2003) who looks at a non-linear relationship between international diversification and INPD performance in Chinese firms.

management support or INPD process formalization may well exert an inverted u-shaped impact on INPD performance. Finally, some multi-item and SEM based studies introduce a bunch of situational control variables (e.g. the number of countries targeted, novelty of the product) or mediating effects. None of the studies uses moderators even though the examined success determinants may well exert varying impact on performance in different environmental settings (Henard & Szymanski, 2001).

To conclude, studies of Kleinschmidt and colleagues, using all the same data set, (de Brentani & Kleinschmidt, 2004; de Brentani et al., 2007; Kleinschmidt et al., 2010) are a good example of the methodological advancements observable in INPD research. While their first study applied cluster analysis and ANOVA, in their subsequent study they went on with SEM, tested for CMB and introduced a theoretical foundation for their constructs. Finally, in their latest study they applied formative scales and the adequate evaluation technique partial least squares (PLS).

5.2 Limitations and Further Research

The aforementioned studies constitute a valuable basis for future research. There are however, still numerous research areas that need to be addressed in more detail both in terms of content and methodology (see e.g. Table 7). Particularly, more examinations on INPD activities prior to the product's actual launch, context-specific antecedents of INPD performance and the impact of up-to-date developments in international markets on INPD management might be interesting research directions. To overcome the methodological shortcomings more large-scale, multiple informant studies with more sophisticated research instruments are needed. More empirical research is also essential for assessing the universality of findings across firms with different backgrounds. Contrary to domestic NPD there also exists no meta-analysis of INPD success determinants (Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994). Such a quantitative cumulation and analysis of statistics across studies might become feasible in the near future due to the growing body of empirical research into INPD⁹.

⁹ At present a meta-analysis is not feasible as there are too few samples reporting the r-family of statistical effects (i.e. correlation coefficient or its variants) (Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994). Besides, the frequency of success factors studied is too low to permit a meaningful investigation of their effects in a meta-analysis.

While there exists a great number of potential research questions in INPD, our literature review suggests the following avenues that might prove fruitful for upcoming examinations.

From a strategy perspective, what does a firm need to successfully conduct INPD?

Table 2 demonstrates that targeting the “right” product-market mix in the “right” way is indispensable in INPD. This however, is only one strategic facet of INPD activities. Our literature review shows that successful INPD requires a whole bundle of new capabilities that are applicable in the international environment and that changing NPD from a domestic to an international setting is anything but a trivial undertaking. Thus conceptualizing INPD within a dynamic capabilities framework (Eisenhardt & Martin, 2000; Teece, 2007) may assist in developing further theoretical and practical understanding of this vital company activity. For instance, the concept of a strategic orientation defining the broad outlines for a firm’s strategy (Slater, Olson, & Hult, 2006) from an outward-looking perspective i.e. the fit between strategic choices and the environment (Zhou & Li, 2010) might be helpful when building dynamic capabilities applicable in INPD. Accordingly, conceptualizing and empirically examining with the help of an adequate measurement model an “international orientation” in NPD would constitute an interesting research endeavor.

How does the international organizational structure affect INPD?

Organizational considerations are a cornerstone of INPD activities (see Table 4). An impressive number of R&D organization typologies can be identified in the literature (Bartlett & Ghoshal, 2002; Boutellier et al., 2008; Chiesa, 2000; Kuemmerle, 1997) but only a few connections to NPD outcomes exist (Brockhoff & Medcof, 2007). This leads us to the question for a favorable international R&D structure helping to achieve “best” INPD results. A promising approach to shed some light on this pivotal interaction might be by means of multilevel examination (Hitt, Beamish, Jackson & Mathieu, 2007) which allows connecting firm-level aspects with project-level outcomes. An adequate methodology – so far not applied in INPD – may be Hierarchical Linear Modeling (HLM). Additionally, as NPD is not solely conducted by the R&D department the structure question should incorporate other functional departments as well.

How to organize international market information processing in INPD?

A number of studies suggest that using international market information especially tacit in nature is a necessary precondition for INPD success (see Table 5). Such information, however, is costly to gather and difficult to decipher thus its use in NPD should be clearly defined. There exists anecdotal evidence that the amount and type of international market information used varies along the NPD process (Bartlett, 2003; Lindqvist et al., 2001). Yet all these studies do not link the use of international market information in distinct process stages to INPD success. Therefore, a more detailed investigation would be helpful. Another important research question relates to the antecedents of international market information processing in the decisive INPD process stages.

How can the subsidiary perspective augment INPD research?

All empirical studies compiled in this literature review use key informant data. This data usually comes either from company headquarters in a single country or firms active in a given country irrespective of their origin or are a mixture of both different countries and different origins. Foreign subsidiaries per se are rarely subject to INPD research, even if their early involvement and collaboration over the length of the INPD process is vital for INPD success¹⁰. Existing studies are further not designed to compare the perspectives of headquarters and overseas subsidiaries on INPD to gain a more holistic understanding of this complex activity. We would strongly recommend a dyadic research design comparing both headquarters' and subsidiaries' points of view regarding INPD management as there is evidence on the diverging perceptions of phenomena by managers in both locations (Birkinshaw, Holm, Thilenius, & Arvidsson, 2000). What's more, discrepancies in perceptions have likely consequences for instance, on headquarter-subsidiary cooperation – a critical issue in INPD.

How can MNCs manage reverse innovation?

Most existing research on INPD more or less explicitly acknowledges that a decisive part of NPD for international markets is undertaken at company headquarters or at least in the Triad region. In recent years, in the advent of so-called emerging economies, additionally some local NPD for local demand gained momentum in these markets (Gadiesh et al., 2007; Shankar et al., 2008). This however,

¹⁰ The only exception is Subramaniam and Hewett (2004) who surveyed overseas subsidiaries of US companies only.

did not change the “traditional” flow of innovative products, namely from more to less affluent countries. Reversing the stream of goods and ideas seemed neither possible nor desired in the past. The influential paper of Immelt et al. (2009) questions this assumption by introducing the idea of reverse innovation i.e. developing products in emerging markets like China and India and then distributing them globally. This case study on a single MNC paves the way for some deeper examinations. We encourage research providing more understanding on how to conduct reverse innovation and how to overcome the likely intra-organizational pitfalls accompanying this new NPD paradigm.

How do MNCs from emerging markets manage NPD?

There exists first evidence that MNCs from emerging economies tend to follow different internationalization trajectories than MNCs from already developed countries (Guillén & García-Canal, 2009; Ramamurti & Singh, 2010). These differences are likely to be perceivable in these companies’ NPD activities (Khanna & Palepu, 2010). Because of this, research on innovation patterns of emerging MNCs both at home and in foreign emerging markets on the one hand as well as foreign developed markets on the other hand would constitute a promising research endeavor.

6. Conclusion

NPD for international markets is today a cornerstone of business activities for multiple companies worldwide. They increasingly internationalize NPD as they have to find new sales markets, new knowledge sources and decrease their growing R&D costs. INPD has also recently increased in scope as new country markets in Asia and Latin America for good entered the global trade arena. Yet, this vital company activity has not been studied in much detail in the past. It has not been until the beginning of the 2000s when INPD caught the attention of scholars on a permanent basis. Still there is no comprehensive definition of INPD. Thus, to provide some systematization in this fragmented research area our paper has introduced a tentative definition of INPD as one involving NPD activities taking place across national boundaries prior to the product’s actual launch abroad.

Our extensive review of empirical and conceptual literature on INPD has further distilled a set of determinants of new product success in overseas markets. Some of these factors like INPD strategy,

top management support, INPD organization, INPD process and INPD culture are at first glance already well-known from the domestic setting. However, at second glance it becomes clear that INPD success abroad depends on a number of specific issues like the coordination of an increased amount of interfaces within the organization at home and abroad or the familiarity and access to overseas knowledge sources. What's more, changing from the national to the international dimension is by no means an automatism for both executives and employees. It can take years before a company adjusts to the international arena.

Finally, based on existing literature we have introduced a research agenda. It of course cannot be complete. Rather we have sketched a subjective set of inquiries which can serve as a departure point for future studies. Nevertheless, we hope that these diverse research questions will encourage scholars to address pressing INPD issues and provide guidance for practitioners on day-to-day INPD tasks.

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C. LEAVING THE HOME TURF: INTERNATIONAL ORIENTATION, ITS ANTECEDENTS AND IMPACT ON INNOVATION

“The successful development and introduction of new products in worldwide markets may require an orientation that significantly deviates from the traditional geocentric viewpoint.”

Ogbuehi and Bellas (1992), p. 60.

1. Introduction

In recent years, globalization has influenced a broad spectrum of firms irrespective of their size, history, industry affiliation, or geographic location (Almeida & Anupama, 2004; Cantwell & Mudambi, 2005; Frost, Birkinshaw, & Ensign, 2002). A key reason for this trend has been an exponential rise in new opportunities around the world that have increased the competitive implications of establishing and leveraging presence across country borders (Doz, Santos, & Williamson, 2001; London & Hart, 2004). Firms failing to avail of these opportunities face the risk of being preempted by rivals for likely economic set backs (Yu, Subramaniam, & Cannella, 2009). Hence, with a widening range of potential markets and sourcing options worldwide, more and more firms are striving to pay closer attention to their global environment (Bouquet, Morrison, & Birkinshaw, 2009).

These rising opportunities nevertheless, have also escalated the complexity of managing global activities. Conditions across countries often differ significantly, thus demanding an astute understanding of how to cater to individual markets or manage international operations (Ghemawat, 2007; Jensen & Szulanski, 2004; Subramaniam & Venkatraman, 2001). As a result, channeling a firm's alertness to sense global trends and sharpening its sensitivity to interpret unique prospects across countries has become an important source of competitive advantage (Almeida, 1996; Frost, 2001; Phene & Almeida, 2008; Sofka, 2008). In essence, international orientation (IO) has become a legitimate and essential component of firm strategy.

We view IO as a firm's capability at recognizing and availing of opportunities beyond its own country borders. As such IO is a major dynamic capability helping to sustain a firm's competitive position in a fast changing environment (Eisenhardt & Martin, 2000; Foley & Fahy, 2009; Helfat et al., 2007; Teece, 2007). Following Eisenhardt and Martin (2000: 1107) dynamic capabilities can be defined as "a firm's processes that use resources (...) to match and even create market change." Thus they are the organizational and strategic routines by which firms achieve new resource configurations as markets shift (Eisenhardt & Martin, 2000). More specifically, IO is about both the sensing and the leveraging of opportunities outside the firm's parochial borders. As Augier and Teece (2007: 185) put it: "(...) the multinational corporation's ability to respond to - and shape - the changing kaleidoscope of opportunities at home and abroad is critical to success." An underlying aspect of this dynamic capability is a firm's effectiveness at acquiring, sharing and using overseas knowledge – as, it is this knowledge that is fundamental to not only the awareness about various international possibilities, but also the ability to execute upon them. Hence, a firm's effectiveness at acquiring, sharing and using overseas knowledge lies at the core of its IO. What's more, these knowledge flows are not restricted to flows within the firm, such as between headquarters and subsidiaries; they also embrace external sources, such as the acquisition of market intelligence or unique resources in overseas locations.

While several studies have examined how multinational corporations (MNCs) manage cross-border knowledge flows (Gupta & Govindarajan, 2001; Subramaniam, 2006; Yang, Mudambi, & Meyer, 2008), the primary focus of these studies has been on the specific mechanisms of intra-MNCs knowledge transfer, or the patterns of relationships between headquarters and subsidiaries that enable this transfer (Birkinshaw & Hood, 2001). And even as these studies provide useful insights on how cross-border knowledge transfer effectively transpires, they overlook examining the underlying organizational antecedents that shape a firm's priorities to look for overseas opportunities, or its desire to target its knowledge transfer mechanisms with an outward rather than inward focus. As a consequence, these studies tell us little about why a firm is likely to be internationally oriented or the possible outcomes of it being able to do so.

A different set of studies offer typologies categorizing MNCs with regard to how they are oriented internationally. Most notably, Perlmutter (1969) distinguishes between MNCs that are

ethnocentric (home-country orientation), polycentric (host-country orientation) and geocentric (world orientation). Perlmutter's influential work and the ensuing studies that have advanced this line of thinking (e.g., Adler & Bartholomew, 1992; Maznevski & Lane, 2004) primarily focus on the mindsets of individual managers within MNCs to provide useful delineations of their IO. These studies while providing helpful insights on some specific characteristics of firms that are internationally oriented, overlook elaborating on how these characteristics influence the underlying organizational capabilities of recognizing and availing of international opportunities. Put differently, a systematic assessment of the antecedents and outcomes of IO remains to be further developed.

In this paper we attempt to fill this gap by examining the organizational antecedents of IO and verifying how it influences international innovation performance. We chose to focus on this specific outcome not only because innovation for international markets is an important performance outcome, but as it reflects a firm's success at leveraging overseas opportunities. Our study also more broadly contributes to the literature on dynamic capabilities (Eisenhardt & Martin, 2000, Helfat et al., 2007; Teece, 2007). First, it examines a dynamic capability in the context of a MNC which has received very limited attention so far (Augier & Teece, 2007; Pitelis & Teece, 2010). Second, it enhances our understanding of drivers of dynamic capabilities (Rothaermel & Hess, 2007) as well as their consequences with regard to innovation performance (Lichtenthaler & Ernst, 2011). Finally, it develops and empirically tests a new multidimensional measurement model assessing IO which has also been highlighted as a shortcoming of existing studies (Lichtenthaler & Ernst, 2011).

2. Conceptual Background

Among the many literature streams that have expounded on the term "orientation", it is probably the field of marketing that has given it the most systematic theoretical and empirical attention. This field describes market orientation as the organization-wide generation, dissemination and responsiveness to market intelligence (Jaworski & Kohli, 1993; Kohli, Jaworski, & Kumar, 1993; Ruekert, 1992). Market intelligence entails acquiring present and future customer needs, monitoring of competitors' actions, and analyzing changing conditions in industries and regulations affecting customers (Kohli & Jaworski, 1990; Moorman, 1995). Central to the generation, dissemination and

response to market intelligence however, is knowledge – its acquisition, sharing and use. But given that the focus of these studies is circumscribed within the marketing function, the acquisition, sharing and use of knowledge here is understandably restricted to generic market/customer related targets that are not necessarily in the international domain. Cadogan, Diamantopoulos and Siguaw (2002) extended the market orientation concept into the international arena to study the export performance of firms. Whereas this study provides useful insights on a number of antecedents of a firm's export performance, it is limited to export customer oriented activities and does not examine multi-faceted international knowledge flows.

In the international domain, scholars have long recognized that firms can significantly differ in the extent of their international focus, interest in pursuing international markets, and ultimately in their underlying capabilities at sensing and leveraging overseas opportunities. In other words, understanding why some firms are more internationally oriented than others has long been of interest to this field. Early attempts influenced by Perlmutter (1969) and other scholars explained these differences through characteristics of individual managers and their collective “mindsets”. Their basic idea was that certain firms are more geared towards international opportunities when their managers had more “universalistic” or “supranational” attitudes that deemphasized the significance of their own home country culture and were open to ideas from other countries (Perlmutter & Heenan, 1979). In a similar vein, other studies have advanced the notion of a “global mindset” (Gupta & Govindarajan, 2002), describing attributes such as openness to diverse cultures and the skills at assimilating diversity that make firms more “global” as opposed to “parochial” or “diffused” in their mindsets. The emphasis here too is on managerial cognition (see Levy, Beechler, Taylor, & Boyacigiller, 2007 for a review). That is, these researchers underscore the point that the collective cognitive framework of individual managers can endow a firm with a more cosmopolitan world-view which can consequently enhance their capabilities to compete in the global market place (Bartlett & Ghoshal, 1989; Gupta & Govindarajan, 2002; Jeannet, 2000).

Although managerial cognition is an important attribute enabling firms to be more sensitive to overseas opportunities, it is probably not the only factor determining a firm's IO. Taking this perspective, other researchers have focused on action rather than cognition, suggesting that the time

and effort firms actually devote to global markets, or the attention they give to international markets is an equally important factor. For example, Bouquet et al. (2009) propose global scanning, overseas communication and global discussions as three action oriented constructs that determine “international attention”, which they find to be a significant factor driving firm performance in international markets.

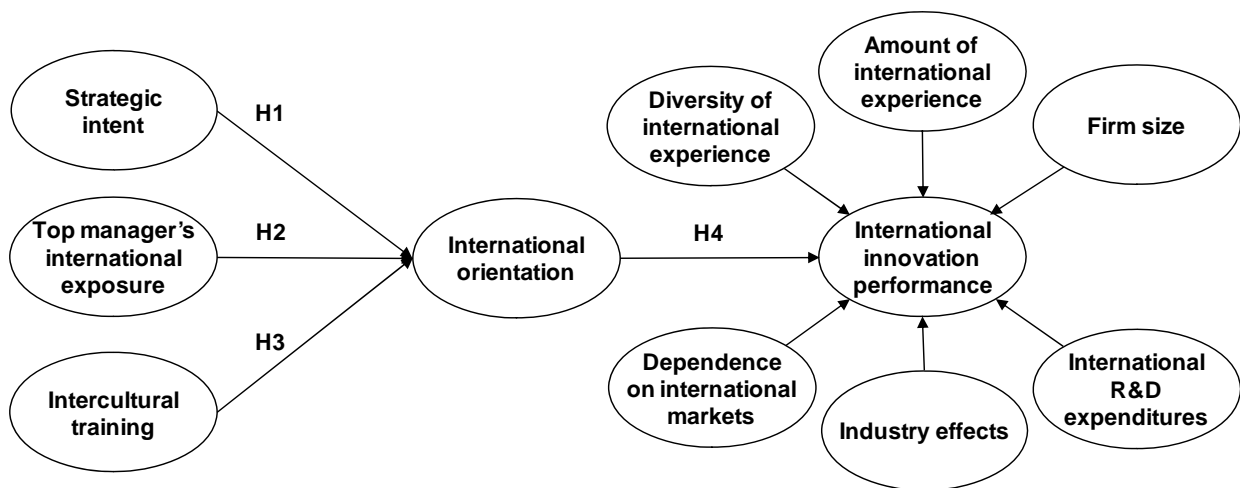
Our own view is that the cognitive and action perspectives are likely complementary, as they jointly enhance a firm’s abilities to sense and leverage overseas opportunities. Put differently, by integrating the cognitive and action-oriented perspectives we can develop a more comprehensive framework that sees managerial cognition motivating international attention, and both having a role in influencing IO and its outcomes. More specifically, openness in cognitive structures and the willingness to absorb ideas from other cultures are likely components of a firm’s abilities to acquire, share and use overseas knowledge and hence to IO. Also worth noting is that the action oriented constructs of scanning, communicating and discussing proposed by Bouquet et al. (2009) are in effect attributes of the broader and more overarching concepts of acquiring, sharing and using knowledge. Accordingly, by incorporating these views and assimilating them with insights from the knowledge transfer and global mindset literature streams we can develop a more comprehensive notion of IO, its antecedents and outcomes. Our objective thus is to build on these prior studies to develop a more holistic view of the capabilities that enable firms to be better at sensing and leveraging opportunities outside their home country borders.

3. Research Framework

3.1 Overview

Figure 1 depicts our research framework laying out our conceptualization of IO, its antecedents and performance outcomes.

Figure 1: Research Framework: Antecedents and Outcome of International Orientation



Source: Own illustration.

As noted earlier, we define IO as a firm's capability to recognize and avail of opportunities beyond its own country borders. To recognize and avail of these opportunities a firm needs to: 1) acquire knowledge about those opportunities, so as to identify and be aware of them, 2) share that knowledge internally, so as to assimilate and absorb the promise behind those opportunities, and 3) use that knowledge, so as to actually act upon and benefit from the perceived opportunities. We consider three antecedents that influence the degree of IO of a firm: the nature of its 1) strategic intent, 2) top manager's international exposure, and 3) intercultural training. Collectively, these antecedents represent a key set of factors that influence the priorities and skills of a firm to encourage the acquisition, sharing and use of overseas knowledge and hence IO. These antecedents not only shape the cognitive structures of managers as proposed by the global mindset literature to guide a firm's knowledge transfer processes toward an overseas rather than domestic focus but are also consistent with the categories of factors used in prior studies examining the more generic construct of orientation

(Jaworski & Kohli, 1993). For example, studies from the marketing literature stream have singled out marketing strategy, top management/leadership emphasis, and organizational processes as the key antecedents influencing market orientation (Kirca, Jayachandran, & Bearden, 2005). Finally, we also propose that the recognition and availing of overseas opportunities leads to greater success in innovating for international markets.

3.2 Hypotheses

Several studies have emphasized how strategy is critical for marshalling resources and shaping and directing a firm's efforts toward any goal (Johansson & Yip, 1994; Zou & Cavusgil, 2002). Hamel & Prahalad (1989) influential concept of "strategic intent" particularly highlights the significance of laying out a well articulated, concise, but ambitious rallying cry, that galvanizes a firm to stretch beyond its own perceived capabilities and sharpen its efforts toward a specific direction in order to achieve competitive leadership.

Orienting a firm internationally is intrinsically difficult as foreign markets are generally harder to understand when compared to domestic markets (Ghemawat, 2007; Zaheer, 1995). Sensing and leveraging domestic rather than international opportunities is often the more natural alternative for a firm, other things being equal. Thus directing a firm to anchor its knowledge acquisition, sharing and use to sense and leverage overseas opportunities meets with a lot of basic resistance (Subramaniam & Venkatraman, 2001). Under such circumstances, unless there is an overarching strategic thrust that underscores the critical importance of international opportunities, a firm is unlikely to move outside its comfort zone, look outside its domestic borders and be internationally oriented. In other words, the cognitive structures of individual managers are unlikely to be framed to sense and leverage international opportunities unless a broader strategic framework is available for that purpose (Bouquet, 2005; Murtha, Lenway, & Bagozzi, 1998).

Strategic intent structures and drives day to day actions of a firm including its knowledge transfer processes, and steers it to look for and take advantage of overseas opportunities. For example Procter and Gamble (P&G), in the 2000s, clearly established a strategic intent of being a global corporation with an explicit goal to focus on and address new international customer segments. Today

P&G sees internationalization as a major force behind its future growth and is a pioneer in leveraging new market opportunities worldwide (Grant, 2005). In fact, P&G's earnings from international markets over the last decade increased by 250 percent (P&G, 2000; P&G, 2009). Such clarity of purpose and the consistency of actions become particularly significant when targeting international opportunities wherein environments are uncertain and market signals confusing because of lack of familiarity. Thus firms whose strategic intent places greater priorities for growth from international avenues are more likely to direct their acquisition, sharing and using of knowledge toward overseas prospects. Accordingly,

Hypothesis 1: The more international a firm's strategic intent, the greater its IO.

Several studies highlight the importance of a firm's top management and CEO having experience in and exposure to international markets for shaping its priorities toward overseas opportunities (Dichtl, Koeglmaier, & Mueller, 1990; Reuber & Fischer, 1997; Tihanyi, Ellstrand, Daily, & Dalton, 2000). International experience provides CEOs with broader and deeper absorptive capacity to perceive and act upon strategic overseas opportunities. Such experience also influences the priorities they set for the firm as a whole. Gupta and Govindarajan (2002) for instance, suggest that CEOs with greater global experiences send strong signals to the rest of the firm to be open to diverse cultures. Such signals shape the cognitive structures, incentives and behavior of operational managers who then are more likely to direct their knowledge acquisition, transfer and use toward overseas prospects.

The above argument is also consistent with the "upper echelon" perspective, which posits that the CEO greatly influences organizational processes and outcomes of an organization (Hambrick, 2007; Hambrick & Mason, 1984). The underlying rationale is that top executives often act based on their personal interpretations of external stimuli, and as their unique experiences and values predispose these interpretations and consequent judgment, their personal backgrounds can predict their likely actions. Moreover, as it is the top manager or CEO that influence a company's strategic decisions to a high degree, her/his background will have a huge impact on a firm's overall orientation. For example, the CEO of Siemens is an Austrian who spent more than ten years in the US, Japan, UK, and Spain as

well as studied in Hong Kong and the US (Siemens, 2010). Siemens is known for a very strong international focus with a significant percentage of its revenue coming from overseas markets. The greater the international background of top managers the more likely that they will instill knowledge transfer processes with an overseas focus and hence greater a firm's efforts at acquiring, sharing and using overseas knowledge. Hence,

Hypothesis 2: The greater the international exposure of a top manager /CEO, the greater the firm's IO.

While strategic intent and top management teams can set the tone, direction and incentives for a firm to seek and leverage international opportunities, it is the wider set of managers and employees within a firm who enact day to day actions and implement strategy. Hence, how these individuals act on a day-to-day basis also has a significant influence on a firm's IO. A firm's training processes play an important role in shaping the mindsets and consequently the actions of managers and employees. Not surprisingly, studies from the market orientation literature have also highlighted training as a key variable that facilitates clear focus and vision within the organization and sets the stage, direction, and foundation for market orientation (Ruekert, 1992).

In the case of IO, the kind of training expected to be pertinent is essentially intercultural in nature. Intercultural training reduces the misunderstandings that arise from differences in national "thought worlds" and helps build trust and sensitivity towards colleagues located in different geographic regions (Maltz & Kohli, 2000). Such a rooting of trust among colleagues significantly enriches knowledge transfer processes (Subramaniam, 2006). Intercultural training also enhances the "cultural intelligence" of employees or their ability to adapt to new cultural contexts (Early & Ang, 2003).

The software giant SAP extensively uses different intercultural training options for all hierarchical levels, especially for employees engaged in new product development. Among the training measures applied intercultural aspects (e.g. time management, role of personal relationships), language courses and exchange programs play an important role (SAP, 2008). This is necessary as most of them work in an international setting often cooperating solely virtually with their counterparts.

They have to develop skills that assist them to better understand people coming from different cultures. Similarly, the French car manufacturer Renault explicitly has a “diversity charter”: some 25-30 percent of new managers hired each year have an “international profile” (Renault, 2008).

Such cultural intelligence enables employees to be more open to and aware of different cultures, which is known to enhance an organization’s proficiency at acquiring, transferring and using knowledge (Bouquet, 2005). Consequently, it also allows them to be not only more perceptive to international opportunities but also improve their odds at leveraging them by executing more appropriate and regionally responsive strategies. Intercultural training thus builds a stronger ethic within a firm to acquire, transfer and use overseas knowledge. Hence:

Hypothesis 3: The higher the intercultural training for a firm’s employees, the greater a firm’s IO.

Several meta-analyses confirm that firms which acquire, share and use market knowledge are successful innovators (Grinstein, 2008; Kirca et al., 2005; Rodriguez-Cano, Carrillat, & Jaramillo, 2004). Firms that are internationally oriented are more likely to identify and detect new market opportunities faster and more frequently. They are also better equipped to understand and serve the needs of international customers. Consequently, not only are they likely to be more conscientious when developing new products for international markets but their efforts for product development are also more likely to respond to genuine needs of customers in those markets. Hence with greater IO, firms should have greater success in their international innovation efforts. Nokia for instance, has become market leader in developing countries because it went to great lengths to visit and listen to its customers in their home environment. Nokia’s new product development teams managed to incorporate this valuable knowledge in the design of new handsets equipped with features like dustproof keypads exactly meeting local customer needs in emerging markets (Ewing, 2007).

Despite these positive examples, the relationship between IO and innovation performance may not be as straightforward as it sounds. The process of acquiring and sharing overseas knowledge is likely to be more costly and time-consuming compared to national activities (Ayal & Raban, 1990). Furthermore, the integration of overseas units increases the complexity and creates more interfaces

that need to be aligned during the international development process. These potential downsides of more IO could cause a significant amount of additional costs, time delays and organizational conflicts, which may lower the innovation performance in international markets (Berggren, 2004; Hedlund & Ridderstråle, 1995). Thus, it is worthwhile for academics and managers to analyze if an increased level of IO actually leads to the desired economic outcomes. Given the conceptual arguments made above and the existing positive examples, we assume that the benefits of achieving a higher level of IO outweigh the costs associated with it. We therefore posit the following hypothesis:

Hypothesis 4: The greater the IO of a firm, the higher its international innovation performance.

4. Methods

4.1 Sample

In order to test the hypotheses we conducted a survey. We drew our sample from the top five German manufacturing industries – namely: machinery, electronics, chemicals, automotive, and metal industry. We used the Hoppenstedt Database to identify individual firms and we confirmed through an extensive internet search that all of these companies were headquartered in Germany. We chose this approach to avoid possible biases coming from different home market sizes or diverging national cultures. We contacted all companies by phone and requested their participation in the survey. We further asked for the appropriate contact person that is most knowledgeable about the firm's international operations and its innovation activities. Our informants had been with their respective firms for many years and typically held senior management positions such as head of R&D, head of international marketing, head of business development. As the degree of IO could vary across different business units within a corporation, we used the business unit as our level of analysis.

Due to the fact that key-informant studies often may have a common-method bias, we countered this possible problem by collecting a second set of primary data from a second informant in the same firm for several of the participating business units (Kumar, Stern, & Anderson, 1993). The objective was to assess the robustness of the findings from the first sample with a second sample of respondents. The second set of data was collected simultaneously with the first data set. We asked the

first informant to name a second knowledgeable informant in his/her firm. Both respondents filled out the same standardized questionnaire. To increase the response rate, follow-up phone calls were conducted and two reminder emails were sent approximately two and four weeks after the first mailing.

Out of 378 companies initially selected, a total number of 129 participated and returned questionnaires from 138 business units (in nine companies more than one of their business units participated in the survey). Our response rate of 34 % can be considered better than average for this type of surveys (Menon, Bharadwaj, Adidam, & Edison, 1999). For 55 out of the 138 business units, we obtained answers from two informants (dyads). We obtained data with a reasonable spread across our five industries: machinery (31.2%), electronics (18.1%), chemicals (27.5%), automotive (11.6%), and metal industry (11.6%). The participating business units had mean annual revenues of US\$ 449 million out of which 67%, on average, came from international markets. They were, on average, active in 58 countries. A non-response bias test (Armstrong & Overton, 1977) of all constructs used in this study showed that a non-response bias was not an issue.

4.2 Measures

We developed our measures over several stages in order to ensure their validity. First, we conducted a literature review to identify usable scales that had been used previously in empirical studies. Secondly, we conducted a series of 13 exploratory in-depth interviews with senior managers from multiple companies to discuss and adapt possible items intended to measure our constructs. Third, the questionnaire was pre-tested with nine academics and seven senior managers from different firms. Minor adjustments in terms of wording were undertaken to create the final design of the questionnaire (see appendix for items and scales used to measure the constructs used in this study).

We operationalized IO as a second-order formative construct (Jarvis, MacKenzie, & Podsakoff, 2003). Based on earlier work by Jaworski and Kohli (1993) on strategic orientation, we took the dimensions international information acquisition, international information sharing, and international information use as the three components of IO. They constitute the first order factors. Each of these factors was measured by several reflective indicators. The items captured the generation

of intelligence from different foreign sources e.g. customers, competitors, and suppliers, the subsequent dissemination of the gathered information across the entire organization as well as finally, the utilization of it during innovation activities (see appendix).

Strategic intent was measured with four items. The scale focuses on the strategic importance of international markets for a business unit and the pro-activeness in entering these markets as well as the firm's belief that internationalization would yield more opportunities than threats. Our self-developed measures were based on previous work (Ohmae, 1989; Zou & Cavusgil, 2002) and our interviews (see appendix).

Top manager's international exposure was measured with a two-item scale assessing the extent of international work and international higher education experience of the CEO or the head of the business unit. Our items were based on the work of Sambharya (1996), Sanders and Carpenter (1998) and Tihanyi et al. (2000) (see appendix).

The four items assessing intercultural training were created on the basis of the multifunctional training scale developed by Maltz and Kohli (2000). It captures the degree to which managers and employees of a business unit are trained to deal with international markets and people from other national cultures (see appendix).

Finally, to measure the international innovation performance, we used four items from a scale developed by Cooper and Kleinschmidt (1995). One item was added based on our firm interviews. The assessment of the international innovation performance was carried out for the entire portfolio of new products launched in international markets in the last three years prior to the survey (see appendix).

As several organizational factors apart from IO may influence international innovation performance, we used several control variables. First, large firms may be more successful with their new products abroad as they might capitalize on their vast resource base. Hence, we included the logarithm of a business unit's level of international revenues (in millions of US\$) as a measure of firm size. Secondly, as the investment in the development of new products may influence the innovation performance, we took a firm's level of international R&D expenditures, defined as the percentage (from total R&D) of R&D spend in international markets, into account. Thirdly, due to our cross-industry approach, we controlled for industry effects. We examined firms from five different

industries. For four of them we included a dummy variable (1 = pertaining to this industry, 0 = not pertaining to this industry). Fourthly, as organizations may partly owe their international success to their distinct capabilities deriving from accumulated international experience, we captured this variable both in terms of diversity and quantity (Erramilli, 1991). The diversity (= scope) of experience was measured by the actual number of foreign countries in which the business unit was active. The number of years a business unit had been active in international markets captured the quantity dimension of experience (Cadogan et al., 2002). Since a company's dependence on international markets may cause greater investments in these markets, we further controlled for the percentage of sales (from total sales) derived from international markets (Cadogan et al., 2002).

4.3 Analytical Procedure

We validated our reflective constructs following the suggested procedures in the literature (Churchill, 1979; Hulland, 1999). A factor analysis performed with the software SPSS (varimax rotation, eigenvalue >1, factor loadings > 0.40, communalities > 0.50) confirmed the predicted multi-construct structure in our data. Furthermore, we computed item-to-total correlations. Items with correlations not exceeding 0.30 (Dunn, Seaker, & Waller, 1994) were eliminated. After the scale purification, we assessed the reliability of the constructs and computed Cronbach's Alpha coefficients which all but one exceeded 0.7 (Nunnally, 1978). Solely for the construct "international information use", the value for Cronbach's Alpha was slightly lower (0.66). However, as this is a newly developed scale in an early stage of research in the domain of IO, values exceeding 0.60 are acceptable (Hair, Black, Babin, Anderson, & Tatham, 2006; Peter, 1979). Composite reliability (CR) exceeded 0.70 for all constructs (Nunnally 1978). Thus, reliability of all constructs was given. Convergent validity of the constructs was assessed through average variance extracted (AVE). All constructs exhibited AVE above 0.50 considered indicative for convergence validity (Fornell & Larcker, 1981). Finally, we assessed the discriminant validity of our constructs by using the criteria suggested by Fornell and Larcker 1981. The square root of the AVE values exceeded the correlations of the respective constructs with all other constructs.

As we use key informant data, we conducted further analyses to assess the extent of a potential informant bias (Kumar et al., 1993). We used our 55 dyads to check the answers of both respondents for consistency. We used the multiple-item estimator for within-group inter-rater reliability (IRR) as proposed by James, Demaree and Wolf (1984). Overall, we found a strong agreement between the two raters in the same firm regarding all our multi-item constructs, i.e. IO, strategic intent, top manager's international exposure, intercultural training and international innovation performance (respective IRR values of 0.87, 0.85, 0.59, 0.74, and 0.83) with all but one exceeding the threshold of 0.70 (James et al. 1984).

Following the suggestions by Jarvis et al. (2003), we operationalized IO as a second-order formative construct. We aggregated the IO scale to three indicators, i.e. we eliminated one level of the construct. We replaced the first-order constructs with their respective arithmetic means and used them as direct formative indicators of IO (Matsuno, Mentzer, & Özsoyner, 2002). Variance inflation factors (VIF) and condition indices (CI) below the recommended thresholds of 10 and 30 (Im, Nakata, Park, & Ha, 2003) indicate that multi-collinearity is not a problem. Furthermore, all three indicators of IO are highly significant, with weights of 0.49 ($p < 0.001$) for international information acquisition, 0.31 ($p < 0.01$) for international information sharing, and 0.44 ($p < 0.001$) for international information use, respectively. The weights show that all three dimensions contribute similarly and strongly towards the overall construct IO. Finally, the external validity of the formative construct IO was assessed using a 'Two-Construct-Model' with an additional "phantom variable" (Diamantopoulos & Winklhofer, 2001). We modeled the relationship between the phantom variable "responsiveness to differences in local markets" and IO. The results show a highly significant and strong path coefficient of 0.39 ($p < 0.001$) as an indicator of external validity (Diamantopoulos & Winklhofer, 2001). Table 1 lists the relevant descriptive statistics of all variables and constructs and the respective correlation coefficients.

Table 1: Descriptive Statistics and Correlations

Variables	Descriptive Statistics and Correlations													
	Mean	S.D.	Min.	Max.	1	2	3	4	5	6	7	8	9	10
1. Firm size	5.43	1.79	1.10	10.58	n.a.									
2. International R&D expenditure	10.63	15.29	0.00	70.00	0.28	n.a.								
3. Diversity of international experience	57.69	42.21	3.00	200.00	0.33	0.03	n.a.							
4. Amount of international experience	34.57	28.41	1.00	150.00	0.28	0.12	0.31	n.a.						
5. Dependence on international markets	64.10	20.78	15.00	95.00	0.44	0.27	0.29	0.15	n.a.					
6. International orientation	4.46	1.02	1.82	6.45	0.26	0.20	0.13	0.22	0.25	n.a.				
7. Strategic intent	5.40	1.03	1.50	7.00	0.15	0.19	0.11	0.15	0.22	0.43	0.75			
8. Top manager's international exposure	3.70	1.86	1.00	7.00	0.21	0.06	0.07	0.24	0.16	0.33	0.17	0.74		
9. Intercultural training	4.05	1.39	1.00	7.00	0.16	0.23	0.02	0.18	0.23	0.57	0.41	0.33	0.84	
10. International innovation performance	4.25	1.10	1.40	6.60	0.16	0.16	0.06	0.17	0.36	0.60	0.39	0.19	0.43	0.89

Notes: Bold numbers on the diagonal show the Cronbach's Alpha; n.a. = no Alpha scores calculated because the construct is measured by a formative scale or single item.

n = 138.

S.D. = standard deviation

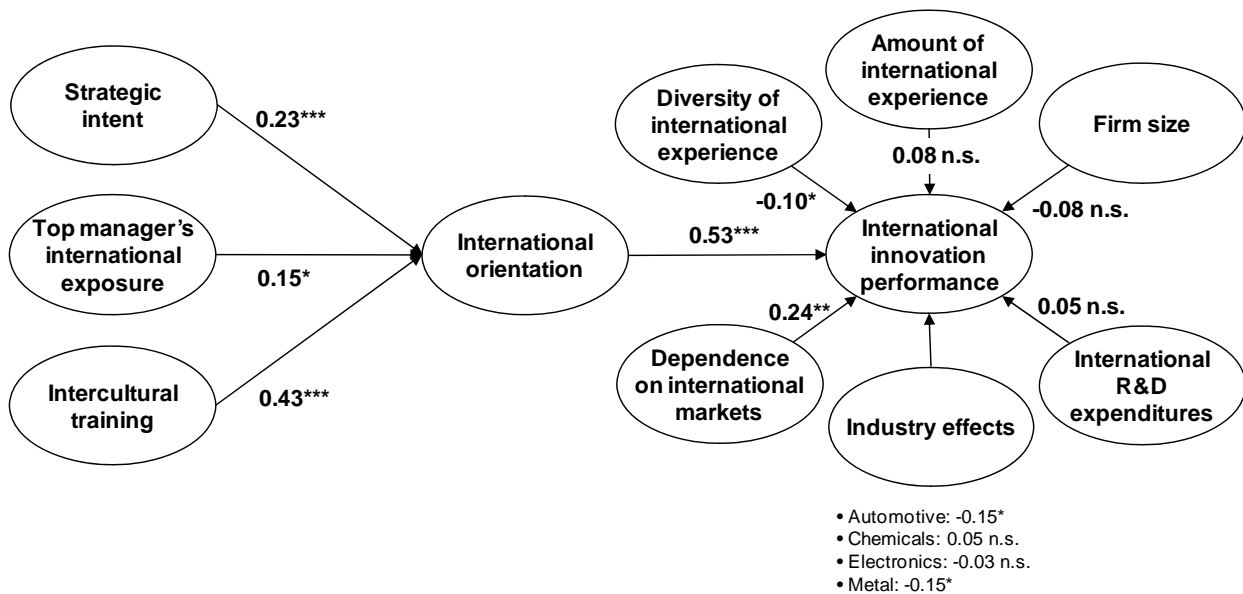
To test our hypotheses we used PLS (Partial Least Squares) structural equation modeling (Chin, 1998). Specifically, we applied SmartPLS (Ringle, Wende, & Will, 2005), which allows for the simultaneous testing of hypotheses while enabling single- and multi-item measurement as well as the use of both reflective and formative scales. Additionally, it is a distribution free method. To evaluate our model we followed the recommendations of Chin (1998) and examined path coefficients, the coefficient of determination (R²), and the Stone-Geisser-Test-Criterion (Q²). The path coefficients in PLS can be interpreted similarly to the beta weights in multiple regressions. The extent and direction of a path coefficient determines whether a hypothesis can be accepted or not. However, only the significance level allows making an exact statement on the exploratory power of the path coefficient. We determined the respective t-values by using the bootstrapping method (Chin, 1998). Further, we examined the R² for the independent performance variable, i.e. international innovation performance. With a value of 0.46 for international innovation performance, our model has a good estimation quality (Chin, 1998). Lastly, the predictive relevance of our model is satisfactory since the Q²-value is well-above the threshold of 0 (Chin, 1998).

5. Results

5.1 Test of Hypotheses

We tested our hypotheses using our sample of 138 business units. Figure 2 summarizes our results.

Figure 2: Results of the Full Model



n = 138

†: $p < 0.10$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$; n.s. = not significant

Source: Own illustration.

All of the proposed antecedents have a positive and significant impact on the level of a firm's IO. We find a positive and significant (0.23, $p < 0.001$) relationship between a firm's strategic intent and its level of IO. This supports hypothesis 1. The impact of top managers' international exposure on IO is also positive and significant (0.15, $p < 0.05$), which confirms hypothesis 2. Hypothesis 3 predicted a positive relationship between intercultural training and IO. This hypothesis receives strong support by our data (0.43, $p < 0.001$). Finally, we examined the impact of IO on a firm's international innovation performance – hypothesis 4. This hypothesis gets strong empirical support from our data (0.53, $p < 0.001$).

5.2 Robustness Checks

We used our 55 dyads to cross-validate the previous findings (using informant 2 for the independent variable and informant 1 for the dependent variable). As these 55 pairs were not enough

cases to estimate the full model, we split the main model into two separate models: the first one focusing on the relationship between IO vs. international innovation performance and the second one focusing on the antecedents of IO. Similar to the results reported previously, we found a positive relationship between IO and a firm's international innovation performance (0.29, $p < 0.05$). The overall model fit is lower ($R^2 = 0.22$), but still satisfactory (Chin, 1998). We could also confirm the positive and significant impact of top managers' international exposure (0.17, $p < 0.1$) and intercultural training (0.30, $p < 0.01$) on IO. The effect of strategic intent on IO remains positive, however, the coefficient is not significant anymore. We further applied the Harman's one-factor test and the procedure suggested by Lindell and Whitney to check for a common method bias (Lindell & Whitney, 2001; Podsakoff & Organ, 1986). Both tests reveal that a common method bias is not existent in our data set.

Finally, we cross-validated our performance variable "international innovation performance" by correlating it with the "overall innovation performance" variable, which captured the firms' innovation performance both in the home and international markets. The correlation is significant and positive (0.49, $p < 0.01$) indicating that the innovation success in international markets is not necessarily achieved at the expense of lower success in the home market.

6. Discussion and Outlook

Our study is one of the early studies to systematically examine the antecedents of IO and report on its outcomes on innovation. To do so, it integrates multiple literature streams from international business, global strategy, dynamic capabilities and marketing to provide new insights on this specific but important aspect of firms engaged in global competition. We find that IO has a positive influence on international innovation performance. This outcome shows that the benefits of increased IO outweigh the costs associate with achieving it. We further find strong support for our three antecedents of IO: strategic intent, top manager's international exposure, and intercultural training processes.

These findings highlight that to be internationally oriented requires multi-faceted inputs. Clearly it starts at the top, with an inherent strategic desire to value opportunities in overseas markets

and having a CEO who has experience in and has developed an appreciation for overseas conditions. These findings reinforce the fact that IO is a core strategic attribute of a firm. This attribute is hard to develop without a strong impetus from the top. The findings also indicate that fundamental structures and processes of a firm are also important for being internationally oriented. More specifically, training processes, which familiarize middle managers with cross-cultural issues, are important to effectively develop IO.

From a conceptual standpoint this study contributes by developing a more holistic perspective of IO. While we root the concept of IO in the processes of knowledge acquisition, sharing and use, we also consider antecedent factors that shape these processes with an outward rather than inward focus and validate its value by linking it to innovation outcomes. In doing so, we advance the notion of IO from an individual manager's cognitive attributes to the level of a firm, whose abilities to acquire share and use knowledge is driven by a strategic desire and the capacity to absorb ideas from other cultures. We present a framework that integrates prevailing insights on knowledge transfer processes within MNCs with inputs from the global mindset literature and more recent perspectives of international attention to develop a more comprehensive approach to understand why some firms are better at sensing and leveraging overseas opportunities than others. Our study also offers several contributions to better understand dynamic capabilities in the international context which has received scarce academic attention so far. By doing so it deepens our understanding of drivers and consequences of international dynamic capabilities. Last but not least, our newly introduced measurement model of IO accommodates the call to capture the multidimensional character of dynamic capabilities and validate it empirically (Lichtenthaler & Ernst, 2011).

To managers, our study offers some strong pragmatic guidelines as to how existing knowledge transfer processes within firms can be shaped and refined to develop an international rather than a domestic focus. It encourages firms to elevate the strategic importance of international operations, inculcate solid international experience in the top management and instill strong intercultural sensitivity among employees through effective training processes.

Siemens, for example, is such a successful global player because it has started multiple company-wide initiatives to strengthen its IO. Recently, it introduced a new corporate development

strategy called “SMART”. This acronym stands for simple, maintenance-friendly, affordable, reliable, and timely to market products developed mainly for emerging markets, but also having the potential for worldwide roll out (Bartsch, 2009). This program sets a clear strategic direction for Siemens’ future innovation activities and assigns emerging markets a high priority. Furthermore, Siemens created the position of a Chief Diversity Officer reporting directly to the CEO and responsible for promoting plurality in the ranks of Siemens senior management, especially in terms of international experience and background (Siemens, 2008). Finally, the company has started to offer extensive intercultural training at various Siemens’ sites worldwide to foster collaboration and knowledge-exchange within the firm globally (Siemens, 2008).

A few limitations of this study, which may reflect opportunities for further research, are important to highlight. First, the study exclusively looks at German companies, and as such the findings may reflect attributes that are specific to this setting. However, as the core constructs we use are universal, we think that our findings may be generalizable across different country contexts. More studies probing on these interrelationships in other country settings may, however, prove to be fruitful. Second, although we have suggested a set of potential antecedents to IO, we have not identified all possible antecedent factors. Future research could explore other potential antecedents. Third, in our empirical design we have limited our survey to headquarters. Future studies may consider taking the subsidiary perspective also into consideration.

To be oriented internationally is becoming increasingly important for firms in our global economy. This is particularly true given the recent explosion of opportunities overseas not just in developed markets but currently also in several emerging markets. Now more than ever it is becoming critical for companies not to rely purely on their domestic markets but learn to recognize and leverage opportunities abroad. And while these forces of globalization are affecting more and more firms, many fail to understand how to orient themselves internationally. Our study offers some new insights on the antecedents and consequences of IO. We find some useful results that could guide managers in developing initiatives in their firms to either build or refine their international orientation.

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Appendix: Constructs, Items, Scales and Reliabilities

International information acquisition (7-point scale with *strongly disagree* / *strongly agree* anchors; Cronbach's $\alpha = 0.77$)

1. We regularly survey our customers in international markets in order to better understand their needs.
2. We look regularly also in international markets for new technological solutions for our products.
3. We monitor intensively our competitors in international markets
4. We exchange opinions with our international partners (e.g. suppliers, trade partners) in order to better understand our customers.

International information sharing (7-point scale with *strongly disagree* / *strongly agree* anchors; Cronbach's $\alpha = 0.86$)

1. R&D personnel invest lots of time to inform other functional departments about the newest overseas technologies for potential new products
2. We regularly circulate documents (e.g. reports) that provide information on our overseas markets.
3. Information about overseas markets disseminates quickly in our business unit.
4. Important information about overseas markets reaches the relevant departments often too late to be of any use.^R

International information use (7-point scale with *strongly disagree* / *strongly agree* anchors; Cronbach's $\alpha = 0.66$)

1. Customer segmentation on an international basis determines our new product development activities.
2. Decisions to standardize new products across markets or to adapt them locally are always based on international market research.
3. We rapidly respond to new products that our competitors launch in overseas markets.

Strategic intent (7-point scale with *strongly disagree* / *strongly agree* anchors; Cronbach's $\alpha = 0.75$)

1. Our long-term growth strategy aims mainly at international markets.
2. High market share in key international markets is of strategic importance to us.

3. We are often present as one of the firsts in international growth markets in our industry.
4. We are convinced that internationalization yields more opportunities than threats to us.

Top manager's international exposure (7-point scale with *not at all* / *to a very high degree* anchors; Cronbach's $\alpha = 0.74$)

Please estimate the following in regard to the CEO/ top manager of your business unit:

1. If she/he worked abroad during her/his career (e.g. as an expatriate)
2. If she/he attended a higher education institution abroad (e.g. master studies, Ph.D. studies)

Intercultural training (7-point scale with *strongly disagree* / *strongly agree* anchors; Cronbach's $\alpha = 0.84$)

1. Managers participate in training programs that acquaint them with conditions in international markets.
2. Experience in one of our international subsidiaries is a consideration for promotion and advancement.
3. Employees receive training in how to communicate with people from other cultural backgrounds (e.g. language courses, intercultural seminars)
4. Managers are trained sufficiently to work internationally.

International Innovation Performance (7-point scale with *very small* / *very high* anchors; Cronbach's $\alpha = 0.89$)

1. Impact of new products launched in the last three years in international markets on your business unit's today's international sales.
2. Profitability of new products launched in the last three years in international markets relative to the spending on developing and launching them.
3. Impact of new products launched in the last three years in international markets on today's profitability in international markets.
4. Profitability of new products launched in the last three years in international markets relatively to the new products launch by your most important competitors.
5. Market share of new products launched in the last three years in international markets relatively to

your most important competitors.

Note: R = reverse coded.

D. INTEGRATION OF INTERNATIONAL MARKET INFORMATION IN NEW PRODUCT DEVELOPMENT – A STAGE-SPECIFIC VIEW

“By sourcing and integrating knowledge from dispersed geographic locations, companies can generate more innovations of higher value and lower cost.”

Santos, Doz and Williamson (2004), p. 31

“No one has a monopoly on great ideas, least of all headquarters.”

Birkinshaw and Hood (2001), p. 131

1. Introduction

Companies are increasingly dependent on the success of their products abroad (Kafouros, Buckley, Sharp, & Wang, 2008; Kleinschmidt, de Brentani, & Salomo, 2007). However, as international markets can considerably differ from the home turf in terms of culture, consumer habits, and buying power they require special product offerings (Deloitte, 2006; Golder, 2000). Improper prices, unmet customer requirements or unsuitable technological solutions are typical handicaps of exported home-made products. Overcoming this is difficult for companies as most of them have built their innovation capabilities on understanding preferences and technical requirements of domestic customers for whom they develop new products in the first row (Golder, 2000; Vernon, 1979). Switching between domestic and international new product development (INPD) is by no means an automatism. It requires a systematic learning of new capabilities applicable in the international domain (Sofka, 2008). For instance, foreign market knowledge competence is necessary to develop successful products for foreign markets (Li & Cavusgil, 2000).

Furthermore, relevant NPD information is scattered worldwide. The search for it is complex and costly (MacPherson, 2000; Santos, Doz, & Williamson, 2004). As managers often tend to be less knowledgeable about foreign markets they may encounter problems to understand, filter, process, and use sticky local information. Thus other things being equal they may tend to focus their information

processing on the more readily available domestic context (Lindqvist, Sölvell, & Zander, 2001). This however, can lead to an array of me-too products because of other competitors churning through the same local knowledge clusters (Santos et al., 2004).

In order to develop products demanded by the market and reduce risks associated with product failure companies have to keep track with customer wishes, market developments, competitor moves and technological opportunities along the entire NPD process (Ernst, 2002; Moenaert, de Meyer, Souder, & Deschoolmeester, 1995; Zahay, Griffin, & Fredericks, 2004). Research shows that early stages of NPD are extremely important for success (Cooper, Edgett, & Kleinschmidt, 2004). Nevertheless, managerial practice indicates that companies adjust their products for international sales often only in terms of price or promotion activities – typically carried out later in the NPD process (Deloitte, 2006; Whitelock, 1987). To succeed, companies should adopt an international perspective throughout the whole NPD process (Perks & Wong, 2003). Studies show that firms initiating NPD with respect to the needs of foreign buyers are more successful abroad than companies entering foreign markets with products originally designed for domestic clients (Kleinschmidt & Cooper, 1988; MacPherson, 2000). What's more, tapping international markets for innovative ideas can constitute a decisive competitive advantage for those companies who decide to leave their own backyard (Golder, 2000; Santos et al., 2004).

Surprisingly, research on internationalization of NPD is scarce even though it is such an important building block of companies' success (de Brentani & Kleinschmidt, 2004). The present study therefore contributes to closing this research gap. It also enhances the information processing theory of the multinational corporation (MNC) (Eggelhoff, 1991) by examining the integration of foreign market information in three distinct stages of the NPD process i.e. concept development, product development, and commercialization. Prior empirical studies on INPD do not examine stage specific aspects of integrating overseas market information or the relative effectiveness of choosing different stages for such integration (Subramaniam, 2006; Subramaniam & Venkatraman, 2001). And this is important as overseas market information is more costly to gather and more difficult to decipher in comparison to its domestic counterpart (Ayal & Raban, 1990; Toften & Olsen, 2004). Thus companies should know exactly where in the NPD process its integration helps to achieve the

best product outcomes. Also anecdotal evidence suggests that companies might be experimenting with all kinds of approaches for this complex task. For example, when developing a new phone for emerging markets, Nokia's engineers spent considerable time before the actual product development, conducting ethnographic and long-term user research in several Asian countries (McGregor, 2006). On the other hand when developing a new successful skin cleanser, P&G invested much effort all through the process to integrate international market information (Bartlett, 2003). In contrast, ABB developed its new electric power generator in a very home-centric way – even if the technology was conceived for global markets. Only before launch the opinion of overseas customers was requested (Berggren, 2004).

Our study additionally considers two antecedents of international market information integration namely, international innovation culture and international company experience. As previous research on INPD has predominantly examined “hard” determinants of success like the existence of cross-national NPD teams (Subramaniam, 2006), product strategies (Calantone, Cavusgil, Schmidt, & Shin, 2004) and management practices for foreign R&D sites (Chiesa, 2000), we follow the suggestion of de Brentani and Kleinschmidt (2004) as well as de Brentani, Kleinschmidt and Salomo (2010) to address “softer” or “intangible” success determinants referring more to the behavioral environment of the firm and taking into account a firm's values and attitudes. Such “softer” approaches have proved particularly beneficial in INPD (Chryssochoidis & Wong, 1998). We also chose our antecedents to be controllable by management. Consequently, we provide first guidance for practitioners how to enhance NPD performance in foreign markets.

2. Conceptual Background

2.1 NPD Process Conceptualization

NPD is largely conceptualized as information processing in a sequence of stages¹¹ where distinct activities are carried out on the basis of different pieces of information (Cooper, 2008; Song & Parry, 1997). However, with regard to the number of stages which have to be completed the literature differs to a high extent. Depending on the research context a more or less granular NPD process

¹¹ Some process steps can also be carried out simultaneously and/or iterative (Im, Nakata, Park, & Ha, 2003).

conceptualization is recommended. Studies introduce between as many as seven (Booz Allen, & Hamilton, 1982), through six (Gruner & Homburg, 2000), five (Song & Parry, 1997), four (Song & Swink, 2009), three (Veldhuizen, Hultink, & Griffin, 2006), and finally two separate NPD stages (Im et al., 2003). Overall, the consensus appears to be around three generic stages: 1) concept development, 2) product development and 3) commercialization (Ernst, Hoyer, & Rübсаamen, 2010).




The concept development stage comprises all activities around the generation and selection of new product ideas on the basis of identified market needs and risks in line with the company's NPD strategy (Cooper et al., 2004; Song & Parry, 1997). The subsequent product development stage focuses on prototype development and testing as well as manufacturing planning (Cooper et al., 2004; Song & Parry, 1997). Finally, the commercialization stage encompasses activities around the actual market launch of the product like final market tests, distribution, promotion and product in-market success assessment (Cooper et al., 2004; Song & Parry, 1997).

Several studies have examined the importance of distinct NPD process stages for NPD success, however, with varying focus. Most attention has been devoted to study the conceptualization stage and to a considerably lesser extent launch activities (Ernst, 2002). Clearly, the actual product development seems to be the least studied stage. To the best of our knowledge there exists no study focusing solely on this stage. All in all, the proficient execution of various tasks plays an important role throughout the whole NPD process (Henard & Szymanski, 2001; Montoya-Weiss & Calantone, 1994). However, "predevelopment" or "homework" tasks – falling into the concept development stage – seem to be especially important for NPD performance (Ernst, 2002; Henard & Szymanski, 2001; Langerak, Hultink, & Robben, 2004a; Montoya-Weiss & Calantone, 1994). This is due to the fact that NPD is a process with highly uncertain outcomes. The more uncertainty is reduced at the beginning, the smaller the deviations from initial specifications later on and hence higher the NPD success (Verganti, 1997). Also many managers perceive activities in early and middle stages of NPD to be more important for the successful development of new-to-the-world products than for product modifications (Rochford & Rudelius, 1997). Finally, research shows that product launch activities exert a decisive impact on new product performance and are often the costliest single step in the NPD process (Di Benedetto, 1999; Langerak, Hultink, & Robben, 2004b; Hultink & Robben, 1999).

2.2 Domestic Market Information in NPD


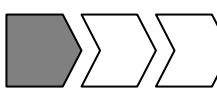
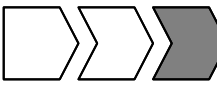



Market information plays a leading role with regard to NPD success (Ernst, 2002; Ernst et al., 2010). However, this is only the case when it is used effectively and not merely collected (Ottum & Moore, 1997). Market information encompasses present and future customer needs, details about competitors' actions as well as changing conditions in industries and regulations affecting customers (Kohli & Jaworski, 1990). Several studies have examined the importance of market information integration in each of the generic stages of NPD (see Table 1 for an overview).

Table 1: Overview of Stage-specific Empirical Studies on Market Information Integration in NPD in the Domestic Context

Study, Sample, Country	Research Focus	Key Findings	Decisive Stages ¹²
Descriptive Studies			
Frishammar and Ylinenpää (2007), n = 4, Sweden	Discusses the type of information, information sources and types of cross-functional integration practices associated with high NPD performance in different stages of the NPD process.	Early and late stages are most information intensive. Use of customer information important throughout the NPD process and competitor information in early and late stages.	
Zahay et al. (2004), n = 20, USA	Uncovers which type of data, from what sources, and in what form B2B companies currently use in their NPD process.	Most information types are needed at the beginning and then again in later stages. The fuzzy front end is the most information intensive stage.	
Causal Analyses			
Di Benedetto (1999) ¹³ , n = 183, USA	Identifies which activities associated with product launch as well as which information-gathering support activities are perceived to be the most critical to launch success.	Top perceived performance on virtually all market information-gathering activities was very highly related to perceived launch success.	

¹² When necessary the original NPD conceptualization was “translated” into our three stage NPD process model to enhance comparability of results.

¹³ The commercialization stage was the only one assessed in this study.

Study, Sample, Country	Research Focus	Key Findings	Decisive Stages ¹²
Gruner and Homburg (2000), n = 310, Germany	Assesses the performance impact of the intensity of interaction with customers in different stages of the NPD process.	Interaction with customers during early and late stages of the NPD process has a positive impact on new product success.	
Langerak et al. (2004a) ¹⁴ , n = 126, The Netherlands	Investigates the relationships among market orientation, the proficiency in predevelopment activities, new product performance, and organizational performance.	Market orientation is positively related to the proficiency in strategic planning, idea generation and idea screening. Strategic planning and idea generation are positively related to new product performance.	
Langerak et al. (2004b) ¹³ , n = 126, The Netherlands	Investigates the relationships among market orientation, new product advantage, the proficiency in new product launch activities, new product performance, and organizational performance.	Market orientation is related positively to the proficiency in market testing, launch budgeting, launch strategy, and launch tactics. Proficiency in launch tactics is related positively to new product performance.	
Rochford and Rudelius (1992) ¹⁵ , n = 79, USA	Analyzes sources and users of information in different stages of the NPD process and whether sharing information widely among different functional areas in these stages has an effect on performance.	Information from a larger number of sources appears to have an effect on new product performance during the early, predevelopment and middle stages of the NPD process.	
Troy et al. (2001) ¹⁴ , n = 285, USA	Models product idea generation as a function of the amount of market information that the NPD project group has.	Amount of market information gathered has a positive impact on the number of new product ideas generated.	
Veldhuizen et al. (2006), n = 166, The Netherlands	Explores antecedents and consequences of market information processing during three generic stages of NPD of new high-tech products.	Using market information in the first stage of the NPD process is associated with market/financial success.	

There exists support for the notion that its integration is especially important in the early and late stages of NPD (di Benedetto, 1999; Frishammar & Ylinenpää, 2007; Veldhuizen, et al., 2006).

¹⁴ The concept development stage was the only one assessed in this study.





¹⁵ The commercialization stage was not assessed in this study.

Thus for instance, market information acquired in early stages impacts the amount of new product ideas generated (Troy, Szymanski, & Varadarajan, 2001) whereas market information acquired in later stages helps to control and fine-tune the commercialization efforts (di Benedetto, 1999). However, there are only a few empirical studies which look at more than one NPD stage concurrently. Therefore, most of them cannot reveal how important market information integration in each stage is relatively to the other stages.

With regard to market information types critical in distinct NPD process stages the literature is quite agreed. During concept development information on current and potential customers as well as competitive and regulatory aspects is important (Frishammar & Ylinenpää, 2007; Gruner & Homburg, 2000; Zahay et al., 2004). The literature reveals that gathering information on customers' problems and latent needs is more helpful than on their proposed solutions or expressed wants (Frishammar & Ylinenpää, 2007). In the product development stage an update on customer needs and problems is vital (Frishammar & Ylinenpää, 2007; Zahay et al., 2004). Finally, in the commercialization stage again the same information types as in the conceptualization stage are a precondition of success (Frishammar & Ylinenpää, 2007; Gruner & Homburg, 2000; Zahay et al., 2004).

The main source of market information is traditionally the marketing department however, not exclusively (Kohli & Jaworski, 1990). Its involvement in NPD has been subject to much research scrutiny (Ernst, 2002). Even if studies on the marketing function integration usually do not mention the type of information exchanged, most seem to assume that integration of this department equals the inclusion of market information in the NPD process. Overall these studies claim that marketing should be integrated along the entire NPD process (compare Table 2). Nevertheless, its impact is most prominent in the early and late stages of the NPD process (Gomes et al., 2003; Song & Swink, 2009). On the contrary, Ernst et al. (2010) show that the integration of the sales department – being the customer voice channel but rarely distinguished from the marketing department – has a positive effect on NPD in the first two NPD process stages.

Table 2: Overview of Stage-specific Empirical Studies on Marketing Function Integration in NPD in the Domestic Context

Study, Sample, Country	Research Focus	Key Findings	Decisive Stages ¹²
Descriptive Studies			
Ernst et al. (2010), n = 106, Germany	Examines the effect of cross-functional cooperation between sales, marketing, and R&D on NPD performance across multiple stages of the NPD process.	Sales-R&D cooperation in the concept and product development stages is critical for higher NPD success. Sales-marketing cooperation is important in the concept development stage and has surprisingly less impact in the implementation stage.	
Gomes, de Weerd-Nederhof, Pearson and Cunha Pina, (2003), n = 92, The Netherlands, UK	Explores the relationship between NPD performance and functional integration of R&D and marketing under different conditions of project uncertainty.	Interaction between marketing and R&D in initial stages of NPD has an impact on new product quality, whereas in later stages it is associated with faster time to market.	
Song and Swink (2009), n = 467, USA	Examines the influences of marketing-manufacturing-integration (MMI) in four stages of the NPD process.	For innovative NPD projects, higher MMI in each process stage leads to greater NPD success, but MMI in the earliest stages is especially salient. For incremental NPD projects, the strongest positive impact of MMI on NPD success is in product commercialization.	
Song, Thieme and Xie (1998), n = 236, USA	Examines the relationships between NPD performance and cross-functional joint involvement between R&D, manufacturing, and marketing in five stages of the NPD process.	The marketing function's joint involvement is beneficial for NPD performance in the following stages: market opportunity analysis, planning, development, pre-testing. During launch it is not supportive any more.	

2.3 International Market Information in NPD

All the studies mentioned above focus exclusively on domestic NPD. Processing market information in the international context has received limited attention. Sporadic studies that center on this topic mostly present some anecdotal evidence based on single case studies without any normative implications.

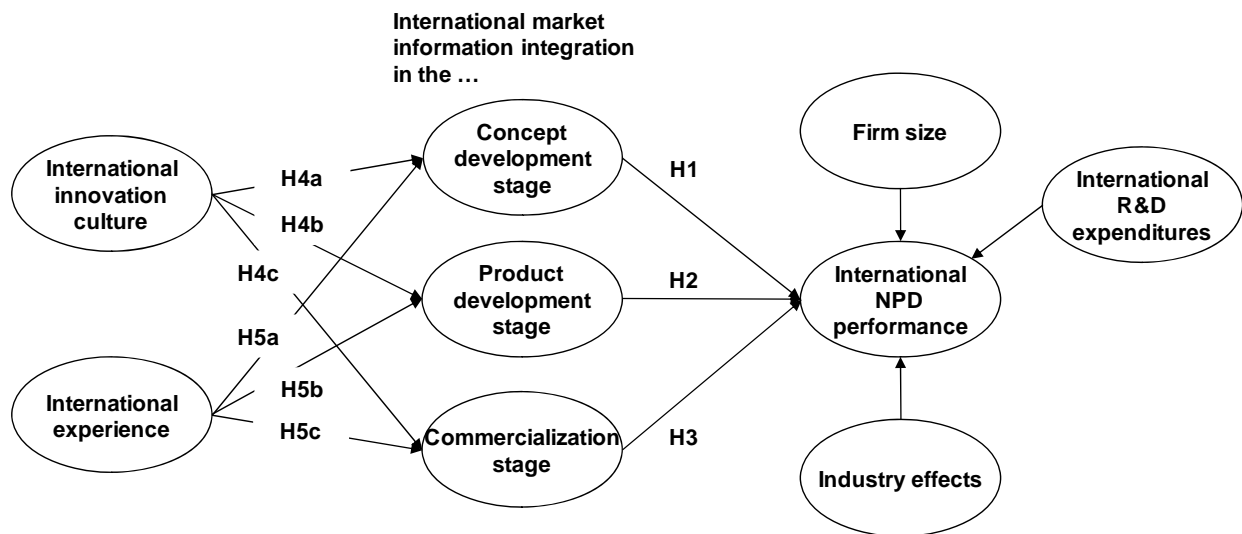
Zooming into the NPD process of three Swedish companies Lindqvist et al. (2001) find initial support for an “hour-glass shape” model of international market information integration i.e. much higher input of international sources at the beginning and at the end. Similarly, Chiesa (2000) documents that the intensity of information exchange between overseas R&D sites differs across stages of global NPD projects. In general, all introduced R&D structures enhance information exchange in the early and late project stages while only half of them along the entire process. On the contrary, Hedlund and Ridderstråle (1995) sketch a “glocal” NPD model i.e. *global* at the beginning and *local* further on. Also Ayal and Raban (1990) demonstrate that successful INPD projects focus on research and market planning as early as possible during concept and product development. Finally, Boutellier, Gassman and von Zedtwitz (2008) state that the internationalization degree increases with the project preceding. However, they add that the beginning of the process can become more international depending on the extent of global stimuli it receives. Finally, Chrysochoidis and Wong (1998) complement that a timely product launch across multiple country markets depends among other things on marketing resource sufficiency as well as effective communication between headquarters, subsidiaries and customers in different countries. Clearly, there seems to be no consensus in the literature as to where in the NPD process international market information should be best integrated.

Other studies devoted to INPD do not focus on the relative importance of stages. For instance, Li and Cavusgil (2000) show that integrating foreign market information in NPD is beneficial because it helps orienting the new product toward foreign markets and in turn increases the product’s acceptance. Similarly, MacPherson (2000) as well as Kleinschmidt and Cooper (1988) argue and empirically demonstrate that integrating foreign market information in NPD increases product success abroad. Also Subramaniam and Venkatraman (2001) highlight that overseas knowledge when embodied in products increases the frequency and consistency of their launch in international markets.

3. Research Framework

Figure 1 depicts our research framework laying out our conceptualization of international market information integration in the NPD process, its antecedents and INPD performance outcome.

Figure 1: Research Framework: Antecedents and Outcome of Integrating International Market Information in NPD



Source: Own illustration.

There are strong reasons to believe that international market information is critical at the beginning of the NPD process. The concept development stage is clearly the most information intensive (Frishammar & Ylinenpää, 2007; Zahay et al., 2004). In the domestic context market information integration at this stage is decisive for success (Langerak et al., 2004a; Veldhuizen et al., 2006) especially, in very innovative NPD projects (Song & Swink, 2009). This reasoning may also apply to the international context where companies cannot build on well-known customer profiles and accumulated market knowledge. They are confronted with high uncertainty with regard to the target market. Therefore, a particularly careful integration of market information in early INPD steps may be of uttermost importance (Chrysochoidis & Wong, 1998). Thus new products for international markets may need to be rooted in the real market early on and designed with international markets in mind (Golder, 2000; Kleinschmidt & Cooper, 1988; MacPherson, 2000). Initial studies also show that the first NPD stage may have the broadest international exposure (Hedlund & Ridderstråle, 1995; Lindqvist et al., 2001) where companies search for new product ideas, market trends and customer insights (Santos et al., 2004). A solid understanding of the foreign clients' expectations might be absolutely necessary to plan for their needs (Reuber & Fischer, 1997). Accordingly,

Hypothesis 1: The use of international market information in the concept development stage has a positive impact on INPD performance.

The product development stage is regarded as more in-house oriented and less information intensive especially with regard to market information (Frishammar & Ylinenpää, 2007; Zahay et al., 2004). The central department in this NPD stage is R&D (Hedlund & Ridderstråle, 1995; Song et al., 1998). R&D managers are more concerned with technical issues, like performance, efficacy, safety, design and manufacturing processes (Gresham, Hafer, & Markowski, 2006) which might be dependent more on “objective” state of the technology issues than on more “subjective” customer information. Moreover, technical and especially engineering-related knowledge may be very tacit in nature thus less predestined to be exchange over large distances (Berggren, 2004; Lindqvist et al., 2001). Additionally, the type of tasks performed in this stage for instance, prototype development and testing seem to require less external market input. That might be because customers are often suboptimal sources of technological solutions for their problems and thus companies might be better off when relying on their own competences during technical development (Frishammar & Ylinenpää, 2007; Gruner & Homburg, 2000). Also a clear NPD project roadmap set in earlier NPD stages can make relying on technical information of the R&D department more important than international market information (Frishammar & Ylinenpää, 2007). Hence,

Hypothesis 2: The use of international market information in the product development stage has no impact on INPD performance.

The importance of market information increases again in the commercialization stage (Frishammar & Ylinenpää, 2007; Zahay et al., 2004). To properly fine-tune the launch process, adapt after sales measures, logistics as well as assess competitors’ reactions a steady market feedback is inevitable (Di Benedetto, 1999; Hultink & Robben, 1999; Langerak et al., 2004b). Especially, in the international context it seems to be crucial for product positioning. It can provide a decision basis on how much standardization versus adaptation of the marketing mix across country markets is necessary for success (Golder, 2000). And at least some degree of customization of the marketing mix seems to be helpful – particularly when the envisioned markets differ greatly in terms of mores, language, technology infrastructure and channel parameters (Bruce, Daly, & Kahn, 2007). Integrating the requirements of multiple markets at this stage may also increase the number of countries the product

could be potentially launched – ideally simultaneously – which further enhances the product’s success (Chrysochoidis & Wong, 1998; Oakley, 1996). Thus,

Hypothesis 3: The use of international market information in the commercialization stage has a positive impact on INPD performance.

“Cooperative” company practices like department-overarching goals and objectives, lack of interdepartmental conflict or a good working climate have been widely regarded as facilitators of market information processing both in the domestic (Kirca, Jayachandran, & Bearden, 2005) and export-related (Cadogan, Diamantopoulos, & Siguaw, 2002) context. The influential study of Moorman (1995) demonstrates that some company cultures are better for stimulating market information processing in the domestic context than others. Similarly, Maltz, Menon and Wilcox (2006) demonstrate that certain affirmative cultures with a “pro-innovation bias” help to use market information within firms. Finally, Wei and Morgan (2004) prove that a supportive organizational climate has a positive impact on domestic market information processing both on individual and group level while not directly on NPD performance.

An appropriate innovation culture may be even more important in the international context where the number of national and departmental divisions is bigger than in the domestic context thus likely hampering information flow. Such an international innovation culture can be defined as “an international mindset’ and a ‘global readiness’ on the part of managers and employees to deal effectively with the complexities and opportunities that result from different national cultures, geographic dispersion of markets and participants, building trust and cooperation among dispersed affiliates, and cross-locational/-cultural idea generation and resource utilization” (de Brentani & Kleinschmidt, 2004: 313). The positive impact of international innovation culture on gathering, coordinating, and integrating external, globally dispersed information is tentatively supported by the study of Kleinschmidt et al. (2007).

On the basis of previous research, we believe that attitudes and values expressed in a firm’s innovation culture may lead to specific behavior among NPD employees reflecting these values.

Therefore, the impact of international innovation culture on INPD performance seems to be of a more indirect nature. In this case we hypothesize that:

Hypothesis 4: An international innovation culture positively impacts the use of international market information in all stages of the NPD process.

Competences and capabilities for identifying and absorbing foreign information for NPD can be enhanced by international experience. In particular, such exposure can help to generate richer transmission channels which facilitate information flows (Sofka, 2008). Internationally inexperienced managers are also less likely to look for international information – they tend to rely on domestic knowledge for decision making even if it does not fit the foreign context (Harvey & Novicevic, 2000).

The more experienced a company is within foreign markets the more its market knowledge and familiarity with knowledge sources increases (Diamantopoulos, Schlegelmilch, & Tse, 1993). Similarly, more internationally experienced companies can better filter and disseminate relevant international market information throughout their organization which in turn facilitates its integration into new products. Several studies demonstrate a strong link between international firm experience and its ability to launch new products in international markets (Calantone et al., 2004; Yeniyurt, Townsend, & Talay, 2007). To sum up, a greater amount of international experience may enhance the processing of international market information (Cadogan et al., 2002). Consequently, we hypothesize that:

Hypothesis 5: International experience positively impacts the use of international market information in all stages of the NPD process.

4. Methods

4.1 Sample

We conducted a survey to test our hypotheses. We drew our sample from the top five German manufacturing industries in terms of international sales – namely: machinery, electronics, chemicals, automotive, and metal industry. We used the Hoppenstedt Database to identify internationally active

firms and we confirmed through an extensive internet search that all of these companies were headquartered in Germany. We focused on German companies in order to have a homogenous sample and avoid biases due to different home market sizes or diverging national cultures. We contacted all companies by phone and requested their participation in the survey. We further asked for the appropriate contact person that is most knowledgeable about the firm's international operations and its NPD activities. Informants had been with their respective firms for many years and typically held senior management positions such as head of R&D, head of international marketing or head of business development. To increase the response rate, follow-up phone calls were conducted and two reminder emails were sent approximately two and four weeks after the first mailing. Our unit of analysis was the business unit as it is possible that different business units within a corporation may differ in terms of their NPD activities.

Out of 378 companies initially selected, a total of 129 companies participated and returned questionnaires from 138 business units (in nine companies more than one of their business units participated in the survey). Our response rate of 34 % can be considered more than average for this type of surveys (Menon, Bharadwaj, Adidam, & Edison, 1999). We obtained data with a reasonable spread across our five industries: machinery (31.2%), chemicals (27.5%), electronics (18.1%), automotive (11.6%), and metal industry (11.6%). The participating business units had mean annual revenues of US\$ 449 million out of which 67%, on average, came from international markets. They were on average active in 58 countries. A non-response bias test (Armstrong & Overton, 1977) of all constructs used in this study showed that a non-response bias was not an issue.

4.2 Measures

We developed our measures over several stages in order to ensure their validity. First, we conducted a literature review to identify usable scales that had been used previously in empirical studies. Second, we conducted a series of 13 exploratory in-depth interviews with senior managers from multiple companies to discuss and adapt possible items intended to measure our constructs. We used this information to build the first version of our questionnaire. Third, the questionnaire was pre-tested with nine academics and seven senior managers. Based on their feedback we made adjustments

to the scales and created the final design of the questionnaire (see appendix for items and scales we used to measure the constructs in this study).

We operationalized integration of international market information in three distinct stages of the NPD process as formative constructs (Diamantopoulos & Winklhofer, 2001). Each construct – namely: integration of international market information in the concept development stage, integration of international market information in the product development stage, and finally integration of international market information in the commercialization stage was measured by seven, four, and six items respectively based on Ernst et al. (2010) as well as Song and Parry (1997) (see appendix). We used formative items for our scales because the individual activities carried out in the NPD process from inception to a successful product launch are distinct tasks that not necessarily correlate with each other. What's more, they also cover the entire scope of NPD activities (Jarvis, MacKenzie, & Podsakoff, 2003).

We used reflective items for the rest of our constructs (Jarvis et al., 2003). International innovation culture was measured by four items based on de Brentani and Kleinschmidt (2004) as well as Kleinschmidt et al., (2007). They capture a company's attitude towards enhancing INPD-related knowledge sharing as well as the use of mechanisms coordinating NPD activities worldwide e.g. INPD teams. The scale intends to assess whether a firm tries to create a truly international innovation culture throughout its organization worldwide (see appendix).

We measured international experience by the number of years a business unit was active in international markets (Cadogan et al., 2002).

Finally, we measured the dependent variable INPD performance through five items adapted from Cooper and Kleinschmidt (1995) (see appendix). The assessment of the INPD performance was carried out for the entire portfolio of new products launched in international markets in the last three years prior to the survey.

As several organizational factors apart from integrating international market information in the NPD process may influence INPD performance, we used a number of control variables. First, as large firms may be more successful with their new products abroad because of greater resources, we controlled for their size. We operationalized size as the logarithm of a business unit's level of

international revenues (in millions of US\$). Second, we controlled for a firm's level of international R&D expenditure as the investment in R&D may influence NPD success. We defined international R&D expenditure as the percentage (from total R&D) of R&D spent in international markets. Third, due to our cross-industry approach, we controlled for industry effects by dummy variables.

4.3 Analytical Procedure

To evaluate both our measurement models (i.e. our constructs) as well as our structural model (i.e. the relationships between the constructs) we used PLS (Partial Least Squares) structural equation modeling (Chin, 1998). Specifically, we applied SmartPLS (Ringle, Wende, & Will, 2005) as it allows the simultaneous testing of hypotheses while enabling single- and multi-item measurement as well as the use of both reflective and formative scales. Additionally, it is a distribution free method.

We validated our two reflective constructs, namely: international innovation culture and INPD performance, following the standard procedures in the literature (Churchill, 1979; Hulland, 1999). To purify the scales we used the software SPSS for a factor analysis (varimax rotation, eigenvalue > 1 , factor loadings > 0.40 , communalities > 0.50) which confirmed the predicted multi-construct structure in our data. Furthermore, we computed item-to-total correlations. Items with correlations not exceeding 0.30 (Dunn, Seaker, & Waller, 1994) were eliminated. After dropping items exhibiting a poor fit we continued our analysis with SmartPLS and assessed the reliability of the constructs. We computed Cronbach's α coefficients which all exceeded 0.70 (Nunnally, 1978). Also composite reliability (CR) exceeded 0.70 for all constructs (Nunnally, 1978). Thus, we confirmed reliability of all the constructs. Convergent validity of the constructs was assessed through average variance extracted (AVE). Both constructs exhibited AVE above 0.50 considered indicative for convergence validity (Fornell & Larcker, 1981). Finally, we assessed the discriminant validity of our constructs by using the criteria suggested by Fornell and Larcker (1981). The square root of the AVE values exceeded the correlations of the respective constructs with all other constructs.

As quality criteria for formative scales differ from reflective ones, we evaluated our three formative constructs capturing integration of international market information in distinct NPD stages following Diamantopoulos and Winklhofer (2001). We first assessed indicator relevance at the

individual item level. We used the items' weights calculated by the PLS algorithm. Even though they are not the basis for scale purification – due to the very nature of this type of measurement models (Jarvis, et al., 2003) – they mirror the contribution of each item to the overall construct (Sambamurthy & Chin, 1994). In the concept development stage the internationalization of the activities “planning and formulating new product goals and strategies” (0.44) and “assessment and selection of new product ideas” (0.33) play a crucial role. In the product development stage enhancing “determining the desired product features of the prototype” (0.69) and “preparation of the commercialization concept” (0.44) with international market information is key. Finally, in the commercialization stage “monitoring customers and competitors reactions” (0.37) and “execution of test marketing measures before market introduction of new products” (0.32) contribute the most to the underlying construct. Second, we ruled out multi-collinearity both on the item level as well as the construct level as the variance inflation factors (VIF) and condition indices (CI) are below the recommended thresholds of 10 and 30, respectively (Im et al., 2003). Finally, we assessed the external validity of the formative constructs using a ‘Two-Construct-Model’ with an additional “phantom variable” (Diamantopoulos & Winklhofer, 2001). We modeled separately the relationship between the phantom variable “We emphasize responsiveness to differences in local markets” and all three international market information integration constructs. The results show highly significant and strong path coefficients of 0.44 ($p < 0.001$), 0.43 ($p < 0.001$) and 0.47 ($p < 0.001$) for the concept development, the product development, and the commercialization stage as an indicator of external validity (Diamantopoulos & Winklhofer, 2001).

As the independent and dependant variables were collected from a single informant, the so-called common-method bias can be an issue. To analyze the extent of a potential common-method bias we applied the Harman's one-factor test and the procedure suggested by Lindell and Whitney (Lindell & Whitney, 2001; Podsakoff & Organ, 1986). The results imply that our findings are not achieved solely due to common-method bias but rather are substantial.

Table 2 lists the relevant descriptive statistics of all variables and constructs as well as the respective correlation coefficients.

Table 2: Descriptive Statistics and Correlations

Descriptive Statistics and Correlations												
Variables	Mean	S.D.	Min.	Max.	1	2	3	4	5	6	7	8
1 Firm size	5.44	1.79	1.10	10.58	n.a.							
2 International R&D expenditure	10.63	15.29	0.00	70.00	0.29	n.a.						
3 Concept development	4.66	1.25	1.68	7.00	0.22	0.20	n.a.					
4 Product development	4.66	1.39	1.25	7.00	0.22	0.18	0.78	n.a.				
5 Commercialization	4.72	1.43	1.33	7.00	0.25	0.12	0.75	0.80	n.a.			
6 International innovation culture	5.10	1.35	1.25	7.00	0.23	0.19	0.47	0.47	.048	0.85		
7 International experience	34.57	28.41	1.00	150.00	0.28	0.12	0.09	0.18	0.22	0.12	n.a.	
8 International NPD performance	4.25	1.10	1.40	6.60	0.16	0.16	0.56	0.57	0.50	0.47	0.17	0.84

Notes: Bold numbers on the diagonal show the Cronbach's α ; n.a. = no Cronbach's α scores calculated because the construct is measured by a formative scale or single item.

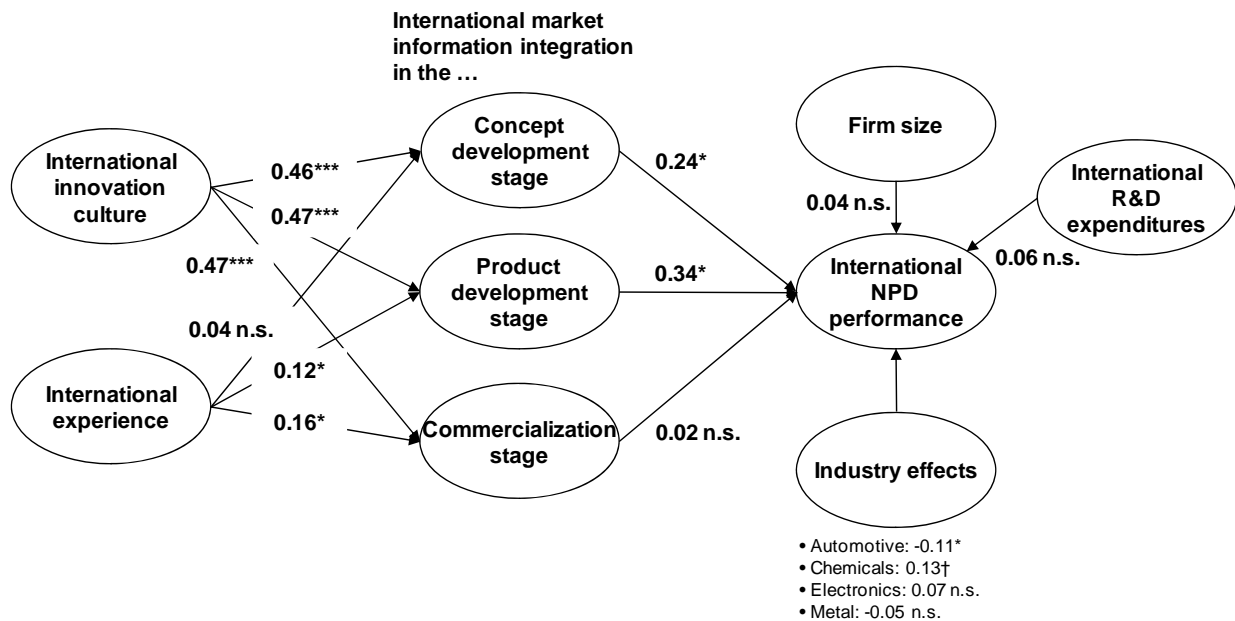
n = 138.

S.D. = standard deviation.

To evaluate our model we followed the recommendations of Chin (1998) and examined path coefficients, the coefficient of determination (R^2), and the Stone-Geisser-Test-Criterion (Q^2). The path coefficients in PLS can be interpreted similarly to the beta weights in multiple regressions. The extent and direction of a path coefficient determines whether a hypothesis can be accepted or not. However, only the significance level allows making an exact statement on the exploratory power of the path coefficient. We determined the respective t-values by using the bootstrapping method (Chin, 1998). Further, we examined the R^2 for the independent performance variable, i.e. INPD performance. With a value of 0.40 for INPD performance, our model has a good estimation quality (Chin, 1998). Lastly, the predictive relevance of our model is satisfactory since the Q^2 -value is well above the threshold of 0 (Chin, 1998).

5. Results

Figure 2 summarizes the results of our hypotheses tests.

Figure 2: Results of the Full Model

N = 138

†: $p < 0.10$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$; n.s. = not significant

Source: Own illustration.

Our results show that integration of international market information in both the concept and product development stages has a positive and significant impact on INPD performance (0.24, $p < 0.05$ and 0.34, $p < 0.05$ respectively). This supports hypothesis 1 but not hypothesis 2. Hypothesis 3 predicted a positive relationship between international market information integration in the commercialization stage and INPD performance. We did not find support for this in our sample (0.02, n.s.).

With regard to the antecedents international innovation culture has a positive and significant impact on international market information integration in all NPD process stages supporting hypothesis 4 (0.46, $p < 0.001$; 0.47, $p < 0.001$ and 0.46, $p < 0.001$ respectively) whereas international company experience has a significant positive impact on the product development and commercialization stage (0.12, $p < 0.05$ and 0.16, $p < 0.05$ respectively) not on the concept development stage (0.04, n.s.) thus only partly supporting hypothesis 5.

6. Discussion

To summarize the results of the hypotheses testing, we can conclude that integration of foreign market information in NPD stages exerts a varying impact on INPD performance. Against the hypothesized hour-glass like impact distribution of international market information integration on INPD performance our data shows a more skew one i.e. intensive impact of the first two stages and a nonsignificant impact of the last stage. It suggests a “broader top and waist” (Lindqvist et al., 2001: 121) of the initial INPD model. We additionally find strong support for international innovation culture being an important determinant of international market integration in all three NPD stages. Finally, we find only limited support for our hypothesis with regard to the second antecedent, namely international company experience. Counter intuitively it has a positive and significant impact only on the last two NPD process stages.

Especially, the hypotheses that were only partly or not at all supported deserve a more detailed commentary. First, international market information integration proved to be important in the product development stage. Thus although it is traditionally regarded as being more in-house oriented and dependant on technological capabilities of the firm, R&D managers should still keep track with market developments particularly when the latter are unfamiliar. Market information integration – especially regarding non-European markets being the context of this survey – allows making on time adjustments to the technical content of a product or the materials or components embodied into it. It further allows staying up-to-date with critical local regulations affecting technical solutions. All of this helps to determine the necessary level of technology customization or adaptation of products across markets which in turn impacts INPD success (Chrysochoidis & Wong, 2000). As changing technological characteristics of products can be particularly time consuming and resource intensive (Chrysochoidis & Wong, 2000), seeking market feedback in the development stage could help to avoid costly delays and misinvestments. Our results might also partly be explained by the dominance of B2B companies in our sample. These firms are often dependent on close collaboration with lead customers during the development stage (Gruner & Homburg, 2000; Hedlund & Ridderstråle, 1995).

Second, integrating foreign market information in the commercialization stage may not exert a significant positive impact on INPD performance as the product is nearly completely developed at this

point of time. Minor changes in product features or distribution measures – typical for this stage – will not miraculously change the very core of the product. In other words, if the product was developed excluding its target international markets it will not help significantly anymore even if it is pre-tested with the adequate customer group. This does not mean that international market information should be ignored – market-driven customization of commercialization activities remains an important step in the NPD process – but in comparison to other stages our tentative results show a less significant performance impact (Gruner & Homburg, 2000). Managing information in this stage may also be a little bit easier as it is not so rich anymore (Zahay et al., 2004). Because of this the majority of companies might be familiar with the information processing procedures and its use does not make a significant difference between winners and losers. Finally, our respondents came from company headquarters only, thus they sometimes might have difficulties to assess the full scope of international market information integrated in the commercialization stage as it is often performed at a foreign subsidiary.

Finally, contrary to our expectations, international company experience impacts integration of international market information in all but the concept development stage. Thus it seems that an international innovation culture – which has a positive impact on international market information integration in all three stages – matters more than bare experience. Norms and beliefs deeply rooted in a firm seem to be more critical for accomplishing such complex tasks as international market information processing. A further more “technical” explanation of this finding might be that international experience measured in years – as we did it – not necessarily mirrors the breadth of a company’s overseas NPD-related experience being so important at the concept development stage. Companies often start their overseas engagement via local independent distributors. This type of engagement does not help to learn local ropes in much detail as the firm is too detached from the overseas market. An increased understanding of local markets comes via feedback gained through own subsidiaries (Cavusgil, Zou, & Naidu, 1993). These however, are often sales offices at the beginning and not intended and not trained to be involved in NPD. They focus on selling existing products and at best provide feedback for local product adaptation in the commercialization stage (Immelt, Govindarajan, & Trimble, 2009). Secondly, a firm might be active abroad since many years but only

in a single country. This in turn can make it difficult for a company to integrate conflicting, unfamiliar and complex international market information coming from several culturally distinct markets in the information rich concept development stage.

From a theoretical point of view, the research presented here answers recent calls for adopting an international perspective in NPD (de Brentani & Kleinschmidt, 2004; Perks & Wong, 2003). It specifically aims at reducing the deficits of quantitative empirical research into this field. The results of our study add to the overall story of how to achieve greater new product success in the international context by examining antecedents and consequences of international market information integration in NPD. A further contribution of this study lies in the investigation of “softer” antecedents of international market information processing. These antecedents might be particularly helpful to integrate overseas market information as it contains a high proportion of tacit elements (Subramaniam, 2006). Additionally, the results also enhance the information processing theory in the context of internationally active firms (Egelhoff, 1991) as they allow a detailed view on international market information processing along the entire NPD process by zooming in three distinct process stages. Thus they complement previous findings acknowledging the necessity of integrating foreign market information per se in INPD (Subramaniam, 2006; Venkatraman & Subramaniam, 2001) by explicitly indicating where in the NPD process this costly resource has to be used to drive new product success.

We also draw some important implications for managers involved in INPD. Our interviews conducted in the exploratory stage of this study clearly indicate that companies still experience high flop rates with regard to new products launched abroad. The study's results underscore that products for international markets should be developed from scratch by taking into account foreign market information as early as possible in the NPD process. Just take a look at the French car manufacturer Renault. When it decided to build a new car series for new international customers it chose to design the car from scratch. Adjusting an existing car model to the needs of the target customers in terms of price or equipment components i.e. integrating relevant market information relatively late in the NPD process was deemed by far the less promising strategy. It would not allow tackling features customers valued the most like considerably lower price, robustness, simplicity and reliability. Only a systematic consideration of relevant foreign market information from the very beginning helped Renault to design

a car “to comfortably accommodate four adults, a pig, 220 pounds of potatoes and a kitchen sink” (BusinessWeek, 2005). To enhance the processing of international market information, executives should promote an internationally-oriented NPD culture building on trust and openness towards foreign company subsidiaries and national cultures. At last, evidence can be found that integration of foreign markets into the NPD process can be learned for instance, through an ongoing international exposure.

Finally, a few limitations of the study are worth noting. First, as we exclusively examined German companies – on the one hand highly dependent on exports on the other hand building on a huge domestic market – our findings may mirror aspects specific to this national setting. Thus studies in other countries for example, emerging markets could be particularly interesting due to their rising importance and distinctiveness. Second, we have examined only two antecedents of international market information integration which leaves room for identifying further determinants. Third, we have studied the impact of international market information integration only with regard to overseas markets. As information relevant for NPD is becoming more and more dispersed globally tapping it may also be a source of competitive advantage at home (Santos et al., 2004). It would be worth to enhance this so far poorly examined research stream (Sofka, 2008). Last but not least, some companies start to successfully sell products developed for foreign markets at home (Immelt et al., 2009). A closer look at this phenomenon could constitute an interesting research endeavor, too.

7. Conclusion

NPD and internationalization are quite rarely studied together – a surprising fact considering the role played by overseas business activities in today’s world. With this study we intended to shed some light on this interesting research topic and derive some implications for managerial practice on how to increase the likelihood of success of new products abroad. Our results reported in this article highlight the importance of integrating international market information in the NPD process as early as possible in order to develop products mirroring the needs of the target foreign markets. Taking into account local market characteristics solely in the commercialization stage is anything but a successful strategy. The product is already developed and often only minor “cosmetic” changes possible.

Integration of foreign market information in NPD can be enhanced by an international innovation culture stimulating cross-border information exchange as well as international company experience. Both determinants are influenceable by management thus companies can learn over time to become more internationally market-oriented.

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Appendix: Constructs, Items, Scales and Reliabilities

Scales measuring integration of international market information were considered formative constructs, rated on a seven-point Likert scale, anchored by 1 = “not at all” and 7 = “to a very high degree.” The variance inflation factors (VIF) of each item with regard to the other items of the respective construct are in parentheses.

Integration of International Market Information in the NPD Process

Please indicate the contribution of international markets during the following activities being part of a typical NPD process in your strategic business unit / company:

Concept Development Stage

1. Planning and formulating new product goals and strategies. (2.30)
2. Idea generation. (2.39)
3. Analysis of trends, market chances and potentials. (2.92)
4. Assessment and selection of new product ideas. (3.59)
5. Assessment of potential technologies for selected new product ideas. (2.19)
6. Assessment of needed funds, times as well as risk to NPD projects. (2.20)
7. Preparation of written product concept (briefing). (2.14)

Product Development Stage

1. Determining the desired product features of the prototype. (2.73)
2. Actual development of the prototype. (2.07)
3. Preparation of the commercialisation concept. (2.30)
4. Execution of prototype tests with clients. (2.04)

Commercialization Stage

1. Selection of clients for test marketing reasons. (3.21)
2. Execution of test marketing measures before market introduction of new products. (4.81)
3. Final evaluation of different marketing tests before market introduction of new products. (3.99)

4. Determination of the overall strategy before introducing new products to the market. (3.03)
5. Market introduction of new products (selling, advertising, distribution). (5.71)
6. Monitoring customers and competitors reactions. (4.35)

International Innovation Culture (7-point scale with *strongly disagree* / *strongly agree* anchors; Cronbach's $\alpha = 0.87$)

1. We apply cross-border coordination mechanisms in NPD processes (e.g. international teams).
2. We strongly encourage contributions from team members located in different countries or cultures.
3. We strongly emphasize knowledge sharing across different geographical subunits.
4. We strongly endorse informal communication and coordination of NPD activities across country units.

INPD Performance (7-point scale with *very small* / *very high* anchors; Cronbach's $\alpha = 0.89$)

1. Impact of new products launched in the last three years in international markets on your business unit's today's international sales.
2. Profitability of new products launched in the last three years in international markets relative to the spending on developing and launching them.
3. Impact of new products launched in the last three years in international markets on today's profitability in international markets.
4. Profitability of new products launched in the last three years in international markets relatively to the new products launch by your most important competitors.
5. Market share of new products launched in the last three years in international markets relatively to your most important competitors.

E. INCREDIBLE INNOVATIONS – HOW TO SUCCEED WITH NEW PRODUCTS IN EMERGING MARKETS

“By going beyond their traditional innovation strategies targeted to the needs of developed markets – and taking advantage of their global capabilities – manufacturers can use emerging markets as real-world laboratories for innovation.”

Deloitte (2006), p. 3

„... I think a low-cost product must be designed from scratch, something our European engineers can't easily do. They don't have the right mentality and would set excessively high standards for even the smallest details, ending up with an over engineered and too expensive product“.

Jørgen Clausen, former CEO, Danfoss

1. There is no magic!

Imagine a product of good quality, reliably performing all expected functions, using up-to-date technology and carrying a well-known Western brand name. So far so good, you think and throw a glance at the price tag. You must have overlooked something, crosses your mind. The price is an order of magnitude below your expectations! It could be a fake – your mind looks for a logical explanation of this surprising price-performance mix. But there is no trick! You might just be looking at a brand new electro-cardiogram (ECG) device designed by GE Healthcare for rural India, Siemens' steam turbine for Brazilian sugar mills or Bosch's injection system for Tata Nano's diesel engine. The latter is even priced at an equivalent of a navigation system in a premium German car. All these products, to name just a few, are not humanitarian aid. They are regularly sold in local markets and indeed profitable. Some companies like Vodafone for instance, achieve in emerging markets profit margins that easily match those in Europe (Louven, 2008). Table 1 depicts some further examples of successful innovations for emerging markets.

Table 1: Examples of Successful Innovations for Emerging Markets

Company	Example
Osram	<p>Light for Villages at the Lake Victoria</p> <p>Osram demonstrates with a pilot project at Lake Victoria, Kenya, how to environmentally friendly deliver off-grid electricity and replace fuel-based lighting that is inefficient, expensive, and dangerous for its users (Martini, 2009). The company offers battery-powered recyclable energy-saving lamps (O-LAMPs). These lamps are recharged with solar energy in energy hubs located in the community under consideration. The relatively high deposit for a lamp of US\$ 30 can be financed with the help of a micro-finance provider. The battery recharging costs however, are 30% cheaper than the kerosene needed to produce an equivalent amount of light.</p>
Renault	<p>A Car for "Four Adults, a Pig, 220 Pounds of Potatoes and a Kitchen Sink"¹⁶</p> <p>In 2004 Renault launched a revolutionary low-cost car, the <i>Dacia Logan</i>, in Eastern European markets (Kukreja & Dubiel, 2010). Its basic version was priced at just about US\$ 6,500. This price tag was possible due to a stringent design-to-cost approach and focus on a "just enough" functionality. Consequently, the <i>Logan</i> has only basic safety features, fewer components than an average Western car and is made out of traditional type of steel in a labor-intensive assembly process. Furthermore, the car is adapted to several restrictions facing its customers like a fuel filter for poor fuel quality or a car battery to bear extreme weather conditions. Till the end of 2008 more than 1.2 million <i>Logans</i> have been sold worldwide. What's more, the car series has grown to a full-range product family with a pick-up, a van, a station wagon, and a mini SUV.</p>
SAP	<p>Software for South African Mom-and-Pop Stores</p> <p>A local SAP team in South Africa recently developed a software platform connecting wholesalers with small groceries (Hofer, 2009). So far only the wholesaler might have been a customer of SAP. With the new development SAP intends to enter a roughly US\$ 1.1 billion market of micro enterprises and public institutions in BRIC countries (Brazil, Russia, India and China) that could not afford established software solutions so far. With the help of the new software platform owners of small groceries can forward their orderings via mobile phone to brokers instead of driving to supermarkets to buy goods for resale. The intermediary gathers the purchase orders and forwards them to the wholesaler.</p>

¹⁶ Cited in Edmondson (2005).

Company	Example
Siemens	<p>Environmental Friendly Biomass Turbines</p> <p>Siemens introduced a steam turbine for sugar mills in Brazil (Kleinschmidt, 2009) producing ethanol from sugar cane. As energy stored in this alcohol is solar it is already a quite “green” source. However, the environmental friendliness of the ethanol distilling process can often be increased. This is where Siemens’ turbine comes into play. It recycles the sugar cane residues left after distillation to obtain electricity and steam for the distillation process itself. Yet, this argument alone would not be sufficient to make the turbine a bestseller. Local companies are price-sensitive and have specific expectations. Therefore, Siemens had to redesign the initial European product locally to guarantee a more attractive investment vs. efficiency gains ratio over the product’s life cycle. Siemens also had to ensure that the machine could be manufactured using local materials.</p>

2. See the World from a Different Angle...

Since about a decade pioneering Western multinational corporations (MNCs) discover new spots on their emerging markets’ innovation landscape going beyond the premium slices. Existing product strategies get redefined and companies start rethinking the dominant logic that guided them for most of their history. Emerging markets are undergoing a dramatic change belying several assumptions that MNCs typically have about midtier and low-end market segments in developing economies (Prahalad, 2006).

Firstly, the so far “poor” customers are becoming increasingly solvent. Thus they will be more and more attractive for MNCs and critical for their long term growth. For instance, China became in 2008 the world’s third biggest economy (World Bank, 2009). An important change is also the growth of a so-far virtually nonexistent middle-class. Worldwide even two billion people may join this segment by 2030 (Goldman Sachs, 2008). Secondly, local customers increasingly have use for products traditionally sold in developed markets. Just think of mobile phone headsets. Even though still simpler than in Europe the ones sold in India have many add-ons and their buyers are willing to pay a bit more for branded products. People in the South also want features – and even fashion (Einhorn & Ewing, 2007). Thirdly, the new consumers appreciate and are ready to pay for technological innovations. For example, Motorola’s low-cost phone for India was a flop despite being cheap, in part because its very limited features didn’t express the status of potential buyers (Ewing, 2007a). Finally, also the attitudes of MNC’s employees change. Therefore, it is becoming easier to

recruit managers for assignments in emerging markets. What's more, such experience is becoming an essential building block of a successful career.

These dynamics are perpetuated by the fact that Western MNCs stop being among themselves in upper segments of emerging markets which on top offer only limited growth potential. Local MNCs increasingly come into play. They learn fast and offer better and better products climbing up the market ladder towards midtier segments. Here they start luring some high-end customers not willing to pay a considerable price premium any more. The situation even worsens as emerging MNCs start poaching on established MNC's home turf by attracting an increasing number of usually lower-end developed market costumers (Gadiesh & Vestring, 2008; Gadiesh, Leung, & Vestring, 2007).

3. ... and Change the Rules of the Game

Farsighted MNCs already changed the rules of the game and offer products with new price-performance ratios meeting local demand instead of selling imported high-end products with minor (price) adjustments only. Recall GE's ECG device. What makes it so special? It is a successful example of a low-cost-clearly-defined-functionality product meeting exactly the customer's needs – no more, no less. Precisely this means that it meets tough local price constraints by conducting examinations for US\$ 1 each, it is robust and light enough to be portable and it is able to run for up to a week on a single battery charge. What's more, it's very simple to operate even for untrained personnel due to smart software. It goes without saying that the device doesn't save on patient's safety. The ECG was without difficulty registered for usage in the U.S. early this year (Immelt, Govindarajan, & Trimble, 2009; Jana, 2009). And it's not an exception in GE Healthcare's product portfolio. The company offers a broad range of entry-level medical equipment and is best prepared to meet India's demand for it reaching US\$ 1.5 billion each year (GE, 2009). Similarly, GE's whole Infrastructure Division including the healthcare business, plans to derive 40% of its revenue from emerging markets by 2010 from about 30% in 2007 (Guerrera, 2007).

4. A Stony Road to Go

As luring these markets are, as challenging they can be for Western MNCs because they differ sharply from familiar grounds in terms of customer preferences, local competitors, environmental

conditions, and market dynamics (Deloitte, 2006; Hemerling, 2007; IBM, 2007). Most MNCs are thus handicapped as they have built their NPD capabilities on understanding preferences, technical requirements, and acceptable pricing of developed markets' customers. Additionally, they often face unfavorable cost structures as well as weak local distribution and service networks. To succeed with new products it is therefore crucial for MNCs to adjust their NPD processes and product strategies, get as close as possible to the new customer as well as localize R&D. Best practices clearly show that designing new products with an adequate price-performance ratio from scratch is the recommended course of action (Anderson & Markides, 2007; Deloitte, 2006). The following key factors identified in the course of our research project (See Figure 1 for details) can help companies to maximize the success of new products in emerging markets.

Figure 1: About the Research

About the Research

With regard to the research design, we firstly extensively reviewed managerial and academic literature to identify core success factors of innovating for emerging markets. We also identified and analyzed several real-life new products and services developed for emerging markets by companies from developed markets. On this basis, we conducted 27 interviews with experienced managers from 12 German and US-American companies. Additionally, we conducted in-depth case studies with four companies interviewing up to 10 people per company and traveled to India several times to experience on-site NPD for emerging markets.

5. Eight Steps to NPD Enlightenment

Adapt your innovation strategy! For MNCs serving for most of their history customers at the top of the economic pyramid the design of low-cost middle-tech products marks a major shift in operations. In order to succeed, the companies have to adapt their organizational structure, culture, processes and HR management. These far reaching changes have to be guided by a clear strategy laying down the intended course of action. It's inevitable that emerging markets are assigned a visible place on the company's agenda and top management backs this development.

Siemens for instance, introduced a strategic initiative called S.M.A.R.T. in order to be better prepared to compete in emerging markets. SMART stands for simple, maintenance friendly, affordable, reliable, and timely to market products aiming at customers the company left unnoticed in the past. As the initiative is part of an overarching company program and is further coordinated by

headquarters, it enjoys appropriate visibility and serves as a forum for best-practice sharing among the company's business units (Achatz et al., 2009).

Cisco implemented a somehow different approach. In 2006 the first Chief Globalization Officer (CGO) heading the company's second global headquarters in Bangalore, India, was appointed (India Knowledge @ Wharton, 2009). The location is not accidental. It is a global hub for software and hardware development facilitating the CGO the intended access to new growth markets, new innovation and new talent worldwide. And as he is the first direct report to the CEO outside of California – the company's headquarters – the outstanding role of India in particular and emerging markets in general for Cisco's future is emphasized.

Meet your new customers! To develop sought-after products, companies have to learn about the needs of their new customers. And this has to be done bottom-up as familiar Western customer profiles and behaviors hardly ever match those of the new clientele. As the distinctiveness of a new product is crucial in every market, the company has to listen carefully to the expectations of its potential customers. In doing so, pioneering MNCs have gone to great lengths to meet the customer in his or her social environment.

For example, Osram a global market leader in lighting started a pilot project in Kenya aiming at delivering off-grid electricity to local people (Martini, 2009). In these early project stages Osram's employees conducted detailed on-site market research. Through home visits, experiencing local living conditions and talking to local people they assessed the demand for new lamps, price sensitivity, existing substitutes, and environmental challenges of operations in the region as well as satisfaction with already available Osram products. They also turned their attention to the social impact of the new technology on local communities (Dewald, 2009).

Getting to know the consumer was also indispensable with regard to designing a basic handset for low-end segments of emerging markets for as low as US\$ 25 (Reinhardt & Johnson, 2005). Before starting the actual product development process Nokia's engineers spent considerable time conducting ethnographic research as well as experienced local living conditions through trips to India or Nepal. This approach allowed them to design handsets meeting local demand both in terms of price as well as specific features for instance, screens more legible in bright sunlight (McGregor, 2006).

Offer a new price-performance ratio! Clearly, well-executed market research as close as possible to the new customer is a first and extremely important step in the NPD process. It allows the MNC to focus on what customers really want and are able to pay. Affordability in this case however, means that products must be an order of magnitude cheaper than in developed markets. Examples of successful companies illustrate that stripping off features from existing Western products cannot cut their prices considerably as complexity and costs are built right into them. Rather designing a product from scratch is the recommended course of action.

Siemens for instance, offers a steam turbine for biomass power plants in Brazil that is 30% cheaper than its German counterpart (Kleinschmidt, 2009). Suitable are also flexible offerings like the camera system for online monitoring of manufacturing processes. The system can be customized in such a way that it does exactly and only what the customer wants. Expensive gimmicks with no value-added can be eliminated. The versatile camera is applied in food, automotive, cigarette and medical equipment industry in India (Pease, 2009).

The Dacia *Logan* – a low-cost car designed by Renault – is also an attractive price-performance offer for emerging market middle-class customers. The full-fledged car not only has a price tag of only US\$ 6,500 and is spacious enough to transport up to five people with their luggage but has also an appealing life-cycle costs structure. It can be for instance, serviced at half cost of a comparably big Renault *Mégane*. The maintenance doesn't have to be done by an authorized Renault workshop either – even basic technicians are able to do it without difficulty.

Apply “Gandhian” engineering! To develop products with an appropriate price-performance mix the mindset of headquarters' employees has to change, too. Emerging market constraints necessitate a new scarcity attitude and cost consciousness. And this is not straightforward as German engineers for instance, are often inclined to apply the newest technological solutions in products they design. To succeed in emerging markets developing simpler and more robust products should become an equally acclaimed achievement within a company as developing products packed with newest bells and whistles.

In order to meet the tough cost targets Renault's top management explicitly authorized Dacia *Logan* development team members not to respect all basic specifications from Renault cars and

especially specifications related to functions and equipment components (Kukreja & Dubiel, 2010). This approach paved the way for a no-frills car with a redesigned supply chain and labor-intensive manufacturing process. However, it reliably and safely transports people from A to B.

Similarly, Bosch learned that value-engineering – the ability and will to design products meeting tough cost constraints – and simplification can be very important for customers as well. To meet Tata's ambitious goals for the *Nano* car Bosch's engineers came up with some unconventional solutions (Brönstrup, 2009; Lamparter, 2008). They decided to hone the injection technology for two-wheelers and adapted it for use in a car. For the diesel engine, by contrast, they simplified a tried-and-tested product. Finally, a cost-effective off the shelf plug-in pump was used to generate injection pressure instead of developing a new device.

Localize R&D activities! New products for emerging markets can be best developed in those markets themselves. Firstly, because local engineers can best understand local market needs. Secondly, this helps to keep development costs under control. And thirdly, engineers from developed markets are often less open to apply unconventional solutions and limited by the not-invented-here syndrome. Both GE and Siemens have established R&D facilities in India and China in the last decade and they invest heavily in these subsidiaries (Achatz et al., 2009; Dubiel, 2009). GE's R&D center in Bangalore alone has grown from 300 to 3,800 employees since its establishment in 2000. And that's not the end. It is planned that in 2010 every fourth GE engineer will be based in India. To succeed, Siemens too looks for skilled employees for its local R&D sites. The company picks candidates with strong technopreneurial skills willing to create innovative solutions from scratch. To unleash its engineers' creativity Siemens guarantees them a high degree of flexibility and freedom to pursue their tasks (Monster India, 2007).

Adapt marketing and sales! Developing a low-cost-clearly-defined-functionality product is not straightforward but getting it to the market, especially in faraway locations, poses a comparable challenge. Competitive product prices presume efficient distribution. So how does Nokia control its sales network of estimated 90,000 points-of-sale in India? The Finns learnt to work with local means and became local market leader. Their fleet of sales vans tours rural areas and teaches people about

mobile phones (Ewing, 2007b). As most of these first-time buyers prefer to talk to sales reps in person instead of calling hotlines, Nokia's shops on wheels are also responsible for after sales service.

Getting a mobile card for a Nokia phone in Mumbai also unveils local specialties of the product's value chain. Network providers like Vodafone sell them through independent vendors distributing prepaid cards to local shops. Airtime for a few cents – as people usually have irregular income – is offered in kiosks along with all other products of daily life (Louven, 2008). And if from time to time a wealthy customer comes along asking for an expensive airtime recharge, the kiosk owner calls a mobile hawker who keeps expensive airtime cards ready for a certain city district. The result is a win-win-win situation for all parties involved: The kiosk owner doesn't need to tie up his capital and keep expensive cards in store, the customer gets quickly the requested recharge and the freelance hawker has a job.

Introduce new business models! India is the fastest growing mobile telecommunications market in the world and moreover a very competitive one. On average customers spend humble sums of US\$ 5-US\$ 6 monthly on phone calls but through good connections to Western markets they are up-to-date with technological developments and brands. Hence they are quite demanding. What's more, the telecommunications market in urban areas is saturating thus pushing providers to expand in faraway rural areas where people have even less money to spend and telecommunication infrastructure is rare at best. Nokia Siemens Network (NSN) the Finnish-German mobile infrastructure provider has come up with a new solution combining smart technology with a business model innovation. The combination minimizes the capital and operational expenditure for operators allowing them to profitably enter low-end market segments. The cost effective, easy to implement and operate solution called *Village Connection* rests upon a partnership between a mobile network provider and a local entrepreneur supported when necessary by a micro-finance provider. The entrepreneur as the franchisee interacts with subscribers on the operator's behalf.

In a similar manner the hardware manufacturer Lenovo has come up with an innovative approach to boost PC sales in Brazil, especially to first-time buyers. Teamed up with Microsoft providing special software Lenovo offers a pay-as-you-go plan for purchasing a PC through a local

retailer. This model resembles prepaid mobile cards which are already familiar to Lenovo's customers (Microsoft 2006a, 2006b).

Find a local partner! Finding a local partner can considerably speed up learning local ropes and overcome the liability of foreignness. Some pioneering companies already demonstrate how to partner and network in emerging markets to achieve outstanding results. These co-operations tackle all parts of a company's value chain. Osram for instance, co-operates with micro-credit providers in Kenya and Uganda who enable customers to make a down payment for its lamps. Employees in the four energy hubs recharging the lamps are also locals which increases the acceptability of the products among customers. GE on the contrary, profits from local networks in a different way. To establish ties with Indian universities and secure a steady stream of top-notch graduates for its R&D site the company invites professors from well-known local higher education institutions to spend a sabbatical at GE's R&D facility in Bangalore (Dubiel, 2009). Furthermore, excellent connections to the National Chemical Lab in Pune were helpful for establishing the R&D center on the subcontinent.

Table 2 provides a summarizing overview of the eight success factors of innovating for emerging markets.

Table 2: Success Factors Overview

Factor	What Matters?	Example
Adapt your innovation strategy	Explicit consideration of emerging markets in the company's new product strategy; top management backing	Danfoss declared China its second home market, made its CEO to oversee Chinese businesses directly and created a portfolio of adequate new products to conquer the local market (Hoover, 2006).
Meet your new customers	Willingness to apply new market research approaches; go where the customer is; involvement of local lead users and opinion leaders	Nokia's NPD team members extensively traveled to India and Nepal to conduct on-site market research and personally experience living conditions of their future customers (McGregor, 2006)
Offer a new price-performance ratio	Focus on pivotal product features; no over-engineering; considerably lower cost; design products from scratch	Siemens' middle-market CT scanner from China costs about one sixth of a high-end device. It cannot conduct all complicated examinations but is a reliable, easy to operate and high-quality basic equipment.

Factor	What Matters?	Example
Apply “Gandhian” engineering	Will to simplify solutions; scarcity mindset of employees; “good enough” approach; out of the box thinking	Renault explicitly asked engineers involved in the development of the Dacia <i>Logan</i> not to follow established explicit or implicit developments guidelines and specifications.
Localize R&D activities	Vest responsibility for local products in the hands of local engineers; establish networks with local partners	In 1992 Bosch established an R&D facility in Bangalore. In 2005 alone it grew from 1,000 to 2,900 employees (Müller, 2006) who were heavily involved in the development of Tata <i>Nano</i> subsystems.
Adapt marketing and sales	Openness for unconventional sales channels; employ local brand ambassadors	Dell sets product-display centers in China to allow customers to try out its products before buying. Since 2007 Dell’s PCs can be bought via a local retailer, too (Handelsblatt, 2007, Fairclough & Spencer, 2007).
Introduce new business models	Questioning existing business models; working with local partners; bottom-up thinking	Microsoft and Lenovo offer a pay-as-you-go plan for purchasing a PC similar to prepaid mobile cards in Brazil through a local retailer (Microsoft, 2006a, 2006b).
Find a local partner	Excellent network within local industry, science institutions and NGOs; overcoming the liability of foreignness	The insurance giant Allianz cooperates with Care, a humanitarian organization, to develop and sell micro-insurances in Southern India (Jarke, 2008).

6. Benefits for Global Operations

Innovations developed with emerging markets in mind can be advantageous beyond these countries’ as well (Immelt et al., 2009). Entering an emerging market and particularly establishing a local R&D operation can help the company to develop a truly global mindset.

Just look at SAP, the German software giant, which felt like a truly global company only after establishing its Indian R&D site. As SAP’s activities have focused for years on developed markets only, the cultural distances between employees were relatively short. And even as the company internationalized its marketing and sales these operations remained somehow detached from local roots. Not so R&D: To flourish an active exchange with local science and industry is necessary. SAP Labs India is not only decisive for growth in the increasingly attractive Indian market but it is also an indispensable input provider for worldwide products. Furthermore, through exchange with Indian

colleagues German employees became more internationally oriented and open for foreign sources of innovation. A visible mindset shift is the introduction of English as the company language – not a matter of course in Germany.

Also other companies profit from their emerging market innovations in the Western world. As already mentioned, GE successfully introduced its ECG device on the US-American market in 2009 (Jana, 2009). And NSN considers applying its Indian-developed software to switch mobile networks into a kind of sleeping modus at night to save energy in Western environmentally conscious markets.

7. Summary

Emerging markets are already very attractive for numerous Western MNCs. Their importance will even increase in the future as they are recovering surprisingly fast from the current financial crisis thus becoming the engine of global economy. And although innovating for these markets is not an easy task, several product examples demonstrate that it is possible. To succeed companies have to learn new skills and detach themselves from taken as granted assumptions about the world order. Best practices show that changes in strategy, NPD processes, structure and HR management touching the very heart of an average company's business model are necessary. But such a successful transformation allows developing low-cost-clearly-defined products from scratch exactly matching local market demand. What's more, innovations originally developed for India and China's middle markets can be also successful in MNC's home markets as well as Asian R&D sites used as laboratories for worldwide innovation.

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Appendix: List of Interviewees

Bosch, Member of the “Diesel Injection Systems for Low Price Vehicles” team, Stuttgart, January 16, 2009 and July 24, 2009.

Bosch, Director Coordination Technology Projects, Stuttgart, April 17, 2008.

BSH, Head of Product Management and Development Plant Oil Stoves, Munich, September 6, 2007.

Continental, Head of Technical Center India, Bangalore, June 25, 2008.

General Electric, Managing Director of JFWTC, Bangalore, June 23, 2008.

General Electric, Technology & Engineering Leader Water & Process Technologies, Bangalore, June 23, 2008.

General Electric, Operations Manager Global Research, Bangalore, June 26, 2008.

General Electric, Head of Corporate Communications of JFWTC, Bangalore, January 8, 2009.

General Electric, Diagnostic Manager GE Healthcare, Bangalore, January 8, 2009.

Henkel, Head of Innovation Management Laundry and Home Care, Düsseldorf, September, 7, 2007.

Nokia Siemens Networks, Head of Program Management, Munich, April 17, 2008.

Nokia Siemens Networks, Head of NSN Village Connection Program, New Delhi, December 16, 2008.

Osram, Senior Vice President Corporate Strategy & Marketing, Munich, October 2, 2006.

Osram, Member of the Public Relations team, Munich, August 20, 2009.

Osram, Consumer Lighting Product Manager, Shanghai, February 17, 2009.

Osram, Innovation Manager, Munich, September 18, 2007.

Procter & Gamble, Associate Marketing Director Fabric & Home Care Greater China, Guangzhou, February 13, 2009.

Procter & Gamble, Member of the Global FemCare Process Development team, Crailsheim, October 5, 2006.

SAP, President of SAP Labs India, Walldorf & Bangalore, June 6, 2008.

SAP, Vice President Research & Breakthrough Innovation, Walldorf, June 6, 2008.

SAP, Managing Director SAP Labs India, Bangalore, June 24, 2008.

Siemens Corporate Technology, Senior Consultant, Munich, January 20, 2009 and May 6, 2009.

Siemens Medical, Director CT Product Lifecycle Management, Shanghai, May 24, 2007.

Siemens VDO, Vice President Strategy and Technology Western Europe, Toulouse, May 24, 2007
and November 23, 2007.

F. SUMMARY AND CONCLUSION

1. Key Findings

The papers in this PhD thesis have addressed a topic rarely studied by scholars in the past (Page & Schirr, 2008). Academic research seems not to have fully kept pace with managerial developments as international new product development (INPD) has become a cornerstone of business activities in the last decades on top showing a great interfirm variety of outcomes (De Brentani, Kleinschmidt, & Salomo, 2010; Immelt, Govindarajan, & Trimble, 2009). The knowledge deficit in this area even deepens when it becomes clear that INPD does not equal domestic NPD (Fallah & Lechler, 2008). Experience from the home turf thus often cannot automatically be transferred to the international domain. INPD seems to face all the challenges known from the domestic setting (Ernst, 2002) plus those stemming from multiculturalism and geographical distance (McDonough & Kahn, 1996). In order to succeed abroad, companies may need to “unlearn” what made them successful at home and develop new capabilities necessary to design products satisfying foreign customers’ needs. And this can be a long process. Just recall the example of GE, a highly successful firm on its domestic market, which experienced serious difficulties to offer new products in India (Immelt et al., 2009).

The papers in this thesis have shed some light on this major research gap. Table 1 provides an overview of our key empirical findings.

Table 1: Key Empirical Findings of the PhD Thesis

	Success Factor Category	Key Findings
PAPER 2	INPD Strategy	<ul style="list-style-type: none">• International orientation is a key dynamic capability directly enhancing INPD success• Strategic intent is an antecedent of international orientation thus an indirect driver of INPD success
	Top management	<ul style="list-style-type: none">• Top manager’s international exposure is an antecedent of international orientation thus an indirect driver of INPD success

	Success Factor Category	Key Findings
PAPER 2	International Organization	<ul style="list-style-type: none"> • Intercultural training is an antecedent of international orientation thus an indirect driver of INPD success
PAPER 3	INPD Process	<ul style="list-style-type: none"> • Integration of international market information in the concept and product development stages of the NPD process directly enhances INPD success while the use of international market information in the commercialization stage does not have an impact on INPD success
	INPD Culture	<ul style="list-style-type: none"> • International innovation culture is an antecedent of international market information integration in all NPD process stages thus an indirect driver of INPD success • International company experience is an antecedent of international market information integration in the product development and commercialization stages of the NPD process thus an indirect driver of INPD success

To sum up, our empirical hypotheses tests have detected two direct drivers of INPD performance. The first of them is international orientation which manifests itself in acquiring, sharing and using overseas market-related information. This essential capability helps firms to become aware of and profit from NPD opportunities abroad. Second, our results indicate that integrating international market information i.e. its use, is most beneficial for INPD in early NPD process stages where the characteristics of a given product can still be shaped. Its relative impact during product commercialization is insignificant for a product's success abroad. Thus apart from providing evidence that capabilities to process international market information in INPD are vital, we have also offered tentative results as to where in the NPD process the use of such information is most important.

Our results have also shown a bunch of indirect INPD performance drivers. As such we have first found support for three multi-faceted antecedents of international orientation. These are namely strategic intent, top manager's international exposure and intercultural training of a firm's employees. Strategic intent provides the impetus for a firm to process international market-related information. Top manager's international exposure is vital because it influences the company's behavior via priorities set by the CEO due to his/her personal background. Finally, intercultural training of a firm's employees builds a stronger intra-firm ethic to acquire, transfer and use overseas knowledge. Second,

we have also found support for international innovation culture – building on trust and openness towards foreign subsidiaries and national cultures – enhancing international market information integration in all NPD process stages. Moreover, integration of international market information in NPD is a function of international company experience – at least with regard to the later NPD process stages – thus can be learnt over time.

2. Academic Implications

The thesis has a number of theoretical implications for research into NPD, international management (IM), dynamic capabilities and information processing in the multinational corporation (MNC). With regard to NPD research the study responds to previous calls to shed more light on international aspects of NPD (de Brentani & Kleinschmidt, 2004; Perks & Wong, 2003). First, the thesis offers a detailed literature review synthesizing and categorizing existing research in INPD. On its basis we have introduced a tentative definition of INPD as one involving NPD activities taking place across national boundaries prior to the product's actual launch abroad. This definition clearly underscores that INPD is more than just exporting domestic products. Our study has also conceptually argued that developing successful new products for international markets is distinct from developing products for home markets. Second, the thesis has identified and empirically tested new INPD performance drivers. Thus it adds to the overall story of how to achieve greater new product success. Direct predictors of INPD success encompass international orientation i.e. the capability to acquire, share and use international market-related information as well as integration of international market information in early stages of the NPD process. Thus our results have provided tentative answers not only to the “*if*” but also to the “*when*” question concerning international market information processing in NPD (Li & Cavusgil, 2000; Subramaniam & Venkatraman, 2001). Especially the former success factor explicitly incorporates findings from IM research thus may be seen as a first small step to bridge TIM and IM literature so far seen as quite separate research streams (de Brentani & Kleinschmidt, 2004). Finally, our hypotheses tests have been conducted on the basis of an up-to-date, cross-sectional, random data set of German manufacturing firms with a questionnaire originally

designed for application in the INPD domain. Both aspects have been identified as shortcomings of existing examinations.

In the IM field the thesis contributes to answering the question, why some firms are more inclined to look beyond their home market by proactively searching for and leveraging overseas opportunities in NPD (Gupta & Govindarajan, 2002). In this context we have introduced international orientation as a key capability of internationally active firms. Furthermore, our examination adds to a better understanding of cross-border knowledge transfer encompassing both intra- and extra-organizational knowledge sources (Gupta & Govindarajan, 2001). Our results have also underscored the importance of early NPD process stages so far rarely studied in the IM domain. This finding may also enhance the debate about the optimal degree of product adaptation across markets (Theodesiou & Leonidou, 2003) by emphasizing that the “right” degree of product standardization can only be achieved under detailed and early integration of target markets.

This thesis also enhances the literature stream on dynamic capabilities (Eisenhardt & Martin, 2000), especially in the MNC context (Augier & Teece, 2007). Particularly, by conceptualizing international orientation as a specific process, we further the understanding of dynamic capabilities as identifiable intra-firm routines (Eisenhardt & Martin, 2000). Moreover, we have developed a new multidimensional second order measurement scale of international orientation and have explicitly tested its impact on INPD performance. Both issues have been highlighted as shortcomings of existing dynamic capabilities studies (Lichtenthaler & Ernst, 2011). Finally, we have also introduced three antecedents of international orientation so consequently enhance the academic discussion on drivers of dynamic capabilities (Rothaermel & Hess, 2007).

Finally, examining the integration of foreign market information in three distinct stages of the NPD process i.e. concept development, product development, and commercialization enhances the information processing theory of the MNC (Eggelhoff, 1991). We not only have developed a new measurement model for international market information integration but also have explicitly tested its impact on INPD success. As we have concurrently tested the influence of international market integration in distinct NPD process stages, we could judge their relative strength as performance drivers. Moreover, in response to recent calls for the introduction of “softer” antecedents in INPD

research (de Brentani et al., 2010) we have examined international innovation culture and international firm experience as determinants of international market information integration.

3. Managerial Implications

Our empirical results also have important implications for managers involved in INPD. In particular, our studies have underscored the prominent role of international market information for INPD success. Detailed and up-to-date information about overseas markets is crucial because companies cannot rely on well-known customer and competitor profiles as is often the case at home. Thus to meet the needs of foreign buyers companies should go to great lengths to establish adequate market information processing routines. In particular, managers should pay attention to acquire, share and use foreign market information in NPD. Such “best practices” may well become difficult to imitate capabilities helping to build sustainable competitive advantages over time. As international market information is more costly to gather and more difficult to decipher than domestic market information it can constitute an important resource, too. Our research also demonstrates that it is vital for superior INPD performance that managers know in which stage of the NPD process international market information is most important. Clearly, leading companies develop new products for international markets with these markets in mind thus heavily use international market information in the concept and product development stages. This is because during these stages product features and costs can be relatively easily changed. Adjustments made solely prior to product launch seem to be less promising.

Our results moreover identify some important prerequisites of international market information processing. We have focused on those internal determinants that can be influenced by top management. As such upper echelons should assure a strategic impetus toward international markets as well as look for internationally experienced managers to head the business. There should be also investments in intercultural training for lower level managers in place as it is the wider set of employees within a firm who enact day to day NPD activities. Finally, an international NPD culture and international company experience help to coordinate company-wide INPD.

In our studies we have pointed to the potential and distinctiveness of so-called emerging markets like India, Brazil or China and in particular their lower and middle market segments. Because of their importance we have explicitly applied previously identified INPD success factors in this up-to-date context. The emerging markets' impact on world economy is likely to increase even further thus firms should learn quickly how to satisfy local demand. This however, is not easy as these markets remain very challenging and volatile. NPD for emerging markets differs from the one for established markets as customers' income and needs as well as environmental constraints and infrastructure are very different from what most Western MNCs are used to. Thus firms need to implement a whole bunch of new multifaceted success factors. Our interviews and detailed case studies of German and US-American firms demonstrate that companies should adjust their NPD strategy, display above-average customer orientation, offer products with totally new price-performance ratios, apply a so-called "Gandhian" engineering approach, localize R&D activities, adapt marketing and sales measures, introduce new business models, and co-operate with local partners. Moreover, NPD originally aiming at emerging markets can help MNCs to generate innovations that against widespread believes may be very attractive in developed markets, too.

4. Limitations and Outlook

Our empirical papers are among the firsts to examine INPD phenomena on a large-scale basis. Therefore our tentative results are not limitation-free. Nonetheless, the latter may reflect opportunities for further research highlighted in the following outlook.

First, both questionnaire-based papers deal with international market information processing in NPD and its antecedents. As the INPD setting differs from the domestic one, an adaptation of selected predictors of market information processing at home was needed. We carefully selected them on the basis of existing literature and expert interviews. However, due to the manageable scope of the study we could not consider all possible antecedent factors. Because of this, we encourage future research to explore other potential antecedents of both international orientation and international market information integration. For the former, a possible further driver could be the absence of the "not-invented-here syndrome" or the use of cross-border collaboration enhancing incentives. For the later,

the impact of an open innovation culture or the formalization degree of the NPD process could be worth exploring.

Second, we examined both international orientation and international market information integration on the firm/SBU level. Complementary, zooming into distinct NPD projects aiming at foreign markets might be an interesting endeavor. This would further allow an assessment of different NPD project specific success measures like product newness. What's more, the project level would be appropriate to focus even more on new products designed for emerging markets which become increasingly important for Western companies.

Third, we did not consider any moderators of the relationship between international orientation or international market information integration and INPD performance. Therefore, research on possible moderators like market dynamics or competitive intensity would be interesting.

Fourth, we studied the impact of international orientation and international market information integration only with regard to foreign market outcomes. As information relevant for NPD is increasingly dispersed acquiring it may well be a source of competitive advantage at home (Santos, Doz, & Williamson, 2004). It might thus be worth looking at the role overseas market information plays for domestic innovation. Last but not least, some companies start to successfully reverse their innovation flows by selling products developed for foreign markets at home (Immelt et al., 2009). A closer look at this phenomenon could constitute an interesting research endeavor, too.

Fifth, both empirical studies exclusively look at German manufacturing companies thus our findings may mirror aspects specific to this background. More studies probing on the examined interrelationships in other countries may, however, prove to be fruitful. Particularly interesting could be emerging economies as there exists evidence that local firms follow distinct internationalization trajectories (Guillén & García-Canal, 2009) and that some performance drivers might be country specific (Cadogan, Paul, Salminen, Puumalainen, & Sundqvist, 2001). Moreover, in our studies we have surveyed headquarters only. Future studies may consider giving a voice also to foreign subsidiaries and compare statements from both sources. Finally, recently debated analysis approaches like multilevel examinations with the help of the HLM method might constitute a promising research avenue (Hitt, Beamish, Jackson, & Mathieu, 2007).

To sum up, our study focussed on an interesting and relatively new research field which apparently has to catch up with the importance attached to it by managerial practice. Despite the many contributions of our study to the current discussion in several research streams, some of its results may well be regarded as tentative thus leave room for future research projects.

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