Kingdom of the Netherlands

High technology business-to-business partnerships: a research on the effect of complementary capabilities on innovativeness and internationalization

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"Share our similarities, celebrate our differences."
Morgan Scott Peck (1936 – 2005)

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Abstract

To date, some of the most successful businesses rely on partnerships. Think for example of the cooperation projects between Microsoft and Intel, or Philips and Sara Lee. However, the failure rate of partnerships is high. This paradox draws much academic attention to the subject. Several scholars state that complementarity forms a possible framework to create successful partnerships. Nevertheless, a holistic approach in this area of expertise is still being developed. This paper contributes in completing the approach to complementarity in partnerships by analyzing the influence of complementary capabilities in partnerships on innovativeness and internationalization. A questionnaire has been sent to 216 alliance managers in high tech companies worldwide of which 59 responded. The questionnaire covered three constructs measuring innovativeness, internationalization, and partnership complementarity. Multiple regression analysis of the questionnaire data provided proof for a positive and significant relationship between partnership complementarity and innovativeness. No significant relationship between partnership complementarity and internationalization has been found. These results indicate that an advantage for innovativeness is created through complementary capabilities in business-to-business partnerships. The academic contribution consists of a newly developed holistic approach to partnership complementarity. The practical relevance is formed through knowledge provided for business strategists to manage their partnerships in every life cycle stage.

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Table of contents

Figures & Tables

1 Introduction

1.1 Summary

Many scholars have written about *internationalization,* e.g. (Burgel & Murray, 2000; Perks, 2009), *innovation*, e.g. (Chiu, Lai, Lee, & Liaw, 2008; Kylaheiko, Jantunen, Puumalainen, Saarenketo, & Tuppura, 2011; Y. F. Luo, Peng, & Ieee, 2009; Schmiedeberg, 2008; Witteveen & Hobers, 2011), *complementarity*, e.g. (Lichtenthaler & Ernst, 2012; Parmigiani & Rivera-Santos, 2011; Rothaermel & Boeker, 2008) and perhaps even more on *business-to-business cooperation*, e.g. (Ellonen, Wikstrom, & Jantunen, 2009; Hamel, 1991; Hess & Rothaermel, 2011; Wan, 2005).

For this thesis, like done by others (Jones, Fletcher, & Young, 2009), the topics are combined. Based on theories about organization of R&D activities and international processes (Khalid, 2003) this thesis elaborates on complementary capabilities. The effect of the independent variable complementary capabilities in business-to-business cooperation on the dependent variables innovativeness and internationalization is measured. For this purpose new measures for complementarity are developed and existing measures for innovativeness (Covin & Slevin, 1989; Garcia & Calantone, 2002; Kreiser, Marino, & Weaver, 2002; Miller & Friesen, 1983; Zahra, 1991) and internationalization (Sullivan, 1994) are rearranged and retested.

The research has a focus on (international) business-to-business cooperation in high technology sectors. The thesis is written acting upon instructions from the University of Twente and the Dutch Embassy of the Kingdom of the Netherlands in Rome.

To gather knowledge on the possibilities of international business-to-business cooperation and the effect that complementary capabilities may or may not have on innovativeness and internationalization, this research applies a quantitative research in which questionnaires are sent to 216 high technology companies participating in joint ventures and/or strategic alliances.

In summary; this research aims to find the effect of complementary capabilities in high technology partnerships on innovativeness and internationalization of firms.

1.2 Subject and motive of research

1.2.1 Practical relevance: partnership advantages

Firstly, advantages of business-to-business partnerships (e.g. joint ventures or strategic alliances) resemble the practical relevance of this research. More specifically that is; advantages in the form of innovativeness and/or internationalization that are gained through correct adjustment of complementary capabilities in business-to-business cooperation. These advantages are already demonstrated in literature (Ahuja, 2000; Cassiman & Veugelers, 2006; Colombo, Grilli, & Piva, 2006; Kale & Singh, 2009; Kim, Shin, & Lee, 2010; Schmiedeberg, 2008; Venkatraman & Lee, 2004; D. B. Yoffie & M. Kwak, 2006) and create the practical relevance of correctly forming and managing partnerships.

Secondly, the research objective is to analyze the effect that complementary capabilities in business-to-business partnerships have on innovativeness and internationalization. Thus, by answering that main question, knowledge is created on how complementarity of capabilities results in innovativeness and/or internationalization effects. Companies looking to focus on increasing innovativeness through partnerships can use this knowledge to assess whether their capabilities are correct or still in need of adaption. Moreover it is possible to assess the contingency of a (possible) business partner based on its capabilities.

Thirdly, one may question why it is relevant to discuss business-to-business partnerships once more. Scholars have stated that many partnerships failed (Ahuja, 2000; Hamel, 1991). Indeed, the failure rate in many forms of business partnerships is still rather high. Next to that there are other drawbacks: loss of control, cost of relationship, sharing of

private information or technologies (Trott, 2008). However, according to many, the advantages outweigh the disadvantages ìf the partnership is formed, managed ànd maintained correctly (Parmigiani & Rivera-Santos, 2011; Wan, 2005; Wassmer, 2010). Advantages can come in the form of development and absorption of technology, better withstanding of environmental shocks, and improvement of survival prospects and financial performance (Ahuja, 2000), but also in the form of market power, increasing efficiencies, and accessible resources (Kale & Singh, 2009). Thus, the relevance of this thesis is bipartite; on the one hand it may provide practical grip for companies forming, managing and/or maintaining partnerships. On the other hand it provides academic knowledge on the influence of complementarity of capabilities on innovativeness and internationalization.

1.2.2 Theoretical relevance: research gap

According to Sarkar, Echambadi, Cavusgil, and Aulakh (2001), on the one hand complementarity determines the mix of unique and valuable resources available to achieve strategic objectives, thus enhancing competitive viability of the alliance. On the other, complementarity implies strategic symmetry wherein a balanced share of unique strengths creates partner interdependence. The synergy that results when alliance partners pool together could be formed by complementary resources and capabilities that enhance performance. First, they enhance the economic efficiency and qualitative effectiveness of the task being jointly carried out both directly and indirectly. While the direct effect is stronger, there is a substantive indirect effect, primarily through reciprocal commitment. It thus appears that when firms can partner with firms that can complement their weaknesses, not only is there a direct effect on project performance, but it also has the added effect of increasing the commitment of each partner to the relationship wherein they are willing to invest requisite resources in the relationship to make it a success. This serves as a powerful signaling mechanism that reduces the threat of opportunism, aligns incentive structures, and provides a host of efficiencies. (Sarkar et al., 2001).

However, more research is needed to understand the inducements and opportunities of complementarity in the formation of inter-firm linkages (Ahuja, 2000) and network evolution (Venkatraman & Lee, 2004). Prior studies documented that high technology sectors are characterized by strong complementarities and mutual dependence (Shapiro & Varian, 1999). Khalid (2003) theoretically argues that one may expect complementary capabilities to generate international cooperation and innovation. Scholars argue that future research is warranted to understand how high technology companies build and renew dynamic capabilities for the management of complementary product markets (Lee, Venkatraman, Tanriverdi, & Iyer, 2010). According to Arora and Gambardella (1990), an interesting topic for further research is to see whether other high technology sectors display organizational patterns in the innovation process (Arora & Gambardella, 1990). Moreover it is unclear whether inter-firm diversity affects alliance performance, and if it does, whether it influences performance directly, indirectly through relationship capital, or both (Sarkar et al., 2001). Thus, research is still needed the fill the research gap of complementary capabilities in partnerships.

"While in-depth analysis of competitors and suppliers is de rigueur in formulation strategy, surprisingly few companies pay much attention to firms that sell complementary products"

(David B Yoffie & Mary Kwak, 2006) p. 89

Fortunately, two papers describe the research gap that this research attempts to fill. Kim et al. (2010) focus on complementary knowledge capabilities and their effect on value creation but recognize the need for future research on other complementary capabilities such as organizational capabilities. Rothaermel and Boeker (2008), who find evidence for the key role that complementary capabilities have in alliance formation, state that future research should investigate in more detail the interplay between specific skills and capabilities of partner firms. Moreover they state: "*research is needed on how these skills*

and capabilities complement each other and hold the possibility of creating value" **(p. 74). That is what this research aims at: firstly defining which and how various capabilities are present in business-to-business partnerships and secondly analyzing how – or if – the complementary character of those capabilities creates value (i.e. innovativeness and/or internationalization). In this way the thesis could fill Rothaermel and Boeker's research gap (2008). Moreover the view on complementary capabilities aims to be holistic, including organizational capabilities, knowledge capabilities, and intangible assets (Khalid, 2003; Wu, Shih, & Chan, 2009). In this manner the research aim to fill the gap as identified by Kim et al. (2010).**

1.2.3 Sector definition: high technology partnerships

The research focuses on high technology partnerships. The choice of this sector is the result of both personal interest and interest from the Dutch Ministry of Foreign Affairs in the subject. The personal interest results from the wish to write a paper on an innovative and entrepreneurial market sector. A market sector that is innovative makes entrepreneurial modes and decisions of critical relevance (Lee, Venkatraman, Tanriverdi, & Iyer, 2010). The interest from the ministry is to promote and assist Dutch companies (going) abroad. The successful internationalization of Dutch products or knowledge with potential is an important means to stimulate the gross domestic product of the Netherlands. The NL Agency, an initiative of the Dutch Ministry of Economic Affairs, Agriculture and Innovation that promotes and supports Dutch international business, has recognized the international potential of the Dutch high technology sector.

The choice to focus on the partnerships is based on the wish to retrieve and analyze data from, and makes statements about complementary capabilities within partnerships. Paragraph 3.1 elaborates on the sampling criteria for high technology partnerships.

1.3 Research problem

The Dutch high technology industry is growing (Witteveen & Hobers, 2011), creating possibilities for internationalization (NL Agency, 2011). Success in the industry is based on business-to-business relationships, linkages and networks (Venkatraman & Lee, 2004). Complementary capabilities could generate internationalization (S. Khalid, 2003) and innovation (Wu et al., 2009). To date, this information is known.

With these statement combined, one can assume (1) that possibilities for international business-to-business relationships, linkages and networks currently are present for companies in the Dutch high technology sector and (2) that they can lead to increased innovativeness and internationalization.

Though correct partnership management can lead to advantages (Ahuja, 2000), business-to-business partnerships are still characterized by high failure rates. This still is a problem both in firm-level practice as in Business Administration literature. For that reason this thesis aims to provide extra knowledge on how to manage a partnership, more specifically: how to manage complementary capabilities within a partnership to increase innovativeness and internationalization.

1.4 Research question

What is the influence of complementary capabilities in high technology business-to-business partnerships on the degree of innovativeness and internationalization in participating companies?

2 Theoretical framework and hypotheses

This section presents a review of the academic literature that forms the founding basis of this thesis. The first paragraph reviews literature about complementarity and shows the differences in definition of the concept even in the field of Business Administration. The second paragraph then elaborates on the possible causal relationships between complementary capabilities and innovativeness. Three types of capabilities are distinguished and for each type a hypothesis is formulated. The third paragraph discusses the same capabilities and the causal relationships with internationalization. Again, three hypotheses are formulated. The fourth paragraph presents a figure that illustrates the theoretical framework and hypotheses in a model.

2.1 Complementarity literature review

To work with complementarity of capabilities in high-tech business-to-business partnerships it may be wise to commence the understanding of the concept with the etymology of the word. *Complementarity* is derived from *complement.* Complement finds its origin in the Latin word *complementum*, which means: that which fills up or completes. In other words; complementarity is the phenomenon that exists between parts that together create a complete concept.

One can imagine the countless scientific definitions of the concept complementarity. Exempli gratia, in mathematics complementary angles are angles that together create an angle of 90 degrees. In biology, complementarity can be found in DNA where adenine only links with thymine and guanine only links with cytosine.

In business administration, there are numerous definitions of the concept complementarity as well. In product development (Lichtenthaler & Ernst, 2012) internal and external development can form complements. The products in a firm's portfolio may be complementary (Lee, Venkatraman, Tanriverdi, & Iyer, 2010). But also competing firms may be complementary, e.g. Microsoft and Intel (Yoffie & Kwak, 2006). In summary; although complementarity most certainly has a specific etymologist meaning, countless applications and definitions of the concept exist in academic literature.

Table 2.1 (see next page) presents a review of published research on complementarity in the field of Business Administration throughout the last decade. The table clusters the literature based on five different dependent variables: alliance (post)formation, alliance performance, alliance advantages, innovativeness, and internationalization. The clustering might help the reader to understand how complementarity is understood and what its effect has been in previous research settings. For all papers in the table, author(s), publication year, source, and independent variable are given as well.

This thesis contributes to contemporary literature in two ways. Firstly it approaches the independent variable in a holistic manner, measuring three different types of complementary capabilities. Most scholars (see table 2.1) approach complementarity from a single angle, e.g. resource complementarity or asset complementarity. Secondly this thesis combines the dependent variables presented in cluster 4 and 5 in table 2.1: innovativeness and internationalization.

Separately these two aspects do not from a true contribution. Kale and Singh (2009) already discussed partnership complementarity from a holistic point of view. Moreover Lichtenthaler and Ernst (2012) discuss the effect of complementarity on both innovativeness and internationalization. However, approaching partnership complementarity with a holistic view, combined with the focus on both innovativeness and internationalization, is the contribution of this thesis to current literature.

Table 2.1: List of complementarity theory

Author(s)	Year	Source	Independent variable
		Cluster 1: Alliance (post)formation	
Chung, Singh, & Lee	2000	*Strategic Management Journal*	Resource complementarity
Loohuis & Groen	2011	Book chapter	Resource complementarity
Parmigiani & Rivera-Santos	2011	*Journal of Management*	Resource complementarity
Rothaermel & Boeker	2008	*Strategic Management Journal*	Asset complementarity
Wang & Zajac	2007	*Strategic Management Journal*	Resource complementarity
		Cluster 2: Alliance performance	
Das & Teng	2000	*Journal of Management*	Complementary alignment
Kale & Singh	2009	*Academy of Management Perspectives*	Partner complementarity
Sarkar et al.	2001	*Journal of Academy of Marketing Science*	Resource complementarity
Wu, Shih, & Chan	2009	*Expert Systems with Applications*	Capability complementarity
		Cluster 3: Alliance advantages	
Hess & Rothaermel	2011	*Strategic Management Journal*	Asset complementarity
Kim, Shin, & Lee	2010	*Journal of Computing and Electronic Commerce*	Knowledge complementarity
Lee et al.	2010	*Strategic Management Journal*	Product complementarity
Roper & Crone	2003	*British Journal of Management*	Knowledge complementarity
Wassmer	2010	*Journal of Management*	Resource complementarity
		Cluster 4: Innovativeness	
Cassiman & Veugelers	2002	*Management Science*	Innovation strategy complementarity
Cassiman & Veugelers	2006	*Management Science*	Innovation activity complementarity
Lichtenhaler & Ernst	2012	*Strategic Management Journal*	Product complementarity
Schmiedeberg	2008	*Research Policy*	Innovation activity complementarity
		Cluster 5: Internationalization	
Jones et al.	2009	Book chapter	Complementary capabilities
Kylaheiko et al.	2003	*International Business Review*	Asset complementarity
Wu et al.	2009	*Expert Systems with Applications*	Complementary capabilities

2.2 Complementary capabilities

The theoretical developments of Saba Khalid (2003) form the basis of this paper. Her paper addresses the positive relationship between complementarities in capabilities as independent variable and innovativeness and internationalization as dependent variables. Consequently, according to Khalid, integration of complementary capabilities within partnerships can result in successful innovation and internationalization. She states that internationalization and innovation are objectives to create an adaption of existing technologies and development of new technologies from the existing technologies. Moreover she states that internationalization of R&D and innovation can be achieved by knowledge spillover resulting from complementary relationships between partners because complementary activities create new capabilities. Thus, following the line of thought of Khalid one may assume a positive relationship between complementary capabilities and innovativeness and internationalization.

Wu et al. (2009) agree with Khalid's theory that complementary capabilities may have a positive influence on innovativeness and internationalization. Moreover, these scholars test which specific capabilities can be complementary within business-to-business partnerships. They distinguish three clusters of complementary capabilities: relationship capabilities, market capabilities, and absorptive capabilities (see table 2.2).

Relationship capabilities may be defined as a set of intangible assets that reflect a series of interactions occurring between the interrelated parties (Lages, Silva, & Styles, 2009) and

include the items: previous partnership experience, reputation, skilled workforce, diverse customer base, and knowledge of local business partners.
Market capabilities may be defined as a combination of the market-related resources, processes and knowledge needed to serve current and potential future markets (Ellonen et al., 2009) and include the items: market coverage, high quality distribution system, market share, and export opportunities.
Absorptive capabilities (or absorptive capacity) may be defined as the ability to identify the value of new knowledge, acquire new information, and store such data to facilitate the creation and the repositories of organizational knowledge (Cohen & Levinthal, 1990), and include proprietary knowledge, patents, and trademarks (See table 2.2).
Both the clustering and the individual items in table 2.2. are based on the research of Wu et al. (2009). Paragraph 4.3 presents the exploratory factor analysis that provides support for this clustering based on current empirical data with a significance level of 0.000.

Table 2.2: Clusters of complementary capabilities

Complementary clusters	Items	Author(s)
Relationship capabilities	Previous partnership experience	(Wu et al., 2009)
	Reputation	(Lages et al., 2009)
	Skilled workforce	
	Diverse customer base	
	knowledge of local business partners	
Market capabilities	market coverage	(Wu et al., 2009)
	market share	(Ellonen et al., 2009)
	export opportunities	
	high quality distribution system	
Absorptive capabilities	proprietary knowledge	(Wu et al., 2009)
	patents	(Fabrizio, 2009)
	Trademarks	

2.3 Complementary capabilities and their influence on innovativeness

As is stated in the previous paragraph, it may be assumed that innovativeness through alliances is more likely when partners have complementary capabilities (Ahuja, Lampert, & Tandon, 2008; Parmigiani & Rivera-Santos, 2011). This paragraph makes a case for theoretical relationships between the three clusters of complementary capabilities and innovativeness. Subsequently three matching hypotheses are formed.

2.3.1 Relationship capabilities and innovativeness

In his article Gautam Ahuja (2000) discusses the duality of inter-firm collaboration. He deals with the inducements and opportunities in the formation of inter-firm linkages. According to Ahuja (2000) there are three benefits of inter-firm linkages for the involved companies; (1) development and absorption of technology, (2) better withstanding to environmental shocks, and (3) improvement of survival prospects and financial performance. Next to that Ahuja discusses three forms of capital to partnership formation; (1) technical capital, (2) commercial capital, and (3) social capital. Technical capital represents a firm's capabilities in creating new technology, products and processes. Commercial capital represents the supporting or complementary assets that a firm needs to commercialize new technologies and obtain rents from them. Social capital represents the firm's prior relationships with other firms and provides information and status benefits. Apparently commercial capital is a complementary capability according to Ahuja p. 319. Next to that, Ahuja states that complementary commercial capital has a positive effect on innovation. This could be explained by the fact that an innovation is a commercialized new technology (Zahra, 1991). Wu et al. (2009) define commercial capital as relationship capability. Thus, one may conclude that following Ahuja (2000), Trott (2008), and Wu et

al. (2009) complementary relationship capabilities have a positive influence on innovativeness.

Colombo et al. (2006) wrote an article on the reason why new technology-based firms (NTBFs) cooperate. Based on Teece (1992) the authors elaborate on alliance formation in the resource and competence-based tradition and created a model that highlights the inducements and obstacles that firms face in alliance formation. Through longitudinal econometric analysis Colombo et al. find strong support for the key driver position of complementarity of relationship capabilities in the formation of NTBFs. Because NTBFs are characterized by a high degree of innovation, one could suspect a positive relationship between complementary relationship capabilities and innovativeness in business-to-business partnerships based on Colombo et al.'s findings. Therefore, and because of Ahuja's (2000) ideas, hypothesis 1 is formulated:

H1: Complementary relationship capabilities in business-to-business partnerships have a positive effect on the degree of innovativeness in the participating companies.

2.3.2 Market capabilities and innovativeness

Venkatraman and Lee (2004) discuss preferential linkages and network evolution. The authors state that horizontal – i.e. complementary – relationships are perfectly applicable in high-tech sectors. The authors demonstrate how essential a complementary network can be using examples of IBM and Microsoft. Moreover they state that "success in such networks is based on relationships with complementors" p. 887. The authors provide evidence for the influence of market density overlap, market structural embeddedness, and dominance of partner market position – which are typical market capabilities according to Wu et al. (2009) – on innovativeness.

When looking at the individual items that form market capabilities in this thesis (see table 2.2), it can be understood that they positively influence innovativeness when they are complementary present in a partnership. The first item is market coverage. If two (or more) partners complement each other's market coverage, they have access to a larger part of the market. This results in technology access and increase of innovativeness (Rugman & Verbeke, 2004).

The second item is market share. If the market share is complementary present in a partnership, it increases. Greater market share, in turn, reduces the likelihood of business dissolution. This gives financial and organizational space for introducing innovation. The innovations in their turn, may increase market share again (Banbury & Mitchell, 1995). Consequently, a positive relationship between complementary market share and innovativeness may be assumed.

The third item is export opportunity. For this item also goes that if the capability is complementary within a partnership, it increases. Export opportunities may enhance innovativeness through knowledge and technology spillovers (Fosfuri, Motta, & Ronde, 2001). It thus can be assumed that complementary export opportunities increase innovativeness. According to Fosfuri et al. (2001) complementarity of the (high quality) distribution systems influence innovativeness in the same manner.

Based on Venkatraman and Lee (2004) and the influence of the individual items within market capabilities, the second hypothesis is formed. Hypothesis 2 assumes a positive relationship between complementary knowledge capabilities and innovativeness:

H2: Complementary market capabilities in business-to-business partnerships have a positive effect on the degree of innovativeness in the participating companies.

2.3.3 Absorptive capabilities and innovativeness

Cassiman and Veugelers (2006) take a broader approach to complementarity by adding a combination of the productivity and adoption approach to the subject. Moreover the authors include a search for contextual variables in the firm's strategy that affect complementarity. In their research Cassiman and Veugelers (2006) analyze internal R&D and external knowledge acquisition. Their results suggest that both internal R&D and

external knowledge are complementary assets stimulating innovation. Moreover, internal R&D and external knowledge are measures for absorptive capability (Cohen & Levinthal, 1990; Wu et al., 2009). Thus, Cassiman and Veugelers (2006) actually make a case for the influence of complementary absorptive capabilities on innovativeness.

Schmiedeberg (2008) states that innovation strategies in manufacturing often involve both internal R&D activities and external partnerships. Schmiedeberg (2008) tests for complementarity of different innovation activities. This empirical analysis of cross-sectional firm level data of the manufacturing sector provides evidence that internal R&D and R&D cooperation are complementary – they are both absorptive capabilities according to Wu et al. (2009) – and that they have a significant positive influence on innovativeness.

Kim et al. (2010) wrote an article about the influence of knowledge complementarities in IT outsourcing. The authors examine to which extent partner complementarities promote success in information technology alliances. Their research also includes relative absorptive capacity, which is relevant when complementary knowledge flows between organizations. Kim et al. conclude that complementary absorptive capabilities in partnerships have a positive influence on innovativeness.

Thus, based on Cassiman and Veugelers (2006), Schmiedeberg (2008), and Kim et al. (2010) a positive influence of complementary intangible assets on innovativeness is hypothesized:

H3: Complementary absorptive capabilities in business-to-business partnerships have a positive effect on the degree of innovativeness in the participating companies.

2.4 Complementary capabilities and their influence on internationalization

Although there are some scholars who discuss the relationship between (complementary) capabilities and internationalization, the topic is not as broadly discussed as the relationships for innovation (H1, H2, and H3). Therefore three hypotheses describing the relationship between complementary capabilities and internationalization are formulated in this paper.

Khalid's (2003) theory still forms the basis for she clearly states that there is a relationship between complementarity of knowledge, organizational and technological capabilities and internationalization. In this statement she is supported by Jones et al. (2009) who provide evidence for the critical role of complementary capabilities in the success of internationalization. Next to these scholars, Zahra and George (2002) suggest that a firm's success in exploiting new capabilities for competitive advantage depends on its complementary capabilities. Moreover the authors state that complementary relationship capabilities may have a positive effect on internationalization. In literature there is also interest in the role of market capabilities and their influence on internationalization. Technological capabilities – often absorptive capabilities (Wu et al., 2009) - have a positive effect on internationalization (Kylaheiko et al., 2011) And Kuivalainen, Kylaheiko, Pummalainen, and Saarenketo (2003) suggest that knowledge capabilities have a positive relation with internationalization.

Despite the small amount of literature on the topic, it is possible to argue for relationships between complementary capabilities and internationalization at the level of the particular items that form the capability constructs. In this line of thought the assumption is made that all items increase if they are complementary available in a partnership.

2.4.1 Relationship capabilities and internationalization

The first construct is relationship capabilities. The first item of that construct is previous partnership experience which may have a positive influence on internationalization through experience with building inter-firm trust (Ogasavara & Hoshino, 2008). The second item is reputation. Reputation is known to have a positive influence on internationalization because it forms a competitive advantage through the ambiguity surrounding the intangibleness of the resource it is. This makes it very hard for (foreign) competitors to

replicate it (Fernhaber & McDougall-Covin, 2009). The third item is a skilled workforce. A skilled workforce may have a positive effect on internationalization because it is a resource that is not location restricted. Highly trained employees can be put to work anywhere (Knight & Morshidi, 2011). The fourth item is a diverse customer base. This may positively influence internationalization because diversity in the customer base enhances its network linkage. These linkages can be used for export, FDI, etcetera (Freeman, Hutchings, & Chetty, 2012). The last item of the construct is knowledge of local business partners. This knowledge can positively influence internationalization because it provides access to local resources and makes the adjustment of strategy to the foreign location easier (Tallman & Fladmoe-Lindquist, 2002).

Assuming that all items of the construct relationship capability have a positive influence on internationalization, and that all items increase if they are complementary present in a partnership it is possible to formulate the following hypothesis:

H4: Complementary relationship capabilities in business-to-business partnerships have a positive effect on the degree of internationalization in the participating companies.

2.4.2 Market capabilities and internationalization

In the same manner it is possible to argue for the relationship between complementary market capabilities and internationalization. The first item of the construct market capabilities is market coverage. Rugman and Verbeke (2004) suggest that firms will establish foreign affiliates in the case of strong ownership advantages and location advantages. According to the scholars, market coverage is an ownership advantages and thus positively influences internationalization. The second item is a high quality distribution system. According to Swank and Steinmo (2002) a high quality distribution system increases a firms internationalization because it provides a competitive advantage and lowers the cost of international transactions. The third item is market share. Increases in market share provide a strong argument for internationalization because national markets are always limited. Moreover McDougall and Oviatt (1996) find evidence for a significant and positive relationship between a firm's market share and internationalization. The last item of the construct is export opportunity. Because export is a form of internationalization, a positive relationship between the two is evident.

Again, assuming that all items of the construct market capability have a positive influence on internationalization, and that all items increase if they are complementary present in a partnership it is possible to formulate the following hypothesis:

H5: Complementary market capabilities in business-to-business partnerships have a positive effect on the degree of internationalization in the participating companies.

2.4.3 Absorptive capabilities and internationalization

The first item of the construct absorptive capabilities is proprietary knowledge. According to van Beers, Berghall, and Poot (2008) access to proprietary knowledge is a key motive for internationalization. The authors state that especially in complementary partnerships firms can profit from each other's proprietary knowledge without the obligation to officially share their knowledge. The second item is patents. Harris (2001) argues that firms with patents have higher rates of internationalization because of the benefits the patents provide. Firms are given a competitive advantage to competitors abroad and are able to form international partnerships without losing that advantage. The third and final item of the construct absorptive capabilities is trademarks. According to Giarratana and Torrisi (2010), trademarks positively influence internationalization for the same reasons as patents do.

Finally, assuming that all items of the construct absorptive capability have a positive influence on internationalization, and that all items increase if they are complementary present in a partnership it is possible to formulate the following hypothesis:

H6: Complementary absorptive capabilities in business-to-business partnerships have a positive effect on the degree of internationalization in the participating companies.

2.5 Theoretical model

Six hypotheses have been formulated based on the theoretical framework of chapter 2. Firstly it is hypothesized that the three complementary capabilities have a positive effect on innovativeness. Secondly it is hypothesized that the three complementary capabilities have a positive effect on internationalization. Next to the hypotheses, two other relationships are presented in the figure below. The effect of partnership complementarity in general (i.e. the separate complementary capabilities added together) on innovativeness and internationalization will also be analyzed by multiple regression analysis. This choice is made because the outcomes may be valuable for companies that do not wish (or are not able) to distinguish between the three complementary capabilities.

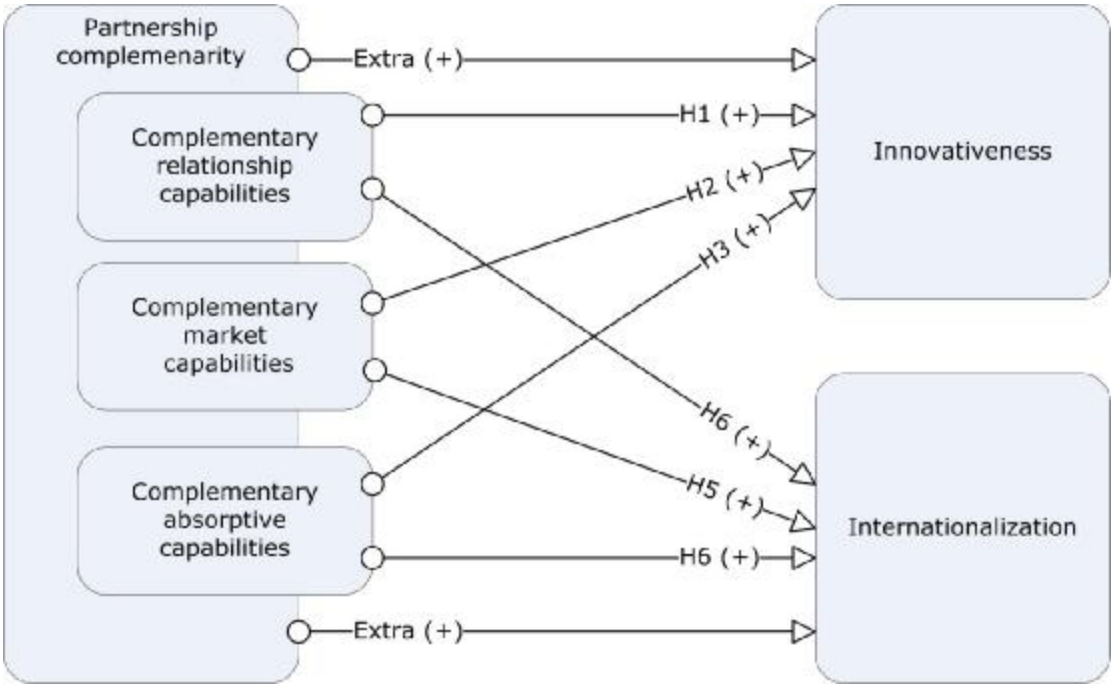

Figure 2.1: Research model

3 Methods

3.1 Setting, data and analysis

In this research, high-tech companies are selected as the focal point of analysis. Based on reports of the European Central Bank (2005) and the Dutch research organization TNO (2011) high-tech companies are selected using their SBI code: SBI'93 29-35, i.e. SBI 29: construction of machines and appliances, SBI 30: construction of office machines and computers, SBI 31: construction of other electrical machines and appliances, SBI 32: construction of audio, video and telecommunication devices, SBI 33: construction of medical devices and instruments, orthopedic articles, et cetera, SBI 34: construction of cars, trailer wagons, and trailers, SBI 35: construction of transportation (no cars, trailer wagons, or trailers) (TNO, 2011).

Using the company database company.info and publications in the Dutch Financial Courier "Het Financieele Dagblad" 216 companies that are active in at least one of the SBI'93 29-35 sectors and are currently participating in a strategic alliance or joint venture have been selected. Management employees of these companies have been contacted by phone or email and asked if they are willing to participate in this research. When they agreed, a digital questionnaire (see appendix A) was send. The questionnaire is based on the constructions that are described by the following two paragraphs.

The results of the questionnaire enabled statistical analysis by multiple linear regression, for which SPSS 20.0 is used.

3.2 Dependent variables

3.2.1 Internationalization

In spite of both positivistic and instrumental research, the reliability of measuring the degree of internationalization of a firm remains speculative (Sullivan, 1994). However, the construction of the measuring device is perhaps the most important segment of any study (Schoenfeldt, 1984). Therefore, if possible one should attempt to apply a tested and approved construction. For internationalization multiple constructions are approved. Sullivan's (1994) construction is tested, approved, and applied by many scholars (Sanders & Carpenter, 1998; Zahra, Korri, & Yu, 2005). For this reason Sullivan's (1994) construction (see table 3.1) is applied in this research as well. In his model Daniel Sullivan (1994) constructs his measurement device based on three indicators: performance (what goes on overseas), structural (what resources are overseas), and attitudinal (what the top management's international orientation is). The performance indicator is measured firstly by foreign sales as percentage of total sales, secondly by export sales as percentage of total sales, thirdly by foreign profits as percentage of total profits, and finally by foreign advertising as percentage of total advertising. Two items measure the structural indicator: foreign assets as percentage of total assets and overseas subsidiaries as percentage of total subsidiaries. The attitudinal indicator is measured by two items as well: the top manager's international experience as percentage of total experience and the physic dispersion of international operations - based on the physic zones of Ronen & Shenkar (1985).

A possible critique on the Sullivan (1994) model is the 'age'. To date the model is 18 years old. Therefore the impact factor of Sullivan's (1994) article is considered. Throughout the last two decennia this impact factor has increased (a JCR score of 2.283 in 2007 to a score of 4.184 in 2010). Apparently the model is still rather up to date and usable. The construct is presented in table 3.1.

Table 3.1: Construct for internationalization (Cronbach's alpha = 0.907)

Item	Author(s)
Foreign sales as percentage of total sales	*Sullivan (1994)*
Export sales as percentage of total sales	*Sullivan (1994)*
Foreign profits as percentage of total profits	*Sullivan (1994)*
Foreign advertising as percentage of total advertising	*Sullivan (1994)*
Foreign assets as percentage of total assets	*Sullivan (1994)*
Overseas subsidiaries as percentage of total subsidiaries	*Sullivan (1994)*
Top manager's international experience as percentage of total experience	*Sullivan (1994)*

3.2.2 Innovativeness

There has always been a tremendous interest in measuring innovativeness (Danneels & Kleinschmidt, 2001). In literature many measurement devices are constructed. There are specific constructions for product innovation, process innovation, radical or incremental innovation, et cetera (Ahuja, 2000; Armstrong & Shimizu, 2007; Carlaw & Lipsey, 2002; Cassiman & Veugelers, 2006; B. Cassiman & Veugelers, 2002; Chiu et al., 2008; Christmann, 2000; Colombo et al., 2006; Dahlin & Behrens, 2005; Danneels & Kleinschmidt, 2001; Garcia & Calantone, 2002; George & Marino, 2011; Y. F. Luo et al., 2009; Park & Ungson, 1997; Rothaermel, 2001; Sampson, 2007; Schmiedeberg, 2008; Stuart, 2000; Teece, 1992; Witteveen & Hobers, 2011; Woodman, Sawyer, & Griffin, 1993; Zahra, Ireland, Gutierrez, & Hitt, 2000). However, this research aims at the creation of knowledge on the effect of complementary capabilities on innovativeness in general. For innovativeness in general no omnipresent theoretical consensus is found. Therefore the choice is made to compose a potentially more appropriate measurement device (see table 3.2) for innovativeness by combining items from constructs of different scholars (Covin & Slevin, 1989; Garcia & Calantone, 2002; Miller & Friesen, 1983; Zahra, 1991).

Table 3.2: Construct for innovativeness (Cronbach's alpha = 0.856)

Item	Author(s)
1. Number of new lines of products or services marketed in the past five years.	*Kreiser et al. (2002)*
2. Changes in product or service: minor / dramatic.	*Kreiser et al. (2002)*
3.Emphasis: true and tried products vs. R&D, technological leadership	*Miller & Friesen(1983)*
4. Degree of emphasis on innovation compared to competitors.	*Zahra (1991)*
5. Pursuing business opportunities developed outside the company.	*Zahra (1991)*
6. Encouraging employee creativity and innovation.	*Zahra (1991)*
7. Rewarding employees for creativity and innovation.	*Zahra (1991)*
8. Revenue generated from products that did not exist three years ago.	*Zahra (1993)*

3.3 Independent variable

Complementarity of capabilities **in business-to-business partnerships forms the independent variable in this research. Many scholars have yet defined complementarity (Arora & Gambardella, 1990; Birchall, Tovstiga, & Ieee, 2002; Cassiman & Veugelers, 2006; B. Cassiman & Veugelers, 2002; Chung, Singh, & Lee, 2000; Harrison, Hitt, Hoskisson, & Ireland, 2001; Hill & Hellriegel, 1994; Krishnan, Miller, & Judge, 1997; Lee et al., 2010; Milgrom & Roberts, 1995; Park & Ungson, 1997; Roper & Crone, 2003; Sarkar et al., 2001; Schmiedeberg, 2008; L. Wang & Zajac, 2007; Wu et al., 2009). However, for many of these scholars complementarity has only been a minor sub topic. In this thesis complementarity is the central independent variable. Therefore a specific conceptualization is needed. This sub paragraph describes the construction of the definition, which is based on previous literature. Moreover a measurement construct is presented in table 3.3.**

For a capability to be complementary it should have four critical characteristics. Firstly a capability should be non-redundant (Colombo et al., 2006; Gulati, 1995; Hill & Hellriegel, 1994; Lee et al., 2010; L. Wang & Zajac, 2007). Secondly a capability should be distinctive in the partnership (Colombo et al., 2006; Gulati, 1995; Hill & Hellriegel, 1994; Lee et al.,

2010; L. Wang & Zajac, 2007). Thirdly a capability should be mutually supportive, i.e. both (or all) firms in the partnership should benefit (Lee et al., 2010; L. Wang & Zajac, 2007). Finally a capability should be interdependent (Lee et al., 2010; L. Wang & Zajac, 2007).

Although these four criteria provide an instrument to assess which capabilities are complementary in a partnership, the choice which capabilities to assess should be made as well. In this thesis that choice is based on theory of Wu et al. (2009). In their article the scholars provide criteria for partner selection in strategic alliances. One of those criteria is complementary capability.
Wu et al. describe three different complementary capabilities which can be defined as: relationship capabilities, market capabilities and absorptive capabilities.(Wu et al., 2009). This approach to complementary capabilities is constructed on a broad range of previous literature (Brouthers, Brouthers, & Wilkinson, 1995; Cavusgil, Yeoh, & Mitri, 1995; Chen & Tseng, 2005; Dacin, Hitt, & Levitas, 1997; Hitt, Ahlstrom, Dacin, Levitas, & Svobodina, 2004; Y. D. Luo, 1998; Medcof, 1997; P. Wang, Wee, & Koh, 1999).
Wu et al. (2009) distinguish the capabilities as well. The scholars also subdivide relationship capabilities in: previous partnership experience, reputation, skilled workforce, diverse customer base, and knowledge of local business partners. Subsequently they discuss the market capabilities, which are: market coverage, a high quality distribution system, market share, and export opportunities. Finally they present the subdivision of absorptive capabilities: proprietary knowledge, patents, and trademarks.
Following Khalid (2003) this thesis hypothesizes that the relationship capabilities, market capabilities and absorptive capabilities can be complementary capabilities too (see paragraph 2.1).
Thus, a partnership with complementary capabilities must have relationship capabilities, market capabilities, and/or absorptive capabilities that are non-redundant, distinctive, mutually supportive, and interdependent.

Table 3.3: Construct for partnership complementarity (Cronbach's alpha = 0.799)

Complementary capabilities	1. Non- redundant *Lee et al. (2010)* *Gulati (1995)*	2. Distinctive *Lee et al. (2010)* *Gulati (1995)*	3. Mutually supportive *Lee et al. (2010)*	4. Interdependent *Lee et al. (2010)*	Author(s)
Relationship capabilities	Previous partnership experience Reputation Skilled workforce Diverse customer base Knowledge of local business partners				(Wu et al., 2009) (Lages et al., 2009)
Market capabilities	Market coverage High quality distribution system Market share Export opportunities				(Wu et al., 2009) (Ellonen et al., 2009)
Absorptive capabilities	Proprietary knowledge Patents trademarks				(Wu et al., 2009) (Fabrizio, 2009)

3.4 Control variables

A firm characteristic that may always have an effect on dependent variables is company size. Therefore company size (both in turnover and FTE) will be included in the analysis as a control variable.

4 Results

This chapter discusses the quantitative research results. The first paragraph states information on the response, i.e. response rate and respondent descriptives. The second paragraph discusses the construct validity and reliability for innovativeness, internationalization, and partnership complementarity. The third paragraph elaborates on the factor analysis of the individual items which is used to create the constructs within the concept of complementarity. The third paragraph presents the correlations between the several variables, factors and constructs.

4.1 Response

4.1.1 Response rate

As stated earlier, in paragraph 3.1, 216 partnership managers (mostly alliance managers) are contacted and are send a link to the online questionnaire. 59 Of those managers submitted the questionnaire. Consequently the response rate is $\frac{59}{216} * 100\%$ or 27,31%. Babbie (2006) regards this as a low response rate. However, when sending questionnaires to (top) management or organizational representatives – as is done is this research – the response rate is usually lower. Baruch (2000) examined 175 different studies and found that the average response rate for (top) management was 36.1% with a standard deviation of 13.3%. From that perspective this research' response rate is acceptable.

4.1.2 Respondent descriptives

The 59 respondents, who have participated in this research, have an average age of 40 years. The youngest respondent is 20 and the oldest respondent is 57 years old (table 8.1 in appendices). The standard deviation of 9.6 years indicates a strong age spread in the respondent base. Over 93 percent (55 people) of the respondents is male (table 8.2 in appendices). Most respondents, 36 percent, are senior manager, followed by junior manager (27%), CEO (20%), production employee (3%), and line manager (2%). Seven respondents (12%) indicated their function as 'other' (table 8.3 in appendices).

Most respondents work at big companies. More than 65% of the participating companies have more than 100 FTE, the average number of FTE is 5,415, and the biggest participating company has 420,000 FTE. In terms of turnover; 22% of the participating companies are under 1 million Euros in 2011, 23% are between 1 million and 10 million Euros, and more than 54% of the companies have a 2011 turnover of more than 1 billion Euros. The average 2011 turnover of participating companies is 9.8 billion Euros (table 8.1 in appendices).

Respondents from companies with headquarters in 11 different countries participated in this research. Most participating companies are headquartered in the Netherlands (N=28), followed by the USA (N=10), France (N=4), the UK (N=3), Belgium (N=3), Switzerland (N=2), India (N=2), Germany (N=2), Italy (N=2), Sweden (N=2), and Denmark (N=1) (see table 8.4 in appendices).

4.2 Construct validity & reliability

Construct validity is broadly defined as the extent to which an operationalization measures the concept it is supposed to measure (Cook & Campbell, 1979). Establishing construct validity of a scale is a process of collecting evidence about what the scale measures. Specifically, construct validity is typically evaluated by looking at patterns of correlations of the used construct scale with other items.

Correlation of items also provides evidence that a scale measures consistently, i.e. reliably(Bagozzi, Yi, & Philips, 1991). Therefore the Cronbach's alpha assesses the correlation of items within a construct. The Cronbach's alpha is used to measure internal consistency of the items. The value of alpha is an indicator for the extent to which several

items measure the same concept. When comparing groups, one may consider constructs to be valid when alpha ≥ 0.70 (Bland & Altman, 1997). Table 4.1 presents the constructs and their reliability.

As can be seen in table 4.1 the Cronbach's alpha scores of all constructs are > 0.70. In fact, the alpha's indicate a great measure of both construct validity and construct reliability. Thus, one may assume that this research' operationalizations consistently measure the concepts they are supposed to measure.

Table 4.1: Cronbach's alpha of the constructs

Construct	Cronbach's alpha	# Items	Measurement
Innovativeness	0.856	8	7-point likert scale
Internationalization	0.907	7	10-point likert scale
Partnership complementarity	0.799	13	5 yes/no questions

4.3 Factor analysis

To examine whether the different capabilities truly form three groups within complementarity (i.e. partnership capabilities, market capabilities, and absorptive capabilities), an exploratory factor analysis was executed. The factors are composed based on the Eigenvalues (see table 8.7 in appendices). The Eigenvalues indicated to what extent the variance can be explained by the factors. The screeplot of Eigenvalues indicates there are three factors. Because the factors appeared not to be orthogonal the principle axis factoring extraction method is applied. This method resulted in the promax-formed pattern matrix that is presented in the table 4.2. The KMO-score of the factor analysis is 0.741 and the significance is 0.000. These results confirm the correctness of the subdivision of the individual capabilities that is made in the theoretical framework of chapter two.

Table 4.2: Pattern matrix of factor analysis

Capability groups	Individual capabilities	Factor scores		
Complementary relationship capability	Previous partnership experience	,849		
	Reputation	,720		
	Skilled workforce	,660		
	Diverse Customer Base	,534		
	Knowledge of local business practices	,439		
Complementary market capability	Market coverage		,852	
	High quality distribution system		,653	
	Market share		,604	
	Export opportunities		,507	
Complementary absorptive capability	Proprietary knowledge			,813
	Patents			,803
	Trademarks			,452

4.4 Correlations

Any method of fitting equations to data may be called regression. Such equations are valuable for at least two purposes: making predictions and judging the strength of relationships. Because they provide a way of empirically identifying how a variable is affected by other variables, regression methods have become essential in a wide range of fields, including the social sciences such as Business Administration (Sen & Srivastava, 1990). This paragraph presents an analysis of multiple regression to judge the strength of relationships present in the quantitative results from the questionnaires. In other words; it is the validation of the relationship between the independent variable (i.e. partnership complementarity) and the dependent variables (i.e. innovativeness and internationalization). The following multiple regression model is applied:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k + \varepsilon$$

In this model y is the dependent variable (i.e. innovativeness or internationalization), x_1, x_2, … x_k are the explaining variables (i.e. partnership complementarity and possible other explaining variables). $E(y) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k$ is the deterministic part of the model. β_i determines the contribution of the explaining variable x_i, and ε is the random deviation (McClave, Benson, Sincich, & Knypstra, 2011). Important to notice; within the model the data has been checked for multi collinearity and normal distribution. In appendix 8.3 the model summary, collinearity diagnostics, frequency plots, and probability-probability plots are presented.

Four multiple regression analyses have been executed. To understand the models it is important to notice that two levels of complementarity have been analyzed. The first and second analysis investigate the effect of general partnership complementarity on innovativeness and internationalization (see table 4.4 and figure 2.1). The third and fourth analysis investigate the effect of the three specific complementary capabilities on innovativeness and internationalization (see table 4.5). Although there are no hypotheses discussing an effect of general complementarity, its effect is investigated because it may be relevant for firms to know whether complementarity an sich has advantages for innovativeness or internationalization (see also paragraph 2.5).

Table 4.3 presents descriptive statistics and the correlations for the control variable company size, the independent variable complementarity, the independent variables of complementary capabilities, the possible moderators $complementarity\ x\ tech.phase$ **,** $complementarity\ x\ tech.sector$ **,** $complementarity\ x\ partnership\ experienc$ **, and the dependent variables innovativeness and internationalization.**

The correlations in table 4.3 already show the strong correlation between partnership complementarity and innovativeness ($r = 0.429,\ p = 0.000$). **However, the correlation between partnership complementarity and internationalization is remarkable;** ($r = 0.52,\ p = 0{,}244$)**. Thus, no significant relationship between those two variables seems to be present. Because of the correlation effects in table 4.3 one may assume a significant relationship between partnership complementarity and innovativeness.**

Table 4.4 and 4.5 present the four multiple regression analyses. Table 4.4 firstly shows the relationship between the independent variable partnership complementarity and the dependent variable innovativeness (column 1.1 - 1.3). The relationship between partnership complementarity and innovativeness is positive ($B = 0.658$) **and vastly significant** ($p = 0.000$)**. Also note the strong increase of R^2 (from** 0.087 **to** 0.331**) when partnership complementarity is added to the regression (column 1.2). This indicates that neither the control variables nor the possible other explaining variables cause the variance.**

Table 4.4 also shows the relationships between partnership complementarity and internationalization (column 2.1 - 2.3). In contrast to innovativeness, the correlation between partnership complementarity and internationalization has positive direction ($B = 0.336$) **but is not in any way significant** ($p = 0.255$)**. The R^2 value only slightly increases after partnership complementarity is added to the model (from** 0.180 **to** 0.200**). Column 2.1 illustrates that most of the internationalization is explained by the control variable company size** ($R = 0.424$).

These results form a start in answering the research question for they present strong proof for the influence of partnership complementarity on innovation and a disavowal for the existence of a relationship between partnership complementarity and internationalization.

Table 4.3: Range, means, standard deviation, and correlation of variables (N=57)

	Mean	St Dev	1	2	3	4	5	6	7	8	9	10
Control: company size	54145	85732	1									
Partnership complementarity	15,271	6,60415	-,119	1								
Compl. relationship capabilities	6,1356	3,83027	-,182	,768**	1							
Compl. market capabilities	4,3220	2,89137	-,217	,718**	,421**	1						
Compl. absorptive capabilities	3,2712	2,85772	,248	,387**	-,081	-,015	1					
Complementarity x technology phase	,0809	4,77719	-,026	-,096	,024	-,386**	,100	1				
Complementarity x technology sector	,3349	3,37303	,109	-,247	-,202	-,281*	,063	,244	1			
Complementarity x partnership experience	-,0031	2,68925	,029	,055	,052	,229	-,189	-,479**	-,004	1		
Innovativeness	39,610	8,57023	,292*	,429**	,302*	,243	,280*	-,254	-,044	,216	1	
Internationalization	33,169	16,0356	,413**	,052	,092	-,153	,113	,049	,021	-,035	,299*	1

* Correlation is significant at the 0.05 level (2-tailed), ** correlation is significant at the 0.01 level (2-tailed)

Table 4.4: Determinants of innovativeness and internationalization for the analysis on complementarity

	1.1 Innovativeness			1.2 Innovativeness			1.3 Innovativeness			2.1 Internationalization			2.2 Internationalization			2.3 Internationalization		
	B	s.e.	p	B	s.e.	p	B	s.e.	p	B	s.e.	p	B	s.e.	p	B	s.e.	p
(Constant)	37.932***	1.308	.000	27.333***	2.643	.000	27.443***	2.681	,000	28.517***	2.285	.000	22.906***	5.326	.000	22.618***	5.617	.000
Control: company size	2.9E-5**	.000	.026	3.5E-5***	.000	.003	3.3E-5***	.000	,004	7.8E-5***	.000	.001	8.1E-5***	.000	.001	8.2E-5***	.000	.001
Partnership complementarity				.662***	.149	.000	.658***	.152	,000				.351	.301	.249	.366	.318	.255
Compl. relationship capabilities				x	x	x	x	x	x				x	x	x	x	x	x
Compl. market capabilities				x	x	x	x	x	x				x	x	x	x	x	x
Compl. absorptive capabilities				x	x	x	x	x	x				x	x	x	x	x	x
Complementarity x tech. phase							-.312	.237	,195							.216	.497	.665
Complementarity x tech. sector							.214	.304	,484							-.032	.638	.960
Complementarity x partnership exp.							.317	.408	,442							-.149	.856	.862
R	.295			.575			.621			.424			.447			.454		
R^2	.087			.331			.325			.180			.200			.206		

N= 59 *p<0.10; **p<0.05; ***p<0.01

Table 4.5: Determinants of innovativeness and internationalization for the analysis on complementary capabilities

	3.1 Innovativeness			3.2 Innovativeness			3.3 Innovativeness			4.1 Internationalization			4.2 Internationalization			4.3 Internationalization		
	B	s.e.	p	B	s.e.	p	B	s.e.	p	B	s.e.	p	B	s.e.	p	B	s.e.	p
(Constant)	37.932***	1.308	.000	28.087***	2.597	.000	28.611***	2.629	.000	28.517***	2.285	.000	24.373***	5.093	.000	4.423***	5.408	.000
Control: company size	2.9E-5**	.000	.026	3.4E-5***	.000	.007	2.9E-5**	.000	.019	7.8E-5***	.000	.001	7.9E-5***	.000	.002	8.0E-5***	.000	.002
Partnership complementarity				x	x	x	x	x	x				x	x	x	x	x	x
Compl. relationship capabilities				.702**	.286	.017	.829***	.290	.006				1.046*	.560	.067	1.041*	.597	.087
Compl. market capabilities				.664*	.384	.090	.296	.427	.491				-.688	.753	.365	-.673	.878	.447
Compl. absorptive capabilities				.689*	.355	.058	.851**	.359	.022				.168	.696	.810	.137	.738	.853
Complementarity x tech. phase							-.364	.260	.168							-.024	.535	.964
Complementarity x tech. sector							.145	.312	.645							-.050	.643	.939
Complementarity x partnership exp.							.403	.426	.350							-.188	.877	.831
R	.295			.567			.620			.424			.482			.483		
R^2	.087			.322			.384			.180			.232			.233		

N=59 *p<0.10; **p<0.05; ***p<0.01 59 *p<0.10; **p<0.05; ***p<0.01

Table 4.5 presents the multiple regression analyses of the relationship between the three complementary capabilities as independent variables and innovativeness (column 3.1 – 3.3) and internationalization (column 4.1 – 4.3) as dependent variables. Because the results of table 4.4 a stronger effect on innovativeness than on internationalization is to be expected.

In relation to innovativeness the addition of the complementary capabilities cause a strong increase of R^2, indicating that they are the cause of the variance. Complementary relationship capabilities have the strongest effect on innovativeness $(B = 0.829\ and\ p = 0.006)$**. Complementary absorptive capabilities also have a significant positive effect on innovativeness** $(B = 0.851\ and\ p = 0.022)$**. When the control variables and other possible explaining variables are included in the model, complementary market capabilities no longer have a significant influence on innovativeness** $(B = 0.296\ and\ p = 0.491)$**.**

Columns 4.1 to 4.3 show the results regarding the relationship between the complementary capabilities and internationalization. There are no significant influences from complementary market capabilities $(B = -0.673\ and\ p = 0.447)$ **or complementary absorptive capabilities** $(B = -0.137\ and\ p = 0.853)$**. There is a slightly significant positive influence of complementary relationship capabilities on internationalization** $(B = 1.041\ and\ p = 0.087)$**. However, when looking at the R^2 scores one can see that most of the variance is explained by the control variable; company size (it increases only from** 0.180 **to** 0.232 **when complementary capabilities are added to the model).**
Table 4.4 and 4.5 also clearly show the influence of the control variable company size in all three other analyses. Because the multiple regression method provides the possibility of separating the effect of the control variable from the effect of the hypothesized variables, this does not form a threat to the correct interpretation of the results. Nevertheless the influence of the effect of company size on the model will be discussed later in this paragraph.

Now that the results are presented and statistically discussed, it is possible to elaborate on the implications that the results have for this thesis.

Firstly, table 4.4 and 4.5 show a positive and significant relationship between the control variable company size (a variable constructed by FTE and turnover) and the dependent variables innovativeness and internationalization. Though small firms can be very innovative (Freel & Robson, 2004) and huge R&D spending does not guarantee innovativeness (Hall & Ziedonis, 2001), the result that bigger companies – both in FTE and turnover - could be more innovative does not come unexpected. Therefore company size is included as control variable in the analysis of the relationship between complementarity and innovativeness. The same line of thought is applicable to the relationship with internationalization. Internationalizing is mostly an act of company growth. Therefore the effect of company size does not threaten the validity in current model. Moreover it is possible to account for the separate effect of company size on the dependent variables. Therefore, and because the R^2 enables to account for its variance in the model, the effect of company size will be regarded as irrelevant.

Secondly, table 4.3 shows a reflexive, positive $(B = 0{,}299)$**, and significant** $(p < 0.05)$ **relationship between innovativeness and internationalization. As with company size, this relationship can be understood. E.g. crossing borders can be seen as a process or product innovation an sich. Nevertheless this correlation between the dependent variables forms an interesting topic for future research.**
It is important to notice that moderator and mediator effects for all other included variables have been analyzed and have been found to be insignificant. This means that the technology sector has no moderation or mediating effect on the relationship between partnership complementarity and innovativeness nor internationalization. The same goes for the technology phase and the previous partnership experience (see table 4.4 and 4.5).

Thirdly, table 4.5 shows that two specific complementary capabilities have a positive and significant effect on innovativeness and that only one complementary capability has a weakly significant effect on internationalization. This last result was already expected because partnership complementarity on the holistic level did not influence internationalization (see table 4.4). More interesting are the two complementary capabilities that influence innovativeness.

Complementary relationship capabilities – i.e. previous partnership experience, reputation, skilled workforce, diverse customer base, and knowledge of local business partners – have a positive and strongly significant influence on innovativeness $(B = 0.829\ and\ p = 0.006)$**. This result implies that business-to-business partnerships in which the relationship capabilities are non-redundant, distinctive, mutually supportive and interdependent are more innovative.**

Hypothesis 1 states that complementarity of relationship capabilities has a positive effect on innovativeness. Because the relationship is positive and significant, hypothesis 1 is confirmed.

In hypothesis 2 it is posed that complementarity of market capabilities has a positive effect on innovativeness. Table 4.5 shows that complementary market capabilities – i.e. market coverage, high quality distribution system, market share, and export opportunities – have a positive but insignificant influence on innovativeness$(B = 0.296\ and\ p = 0.491)$**. Consequently, hypothesis 2 is disconfirmed.**

Hypothesis 3 states that complementarity of absorptive capabilities has a positive effect on innovativeness. Table 4.5 shows that complementary absorptive capabilities – i.e. proprietary knowledge, patents, and trademarks – have a positive and significant relationship with innovativeness $(B = 0.851, p = 0.022)$**. The result implies that Business-to-Business partnerships in which the absorptive assets are non-redundant, distinctive, mutually supportive and interdependent are much more innovative. Because the relationship has shown to be positive and significant, hypothesis 3 is confirmed.**

Fourthly, table 4.5 enables the (dis)confirmation of hypotheses 4, 5, and 6, regarding the influence of complementary capabilities on internationalization.

In hypothesis 4 it is posed that complementarity of relationship capabilities has a positive effect on internationalization. Table 4.5 shows that complementary relationship capabilities have a positive effect on internationalization. One must note, however, that this relationship is only slightly significant $(B = 1.041\ and\ p = 0.087)$ **and that most of the variance is explained by the control variable company size** $(R = 0.424)$**. For those two reasons, hypothesis 4 is disconfirmed.**

Hypothesis 5 states that complementarity of market capabilities has a positive effect on internationalization. Table 4.5 shows that complementary market capabilities have a negative and insignificant influence on internationalization $(B = -0.673\ and\ p = 0.447)$**. Consequently, hypothesis 5 is disconfirmed.**

Finally, in hypothesis 6 it is posed that complementarity of absorptive capabilities would have a positive effect on internationalization. Table 4.5 shows that complementary absorptive capabilities have a positive but insignificant influence on internationalization $(B = 0.137\ and\ p = 0.853)$**. Consequently, hypothesis 6 is disconfirmed.**

Table 4.6: Result overview

	Independent variable	Dependent variable	Relation	p	Result
H1	Complementary relationship capabilities	Innovativeness	Positive	0.006	ü Confirmed
H2	Complementary market capabilities	Innovativeness	Positive	0.491	Disconfirmed
H3	Complementary absorptive capabilities	Innovativeness	Positive	0.022	ü Confirmed
H4	Complementary relationship capabilities	Internationalization	Positive	0.087	Disconfirmed
H5	Complementary market capabilities	Internationalization	Negative	0.447	Disconfirmed
H6	Complementary absorptive capabilities	Internationalization	Positive	0.853	Disconfirmed
extra	General partnership complementarity	Innovativeness	Positive	0.000	ü Confirmed
extra	General partnership complementarity	Internationalization	Positive	0.255	Disconfirmed

5 Discussion

This chapter elaborates on the implications of the results. Firstly the research question is answered. Then the potential limitations of the research are discussed. Subsequently the theoretical contribution and practical implications of this paper are evaluated. In the last paragraph suggestions for future research are made.

5.1 Research question answered

In paragraph 4.4 two hypotheses are confirmed and four others are rejected. Moreover one extra significant relationship has been found. These results enable the answering of the research question, stated in paragraph 1.4: "What is the influence of complementary capabilities in high technology business-to-business partnerships on the degree of innovativeness and internationalization in the participating companies?"

The answer to that question is twofold. Firstly this research has shown that there is a difference between the influence of complementary capabilities on respectively innovativeness and internationalization. In fact, there only is a significant influence on innovativeness. Secondly this research shows that different complementary capabilities have a different influence on innovativeness.

5.1.1 The influence of complementary capabilities on innovativeness and internationalization

As expected there is a strong influence of complementarity of capabilities in partnerships on innovativeness. This is in line with a broad range of previous research (Colombo et al., 2006; Hess & Rothaermel, 2011; Khalid, 2003; Wu et al., 2009). Apparently it can be assumed that partnerships that aim for innovation do benefit from the advantages that come with complementary capabilities. Possible advantages are: new exploitation of yet existing information (Khalid, 2003), simplification of alliance formation processes (Wu et al., 2009), relative absorptive capacity (Kim et al., 2010) or development and absorption of technology (Ahuja, 2000).

Less literature is written about the relationship between complementary capabilities and internationalization than about the one for innovativeness (see paragraph 2.3).

For that reason, it does not come completely unexpected that no significant effect is found in this thesis. However, current results are not in line with available literature (paragraph 2.3) that states that complementary capabilities should have a positive effect on internationalization. Paragraph 5.2 elaborates on the absence of this relationship in current results.

Nevertheless, to answer the first part of the research question, one should state that complementary capabilities in partnerships have a positive relationship with innovativeness and that they do not have a significant relationship with internationalization.

5.1.2 Complementary organizational capabilities, knowledge capabilities, and intangible assets and the influence on innovativeness

The confirmation of hypotheses 1 and 3 (see table 4.6) provide evidence for the positive effect of complementary relationship capabilities and complementary absorptive capabilities on innovativeness. Combined with the content of the constructs for the two variables (see paragraph 3.3) this consequently means that relationship capabilities (i.e. previous partnership experience, reputation, skilled workforce, diverse customer base, and knowledge of local business partners) may be a driver for innovation ìf they are complementary present in a partnership. It also means that absorptive capabilities (i.e. proprietary knowledge, patents, and trademarks) may be a driver for innovation ìf they are complementary present in a partnership. Both the first statement concerning the relationship capabilities (Lages et al., 2009; Wu et al., 2009) and the second concerning absorptive capabilities (Fabrizio,

2009; Wu et al., 2009) are perfectly in line with previous theory and current research expectations. The relationships are shown in figure 5.1.
The rejection of hypothesis 2 (i.e. a positive effect of market capabilities on innovativeness) can be seen as a deviation from the literature (Ellonen et al., 2009; Wu et al., 2009) and current research expectations. In paragraph 2.1.2 of this paper it is posed that market coverage, high quality distribution system, market share, and export opportunities (i.e. market capabilities) would have a positive effect on innovativeness. No such effect is found. Paragraph 5.2 elaborates on the absence of this effect.

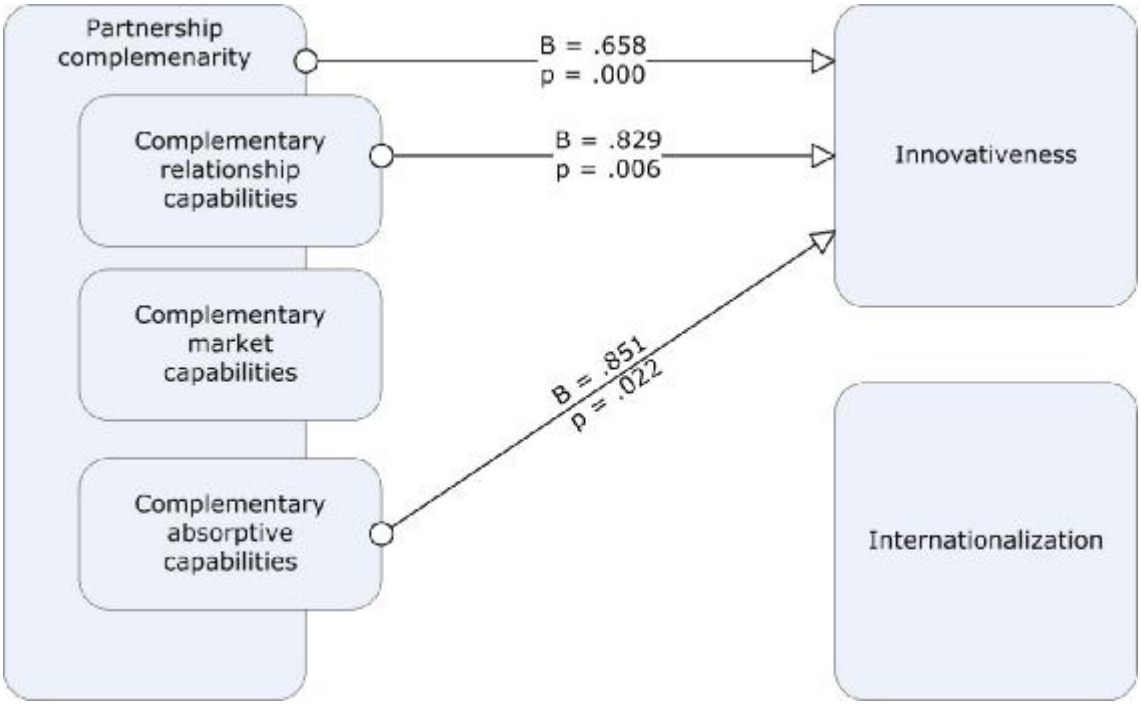

Figure 5.1: Theoretical model after results

5.2 Absence of effects

5.2.1 Internationalization

Surprisingly, all hypotheses describing an effect on internationalization are rejected. Current research results are in contrast with Kylaheiko et al. (2010) who state that complementary market capabilities have a positive effect on internationalization. Moreover, current results seem to disagree with Zahra and George (2002) who argue that complementary relationship capabilities positively correlate with internationalization. Moreover, Khalid (2002) states that complementarity of capabilities in general (relationship, market and absorptive) should have a positive effect on internationalization.
Based on the results of table 4.4 and 4.5, this paper must disagree with those who state that partnership complementarity has a positive effect on internationalization. The effect of general partnership complementarity on internationalization is positive (B = 0.366) but insignificant (p = 0.255). When looking at the different capabilities, results indicate that relationship capabilities have the strongest positive effect on internationalization. However, this effect is insignificant (B = 1.041, p > 0.05). Moreover, R^2 values indicate that most of the variance is explained by the control variable: company size.
Maybe internationalization is driven by entrepreneurial attitude (Coviello, 2006), or technological capabilities (Kylaheiko et al., 2011). Or maybe drivers of internationalization can better be found in business specific, location specific, or network specific aspects of a firm, as described by Zucchella, Palamara, and Denicolai (2007). Then again, explaining internationalization from those angles lies outside the scope of this thesis. The results seem

to imply that there is no relationship between complementary capabilities in partnerships and internationalization.
An explanation might be that complementarity in partnerships does truly not effect internationalization. This could be hard to believe because that the possibility to complement each other's strengths and weaknesses would give advantages for foreign business transactions. However, the explanation cannot be found in the research construct of internationalization because this is a frequently tested and approved construct. Consequently one can assume that the (newly designed) construct for complementary capabilities is not appropriate for this research purpose. To reject or confirm that assumption, future research is needed.

5.2.2 Market capabilities and innovativeness

Table 4.5 is shows that complementary market capabilities do not significantly influence innovativeness. This is remarkable because general complementarity, complementary relationship capabilities, and complementary absorptive capabilities do positively correlate with innovativeness.
A positive relationship was expected because partnerships with complementary market capabilities (i.e. market coverage, high quality distribution system, market share, and export opportunities) would provide participating companies with technology access (Rugman & Verbeke, 2004), financial and organizational space (Banbury & Mitchell, 1995), and knowledge and technology spillovers (Fosfuri et al., 2001). These factors are expected to increase firm innovativeness. However, current results show the conclusion that, at least in this population, complementary market capabilities do not positively influence innovativeness.
An explanation might be that resources as technology access or knowledge spillovers in partnerships are gained through relationship capabilities and / or protective capabilities. Another explanation could be that the construct for market capabilities is not correctly designed for this thesis' research purposes. To diminish the risk of incorrectly designed constructs, future research is needed.

5.3 Potential limitations

The research data and findings are subject to several possible limitations. The first potential limitation lies in causality. In order to prove a causal relationship three requirements must be met: (1) there is a significant correlation between the variables, (2) there are no other explaining variables, and (3) the independent variable is prior to the dependent variable. Only the first requirement can be completely met in this research design. By checking for correlating control variables (see paragraph 3.4) it is attempted to account for other explaining variables, thus requirement 2 for causality is semi-met. However, in this research design it is not possible to prove that partnership complementarity occurs previously to innovativeness. In other words; one cannot be certain that partnership complementarity has innovativeness as result, instead of vice versa.
Secondly there is a potential limitation in the definition of innovativeness. This thesis focuses on innovativeness of business-to-business partnerships (e.g. strategic alliances). The aim of the research is thus to measure the degree of innovativeness of the partnership. Because of the wish to maintain a clear and accessible questionnaire, respondents are informed (by email or phone) of the fact that they should assess their partnership's attributes in the questionnaire and nòt their company's attributes. However, in this research design, one can never be sure that all participants understood this intention.
The third potential limitation is the sampling method. In this research design a purposive sampling of typical instances is applied. In other words; specific respondents are selected without randomization within a population. This method creates a strong thread to internal and external validity. Nevertheless, the choice for this method is based on the need for respondents with extensive and function-specific knowledge. Fortunately, the sampling

method (see paragraph 3.1) does not raise expectations of a (strong) sampling bias. Moreover, the purposive sampling method does increase the external validity of the results.

5.4 Theoretical contribution

Basically, the theoretical contribution of this paper consists of two parts. On the one hand new constructs for measurement are developed, on the other hand a relevant research gap is filled with new knowledge.

The new constructs that are developed can be applied to measure innovativeness and partnership complementarity. Constructs measuring innovativeness were already available e.g. Kreiser et al. (2002) and George and Marino (2011). However, most of these constructs either aim at a specific form of innovativeness (e.g. product innovation, process innovation, et cetera) or only consist of two or three items. For this research a more holistic construct that measures the total concept of innovativeness seemed more appropriate. After all, the goal is to contribute to knowledge about innovativeness in general. Moreover a construct with at least seven items was more appropriate in this thesis, in order to strengthen the internal and external validity of the research. Because of these two considerations a new construct is composed out of items of former constructs made by Kreiser et al. (2002), Zahra (1991), Covin & Slevin (1989), and Miller & Friesen (1983). The Cronbach's alpha of the new self-made construct for innovativeness is 0,850.

As stated in paragraph 2.1, there is great diversity in the definition – and thus measurement – of complementarity. A measurement construct with even a little academic consensus can hardly be found. As with innovativeness, the existing constructs tend to focus on specific parts of complementarity, e.g. resource or knowledge complementarity (Kim et al. 2010). Again, a more holistic construct seemed more appropriate. Therefore a new method of measuring partnership complementarity is developed. The Cronbach's alpha of the new self-made construct for partnership complementarity is 0,799.

Apart from the development of new measurement constructs, the theoretical contribution of this research lies in the creation of relevant knowledge, in other words; filling a research gap. This paper elaborates on complementary organizational capabilities, a topic that still needs academic attention (Kim et al. 2010). Moreover it fills the research gap identified by Rothaermeli & Boeker (2008) by assessing how different capabilities complement each other in business-to-business partnerships. Finally this paper approaches complementarity of capabilities in partnerships in a holistic manner, integrating all factors stated by Khalid (2003), including relationship capabilities (Wu et al., 2009), market capabilities (Kim et al., 2010) and absorptive capabilities (Cohen, 1990).

Obviously, the research findings contribute to contemporary literature as well. However, the holistic approach to complementarity resembles the true theoretical contribution of this thesis.

5.5 Practical implications

Current research results have several practical implications and can be applied throughout the life cycle of business-to-business partnerships. In other words, the results can assist in selecting a partner, constructing a relationship with a partner, maintaining a relationship with a partner, and ending a partnership.

Firstly, the results can assist in partner selection, e.g. for a strategic alliance. If one aims for an innovative partnership, the results indicate which capabilities should be complementary present in the partnership. Thereby they enable the analysis of specific complementary capabilities and their effects, which company strategists can use to select a partner that complements their own company and makes the partnership (more) innovative.

Secondly, the results can assist the construction of a relationship with a partner. Company strategists know on which capabilities the emphasis in their organization lies. Thus, they now can focus on strengthening the partner's capabilities on areas that create complementarity in their partnership(s).

Thirdly, the results can advice company strategist in maintaining an existing partnership. The alliance paradox shows that many partnerships fail (Ahuja, 2000), current results may assist

in reenergizing a partnership. Besides that the results can be applied in a successful partnership that aims at increasing partnership innovativeness.
Not all business-to-business partnerships can be saved, and knowing when to quit is maybe even more important than knowing when to start. This paper's results provide a tool to analyze a partnership's structure on a specific area; partnership complementarity. If it turns out that an unsuccessful partnership also has no complementarity of capabilities, this could form a legitimate reason to end the partnership. The following figure (5.2) summarizes the practical implications of the research findings for the four stages in the partnership life cycle.

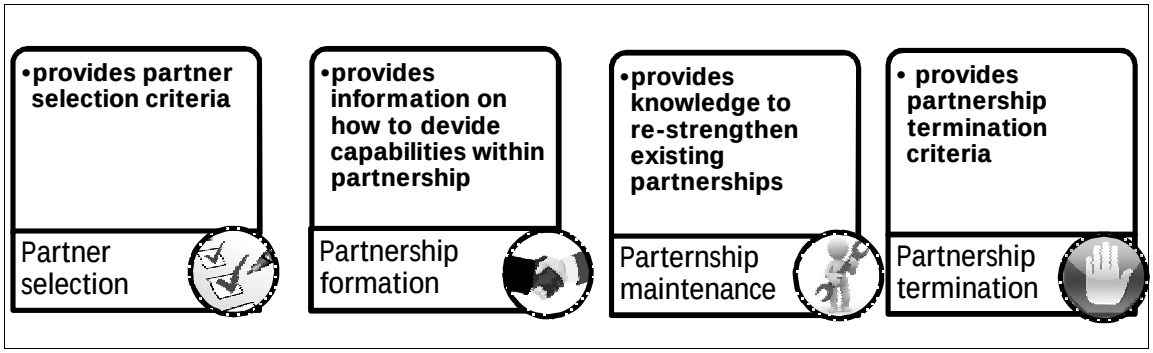

Figure 5.2: Practical implications of research findings

5.6 Suggestions for future research

Future research on partnership complementarity can choose to focus on declining the potential limitations of current research on the one hand, and on filling research gaps on the other hand.
To decline the potential limitations of current research, future research should increase the spread in gender and nationality of respondents. Next to that future research could spend more attention to the measurement tools for complementarity. Moreover future research could attempt to create a research design on partnership complementarity that accounts for all three requirements for causality. Another suggestion to decline current potential limitations is defining partnership innovativeness more clearly. Work is still needed on answering questions like: what exactly is partnership innovativeness and how does one measure it. The last suggestion to decline the current potential limitations concerns the sampling method. This research used a sample of high technology companies. It would be very interesting to sample more specifically (company level) and more broadly (industry level). In other words, it would be interesting to test current hypotheses for e.g. the semi-conductor industry (a specific high-tech company) and for randomly chosen companies (more broadly sampled).
To fill research gaps, future research could be aimed at the influence of complementary capabilities, as defined in this paper, on other company variables like profitability, partnership success, sustainability, et cetera. Besides that it would be interesting to investigate the influence of complementary capabilities in different countries or cultures. The sample of this paper does not include enough foreign companies to significantly analyze those differences. Moreover, current research has a cross-sectional design. Future research should focus on longitudinal analysis of complementary capabilities. Research should show how participating companies in complementary partnerships divide their core capabilities, how the division of core capabilities evolves through time, how the effects of complementary capabilities in a partnership evolve over time, and how complementary partnerships evolve compared to 'not-complementary' partnerships.
Finally, it would be interesting to further investigate the relationships between the variables that did not show significant correlation in this research. Thus; on the one hand the relationship between complementary market capabilities and innovativeness and on the other hand the relationships between all three complementary capabilities and internationalization.

6 Conclusion

In light of increasing interest in partnerships, this thesis challenged the common assumptions of the resource-based view. This paper developed a capability-based approach, which distinguishes a firm's complementary capabilities. It further combined questionnaire data of 59 medium-sized and large high-tech firms, from 11 different countries, that are participating in a partnership to examine the interactions of firms' complementary capabilities in order to explain innovativeness and internationalization. The results underscored that firms with complementary relationships and absorptive capabilities in their partnerships experience increased innovativeness. No significant effect on internationalization is has been found.

Moreover the results have shown that valuable new measurement tools are developed to analyze innovativeness and partnership complementarity. Next to that a research gap has been filled by giving a holistic view on partnership complementarity and innovativeness. For business strategists this paper can be put to practice in all stages of a business-to-business partnership.

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8 Appendices

8.1 Appendix A: Questionnaire

Hello,

This is a research performed in cooperation with the Embassy of the Kingdom of the Netherlands in Rome, Italy and the University of Twente in Enschede, the Netherlands. My name is Bram van de Veerdonk. For my Master graduation thesis I am researching innovation and internationalization in business-to-business partnerships.

Would you be so kind to invest 15 minutes of your time to fill in this questionnaire? All answers will remain anonymous and all results will be dealt with strictly confidential.

Of course it is possible to receive the research results afterwards. If you are interested, fill in your email address at the last question.

Thank you in advance,

Bram van de Veerdonk

1. General information

Please fill in/select the answers:

§	Age:	…….. Years
§	Sex:	M/F
§	Function:	1. top level management 2. middle level management 3. line supervisor 4. functional specialist 5. other: ……
§	Years in company:	…….. Years
§	Company size: (employees)	…….. FTE
§	Company size: (turnover 2011)	…….. Euro
§	Company age:	…….. Years
§	Is your company currently involved in joint venture(s):	Y/N
§	Is your company currently involved in strategic alliance(s):	Y/N
§	Has your company previous experience with partnerships (joint ventures or strategic alliance)?	Y/N
§	Please mark the field of your company's most important technology:	Aerospace, agricultural, biotechnology, construction engineering, engineering, environmental, geographic information systems, information technology, manufacturing, marine, micro- or nanotechnology, process, chemical, transportation.
§	Please mark the stage of your company's most important technology:	Bleeding edge, leading edge, stage-of-the-art, dated, obsolete

2. Innovation

Considering the following aspects, please mark the box that describes your company best:

§	Number of new lines of products or services marketed in the past 5 years:	Low	□ □ □ □ □ □ □	High
§	Degree of emphasis on innovation compared to competitors:	Low	□ □ □ □ □ □ □	High
§	Number of pursuit business opportunities developed outside the company:	Low	□ □ □ □ □ □ □	High
§	Degree of employee creativity and innovation encouragement:	Low	□ □ □ □ □ □ □	High
§	Degree of rewarding for employee creativity and innovation:	Low	□ □ □ □ □ □ □	High
§	Percentage of revenue generated from products that did not exist three years ago:	0 %	□ □ □ □ □ □ □	100%
§	Changes in products or service:	Minor	□ □ □ □ □ □ □	Dramatic
§	Top management emphasis:	Tried products	□ □ □ □ □ □ □	R&D

3. Internationalization

Considering the following aspects, please mark the box that describes your company best:

§	Foreign sales as percentage of total sales:	0%	□ □ □ □ □ □ □ □ □ □ □	100%
§	Export sales as percentage of total sales:	0%	□ □ □ □ □ □ □ □ □ □ □	100%
§	Foreign profits as percentage of total profits:	0%	□ □ □ □ □ □ □ □ □ □ □	100%
§	Foreign advertising as percentage of total advertising:	0%	□ □ □ □ □ □ □ □ □ □ □	100%
§	Foreign assets as percentage of total assets:	0%	□ □ □ □ □ □ □ □ □ □ □	100%
§	Overseas subsidiaries as percentage of total subsidiaries:	0%	□ □ □ □ □ □ □ □ □ □ □	100%
§	Top manager's international experience (as percentage of total experience):	0%	□ □ □ □ □ □ □ □ □ □ □	100%

4. Complementarity of capabilities

Horizontally several capabilities are given. Please assess whether these capabilities are:
- present in your company's partnership(s) (e.g. joint venture/strategic alliance)
- non-redundant (i.e. only present at one of the partners)
- distinctive in your company's partnership(s)
- mutually supportive (i.e. all companies in partnership benefit)
- interdependent (i.e. the capabilities are associated, unified, and coherent)

		Non -redundant	Distinctive in partnership	Mutually supportive	Interdependent
§	Managerial capabilities	□	□	□	□
§	Market coverage	□	□	□	□
§	Diverse customer base	□	□	□	□
§	High quality distribution system	□	□	□	□
§	Market share	□	□	□	□
§	Export opportunities	□	□	□	□
§	Knowledge of local business partners	□	□	□	□
§	Trademarks	□	□	□	□
§	Patents	□	□	□	□
§	Proprietary knowledge	□	□	□	□
§	Reputation	□	□	□	□
§	Previous partnership experience	□	□	□	□
§	Skilled workforce	□	□	□	□

5. Email address

End of questionnaire.

Thank you very much for participating in this research.

Bram van de Veerdonk

8.2 Appendix B: Respondent descriptives

Table 8.1: Age and company size

Variable	Min.	Max.	Mean
Age	20	57	40,2
FTE	3	420000	5415
Turnover (million €)	0	1E+11	9793300000

Table 8.2: Gender partition

Gender	Frequency	Percentage
Male	55	93,2
Female	4	6,8
	59	100

Table 8.3: Function description

Function	Frequency	Percentage
Senior manager	21	35,6
Junior manager	16	27,1
CEO	12	20,3
Other	7	11,9
Production employee	2	3,4
Line manager	1	1,7
	59	100

Table 8.4: Headquarter location

Country	Frequency	Percentage
Netherlands	28	47,5
USA	10	16,9
France	4	6,7
UK	3	5,1
Belgium	3	5,1
Switserland	2	3,4
India	2	3,4
Germany	2	3,4
Italy	2	3,4
Sweden	2	3,4
Denmark	1	1,7
	59	100

8.3 Appendix C: multi collinearity, factor, and normality analysis

Table 8.5: Collinearity diagnostics

Model	Eigenvalue	Condition Index	Variance Proportions			
			(Constant)	Complementarity	Internationalization	Technology phase
1	2,780	1,000	,01	,02	,02	,00
2	1,002	1,666	,00	,00	,00	,98
3	,154	4,248	,01	,37	,72	,01
4	,064	6,576	,98	,61	,26	,00

a. Dependent Variable: Innovativeness

Table 8.6: Variance explained (factor analysis)

Fact.	Initial eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3,830	29,463	29,463	3,368	25,908	25,908	2,861
2	1,948	14,988	44,451	1,527	11,743	37,651	2,692
3	1,807	13,898	58,349	1,298	9,981	47,632	1,588
4	1,186	9,126	67,475				
5	,851	6,547	74,021				
6	,669	5,145	79,166				
7	,585	4,498	83,664				
8	,550	4,233	87,897				
9	,450	3,461	91,358				
10	,364	2,798	94,156				
11	,305	2,342	96,498				
12	,268	2,058	98,557				
13	,188	1,443	100,000				

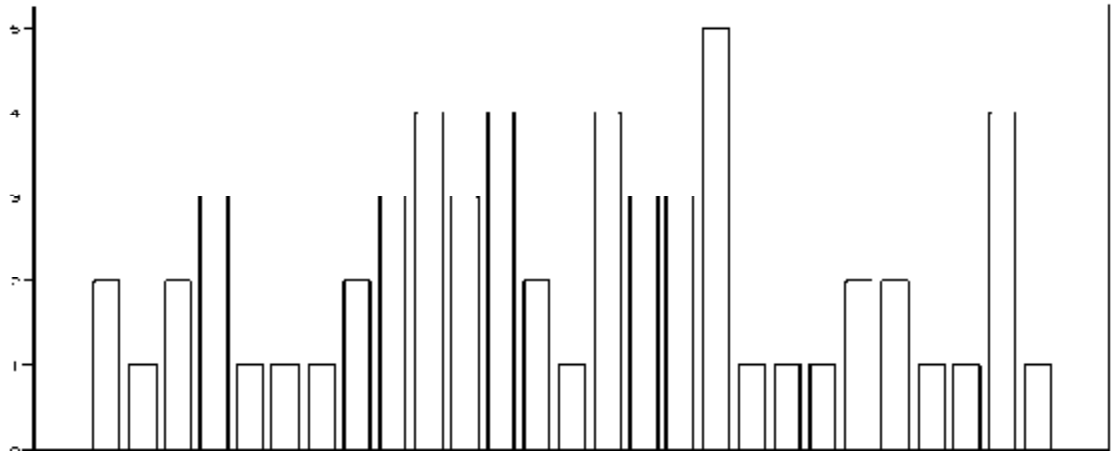

Figure 8.1: Frequency plot innovativeness

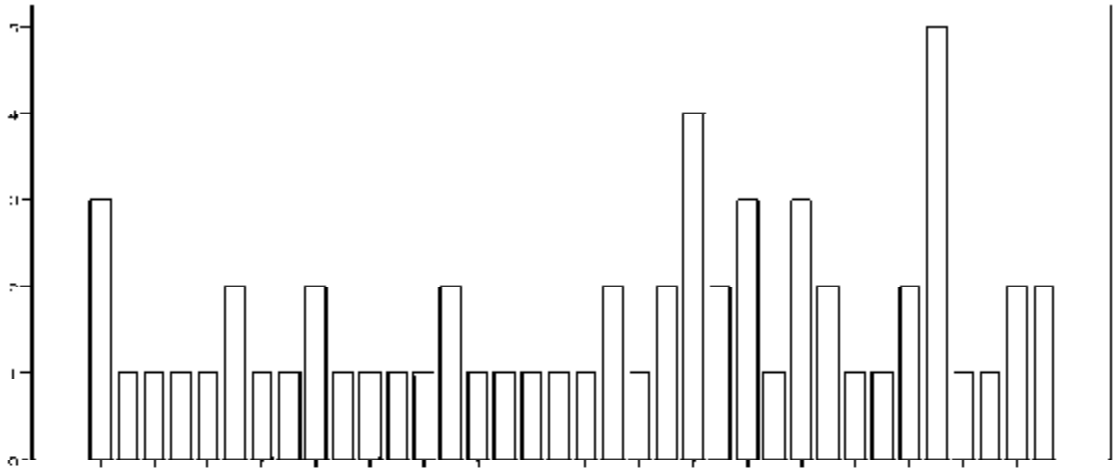

Figure 8.2: Frequency plot internationalization

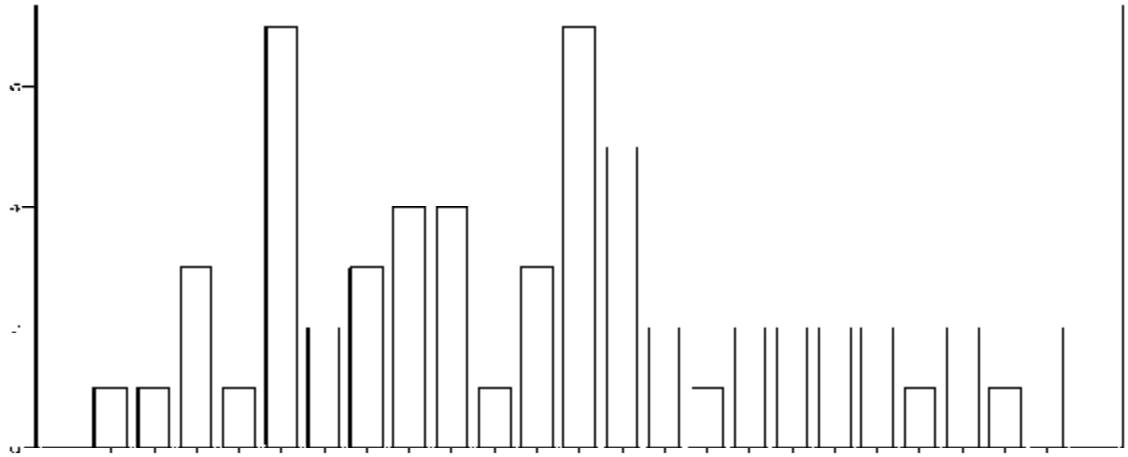

Figure 8.3: Frequency plot partnership complementarity

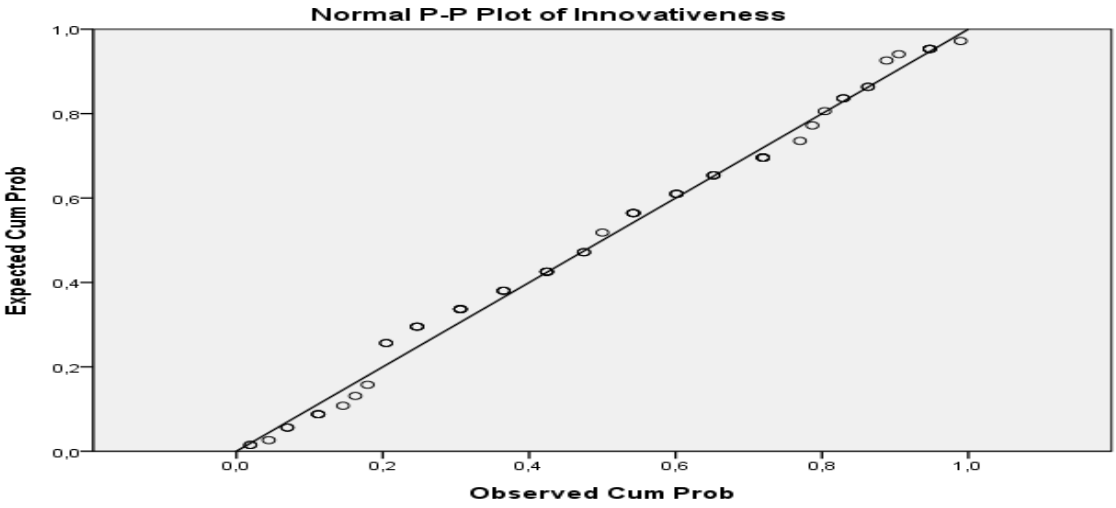

Figure 8.4: P-P plot of innovativeness

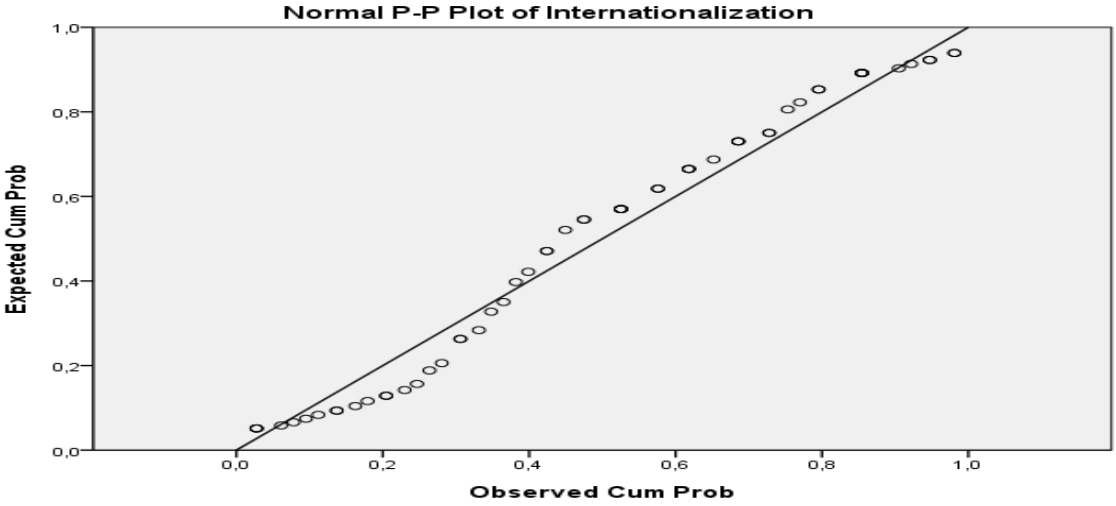

Figure 8.5: P-P plot of internationalization

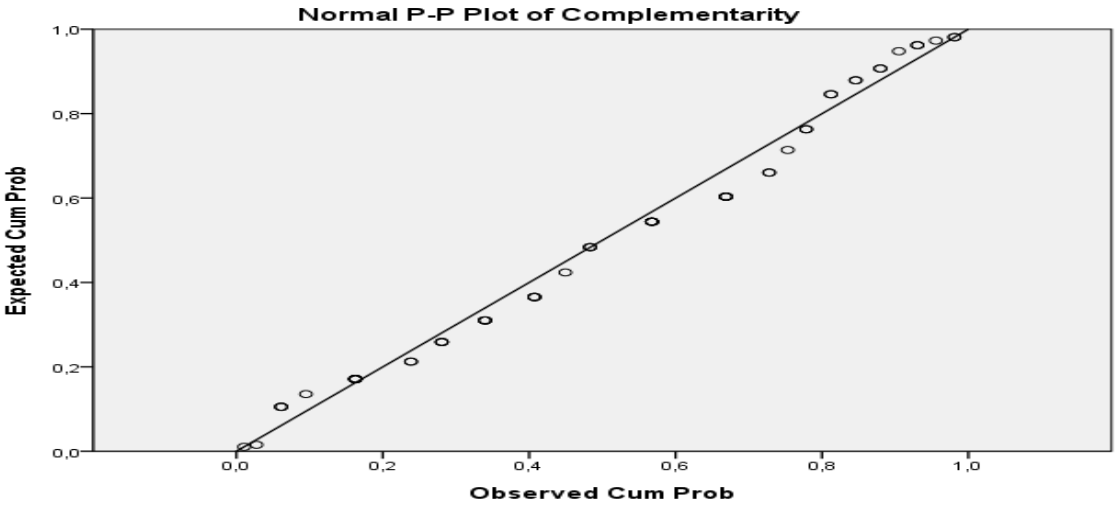

Figure 8.6: P-P plot of partnership complementarity