

# International Entrepreneurship in Networks

The Impact of Network Knowledge Combination on SMEs' Business Creation in Foreign Markets

Daniel Tolstoy







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# **INTERNATIONAL ENTREPRENEURSHIP IN NETWORKS**



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*For Reyhane*





## *Preface*

This report is a result of a research project carried out at the Center for Marketing, Distribution, and Industry Dynamics at the Economic Research Institute at the Stockholm School of Economics.

This volume is submitted as a doctor's thesis at the Stockholm School of Economics. As usual at the Economic Research Institute, the author has been entirely free to conduct and present her research in her own ways as an expression of her own ideas.

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Director of the Economic Research  
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For most people, this would be an academic report only. For me, there is more to it than that. My time at the Stockholm School of Economics has been a defining period in my life. I have learned so much and had so much fun doing it. Now, when I finally hold this book in my hands, it is the weight of all of this that I feel.

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# Contents

|   |    |
|---|----|
| Introduction .....  | 3  |
| Purpose and Intended Contributions .....  | 6  |
| Research Questions.....   | 7  |
| Delimitations .....   | 8  |
| Thesis Structure .....  | 9  |
| Theoretical Background.....   | 11 |
| Process Models .....  | 12 |
| Network Models .....  | 13 |
| SMEs and International Entrepreneurship.....  | 14 |
| The Significance of Knowledge and Networks for International SMEs.....  | 16 |
| Theoretical Development.....  | 19 |
| Toward a Network View on Knowledge.....   | 19 |
| Network Knowledge Combination .....   | 26 |
| A Model on Network Knowledge Combination as a Determinant of Business Creation in International SMEs.....                   | 39 |
| Methodology .....   | 45 |
| Research Design .....   | 45 |
| Qualitative Study.....  | 47 |
| Sampling and Data Collection.....   | 48 |
| Method of Analysis.....   | 52 |
| Quantitative Study.....   | 53 |
| Sampling and Data Collection.....   | 54 |
| Descriptive Statistics.....   | 56 |
| Method of Analysis.....   | 61 |
| Summary of the Articles.....  | 63 |
| Article 1: Network Resource Combinations in the International Venturing of Small Biotech Firms .....                        | 63 |
| Article 2: Knowledge Combination in Networks: Evidence From the International Venturing of Four Small Biotech Firms .....   | 67 |
| Article 3: The International Product Venturing of a Biotech SME: Knowledge Combination in Upstream/Downstream Networks..... | 68 |
| Article 4: The Effect of Personal Interaction on the International Technology Development of SMEs .....                     | 71 |

|   |     |
|---|-----|
| Article 5: Network Development and Knowledge Creation within the Local Market: A Study of International Entrepreneurial Firms.....    | 72  |
| Article 6: Knowledge Combination and Knowledge Creation in a Foreign Market Network ...   | 74  |
| Concluding Discussion .....   | 77  |
| First Major Contribution to Literature on International SMEs: Validation of the Concept of Network Knowledge Combination .....        | 78  |
| Second Major Contribution to Literature on International SMEs: The Impact of Network Knowledge Combination on Business Creation ..... | 81  |
| General Contributions to International Entrepreneurship Theory .....  | 84  |
| Concluding Model and Directions for Future Research .....   | 86  |
| Managerial Implications: How Networks Influence International Entrepreneurship in Smaller Firms .....                                 | 95  |
| Entrepreneurial Networks as Sources of Business Opportunities .....   | 95  |
| Entrepreneurial Networks as Leverage of Firm Competences .....  | 96  |
| Entrepreneurial Networks as Catalysts of Global Business Development .....  | 98  |
| References.....   | 101 |
| APPENDIX A: The Survey.....   | 115 |
| APPENDIX B: The Articles .....  | 139 |

# Introduction

Small and medium-sized enterprises (SMEs) venturing into international markets have undergone unprecedented growth during the past couple of decades. This phenomenon has captured the attention of researchers and policymakers alike for they recognize the tremendous impact these firms have on the economic vibrancy of nations (cf. Organisation for Economic Co-operation and Development [OECD] 2002). SMEs represent 99% of the 23 million enterprises in the European Union (EU) and strongly contribute to the gross domestic product growth of nations (Nyman, Berck, and Worsdorfer 2006). So far, the bulk of research in this area has been devoted to studying the patterns of SME internationalization in terms of pace, market selection, and modes of foreign market entry. Although researchers have diligently explored the behavioral mechanisms that dictate the trajectories of SMEs' international expansion, it is evident that insights into the requisites for firms' competitiveness have been virtually lost (Chetty and Blankenburg Holm 2000). Hence, little is known about the actual determinants of SMEs' business creation in foreign markets. In this thesis, business creation is understood to be market-product outcomes of firm activities; namely, the concept refers to a strategic shift concerning target markets or product/technology portfolios. Business creation thus involves the exploitation of a wide range of opportunities in the international marketplace, naturally influencing SMEs' short-term and long-term performances in their internationalization processes.<sup>1</sup>

Without doubt, this topic offers great scope for research—particularly when the longstanding rationale has been that business creation is at the very heart of sustained international growth (Prashantham 2008). Incorporating both explanatory and outcome factors in models of SMEs' international business operations is essential in guiding future research in this area and in formulating viable practical advice for smaller firms seeking to expand internationally. Jones and Coviello (2005) adopted such a

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<sup>1</sup> Business creation can be placed on a continuum where incremental and transformative outcomes are polar extremes. Incremental outcomes can involve minor modifications of a current product (e.g., the second edition of a school textbook). Transformative outcomes denote an entirely new strategic path (e.g., the launch of a groundbreaking product, such as when IBM released the personal computer [PC] in the early 1980s).

standpoint by suggesting that research that appreciates the determinants behind SMEs' development of business in foreign markets could pave the way for the internationalization of more firms. This call for research is further substantiated by reports conceived outside the academic community, stating that many SMEs currently lack the necessary resources to meet the challenges of creating business abroad (e.g., OECD 2002).

This thesis, with its emphasis on investigating the determinants of business creation, positions itself at the crossroads of network theory and entrepreneurship theory. By distilling crucial tenets from both these perspectives, this thesis argues that knowledge combination in networks is crucial for business creation in international SMEs. A basic logic of network theory is that unexploited opportunities are ingrained in the network structure. In this thesis, networks are understood to be the organizational and personal connections of a firm (Nahapiet and Ghoshal 1998). Furthermore, by drawing on classic entrepreneurship theory, this thesis contends that firms can pursue business opportunities by combining dispersed pieces of knowledge within a given context, such as networks (Kirzner 1973; cf. Hayek 1945). Knowledge combination is understood here to be previously unconnected pieces of knowledge whose value is enhanced when combined (Buckley and Carter 1999). At the nexus of these ideas, this thesis introduces and develops the concept of network knowledge combination: Provided that knowledge is dispersed in networks, the possibilities of achieving synergized outcomes by combining pieces of knowledge in these settings seem infinite. Networks open up avenues that connect multiple actors, thus allowing knowledge to intersect and morph into something new (Beckman and Haunschild 2002). In effect, a piece of knowledge that is mundane in and of itself can be reevaluated when synthesized with other pieces of knowledge at different locations in the network. Knowledge combination in networks can thus enable firms to extract value from knowledge that is not fully owned or controlled by their internal organizations. When such connections are made, knowledge changes form and may appear new and creative (Hargadon and Sutton 1997). The outcomes of these processes may contain higher order knowledge that guides the behavior of the firm and allows it to dismantle its current resource base so as to exploit emerging business opportunities (Teece, Pisano, and Shuen 1997). This notion is vividly captured in



DiMaggio's (1992) description of how Professor Paul Sachs used his unique connections to the otherwise loosely coupled competences held by museums, universities, and financial institutions to mobilize the resources needed to found the Museum of Modern Art in New York City.<sup>2</sup> This example makes an allusion to the idea that networks possess unique features for boosting creativity compared with individuals and separate units.

Networks are, reportedly, instrumental for SMEs seeking to tap into external knowledge and can, thereby, compensate for inherent resource shortages (Coviello and Munro 1997; Crick and Jones 2000; Lu and Beamish 2006; Loane, Bell, and McNaughton 2007). Although studies on international SMEs have certainly underscored the discrete merits of networks and knowledge development, few studies have highlighted the possibility of firms employing networks to promote knowledge combination on a larger scale (Loane and Bell 2006). The concept of knowledge combination in networks indeed offers a novel framework for analyzing the ramifications of distinct interventions in networks and their impact on business creation. In all likelihood, the pervasive variety of options regarding knowledge combination that resides in networks has the potential to alter SMEs' perception of the competitive landscapes in foreign markets, thus facilitating their pursuit of business creation. Consequently, a model in which identification and implementation of knowledge combination in networks form the basis for understanding business creation in international SMEs is elucidated in this thesis. The model is also empirically substantiated by case studies on 12 purposively sampled biotech SMEs and a statistical analysis on a random sample of 188 Swedish SMEs (from various industries), all of which are engaged in foreign market operations.

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<sup>2</sup> This example is reproduced from a study by Hargadon and Sutton (1997), where it was first used to describe the phenomenon of knowledge combination.

## Purpose and Intended Contributions

The purpose of this study is to contribute to international entrepreneurship literature by taking on a network perspective to explore the determinants of SMEs' business creation in foreign markets. Rather than attempting to map out the entire course of internationalization, this study highlights discrete stages of this process (primarily the pre-internationalization and start-up stages) and focuses on what actually enables international firms to create business at a given time and place. To gain insights from this inquiry, the thesis attempts to uncover the effects of a sparsely investigated concept—network knowledge combination. By staying on this track, the study is expected to disclose and fill in some of the gaps that exist in the current literature on SMEs and international entrepreneurship:

Firstly, to the best of my knowledge, no previous studies on international entrepreneurship have explicitly examined the concept of network knowledge combination. Hence, by integrating the network view and the notion of knowledge combination, this thesis makes a specific contribution to this field by creating a parsimonious theoretical framework that can provide new penetrating insights into the mechanisms by which SMEs leverage knowledge residing in network relationships. This endeavor complies with a call from, for example, Loane and Bell (2006), who welcomed more research on international SMEs that links the understanding of knowledge-based opportunities to international network settings. A recent claim by Johanson and Vahlne (2009), stating that knowledge-based opportunities that are embedded in networks are, in fact, key drivers of internationalization, breathed further significance to this task. Furthermore, the concept of network knowledge combination foreshadows answers to questions about the unresolved paradox addressed by, for example, Floyd and Wooldridge (1999)—namely, how firms overcome forces of organizational inertia without breaking the link to existing competences.

Secondly, by investigating knowledge combination in networks, the study attempts to shed new light on the determinants of business creation in international SMEs. This inquiry aims to answer calls put forth by Jones and Coviello (2005) and Zahra and George (2002), all of whom have recognized a need for more research on the underlying mechanisms of business

creation in international SMEs. New findings into this matter could contribute to the currently flawed theoretical understanding in international entrepreneurship of the actual drivers of business creation. From a practical standpoint, knowledge about the effects of network knowledge combination could also serve as an impetus to reinvigorate the advice given to smaller firms that are on the verge of venturing into international markets.

## Research Questions

This thesis attempts to answer two overarching research questions. The first research question, which is explorative in nature, seeks insights into the concept of network knowledge combination to explain how SMEs pursue entrepreneurial opportunities in foreign markets. Previous research has applied the concept of knowledge combination to study the processes of strategic change and knowledge creation within organizations (Nonaka and Takeuchi 1995; Buckley and Carter 1999, 2004). However, the relevance of knowledge combination in real network settings has not been explicitly addressed.<sup>3</sup> The following research question adopts an integrated perspective to discover insights into the elusive concept of network knowledge combination.

- What are the underpinnings of the concept of network knowledge combination in the realm of international SMEs?

Hence, the purpose the first research question is to explicate the concept of network knowledge combination by studying the underlying processes (i.e., the dynamics of knowledge distribution across network actors), structures (i.e., knowledge interdependencies), modes of governance (i.e., mechanisms of coordination), and strategies (i.e., degree of planning). Illuminating these underpinnings may serve as a basis for developing a valid concept that holds for statistical testing.

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<sup>3</sup> A few examples where the notions of knowledge combination and networks have been implicitly linked to each other can be derived from, for example, supply chain management literature (e.g., Hult, Ketchen, and Slater 2004; Wathne and Heide 2004; De Luca and Atuahene-Gima 2007).

The second research question, which is confirmatory in nature, aims to investigate the impact of network knowledge combination on business creation in the context of international SMEs and, in so doing, provide more insight about the determinants of business creation.

- What impact does network knowledge combination have on the business creation of international SMEs?

The impact is measured in terms of the strength of the statistical correlation between the concepts of network knowledge combination and business creation. In addition to measuring this relationship, this research question attempts to provide statistical internal validation for the concepts of network knowledge combination and business creation in the context of SMEs' operations in foreign markets.

## **Delimitations**

The greater portion of the theoretical delimitations of this study adheres to definitional constraints of key concepts. The concept of business creation may obviously carry different connotations, depending on which context it is applied. This thesis, however, investigates outcomes that comprise new products, markets, and technology in international SMEs. Although the study focuses on the entrepreneurial act of combining external knowledge, it is indeed recognized that firms cannot interfere with all stochastic processes that go on around them because the world of practice is just too complicated. As networks develop in complex patterns, firms may at times find themselves incapable of mapping out strategies to handle every upcoming occurrence. From a network perspective, organizations are never in full control of their environment; they are also subject to external control, to a greater or lesser extent, in every situation. Successful use and command of external knowledge depend, to a large degree, on the specific abilities of the individual firms to exploit business acumen. In this respect, international SMEs appear to be viable objects to study, considering that they frequently act on external input in the development of new business. Naturally, the delimitations of these concepts strongly shape how empirical phenomena are interpreted and how constructs for statistical testing are designed. Although networks consist of both individuals and organizations,

they are primarily treated on a general level in the theoretical discussions (i.e., as network actors). More detailed information about the distinctive traits of particular network actors is found in the empirical descriptions.

Apart from the boundaries of key concepts, the study follows the course set by the two research questions: The first question probes the proposed concept of network knowledge combination, whereas the second question elucidates the relationship between network knowledge combination and business creation. However, the key concepts of this study could be influenced by numerous other empirically observable factors and relationships. Thus, every complexity cannot be accounted for in the realm of one investigation. The decision to stick to the chosen research questions is, hence, grounded in the usual considerations that suggest a paramount practical and theoretical relevance.

## **Thesis Structure**

The remainder of the thesis opens with a presentation of the theoretical background. This section contains a pathway that leads through a selection of theoretical paradigms in the discipline of international business, thus setting the stage for the presentation of SME/international entrepreneurship theory. The theoretical background thereafter provides a discussion of the distinctive and overlapping traits regarding organizational knowledge and network knowledge. The theoretical development of the thesis is then introduced, and a discussion of network knowledge combination is provided. Following this section is a discussion of the theoretical model used in this study—namely, how knowledge combination in networks relates to business creation in international SMEs. The subsequent methodological section presents an overview of the research design and includes more detailed discussions regarding sampling and analysis in both the qualitative and quantitative parts of the study. The thesis includes six separate studies that are presented in an order that suits the research design (i.e., it commences with exploratory studies and ends with articles that are more confirmatory in nature). Finally, a discussion about the principal conclusions that can be drawn from the thesis project,

as well as directions for future research and managerial implications, is provided.

## Theoretical Background

A massive surge of research has been carried out on SMEs that internationalize in ways that deviate from established models on internationalization. Contrary to process models, for example (see “Process Models” section), these firms internationalize in patterns that are characterized by international strategies, speed, undertaking of risk, and global and local innovation. Although our understanding of international SMEs comprises a multitude of theoretical facets, international entrepreneurship theory remains a frequently applied analytical framework in studies of these firms. Such theories have dealt with the exploitation of opportunities in foreign markets, but, they have not tried to differentiate between the particular stages of the internationalization process (Melén 2009, being a notable exception). Rather than attempting to explain broad patterns of internationalization over lengthy periods of time, this thesis concentrates on the exploitation of discrete international opportunities (often in pre-internationalization and start-up stages). Hence, this thesis provides explanations of how SMEs create business in the realm of certain ventures in foreign markets.

Process models and network models of internationalization have played a formative role in the multidisciplinary field of international entrepreneurship. In effect, process models have highlighted the importance of knowledge in developing new business internationally, whereas network models have underscored business relationships as an extended resource base for firms. Drawing on both these frameworks, scholars in international entrepreneurship have discussed the distinctive merits of these factors for firms that seek opportunities abroad. This thesis builds on these ideas by arguing that knowledge and networks—taken together in a unified framework—are strongly explanatory for outcomes of business creation in international ventures.

## Process Models

The process-oriented models have undoubtedly advanced international business research substantially. Process models position themselves against the somewhat static foreign direct investment models (e.g., Buckley and Casson 1976; Hennart 1991) by adopting a dynamic view of the firm. From this standpoint, they infer that the trajectory of growth is determined by a wide array of factors, which are ultimately grounded in individual and organized human behavior. Barkema, Bell, and Pennings (1996) distinguished three different types of dynamic models in the process-oriented literature: the product life cycle model (Vernon 1966), the innovation models (Bilkey and Tesar 1977; Cavusgil 1980), and the Uppsala model (Johanson and Vahlne 1977). Vernon (1966) claimed that firms can create advantages in their domestic markets, which can be exploited later on a larger scale (e.g., by making investments in foreign markets). Internationalization, according to this view, is shaped by production-cost considerations that follow specific patterns.

If internationalization follows the same logic as the adoption of an innovation, the innovation models can discern the different stages of a process of gradual foreign expansion. Hence, firms increase their activities in foreign markets in a stepwise manner (see Andersen 1993, for further details). The Uppsala model differs from the innovation models by stipulating that knowledge is a key driver of internationalization. The accumulation of market knowledge shortens the psychic distance to foreign markets and, thereby, propels international expansion (Johanson and Vahlne 1977). Assuming that firms experience distinct phases of international expansion, knowledge also affects the scale of establishment modes in foreign markets; that is, firms typically start out by exporting, proceed by hiring a local distributor, and, finally, open a fully owned subsidiary. The increased degree of internationalization naturally elevates firms' propensities to acquire more market knowledge, thus making the model self-feeding. The process models have emphasized path-dependency (referring to the establishment chain) and have, thus, downplayed the importance of strategies and proactive behavior in firms. These ideas have been contested by numerous international entrepreneurship research studies, which have spread the belief that the entrepreneurial act is indeed



an overriding force in business development. Entrepreneurship theorists have labeled process models as overly deterministic (i.e., these models limit the importance of firms' strategic choice). Moreover, network theorists have criticized the fact that process models do not account for the industrial and social context in which firms operate. Process models have focused on growth induced from within the firm but have not dealt with the impact that network relationships may have on scaling up firm activities and pushing expansion in foreign markets.

## **Network Models**

The network approach, which adopts an industrial perspective on the international activities of firms, has been particularly useful in analyzing smaller internationalizing firms (Coviello and Munro 1997; Loane and Bell 2006). This approach introduces a multilateral perspective to internationalization by arguing that relationships dictate the course of foreign expansion. In essence, decisions made in the internationalization process are influenced by interactions with others. Network models thus complement process models while accounting for the personal and impersonal environments surrounding the firm. Johanson and Mattsson (1988) emphasized firms' positions in networks and the network structures of the foreign markets in which they enter as determinants for which opportunities are available to them. In the case of international SMEs, decisions regarding internationalization may be triggered more often within network relationships than within individual organizations (Chetty and Blankenburg Holm 2000). In short, network relationships provide guidance concerning which markets to enter and when to do it, thus determining the patterns and scope of internationalization. The role of network relationships in internationalization is exemplified in Bell's (1995) study on small software firms, in which firms piggybacked on their customers when breaking into foreign markets. According to Loane and Bell (2006), the majority of related studies on internationalization behavior have assumed networks to be preexisting. Thus, little agency has been given to individual firms to take action in forming entrepreneurial environments. The authors claimed that this assumption of preexisting networks can be turned on its head by massive empirical findings demonstrating that firms

can actively develop network relationships to serve their own objectives. These findings gravitate to the notion that networks and strategic decision making are indeed reconcilable and can be used as powerful leverage for international operations. International entrepreneurship theory, hence, draws on the idea that networks can pave way for strategic incentives that shape the international growth of firms. Such models entail several benefits, not the least of which involves offering a fair amount of predictive power into the cause and effect relationships of internationalization.

### **SMEs and International Entrepreneurship**

During the globalization guise of the 1980s and 1990s, international firms were witnessing the dawn of a new business environment. Obstacles to international trade, such as export and foreign market investment barriers, were gradually removed. Harmonization of international law enforced the protection of intellectual property rights. Novel information and communication systems (with the Internet being the most outstanding example) facilitated cross-border interaction and made the world seem like a smaller place (Mathews and Zander 2007). The practical and psychological impediments to doing business abroad were relaxed, and firms no longer seemed bound to patterns of internationalization that were outlined, for example, by the process models. Based on this progress, new windows of opportunity were opened for a variety of alternative business models. Consistent with these developments, empirical observations suggested that a vast number of firms (which were often smaller in size) internationalized faster, more innovatively, and more intentionally than ever before. A cadre of scholars began devising new theories that tackled the essence of this behavior, resulting in models that assumed these firms to be inherently entrepreneurial (Oviatt and McDougall 1994; Bell, Crick, and Young 2004). In a seminal article that was published at the turn of the millennium, McDougall and Oviatt (2000) emphasized the need to position international entrepreneurship as a distinct field of research that is situated in the intersection of the research paths of international business and entrepreneurship. According to Autio (2005), this field could be distinguished from previous schools of thought by focusing on the enabling factors of internationalization rather than the constraining factors. At a

nascent stage, the field was primarily substantiated by empirical studies of new ventures (i.e., the businesses of firms that internationalized at an early stage). Zahra (2005), however, noted in a review article that researchers in international entrepreneurship have expanded this view by becoming less focused on age and increasingly focused on the entrepreneurial qualities that actually drive firms to expand internationally. Zahra concluded that these qualities are decisive for *how* firms compete once they enter the foreign market and, thereby, largely override the alleged effects from merely being an early international firm. International entrepreneurship has now reached the stage of a recognized field of study, and its conceptual fragmentation is steadily beginning to converge into a more unified understanding. In line with Zahra's observations, the vast majority of studies in the field emphasize the subversive aspects of international entrepreneurial firms, claiming that such firms are bold and groundbreaking in nature. The range of this notion is perhaps better captured by the influential definition put forth by Oviatt and McDougall (2005), who described international entrepreneurship as "the discovery, enactment, evaluation, and exploitation of opportunities across national borders to create future goods and services" (7). According to researchers in the field who have adopted the Kirznerian view, entrepreneurial exploitation occurs when the entrepreneur is better able to recognize and act on surfacing opportunities in the business environment. Entrepreneurship can assume different forms: Apart from being better able to "react" to emerging events around them, researchers have detected a certain propensity among entrepreneurial firms to seek out and exploit opportunities proactively in foreign markets (Autio 2005). A certain feature that distinguishes international entrepreneurship from more general conceptualizations of entrepreneurship is that the pursuit of opportunities across borders is intimately linked to challenges associated with entering uncharted territory. International entrepreneurship theory consequently builds on the notion that entrepreneurial firms have a predisposition to undertake risk (Oviatt and McDougall 1994).

Jones and Coviello (2005) stated that although the contemporary understanding of most international business paradigms comprises multiple theoretical perspectives, a need exists to incorporate the models of international entrepreneurship so as to understand the international

expansion of a vast number of firms (especially smaller enterprises) that do not fit the traditional descriptions of internationalization. SMEs that establish new ventures in foreign markets—from inception or at a later state—are frequently described as entrepreneurial by nature (Fletcher 2006), largely because of their inherent organizational traits. For instance, these firms possess less bureaucracy, are less rigid, and have smaller information systems than larger firms (Liesch and Knight 1999; Knight and Cavusgil 2004). Empirical evidence has also shown that they typically operate in niche industries where they need to innovate so as to differentiate themselves from their rivals (Hutchinson, Quinn, and Alexander 2006).

### **The Significance of Knowledge and Networks for International SMEs**

This thesis is rooted in the idea that international SMEs' competitive advantages in foreign markets stem from knowledge that is developed in networks. The importance of knowledge has long been advocated by researchers in studies on international firms of various sizes (Johanson and Vahlne 1977, 1990, 2003; Hedlund 1986; Kogut and Zander 1993). Knowledge has been argued to offer a framework for discovering and driving opportunities in foreign markets, as well as for formulating strategies to exploit these opportunities. Possessing knowledge is vital for international firms because it enables them to reconfigure idiosyncratic resources into solutions that meet or exceed changing customer expectations or production requirements (cf. Sullivan Mort and Weerawardena 2006). It may also help firms overcome cultural, industrial, and institutional barriers, thereby, reducing costs associated with the internationalization of firms (Eriksson, Johanson, Majkgård, and Sharma 1997). This study draws on the plethora of research on international SMEs that considers knowledge to be a driving force for exploiting foreign market opportunities (see Rialp, Rialp, and Knight 2006, for review). Numerous studies on opportunity-seeking SMEs have downplayed time-consuming knowledge accumulation within firms, which is predominantly outlined by process models of internationalization, and have instead emphasized knowledge as a powerful vehicle that can be used to seize opportunities and

launch unique business solutions in a broad array of niche markets (Knight and Cavusgil 2004; Murray and Chao 2005; Cui, Griffith, and Cavusgil 2005). However, the intrinsic organizational characteristics of SMEs may pose challenges when mapping out strategies for international expansion. Such challenges are often argued to originate from inherent constraints that hamper the ability of firms to compete on the basis of internal resources and achieve economies of scale<sup>4</sup> (Baum 1996). Consequently, SMEs often have to compensate for internal resource deficiencies by seeking leverage of knowledge that is outside their immediate control so as to scale up their operations. The immensity of knowledge available in network relationships is therefore indispensable in generating international growth in SMEs (e.g., Coviello and Munro 1997; Lu and Beamish 2001; Hadley and Wilson 2003). At any given point in time, networks provide numerous options to exert knowledge that can shape business strategies<sup>5</sup> and business outcomes in various ways. For example, effective use of networks can make firms more resilient in adjusting operations to match the specific conditions of foreign markets (Coviello 2006).

The nature of knowledge applied in international operations may have either a coordinating function, which enables firms to develop procedures to internationalize—regardless of context, or a specific tie to the unique conditions of a certain foreign market (Eriksson et al. 1997). In this thesis, knowledge development is regarded primarily as an activity that occurs in organizations and networks of organizations. However, it is recognized that the origins of organizational learning processes can always be traced back to individuals. It is natural for personal networks and organizational networks to overlap, especially in smaller firms that comprise a limited number of employees. Thus, an individual's social connections may yield new knowledge that ultimately benefits the entire firm (Agndal, Chetty, and Wilson 2008). Not surprisingly, key individuals, such as founders, managers, and important staff members, are likely to influence greatly the knowledge development and strategic choices of these firms. Although

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<sup>4</sup> This phenomenon is conceptualized as the “liability of smallness.”

<sup>5</sup> Strategy, from this perspective, can be viewed as a pattern of activities that determine the achievement of planned objectives in a certain context, such as networks (Håkansson and Snehota 1989).

knowledge can assume an infinite number of forms in terms of content, research on smaller firms has primarily stressed the critical need for technological knowledge and market knowledge when acting on opportunities in foreign markets (Yli-Renko, Autio, and Sapienza 2001; Wiklund and Shepherd 2003; Rovira Nordman and Melén 2008). Technological knowledge involves expertise about the core features of the product offering, whereas market knowledge encompasses specific intelligence that is related to market settings (i.e., customer preferences, competitive situations, and emerging customer segments). Market knowledge can elevate a firm's ability to identify and exploit opportunities because it confers awareness of customer problems and preferences. Market knowledge may also help determine the market potential of new business conditions (e.g., that have been induced by technological change) underlying possible opportunities (Wiklund and Shepherd 2003). An important message from past research is that firms which lack knowledge about customers and ways to serve the market will find it difficult to formulate effective marketing strategies that resonate with customer needs (Shane 2000). Although its market applicability is not readily apparent, technological knowledge can lead to business breakthroughs (cf. Abernathy and Utterback 1978); that is, technological knowledge may manifest in products that stir up latent needs among customers and exceed their expectations (Autio, Sapienza, and Almeida 2000). Technological knowledge is also internationally mobile and can enhance a firm's ability to exploit effectively opportunities in various foreign markets (Oviatt and McDougall 1994). Based on the preceding arguments, market and technological knowledge, especially when taken together, appear to constitute important assets that facilitate the creation of new business in foreign markets.

## **Theoretical Development**

This section presents a theoretical outlook on knowledge development in network settings. The organizational perspective, which focuses on the single organization as the prime repository and wielder of knowledge, is first discussed as a way to introduce this topic. Tapping into multiple theoretical paradigms (social network theory, markets-as-networks theory, entrepreneurship theory), a network perspective of knowledge is then developed. Some researchers have argued that firms can create synthesized business outcomes by combining knowledge that resides outside their internal organizations. This eclectically constructed view complements the resource-based view (Wernerfeldt 1984; Barney 1991; Peteraf 1993) and the knowledge paradigm (Kogut and Zander 1992; Spender 1996), thus invoking the notion that knowledge transcends organizational boundaries. By adopting this perspective, we can penetrate the concept of network knowledge combination and study its impact on business creation in international SMEs.

### **Toward a Network View on Knowledge**

This thesis recognizes that knowledge is developed both in individual organizations and in networks. This section addresses the distinct, yet highly complementary, traits of organizational knowledge and network knowledge.

#### **Knowledge in Organizations**

In their landmark study, Kogut and Zander (1992) described knowledge as a key resource, and the business organization as a superior mechanism for storing and managing knowledge. The authors outlined a theory of innovation and product development in large established firms based on the capability of firms to use prior knowledge to exploit technological opportunities. This theory descends from Penrose's (1959) idea that organizational learning occurs through a procedure of discovery that is guided by images of potential opportunities and innovative interpretive

frameworks for handling new types of business problems. A substantial amount of research that subscribes to a dynamic view of knowledge has been conducted in the wake of the knowledge paradigm. These works have emphasized knowledge as the foundation for creating all unique business solutions that entail competitive advantages (e.g., Gupta and Govindarajan 2000; Gold, Segars, and Malhotra 2001; Grant and Baden-Fuller 2004). Organizational learning is concerned with the configuration of knowledge held by separate organizational members that supports the capabilities of firms. The social connections within organizations facilitate the exchange of ideas among individuals and spawn viable opportunities for knowledge creation (Zahra and Filatotchev 2004). The organizational framework coordinates individual pieces of knowledge for a common purpose, implying that organizational learning is simultaneously individual and collective in nature (van der Bent, Jaap, and Williams, 1999). Taking a similar approach, Daft and Weick (1984) claimed that organizations may be regarded as interpretative systems that set the course for learning. According to these authors, the overall learning process of organizations can be divided roughly into two phases: the search for knowledge and the interpretation of knowledge within the organizational system. The first phase, the search for knowledge, can be viewed as the process of monitoring the environment for the purpose of retrieving data for managers. The organization may employ formal data collection methods or use networks as sources of information. The second phase, the interpretation of knowledge, occurs when data are given meaning. The first stage of this process takes place within the minds of individuals. Thereafter, interpretations are disseminated, and collectively shared understandings are constructed. Hence, interpretations become a part of the organization. According to this logic, organizational learning occurs through nearly simultaneous reframing of personal beliefs and actions that can transform the individual as well as the organization. In their knowledge creation spiral model, Nonaka and Takeuchi (1995) pointed out that learning begins at the individual level and advances toward the organizational level through dialogue, discussion, experience sharing, or observation. New members who are admitted to the organization may thus be expected to act within a given cognitive structure, which is likely to bias their interpretation of data and, in so doing, reinforce the implicit and explicit rules for knowledge



coordination within the organization. Therefore, history does indeed matter: What is known within the firm shapes the future interpretation of data.

Knowledge is often considered a source of sustained competitive advantage for firms because it reinforces the ability of firms to reconfigure existing resources (e.g., human, physical,<sup>6</sup> financial, reputational, and managerial resources) for business creation (Kogut and Zander 1992). Resources have no intrinsic value unto themselves. It is the use of resources—namely, their position in a certain configuration—that confers them with value. Although resources can build competitive advantages only if they are difficult to substitute or imitate (Barney 1991), the value of a resource increases if there is an uncertainty about a firm's grounds for efficiency, which prevents presumptive imitators from knowing exactly what to benchmark and how to do it (Lippman and Rumelt 1982). Inimitable resources may, for example, enable a firm to produce with greater efficiency or to satisfy customer needs better than other firms (Peteraf 1993). According to emerging theory, firms have to reconfigure resources continually to meet/exceed customer expectations so as to create and sustain long-term competitive advantages (Teece et al. 1997; Eisenhardt and Martin 2000; Zahra and Filatotchev 2004). This view is grounded in the notion that when resources are integrated, they become embedded into a system that limits their transferability (Madhok 1997). In these processes, firms rely on certain skills that define their ability to manage various resources and maximize their value in a given situation. Such skills allow firms to configure or reconfigure various types of resources for the purpose of business creation. Innovative outcomes of business creation may be inimitable and difficult for competitors to dissect and copy (a process that is often referred to as *reverse engineering*). In short, the ability to optimize the deployment of resources is grounded in knowledge, which, in turn, has to be constantly developed through new combinations that are in sync with the environment.

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<sup>6</sup> Physical resources, for instance, may best be capitalized by knowledge: Although technology may comprise standardized applications and machinery, these components are inevitably coordinated by combinations of tacit knowledge of, for example, skilled constructors or operators. Thus, apart from physical manifestations, technology is—to a varying degree—embodied by intricate knowledge combinations (cf. Lundgren 1995).

The level of output of organizational learning may vary diametrically depending on the situation. Organizational learning may fluctuate on a scale between incremental and transformative outcomes. On the one hand, incremental outcomes involve the mere extension of competences, (i.e., the imitation of knowledge that preexists in the external environment). Hence, this type of learning makes use of pragmatic incentives to keep up with the forerunners in the industry so as to increase the chances of survival in the short term. On the other hand, transformative outcomes are represented by the drastic shift of competences (i.e., by the experimentation of alternatives that reform cognitive and behavioral maps) (Argyris and Schön 1978). Transformative outcomes challenge how activities in organizations are carried out, thus questioning whether current activities are the most appropriate. Furthermore, they may serve to cultivate sustained competitive advantage because of unique features that establish an uncertainty about a firm's grounds for efficiency, which prevents presumptive imitators from knowing exactly what to imitate and how to do it (cf. Lippman and Rumelt 1982). Such outcomes are usually based on knowledge with a high degree of tacitness.<sup>7</sup> These types of outcomes become more difficult to formalize, articulate, and transfer between organizational contexts (Nonaka and Takeuchi 1995) and, therefore, meet the requirements of resource-based theory of being rare and inimitable. If these outcomes are also valuable and organized, they can confer sustained competitive advantages. Balancing the outcomes of incremental knowledge and transformative knowledge may arguably serve the best interests of firms. This argument is based on the fact that firms require the generation of continuous profits stemming from current resources to stay afloat in the short term, as well as unique competitive advantages to meet future demand and, thus, survive in the long term. Creating business on the basis of knowledge development may be no less important in a network context than in an organizational context, especially because research has revealed that knowledge is often developed across multiple organizations.

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<sup>7</sup> Two dimensions of knowledge exist: explicit knowledge and tacit knowledge (Polyani 1967). Explicit knowledge can be easily communicated and explained in plain language, whereas tacit knowledge is more difficult to formalize and communicate. An example of tacit knowledge is the ability of an experienced car mechanic to pinpoint in some cases what is wrong with a car just by listening to the sound of the engine.

## Knowledge in Networks

Network theory has surfaced as a useful perspective for modeling the relationships among multiple entities within an overall network. Powell (1990) claimed that the network is a distinct organizational form as opposed to a hybrid of market and hierarchical structures. According to Powell (1990), these structures tend to emerge in contexts where the exchange involves knowledge that is difficult to codify. In such situations, simple specifications of the contents of the exchange will be insufficient. Hence, groups of actors cannot be coordinated by transactional mechanisms, such as pricing, planning, and monitoring. Instead, “soft” relational mechanisms, which are grounded in a social climate, tend to govern exchanges in networks. Because of their multifaceted and open-ended nature, networks may spawn substantial opportunities for new business. Correspondingly, Håkansson and Snehota (1989) claimed that the competitiveness of firms is formed through network relationships. This notion is largely anchored in the assumption that firms rely on external knowledge, which can be accessed only through network relationships, to create business (Johanson and Mattsson 1988). In a study of the biotech industry, Powell, Koput, and Smith-Doerr (1996) even noted that “firms opt for sustaining the ability to learn, via interdependence, over independence”. The key message of their study is that networks can spur the development of knowledge via dynamic processes that bring disparate competences together. Hence, knowledge has become an integral part of network theory. Research has suggested that individual firms possess superior mechanisms of exploiting knowledge; however, during the past few decades, the knowledge dimension of networks has been shown to invoke a broader perspective on business innovation (Nahapiet and Ghoshal 1998). For instance, in a study of the Toyota network, Dyer and Nobeoka (2000) found that “networks can be more effective than a firm at the generation, transfer, and recombination of knowledge” (364). Researchers have studied various concepts associated with network knowledge, including network learning (Blomstermo, Eriksson, Lindstrand, and Sharma 2004), relationship memory (Cegarra-Navarro 2007), and even network memory (Soda, Usai, and Zaheer 2004). These studies argued that networks offer all kinds of

dispersed knowledge (Beckman and Haunschild 2002), as well as the mechanisms that allow these pieces of knowledge to be acquired and disseminated among actors (Hamel 1991). In short, the network view offers a salient outlook on how we view knowledge, positing that the locus of knowledge development does not necessarily reside at the single firm level but rather is ingrained in the network structure of many firms (Powell et al. 1996). Following this line of reasoning, knowledge that emerges from networks seems especially crucial for business development in contexts where expectations of innovation are high, which has been demonstrated by numerous studies in high-tech industries such as biotechnology (Al-Laham and Souitaris 2008) and software development (Collinson 2000). The need for knowledge in networks also intensifies when firms enter uncharted territory in new markets (e.g., the decision to engage in international business operations) (Sharma and Blomstermo 2003).

In the literature, two dimensions of relevance for knowledge in networks have been consistently highlighted: the structural dimension and the relational dimension (Granovetter 1973; Nahapiet and Ghoshal 1998<sup>8</sup>). The structural dimension encapsulates the system of interconnected relationships that constitute the network as a whole. Hence, it captures the impersonal configuration between individuals and units at a given point in time. The structural perspective stipulates that relationships are not isolated from the surrounding environment (Håkansson and Snehota 1989). To the contrary, any single network relationship is a reflection of the connected structure of which it is a part. Cook and Emerson (1978) even conceptualized network relationships as collective actors, which cannot be analyzed apart from their context. The intrinsic features of the network structure stipulate that network learning is basically interorganizational learning that is taken one step further because it also includes indirect learning (Håkansson and Johanson 2001). In essence, the learning in network relationships involves the counterpart's knowledge and experiences that are gathered from other network relationships (Kaplan 2002). Networks of relationships thus provide firms with an extended

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<sup>8</sup> Nahapiet and Ghoshal (1998) included a third dimension in their framework: the cognitive dimension. This dimension relates to knowledge structures that exist in networks. Hence, this topic is closely related to the idea of network knowledge combination, which is addressed in a separate section.

knowledge base, and their position in the network structure dictates which knowledge is available and how it can be used. Firms are defined on the basis of their exchanges with external actors. Given that directly connected actors within the network tend to possess redundant information, novel knowledge typically spreads through those relationships that link separate actors. By acting as a broker between actors, firms can gain access to unique and, perhaps, corresponding pieces of knowledge (Burt 1992, 1997). Hence, an advantageous network position may imply that firms have access to the right knowledge at the right time (Burt 1992, 1997). Timing is essential because networks are constantly changing and windows of opportunities to exploit knowledge are quickly closing. From an advantageous position, firms rarely have to rely on other actors to mediate critical knowledge. With room to maneuver, they can find and develop network knowledge themselves. An advantageous position increases the scope for managerial action and augments the flexibility of firms to respond to emerging opportunities in a timely manner. Network theorists have referred to this capacity—denoting the extent to which actors are free to pursue their own goals within networks—as structural autonomy (Burt 1983). Based on the structural argument, network learning is mirrored in the strategic decisions that firms make in regard to the network position (Mattsson 1987); that is, the propensity to change or preserve the network position yields different knowledge outcomes. Although networks differ in their capacity to offer varied and applicable knowledge (Beckman and Haunschild 2002), an advantageous network position can enable firms to optimize the use of external knowledge in any given situation. The advantages of central network positions have also been empirically verified. For instance, Reagans and Zuckerman (2001) found that in the collaboration among a group of scientists with different external contacts, “structural holes” were bridged to connect with the network outside the team; that is, the scientists in the group functioned as links to previously unconnected external contacts. Consequently, the group was able to access and share diverse knowledge, resulting in greater innovation and enhanced overall productivity. In summary, the use of networks to achieve effective and, possibly, novel use of knowledge is likely to play an essential part in the process of exploiting business opportunities (e.g., Inkpen and Tsang 2005).

The position in the network is not, however, the only factor that determines the extent to which firms can gain leverage over network knowledge. The quality and content of individual network relationships are equally crucial in attaining access to and managing knowledge for business purposes. Researchers have consequently underscored the relational dimension of networks as one of the key aspects of network learning. The underlying rationale is that close relationships spur the willingness of participants to share what they know, thus enabling them to learn from each other eventually (Uzzi 1996, 1997; Hansen 1999). Close relationships have been characterized as involving frequent and intense social interactions, where information and knowledge are perceived to be trustworthy (Granovetter 1985; Tsai and Ghoshal 1998). In a similar approach, Hansen (1999) argued that close relationships promote the transfer of complex knowledge (i.e., tacit knowledge), whereas more loosely coupled relationships tend to generate knowledge of a higher degree of tangibility (i.e., explicit knowledge). Although relationships may not necessarily start out close, they often grow closer over time. When network relationships are being instigated, firms rely on a mutual understanding, meaning that they are prepared to interact and expect the other party to do the same (Johanson and Mattsson 1988). As time passes, firms can learn about each other through a shared history of interaction. During this process, mindsets and procedures are developed, resulting in a social climate that facilitates the governance of exchange. Developing network relationships may facilitate access to resources, such as knowledge, and make parties more willing to invest in each other (Mattsson 1997). Hence, outcomes of interaction are likely to reinforce the relational qualities and promote the continued diffusion of knowledge (Lorenzoni and Lipparini 1999). The following section will continue to discuss the role of networks as a catalyst of knowledge combination and the development of knowledge in networks as a largely deliberate activity that involves combining knowledge within and across network relationships.

## **Network Knowledge Combination**

Converting knowledge into something that can ultimately be of value for customers in various markets is a key strategic task for international firms.

Knowledge combination may give rise to higher order knowledge that allows firms to optimize the use of their current resource bases, which in turn leads to business creation. The process of knowledge combination involves identifying and exploiting unconnected pieces of knowledge (Amit and Schoemaker 1993; Shane and Venkataraman 2000). The intertwined dimensions of identification and implementation are argued here to form the principal pillars for the theoretical concept of network knowledge combination.

### **The Concept of Knowledge Combination**

Knowledge combinations materialize where separate pieces of knowledge intersect. In the business world, the process of knowledge combination<sup>9</sup> involves the pursuit of synergizing distinct competences so as to exploit entrepreneurial opportunities that render commercial benefits (Wennberg 2009). This notion is related to Hayek's (1945) assumption that knowledge is dispersed among different individuals and entities. When dispersed pieces of knowledge are combined, new knowledge may be created that no one had previously anticipated (Dew, Velamuri, and Venkataraman 2004). According to Schumpeter (1934), the formulation of knowledge combinations is the counterpoint of following standard operating procedures. He used the following analogy to explain his idea: "Carrying out a new plan and acting according to a customary one are things as different as making a road and walking along it" (85). Hence, new combinations of knowledge may have pathbreaking qualities that are positioned at the heart of creativity. The outcomes of these combinations may completely deviate from the input (e.g.,  $A + B$  may equal  $C$ , instead of  $AB$ ). Knowledge

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<sup>9</sup> Some of the fundamental issues of organizational theory (such as coordination [e.g., Fayol 1949; March and Simon 1958; Thompson 1967; Mintzberg 1973], integration [Grant 1996], and information-processing management [Galbraith 1973]) are also of importance to the concept of knowledge combination. By contrast, knowledge combination is characterized by an entrepreneurial proclivity. Such a proclivity provides agency to the firm to act on opportunities in various settings (cf. Hayek 1945). Knowledge combination is thus not only a coordination mechanism that increases efficiency in daily operations but also a driver of growth that is firmly rooted in an aspiration to envisage and open up new business horizons. Another distinct characteristic of knowledge combination is that it deals exclusively with knowledge-based resources and, thus, does not focus on physical resources or other immaterial resources. That is, knowledge combination is conceived as a separate process, which precedes the effective deployment of other idiosyncratic resources that are available to the firm. The concept is, thus, firmly anchored in the assumption that knowledge is the most important resource of the firm, guiding processes of business creation (Eisenhardt and Martin 2000).

combination creates distance from what is known or from what can be easily predicted and can therefore ignite the development of new business (Zahra, Sapienza, and Davidsson 2006). Based on previous work on knowledge combination, the concept has been ascribed to the capability of a firm to leverage unexploited knowledge that has accumulated within the firm (Kogut and Zander 1992). Whereas the concept of knowledge combination has indeed benefited from the rigor of its origins in organizational science, recent studies (particularly those conducted on smaller international firms) have indicated that the applicability of knowledge combination goes beyond the boundaries of the firm and may span numerous relationships in external networks, even crossing international borders (e.g., Yli-Renko et al. 2001). Entrepreneurship theory has long argued that different individuals know different things and that the combination of dispersed pieces of knowledge may therefore confer competitive advantages (Hayek 1945; Kirzner 1973). Not only does engaging in such activities in networks spur creativity and innovation but also combining the knowledge of others may be cost-effective because firms do not have to acquire all the knowledge they need on their own. In other words, firms are more than the knowledge they possess. Hence, if organizational boundaries are to be drawn, which are always arbitrary, they should at least encompass those actors that hold instrumental external resources and knowledge (Snehota 1990). Knowledge always has to be adapted to meet the needs of important counterparts of the firm, and when knowledge is changed, someone else is always affected (Håkansson and Waluszewski 2007). This thesis thus adopts a boundary-transcending outlook by claiming that networks can open up a multitude of avenues for knowledge to flow and intersect. For international firms, this means overcoming challenges caused by geographical and psychic distances to discern what options are available for combining knowledge. Reconnecting with the ideas put forward by Kirzner (1973), who emphasized the cognitive aspects of opportunity exploitation, opens up the possibility of network knowledge<sup>10</sup> combination being considered the manifested

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<sup>10</sup> Examples of knowledge combination in networks are found in the work of Thomas Alva Edison. Edisons' products often reflected blends of existing but previously unconnected ideas that his engineers had picked up while working in different industries. The invention of the phonograph, for instance, was based on a combination of ideas that a network of engineers had developed while working in the telegraph, telephone, and electric motor industries. Hence, like most innovations, Edison based this invention on a combination of different pieces of knowledge.



reflection of higher order knowledge, which enables firms to pursue knowledge-based opportunities that others may have overlooked. This type of higher order knowledge has been described by various synonymous concepts, such as capability (e.g., Teece et al. 1997), competence (e.g., Prahalad and Hamel 1990), know-how (e.g., Kogut and Zander 1992), and absorptive capacity (Cohen and Levinthal 1991). A lack of such ability may have strongly negative effects for firms because they may end up in situations where they try to combine conflicting types of knowledge, ultimately leading to results that are corrosive for business.

It is important for international firms to possess not only experiential knowledge (e.g., knowledge of how to interact with network partners) when creating new business (Lindstrand 2003) but also the ability to leverage knowledge quickly from current operations in their network when pursuing opportunities. New input is essential because entrepreneurial opportunities tend to include elements that deviate from traditional ways of conducting business. These opportunities, particularly those that are transformative in nature, may have weak connections to the past and can be exploited in only a certain international network setting at a particular time. The overall architecture of knowledge combination in networks is composed of different knowledge complementarities that either preexist or emerge in network relationships. The nature of knowledge complementarities determines the trajectory for knowledge flows and the mechanisms of how these flows are governed. In line with Buckley and Carter's (1999) classification of knowledge complementarities,<sup>11</sup> they may be additive, sequential, or complex. These different forms of knowledge complementarities in the smallest component of the network, the dyadic relationship, are displayed in Figures 1 to 3. In the following examples, consider *A* to be the manufacturer and *B* to be its wholesaler (located in a foreign market).

Additive complementarity, the simplest form of knowledge complementarity, means that pieces of knowledge that are found in separate locations are of direct relevance to each other and are bound to

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<sup>11</sup> Compare with Thompson's seminal (1967) taxonomy of different forms of interdependence: pooled, sequential, and reciprocal.

coincide for a common task. For example, A's knowledge about production and B's knowledge about the market are certainly relevant to each other but may not have to be communicated if, for instance, B works on a sales commission contract for A. In these combinations, there usually a limited need for knowledge transfer. For the firms, this may be a cost-cutting arrangement, given that neither interactions across national borders nor the parties' acquisition of the counterparts' tacit knowledge through, for example, interaction and experiential learning is required (cf. Rovira Nordman 2009).



*Figure 1: Illustration of additive complementarity.*

They may also be sequential, which occurs when knowledge flows are directed in a certain one-way path so that knowledge at one location functions as input before knowledge at another location is acquired. For instance, in a closer relationship than the previous example, B's market knowledge may influence A's acquisition of product knowledge to better meet the needs of customers. In these combinations, knowledge transfer usually does not involve knowledge that is highly tacit. The wholesaler in the market may provide feedback about customer preferences, which affects the manufacturer's production decisions. This knowledge is of an objective character and can (and should be) planned ahead to minimize interaction between parties. Similar to the previous case, this example could also be viewed as a low commitment type of foreign market activity, although it does allow for some rudimentary learning and market adaptations to occur (cf. Johanson and Vahlne 1977). Planned knowledge combinations may however generate unexpected outcomes which eventually may compel international counterparts to interact more to solve problems or act on opportunities.



*Figure 2: Illustration of sequential complementarity.*

Furthermore, complementarities may be complex, which occurs when separate pieces of knowledge interact through mutual spillovers (e.g., A’s strategies regarding research and development [R&D] need to be aligned with B’s knowledge about customer preferences—and vice versa—for optimal combination). These combinations tend to involve knowledge that is of a tacit character and is, therefore, not easily transferred through standardized practices. In these types of situations, the representatives of firms have to meet and interact. For the manufacturer, a local presence where the firm can acquire market knowledge in the network through first-hand experience (Johanson and Vahlne 1977) and leverage of social capital (Yli-Renko et al. 2001) may be needed. By interacting with its customers the firm can overcome many of the invisible hurdles in the foreign market regarding institutions, business practices and culture. This scenario is likely to be the most costly but potentially also the most rewarding. Learning and creating new knowledge in foreign markets may reduce psychic distances and lead to new opportunities that promote international expansion.



*Figure 3: Illustration of complex complementarity.*

Because knowledge complementarities may cut across firms, departments, and functions that span national borders, they can be difficult to pin down. By becoming more aware of the big picture, firms may improve their abilities to combine knowledge in networks; this type of insight clarifies the

connections between single processes (Lee, Chen, Kim, and Johnson 2008). Although unique combinations of knowledge emanating from an understanding of complementarities can confer competitive advantages in the short term, they may run the risk of becoming institutionalized over time and, thereby, difficult to disentangle (Madhavan and Grover 1998). This may slow down the pace and scale of knowledge creation in firms, thus compromising firms' competitiveness in the long term. Hence, to allow for the disentanglement of knowledge combinations, firms need to stay prepared to question existing perspectives, frameworks, and premises (Argyris and Schön 1978).

### Identification of Knowledge Combination in Networks

Opportunities for identifying latent knowledge combinations may arise because knowledge is unevenly distributed in networks and varies over time. As the external environment changes, knowledge that was previously regarded as trivial may suddenly increase in value and play an important role in gaining a competitive edge. Firms do not, however, respond only to outside forces; they may also initiate change. That is, the environment does not strictly determine their decision-making alternatives and choices. Substantial possibilities for creativity and autonomy in individual choice may exist (Penrose 1959). The recognition of a discrepancy between performance and aspiration levels may trigger a search for new knowledge alternatives within organizations (Cyert and March 1963). Firms' efforts to reconcile this gap is termed *problemistic search*, which involves initiating change either by maximizing the unexploited potential within the organization or by correcting organizational shortcomings.

The basis for the entrepreneurial advantage in identifying opportunities can be explained by the notion of knowledge asymmetries (Hayek 1945); that is, one actor in the network may simply have access to knowledge that others do not. Studies have shown that participating in a number of network relationships increases the ability to "see" the network accurately (Krackhardt 1990). Hence, the identification of knowledge combinations in networks is reminiscent of Burt's (1992) notion of a network position, in which an actor is able to connect the knowledge of network actors through access to timely information and referrals. Firms can, thus, rejuvenate their

business by searching for possible synergies in the knowledge of network actors, such as customers, suppliers, competitors, and other stakeholders (Anderson, Håkansson, and Johanson 1994; Johanson and Mattsson 1995; Gulati, Nohria, and Zaheer 2000). In an ethnographical study of a product design firm, Hargadon and Sutton (1997) provided evidence to support this notion. The authors concluded that efficient brokering between different sources of technological knowledge in a network can be a powerful vehicle for product innovation. They pointed out that knowledge can be accessed, acquired, and stored in networks and, subsequently, leveraged through combinations when an actor perceives the timing to be right. The process of identifying opportunities for knowledge combination is, however, not disconnected from knowledge that is currently available to the firm; that is, the existing stock of knowledge acts as a filter that influences what is interpreted as valuable, both in regard to existing network relationships and prospective network relationships (cf. Cohen and Levinthal 1991). Essentially, firms tend to recognize knowledge that can be integrated with what they already know and to block out other options (Madhok 1997). As a result, a certain opportunity is not recognized by all entrepreneurs, and the same opportunity will, in all likelihood, be interpreted differently, depending on the individual. In short, opportunities are envisaged in the mind of the entrepreneur, as observations and impressions from the external environment are used to activate latent combinations of knowledge for new business activities. Because the identification of opportunities is immensely influenced by the network environment, the conclusion can be drawn that individuals who are bound to a certain place tend to develop interests, skills, and knowledge that reflect local agglomerations of knowledge and economic activity, thus biasing the interpretation of what constitutes a promising new opportunity. The geographical movements of the individual determine the information pathways for new business opportunities in networks (Mathews and Zander 2007). Hence, the identification of international opportunities regarding knowledge combination in networks involves the evaluation of network relationships on a global scale.

### Implementation of Knowledge Combination in Networks

Whereas the identification of an opportunity for knowledge combination denotes the first step toward business creation in foreign markets (Hohenthal, Johanson, and Johanson 2003), firms have to exploit these opportunities to generate real outcomes. That is, to be able to implement identified combinations of knowledge, firms must act upon hunches and be willing to undertake risk. The inclination to pursue such opportunities may depend on experience, knowledge, and perceived support from networks (Krueger 2000). The implementation of knowledge combinations marks a consolidation phase by which internal knowledge and external knowledge are mobilized in a coordinated action (cf. Szulanski 1996). This phase can involve a constellation of actors in the network, each of which possesses viable knowledge (Hansen 2002), or can take place within firms while they retrieve internally stored knowledge that was previously acquired in network relationships (Hargadon and Sutton 1997). The implementation of knowledge combinations leads to a new overall configuration of knowledge that may involve both the firm and its connected network.

The degree of effectiveness in redeploying internal and external knowledge combinations highly influences the level of success of firms in the marketplace. In most situations, these processes are carried out at varying degrees of interaction between network actors that are in possession of the knowledge. Interaction is instrumental because it underlies the interpretation and flow of knowledge (Nonaka and Takeuchi 1995). Moreover, interaction infuses a social climate into network relationships that may make parties willing to share knowledge with counterparts (Thorpe, Holt, McPherson, and Pittaway 2005). Interaction may be standardized or require improvisation (Hohenthal et al. 2003), depending on the nature of present and emerging knowledge complementarities (Buckley and Carter 1999).

Three different types of knowledge complementarities, which are linked to various mechanisms for implementing knowledge combinations, are shown in Figure 4. To reiterate, the first scenario of additive knowledge complementarities implies that knowledge is directly combined and follows

a designated scheme that determines the trajectory of knowledge flows between involved actors. In this case, knowledge combinations can be implemented by formal agreements between the actors that are in possession of knowledge. Interaction is, therefore, usually not required. An example of this may be an agent that works on commission for the firm and promotes the firm's product in a particular foreign market. This situation implies a direct combination of the firm's product knowledge and the agent's market knowledge. In the second scenario, which concerns sequential knowledge complementarities, knowledge is combined through a series of events where, for example, knowledge input that is derived from the customer is based on the previous knowledge input that emanates from an end-user (i.e., a chain of product feedback). The interaction in this situation usually follows a preordained protocol of interaction that determines the trajectory of knowledge flows. Finally, the third scenario of complex complementarities denotes a situation that tends to generate continual knowledge spillovers between the involved actors. These spillovers may invoke ramifications for operations and processes in other network relationships (i.e., indirectly connected relationships). Implementation of knowledge combinations in this case, thus, unfolds as an emerging process where firms continually interpret upcoming knowledge input and use that information to reconfigure knowledge combinations. That is, firms have to be responsive to events that occur during the process of implementation (Mintzberg and Waters 1985). Firms may start out by pursuing objectives that are clearly defined; however, in the course of this search, they often stumble upon opportunities that they could not foresee (Kirzner 1973). In particular, high-tech projects tend to deviate from an orderly path and have "a nasty habit of spiraling off into multiple, uncharted directions" (Powell et al. 1996). Implementation of knowledge combination will therefore require reciprocal exchange that involves high levels of interaction in the network. The transparency of such relationships makes it easier for firms to be aware of emerging developments and allows them to make corresponding adjustments in connected network relationships.

Furthermore, any business venture may rest on the basis of numerous types of knowledge complementarities. The success of firms is based on their ability to endorse coordinated collective action and cope with change

by making continual adjustments in network relationships (Snehota 1990). Hence, to optimize the use of knowledge so as to serve the greater purpose of a given network setting, firms need to press for the proper governance of each specific complementarity (Gulati and Singh 1998). Figure 4 illustrates such an effort, displaying an example of a confined network setup consisting of both suppliers and customers. This example takes us beyond the dyadic level toward the network level of analysis. Within the realm of the display, consider the entry of a focal firm to a new market where it identifies and recruits a new important customer. In the implementation phase, the firm learns that it depends on feedback from this customer to customize its technology so as to meet local requirements (customer→firm). This feedback is, thus, acquired (and possibly transformed) and subsequently combined with the technological knowledge of an important supplier (firm→supplier) (Buckley and Carter 2004). However, the network has far-reaching implications because every relationship denotes a collective of connected actors. Thus, feedback from the customer of the customer (e.g., the end-user) also influences the same process of technology development. This feedback may be transmitted through knowledge flows, where the participating actors function as intermediates (end-customer→customer→firm→supplier). The firm's internal knowledge base is also active in the process of knowledge combination—either by acting as a filter for interpretation, which transforms knowledge components, or by adding new knowledge components to the overall mix. Countless other scenarios involving network knowledge combination are, of course, possible. For instance, it is quite possible that the focal firm—instead of actively seeking out a customer—could be approached by an offshore customer. This scenario denotes a more reactive situation, in which the firm has to evaluate the business potential of engaging in business with the counterpart.



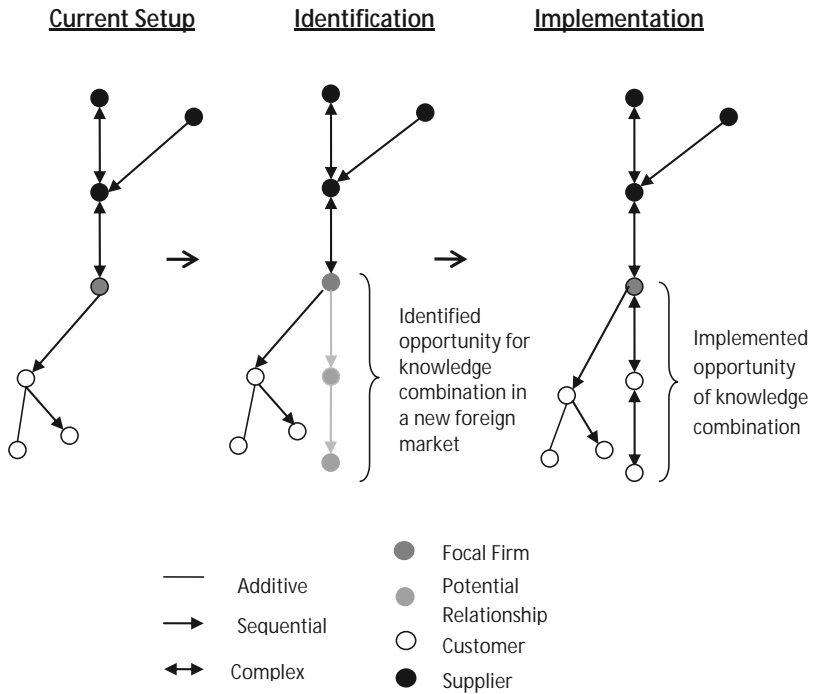


Figure 4: Illustration of network knowledge combination.

To exemplify the phenomenon in more practical terms, Figure 5 depicts how knowledge is combined in the relationships of three firms: Firm A, Supplier A, and Customer A. Firm A produces a technologically sophisticated product in a foreign market. The product is customized to meet the needs of the foreign customer, which means that technological adjustments are required. As shown in Figure 5, the knowledge combinations in the relationship between Firm A and Supplier A influence the knowledge combinations in the relationship between Firm A and Customer A. This figure demonstrates the indirect relatedness of knowledge combinations in networks.

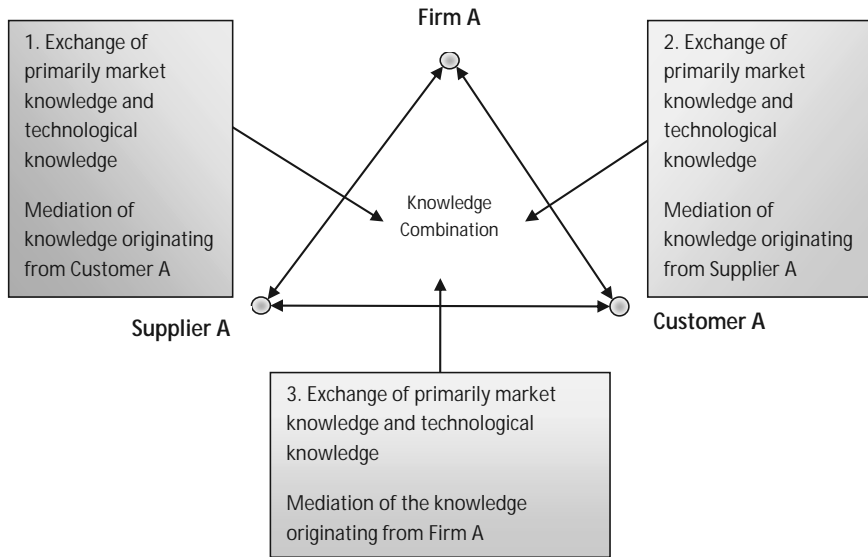


Figure 5: Example of knowledge combinations in a network of three actors.

(1.) The figure shows the exchange of technological knowledge between Firm A and Supplier A. In addition, both Firm A and Supplier A bring the feedback they have received from Customer A into the relationship so as to develop the best possible technological solutions for the customer. The mediation of knowledge from Customer A is complex and requires continual interpretation to be applicable for technology development. (2.) The figure shows that Firm A transfers technological knowledge (e.g., support, prototypes, and suggestions for technological adjustments) to Customer A. As Customer A learns more about the technology, it may become able to provide feedback to Firm A about suggestions regarding modifications and suitable application areas for the product. (3.) On occasion, Firm A arranges project meetings where customers and suppliers can meet in person and discuss user/technology issues. These knowledge-sharing encounters may induce improvements in technology.

This case exemplifies the complexity of knowledge combination in networks and shows that knowledge can travel different paths—not only

directly between actors but also indirectly between actors through mediation with middlemen or intermediaries (cf. Burt 1992: structural hole theory). Outcomes and actions are shaped by both individual network relationships and the larger structure of which they are a part. This case portrays Firm A's pursuit of new business, which involves acting on the opportunities of combining previously unconnected pieces of knowledge. From this illustration, a theoretical platform that lays the basis for this study can be devised.

### **A Model on Network Knowledge Combination as a Determinant of Business Creation in International SMEs**

This thesis contends that network knowledge combination is reflected by an ability to create knowledge synergies that open up possibilities for innovative integration of a variety of resources and that this, by extension, underlies business creation (cf. Eisenhardt and Martin 2000). In an ever-changing business environment, resources are constantly assuming new forms and values according to ambiguous patterns. Under such conditions, network knowledge combination can serve as a counterforce that allows firms to cope with change. We know that international SMEs often face marketplaces where product life cycles are short and current business advantages become outmoded quickly. Technological development and the regular launch of new products are therefore crucial components of firm success. Moreover, new markets are constantly cropping up as a result of emerging economies, forcing firms to reformulate strategies of market selection and customer segmentation. Using similar arguments, Prashantham (2008) claimed that it is essential for firms to reassess regularly their current practices and adjust their grounds for competitive advantage in international markets. This means that the challenge of internationalization is, by necessity, combined with processes of business creation. By leveraging networks, firms can harness various kinds of knowledge that increase their command over resources and fuel international expansion. Knowledge combination in networks is thus instrumental in renewing the capabilities available to firms (Teece et al. 1997) and is here viewed as a prerequisite for business creation in international SMEs.

Figure 6 models the relationship between network knowledge combination and business creation in international SMEs. It stipulates that a business develops through a process of identifying and implementing opportunities in networks. Specifically, SMEs that engage in international business may find themselves circulating in diverse flows of knowledge, individual pieces of which can be combined to spur business creation. Their positions in the network (see current setup) will determine which knowledge-related options are available to them and shape their identification of business opportunities. The identification of opportunities for knowledge combination may open up the playing field and yield an abundance of strategic options for firms to consider. When firms decide to pursue an opportunity, they have to extract knowledge successfully from the relevant network relationships so as to implement the projected knowledge combinations. The process of implementing knowledge combinations in network relationships may follow an unclear trajectory where outcomes are hard to predict. It may unfold as a self-perpetuating process in which emerging ideas guide the identification of new opportunities. That is, new opportunities are likely to be born in the process of implementation, creating a feedback loop between the dimensions of implementation and identification (cf. Penrose 1959; Daft and Weick 1984; Kogut and Zander 1992; Shane 2000). The interplay between these dimensions is often governed by a reciprocal exchange between network partners (Turnbull and Valla 1986). Through such exchanges, firms can share tacit knowledge and act on surfacing ideas in a timely manner. After knowledge combinations have been successfully implemented, firms are likely to switch from governance modes, which involve high levels of interaction, to more standardized methods, which are primarily focused on promoting efficiency in current operations (Szulanski 1996).

In summary, firms need be prepared to oscillate between the identification phase and the implementation phase before any real business outcomes can be expected to take off. Ultimately, the real manifestations of business creation (e.g., products, technology, and market operations) will reinforce firms' capability to combine knowledge in networks and form the basis of firms' future exploitation of opportunities. It is, however, important to reiterate that the effect of business creation inevitably will vary in its

magnitude between incremental and transformative outcomes. In some cases, the outcomes of knowledge combinations may register negatively with business creation, especially if firms lack sufficient capability to distinguish between conflicting knowledge and matching knowledge.

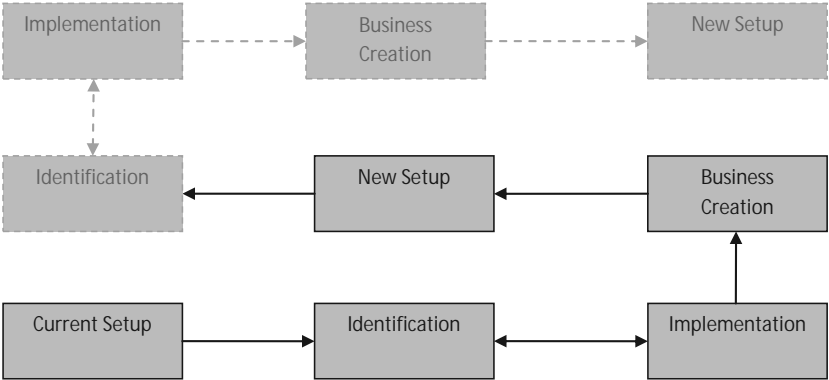


Figure 6: The relationship between network knowledge combination and business creation (faded boxes illustrate the continuation of this process).

Tapping into the knowledge of networks may be of particular importance for SMEs that operate in foreign markets because they may experience both a liability of smallness (Baum 1996) and a liability of newness (Stinchcombe 1965). In essence, networks can allow SMEs to overcome the liability of smallness by providing access to knowledge that they are not able or willing to produce on their own (Wright, Westhead, and Ucbasaran 2007). Networks may also reduce the liability of newness by enhancing firms’ understanding of particular market conditions (Nordman and Melén 2008). For instance, market knowledge and technological knowledge have traditionally been considered vital components for the success of international SMEs (Yli-Renko et al. 2001). In cases where these types of knowledge are combined, firms may become better at knowledge not only about what they could produce (e.g., advancing technological knowledge) but also about what they should produce and whom to target for the product or service (e.g., advancing market knowledge). This reinforcement

of competence may enable firms to extract more resource value from a greater portion of the network, including customers, customers of customers, suppliers, and suppliers of suppliers. Not surprisingly, knowledge derived from networks highly influences decisions regarding market selection, targeted customer segments, and product or technology development (Coviello 2006; Prashantham 2008). This type of knowledge allows firms to better understand the routines and procedures that are the glue and lubricant of networks. However, Loane and Bell (2006) argued that international SMEs not only manage knowledge in existing networks but also develop new networks as a strategy for international expansion. The authors claimed that this finding highlights one of the limitations of existing network theories, as most conceptualizations view networks as preexisting. Even though Johanson and Mattsson (1988) put forward the notion of network development, little attention has been focused on how SMEs leverage knowledge in networks to create business in a dynamic environment. It is highly conceivable that SMEs must continually question current business activities and jockey for advantageous network positions so as to remain competitive in foreign markets (Coviello and Munro 1997; Knight and Cavusgil 2004; Sullivan, Mort, and Weerawardena 2006; Prashantham 2008). In such a way, they are able to connect previously disconnected pieces of knowledge, from which a flurry of higher order competences may accrue (Burt 1992; cf. Johanson and Vahlne 2009). These outcomes thus form a basis for innovation and business creation. Hence, SMEs strive to achieve a variety of globally dispersed network relationships (Ojala 2009). As a result, the execution of knowledge combinations tends to involve complex processes, containing simultaneous cross-border interaction and knowledge transfer with both suppliers and customers (Löfgren, Tolstoy, Johanson, and Sharma 2008). Successful combination of knowledge that cuts across organizations, functions, and departments is therefore contingent on firms' abilities to marshal effectively a wide range of network relationships through elaborate coordinated actions.

Before entering into the methodological part of the thesis, I will review the key notions of this section. More research is needed to understand the determinants of business creation among international SMEs—especially at early stages of internationalization. This study aims to contribute to

international entrepreneurship theory with new insight about these issues, primarily by integrating the notions of knowledge and networks into a unified framework. I argue that network knowledge combination is crucial for international SMEs to be able to identify and exploit entrepreneurial opportunities in foreign markets. This may enhance their performance in producing the right products or services and in satisfying customer needs and wants effectively within the realm of international ventures.





## Methodology

The methodology section begins with a description of the rationale of the overall research design that has governed the execution of this study. Thereafter, the qualitative and quantitative parts of the study are discussed.

### Research Design

This thesis has been developed through a mixed methods approach, combining multiple methods to study one phenomenon. Jick (1979) asserted that the rationale for this approach is based on the notion that multiple viewpoints allow greater accuracy when pinpointing the phenomenon of interest (i.e., triangulation). The effectiveness of a mixed methods approach is dependent on the degree to which the weaknesses of a single method are counterbalanced by the strengths of another method. Researchers should therefore aspire to make different approaches complement each other. Pursuing mixed methods may be fruitful regardless of whether the different methods show divergent or convergent results. Convergent results allow researchers to be more confident in their results, whereas divergent results may provide an enriched and multifaceted explanation of the research problem.

By following this course, investigators do not have to be committed to one system of reality and can thereby draw reasonably liberally from both qualitative and quantitative methods (Creswell 2003). It is, however, important that researchers follow a strict protocol in which the choices of all methods are carefully motivated, as they serve distinct purposes. Qualitative and quantitative methods, for instance, can be argued to represent two critical counterpoints that may complement each other in a mixed methods study. On the one hand, qualitative methods provide personal experiences and firsthand observations that open up opportunities for subsequent analysis of broad and rich data. These methods are primarily used to probe into sparsely investigated phenomena, to fill in the blanks of new concepts, and to validate possible associations between concepts. Qualitative studies are, thus, explorative by nature and useful for generating new theories, propositions, and hypotheses. On the

other hand, quantitative methods can enable researchers to confirm or reject hypotheses accurately, strengthen the internal validity of concepts and correlations, and broaden the scope of external validity. Moreover, the analysis of emerging research areas with quantitative data can prevent researchers from being carried away by strong, but false, impressions that are derived from qualitative findings (Eisenhardt 1989).

This study follows a sequential research procedure to reap the benefits of both qualitative and quantitative analyses. The investigation starts out by analyzing qualitative data, and the findings from these studies are subsequently tested on a larger sample in a quantitative inquiry. According to Creswell (2003), such sequential procedures help researchers to elaborate on the findings of one method by following through with another method.

As displayed in Table 1, the separate studies within this thesis have distinct methodological designs and thereby provide a spread that is useful for covering the scope of the research problem. Articles 1, 2, and 3 pursue the objective of exploring for new insights into network knowledge and resource combination in SMEs. Essentially, these studies attempt to offer a valid categorization of theoretical constructs for further research to build upon. Articles 4, 5, and 6 pursue the objective of confirming theories and propositions that were developed in the qualitative part of the study. In these studies, the construct validity of key concepts is further reinforced, and correlations between key constructs such as knowledge combination in networks and business creation are estimated.

| Study         | Objective    | Causality                       | Data                          | Analysis   |
|---------------|--------------|---------------------------------|-------------------------------|--|
| Articles 1, 2 | Exploratory  | Categorization, associations    | Interview data, archival data | Multiple case study, cross-case analysis                   |
| Article 3     | Exploratory  | Categorization, associations    | Interview data, archival data | Single case study, cross-unit analysis                     |
| Articles 4, 5 | Confirmatory | Construct validity, correlation | Survey data, archival data    | Structural equation modeling                               |
| Article 6     | Confirmatory | Construct validity, correlation | Survey data, archival data    | Structural equation modeling, confirmatory factor analysis |

*Table 1: General Features of the Research Design of the Articles*

### Qualitative Study

The general purpose of using case studies in this thesis is to develop a theoretical framework along with theoretical assumptions that can be tested in subsequent quantitative studies (Glaser and Strauss 1967; Yin 1984; Eisenhardt 1989; Creswell 2003). At this stage, distinctions between concepts are made, and associations between concepts are sought. Case studies are proven to be effective in generating valid theory because investigators work closely with the targeted phenomena and, thereby, are guided by raw empirical evidence when building theory (Eisenhardt 1989). Yin (1984) argued that case studies are appropriate when the study concerns “how” and “why” questions about a contemporary set of events. By providing answers to these questions, researchers can use new discoveries to push the frontiers of theory forward. Researchers’ preconceived ideas may, however, interfere with the largely inductive approach that epitomizes case study research. Although some preconceived ideas may be helpful, Eisenhardt (1989) claimed that researchers should aspire to steer clear of preordained theoretical perspectives or propositions. In practical terms, her arguments imply that researchers should create variables with references to existing literature prior to the investigation and should avoid linking variables together presumptuously. My strategy before conducting the qualitative study was to retain a broad

theoretical outlook, educate myself in numerous theories, and thus maintain an explorative approach.

### Sampling and Data Collection

Purposive sampling was used, as relevance rather than representativeness, as a criterion for selection. The selection of cases aimed to offer both theoretical and literal replication (Yin 1994). Theoretical replication was achieved by selecting firms with various products and strategies. Literal replication involved selecting international firms in accordance with the following criteria:

- fits the definition of a small or medium-sized enterprise,
- has sales to at least one foreign market outside Sweden,
- is independent (is not a subsidiary to a multinational corporation [MNC]),
- is located in the Mälardalen region.

To obtain a geographically accessible sample, the focus was set on firms from the Mälardalen region of Sweden (the extended capital region). Mälardalen, with a population exceeding 2.7 million residents, is a densely inhabited province around Lake Mälaren. The region encompasses several prominent cities including the capital of Stockholm, the university city of Uppsala, and the industrial city of Västerås. Other cities situated in Mälardalen are Enköping, Eskilstuna, Södertälje, and Strängnäs. The region showcases a multitude of business initiatives and industrial clusters. For instance, Västerås has notable examples of spinoffs from heavy manufacturing, whereas a contrasting flurry of science-based firms has developed from the academic community in Uppsala. The Stockholm area, moreover, is home to firms from a wide array of industries, largely reflecting the pervasive demographic spread of this subregion. Given the overall structural diversity of Mälardalen (i.e., infrastructure, demographic characteristics, and economic distribution)—combined with the fact that it makes up over 30% of Sweden’s total population—the region can be argued to be a representative industrial stronghold for the country. Because

the intention was to investigate SMEs, it was desired that firms not be a part of a larger corporation as this could lead to a potential bias. (It turned out that SME 9 was indeed a subsidiary of a larger corporation, thus failing to meet this requirement. This firm is, however, not employed as a case in any studies in this thesis.).

The qualitative study includes 12 SMEs that all (apart from the one mentioned exception) fulfill the abovementioned criteria. Early in our project, the focus was set on firms in the biotech industry. Such firms have the potential to offer rich empirical evidence regarding knowledge creation in foreign markets. The knowledge-demanding and international character of the biotech industry is vividly reflected by a strong emphasis on niche technology, global marketplaces, and immense demands for innovation and knowledge development (Powell et al. 1996). Relevant case firms from this sector were found using the Swedish industry index in the Market Manager database. At least one interview was conducted for each of the firms. We decided to follow up with more interviews for the cases that we found particularly interesting. All of the interviews took place between spring 2004 and fall 2005. My colleague, Angelika Löfgren, and I conducted about half of the amount of interviews together and the other half separately. We discussed the interviews with each other afterward to make sure that we had understood everything correctly. Table 2 displays general information about the sampled firms, as well as the number of interviews conducted with each firm. The table reveals that most firms show negative numbers in their income statements. An explanation for this finding is that many of these firms are undergoing rapid development, which entails very high expenses. More than two thirds of the sampled biotech firms were under 20 years old at the time of the interviews. Most of them were quite small in size; 9 of 12 firms had fewer than 20 employees.

| Firm Alias and Name | Year of Founding | Number of Employees | Turnover in Thousands of Swedish Crowns (SEK) | Net Revenue/Loss in Thousands of Swedish Crowns (SEK) | Number of Interviewed Respondents | Number of Interviews |
|---------------------|------------------|---------------------|---|---|-----------------------------------|----------------------|
| SME1                | 1987             | 85                  | 51 913  | -112 282  | 1                                 | 1                    |
| SME2                | 1986             | 23                  | 35 771  | 6540  | 3                                 | 3                    |
| SME3                | 1994             | 2                   | 1709  | -588  | 1                                 | 1                    |
| SME4                | 1997             | 26                  | 27 549  | -70 207   | 4                                 | 6                    |
| SME5                | 1999             | 6                   | 10 968  | -108  | 1                                 | 2                    |
| SME6                | 2004             | 51                  | 245   | -15 028   | 1                                 | 1                    |
| SME7                | 1996             | 20                  | 11 494  | -26 477   | 2                                 | 2                    |
| SME8                | 1997             | 22                  | 326   | n.a.  | 1                                 | 2                    |
| SME9                | 1996             | 20                  | 29 697  | 11  | 1                                 | 2                    |
| SME10               | 1990             | 31                  | 86 935  | 1974  | 2                                 | 2                    |
| SME11               | 1978             | 29                  | 33 204  | 2463  | 1                                 | 1                    |
| SME12               | 1985             | 39                  | 54 344  | -84 738   | 2                                 | 1                    |

*Table 2: Firms Included in the Qualitative Part of the Study (Data From 2005)*

Personal interviews were the main form of data collection. A total of 24 interviews were conducted with 20 respondents in the 12 case firms (see Table 1). This study used a key informant approach, which is a common practice in marketing research (Phillips 1981). Key informants included chief executive officers (CEOs), market managers, and technical directors, all individuals directly involved in decisions relating to international development. When conducting interviews, researchers run the risk of common methods bias, in which respondents may make an effort to appear consistent and rational in their descriptions of different events, thereby producing inaccurate data (Johns 1994). To increase reliability in the

published case studies, we strove to interview multiple respondents. We also assured the respondents that answers were going to be treated confidentially (i.e., using a firm alias). Furthermore, we avoided using theoretical concepts in the interviews because we did not want to prescribe a rationale that could induce bias in the respondents. To strengthen the reliability of the data further, all interviews except one were conducted face-to-face at the sites of the firms' head offices (the exception was an interview that was conducted via telephone and e-mail because the respondent resided in Australia). Face-to-face meetings allow rich modality interaction and thereby minimize confusion and misunderstandings. The interviews were semi-structured, and questions revolved around the content of resources used in the ventures, where these resources were found in the network, and how these resources were deployed in combinations with other resources. For this reason, an interview guide was designed in collaboration with a colleague; it contained open-ended questions because we wanted to maintain an explorative approach. When interesting topics came up during the interviews, we sometimes asked follow-up questions and allowed ourselves to deviate from the interview guide. In the first interview sessions, the questions revolved around international business activities in general, encapsulating the gamut of international operations. To curb an overload of scattered information, we eventually narrowed the scope of our inquiry so as to focus more stringently on the international ventures regarded to be most significant by the firms (thereby intentionally invoking a bias toward purpose rather than representativeness). By asking questions that more accurately targeted the characteristics of these specific ventures, we expected to gain an augmented understanding of discrete phenomena. We collected approximately 25 hours of interview data. Interviews were tape-recorded and transcribed verbatim. In all cases, interview data were substantiated by other forms of data that were derived from sources such as annual reports, product information brochures, databases (AffärsData and Market Manager), newspaper articles, and information on companies' Web sites. There were a few occasions when we received conflicting information from respondents. If we suspected that the respondents had provided inaccurate information because they had misunderstood the question, we sent e-mails with follow-up questions on the topic. In cases of chronological confusion,

we verified dates with other respondents and/or the previously mentioned sources of archival data.

### **Method of Analysis**

A unit of analysis is the entity from which we collect the information that forms the basis for scientific conclusions (de Vaus 2001). The primary unit of analysis in our case studies was the international business venture, rather than the firm. This is consistent with Styles and Gray (2006), who would like to see an increased focus on the “opportunity” as the unit of analysis in the field of international entrepreneurship. Moreover, investigating the venture may be especially fruitful in network studies because we can study and evaluate the behavior of many firms on a reasonably equal scale. At the secondary level of analysis, the focus was set on the individual case firms, and the tertiary level of analysis focused on the individuals within these firms. Hence, the study recognizes that small firms are difficult to keep separate from their managers and staff. SMEs usually have small numbers of employees who each, according to their relative influence, may have a defining impact on the organizations.

Both single case studies and multiple case studies were pursued. Whereas single case approaches can richly describe the existence of a phenomenon (Siggelkow 2007), multiple case approaches may allow researchers to contrast findings from individual cases and identify idiosyncratic and more prevalent tendencies (Yin 1994)—that is, findings from individual cases can be compared to, supplemented with, and substantiated by other cases (Agndal 2004). By applying both approaches in the project, we could achieve both depth and breadth in the inquiry. Multiple case approaches were adopted at the beginning of the overall research project to pinpoint central themes and compare results across various cases. Thereafter, a single case inquiry was conducted to probe deeper into pertinent concepts and associations that had been identified. In general, the studies followed a pragmatic design, meaning that cases were purposively selected for analysis based on their capacity to provide ample representations of research problems (Creswell 2003). Certain phenomena of interest could



thereby be vividly envisioned in the studied cases and used to validate central research themes clearly.

### **Quantitative Study**

The research performed within the framework for the quantitative study is being carried out in cooperation with other researchers in a project called “Internationalization in networks” (Inet). The project participants—in addition to myself—are Associate Professor Jukka Hohenthal of the Department of Business Studies at Uppsala University; Professor Kent Eriksson, Assistant Professor Jessica Lindbergh, and Sara Jonsson, Ph.D., of the Centre for Banking and Finance at the Royal Institute of Technology; and Professor Dharma Deo Sharma, Assistant Professor Angelika Lindstrand, Sara Melén, Ph.D., Angelika Löfgren, M.Sc., and Emila Rovira Nordman, Ph.D., of the Department of Marketing and Strategy at the Stockholm School of Economics.

As a point of departure for this inquiry, it can be noted that internationalization (like other forms of entrepreneurial behavior) is overt and demonstrable and manifests in recognizable ways. Therefore, evidence of such behavior can be readily represented by explicit measures (Jones and Coviello 2005). We can thus safely assume that a quantitative method would be fruitful in advancing our knowledge of international SMEs. To execute this part of the study, we constructed a questionnaire. The questions revolved around an important and specific local business relationship chosen by the respondent. The respondent was instructed to select the business relationship on the basis of three criteria: (1) it is located in a foreign market, (2) it is ongoing, and (3) it has resulted in realized sales transactions. Hence, the selected business relationship constitutes a focal point in the network in which knowledge combination and knowledge creation can be measured—something difficult to do by aggregate measures without confounding the local market perspective. Therefore, measuring the constructs in a specific local business relationship is deemed to enhance reliability and internal validity. The questions in the questionnaire were measured on a seven-point item scale, with ratings ranging from low to high. To support the validity of the study, the variables

included in the questionnaire stemmed from empirical observations and theoretical reviews. More specifically, variables were developed from three sources: previous questionnaires of the research group, a literature review conducted between the years 2002 and 2003 to identify new measurement scales, and case studies conducted before 2003 concerning knowledge acquisition and knowledge use within business networks.

### Sampling and Data Collection

The formal criteria for being included in this study were that firms be active in foreign markets and that they fulfill the definition of an SME.<sup>12</sup> In 2003, investigators received a stratified random sample of international SMEs from Statistics Sweden's Business Register. All firms included in the sample had at least 10% of their turnovers as a result of export sales.<sup>13</sup> Naturally, many of the firms used more advanced modes of establishment in the local market, such as subsidiaries, agents, distributors, and joint ventures. The sample consisted of two groups: small firms (6–50 employees<sup>14</sup>) and medium-sized firms (51–250 employees). A stratified sample was used to achieve variation in size among the SMEs. If the sample had not been stratified, most firms would likely have been small because 97% of firms in Sweden have 50 or fewer employees. From each of these two groups, we received a sample of 1000 firms covering about 28% of the Swedish small exporters that we were interested in investigating.

To ensure a high response rate, responses were collected during personal visits to firms in the sample. To expedite this time-consuming collection method, investigators focused only on SMEs in the geographical area of Mälardalen. A subsample of 339 firms was drawn from the Mälardalen area

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<sup>12</sup> An SME has 250 or fewer employees according to the OECD, which published the 2002 report titled, *OECD Small and Medium Enterprise Outlook*.

<sup>13</sup> To some extent, this conduct may be regarded as "sampling by success" because all firms, by definition, have managed to take their business international. This practice is common in cross-sectional studies; nonetheless, suspected bias should be considered when interpreting results.

<sup>14</sup> Microenterprises are enterprises that have at most 10 or, in some cases, 5 employees (OECD 2002). Because previous studies have suggested that the behaviors of microenterprises are often significantly different from those of other SMEs (Becherer, Finch, and Helms 2006), we have excluded firms with fewer than 6 employees from the sample.

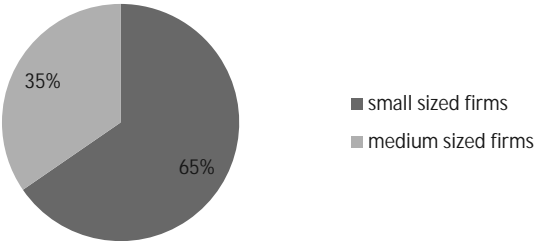
(from the total Swedish sample of 2000 firms). After contacting individuals in these firms via phone, investigators excluded some firms as too large (i.e., they were not SMEs), as not selling their product to foreign customers (i.e., they were not international), or as no longer existing. After these reductions, the total study sample consisted of 233 SMEs. From this sample, 188 questionnaires were collected, yielding a response rate of approximately 81%. Hence, about 19% of sample firms chose not to participate in the study. The two major reasons given for the non-responding firms' declining to participate were a lack of time and a reluctance to release information. Even though a response rate of 81% is quite high in comparison with similar studies, a non-response bias is always a concern. Because the surveys were collected when meeting with the respondents, we could not detect a non-response bias by applying a common test, such as comparing early versus late responses (Armstrong and Overton 1977). We instead used the secondary data collected from Statistics Sweden's Business Register to control for differences between responding and non-responding firms with regard to industry, size, location, and level of internationalization. This analysis revealed no clear imbalances between the groups; therefore, a non-response bias is not likely to be a problematic issue when interpreting the findings of the study.

Precautions were taken to ensure the reliability of data before and during the collection stage. Before distribution to the derived sample, we conducted a pilot study in which the questionnaire was tested on six SMEs in Stockholm and Uppsala. The investigators visited the respondents at their offices and were present in the room while the respondents answered the questionnaires. Respondents were instructed to inform investigators if they experienced any problems with the questions asked. All six respondents indicated that they thought the original questionnaire was too long. After receiving the questionnaire results, the research group met and assessed the test. Their assessment resulted in shortening the questionnaire and modifying certain expressions that the respondents had found confusing. In an attempt to minimize missing values and avoid common methods bias, the investigators decided to attach an introductory letter to the questionnaire to assure respondents that the results would be confidentially maintained.

To ensure reliability further, the investigators personally administered the questionnaires to the Swedish SMEs. By visiting the firms, the research group sought to make certain that the right person was answering each questionnaire and to ensure a high response rate with a low number of missing values. The study used a single key informant approach, which is common in marketing research (Phillips 1981). Individuals who were singled out as key informants included CEOs and marketing managers who influence decisions related to foreign operations. Each visit ranged from a half hour to an hour. To avoid investigator-induced bias, research group members were present solely as observers. When the respondents had completed the questionnaires, the investigators conducted short interviews, encouraging them to describe in their own words the foreign assignments around which the questions had revolved. The investigators took notes about each interview on blank sheets of paper that were attached to each questionnaire.

### Descriptive Statistics

A selection of descriptive statistics is presented here to offer a general oversight of the collected data. All firms in our population were SMEs. However, within this group, firms vary in size. According to the OECD (2002) definition, small firms have 50 or fewer employees, whereas medium-sized firms have 51 to 250 employees. As displayed in Chart 1, 65% of our sample consists of small firms, whereas 35% consists of medium-sized firms. Hence, the sample firms are distributed to represent the full range of SMEs.



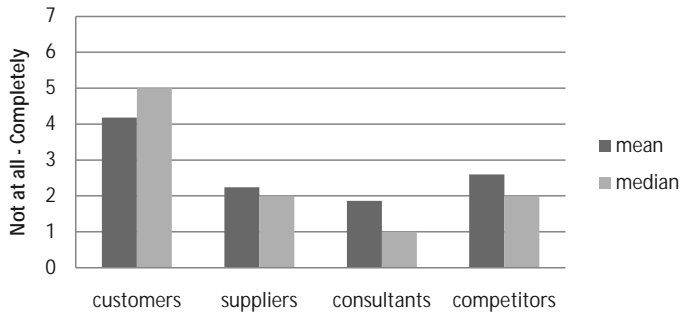
*Chart 1: Small and medium-sized enterprises*

Chart 2 displays fundamental data about the sampled SMEs. It is evident that these firms are highly dependent on international affairs and conduct a substantial amount of sales in foreign markets. The firms, however, generally seem to have relatively limited international experience amounting to a median of 5.5 years of doing business abroad.

| Organizational Characteristics   | Mean    | Median |
|----------------------------------|---------|--------|
| No. of employees                 | 48      | 23     |
| Turnover (thousands SEK)         | 122 193 | 50 379 |
| Net revenue/loss (thousands SEK) | -1273   | 210    |
| Years abroad                     | 8.9     | 5.5    |
| Share of total sales abroad (%)  | 56      | 50     |

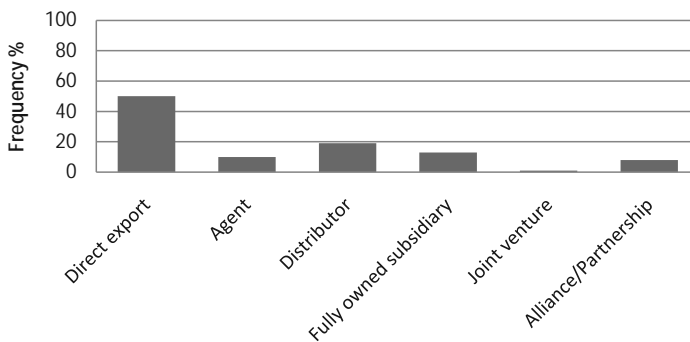
*Chart 2: General characteristics*

Chart 3 indicates the importance of various network relationships when initiating a business venture in a focal foreign market. It is clear that customer relationships are of vast importance. Suppliers and competitors appear to support foreign market entry to a lesser extent. It reasonable to assume that firms are primarily driven by a market demand and that supply channels are developed to a greater extent after foreign market entry.



*Chart 3: Sources of information that are important for the instigation of the venture*

Chart 4 shows that firms choose from a great variety of entry modes to foreign markets. The reason that the frequency of foreign market entry modes exceeds the number of sampled firms is simply that firms may use more than one form simultaneously. We can see that low-commitment modes such as export and distributors are generally preferred over subsidiaries and formal partnerships. However, informal network relationships are not captured by this display. It may be reasonable to assume that a firm's business in foreign markets is developed not only through formal channels but also through informal relationships in which firms can develop knowledge about the market.



*Chart 4: Modes of foreign market entry*

Chart 5 is a cross-tabulation displaying the relationship between the perceived importance of knowledge and knowledge sharing in the selected foreign business relationship. It appears that most firms score highly on these knowledge-related dimensions. The table shows that many firms do indeed consider knowledge to be important for their business engagements. Furthermore, most of these firms also participate in knowledge-sharing activities with international counterparts (predominately to a medium degree). Hence, a need for knowledge may push firms to reach outside their own boundaries for new input. The ability to use external competence may thus be critical for firms that face knowledge-demanding contexts, which, arguably, is often the case for international SMEs.

| Importance of Knowledge in Customer Relationships | Low Degree of Knowledge Sharing in Customer Relationships, % (no.) | Medium Degree of Knowledge Sharing in Customer Relationships, % (no.) | High Degree of Knowledge Sharing in Customer Relationships, % (no.) | Total, % (no.) |
|---|--|---|---|----------------|
| Low (1–2)   | 6 (11)   | 12 (22)   | 0.5 (1)   | 18 (34)        |
| Medium (3–5)                                      | 6 (12)   | 38 (70)   | 9 (17)  | 54 (99)        |
| High (6–7)  | 3 (5)  | 14 (25)   | 12 (22)   | 28 (52)        |

Missing values: 3, Effective sample: 185; Low = 1–2 on a 7-item scale, Medium = 3–5 on a 7-item scale, High = 6–7 on a 7-item scale.

*Chart 5: Cross-tabulation of the importance of knowledge and degree of knowledge sharing*

In many cases, innovation is a prerequisite for business creation. Therefore, the relationship between knowledge and innovation is of great interest for this thesis. Chart 6 shows that firms that perceive knowledge as relatively important also believe that the business engagement has resulted in innovative outcomes.

| Importance of Knowledge in Customer Relationships | Low Degree of Innovation Outcomes in Customer Relationships, % (no.) | Medium Degree of Innovation Outcomes in Customer Relationships, % (no.) | High Degree of Innovation Outcomes in Customer Relationships, % (no.) | Total, % (no.) |
|---|--|---|---|----------------|
| Low   | 11 (21)  | 6 (11)  | 1 (2)   | 19 (34)        |
| Medium  | 16 (30)  | 31 (56)   | 6 (11)  | 53 (97)        |
| High  | 4 (7)  | 15 (27)   | 10 (18)   | 29 (52)        |

Missing values: 5, Effective sample: 183; Low = 1–2 on a 7-item scale, Medium = 3–5 on a 7-item scale, High = 6–7 on a 7-item scale.

*Chart 6: Cross-tabulation of the importance of knowledge and the degree of innovation outcomes*

Chart 7 provides a network perspective by depicting the degree to which firms depend on indirectly connected relationships as a source of knowledge. As expected, we can see that most firms indicate that they are dependent on knowledge from indirectly connected relationships (in this case, customers’ customers relationships) to a significant degree (Pearson’s chi-square = 10.9,  $df = 4$ , at the 0.01 level). Moreover, based on these statistics, there also appears to be some correlation between the perceived importance of knowledge in a certain business venture and the degree to which firms depend on the knowledge of the customers’ customers. This result supports the basic idea of this thesis: Knowledge development encompasses not only direct network relationships but also indirectly connected network relationships.



| Importance of Knowledge in Customer Relationships | Low Dependence on Knowledge of Customers' Customers, % (no.) | Medium Dependence on Knowledge of Customers' Customers, % (no.) | High Dependence on Knowledge of Customers' Customers, % (no.) | Total, % (no.) |
|---|--|---|---|----------------|
| Low   | 11 (20)  | 6 (11)  | 3 (5)   | 19 (36)        |
| Medium  | 18 (34)  | 24 (45)   | 12 (21)   | 54 (100)       |
| High  | 8 (14)   | 11 (20)   | 10 (18)   | 28 (52)        |

Missing values: 3, Effective sample: 185; Low = 1–2 on a 7-item scale, Medium = 3–5 on a 7-item scale, High = 6–7 on a 7-item scale.

*Chart 7: Cross-tabulation of the importance of knowledge and the dependence on knowledge of customers' customers*

### Method of Analysis

The linear structural relations (LISREL) statistical package was used to process the data. Structural equation modeling, such as that done by LISREL, is a statistical technique used to study direct and indirect relationships between one or more independent variables and one or more dependent variables. A distinctive strength of LISREL-based models is the inclusion of latent variables, which makes possible the measurement of abstract concepts that cannot be measured directly. These latent variables are higher order constructs, representing the commonalities of a set of indicators, and are interpreted as theoretical constructs. The LISREL method contains two fundamental dimensions: a structural dimension, which involves the formation of constructs and models, and a causal dimension, which involves error covariance and correlations. The LISREL technique is usually applied to research involving confirmatory analysis. This method requires researchers to anchor the model in theory, a requirement that members of the research group took into consideration by basing their questionnaire on an elaborate theoretical framework.

An interpretation of the valid structural model should consider each relationship to be part of a broader context that is constituted by the model,

taking into account not only direct but also indirect effects. One example is a causal chain where construct *a* causes construct *b*, and *b* causes *c*. In this chain, *a* has an effect on *b*, and *b* has an effect on *c*. Furthermore, *a* has an indirect effect on *c*, mediated by *b*. An analysis that omits the indirect effect mediated by *b* will suffer from inadequacies because it will not reveal the total effect (Bollen 1989). This implies that relationships cannot be analyzed piece by piece; all constructs must be evaluated within the framework of the entire model. This evaluation may take place in both a measurement model (confirmatory factor analysis) and a structural model (path analysis). The validity of structural models is measured with regard to both the validity of the complete model (nomological validity) and the discrete relationships within the model. Because the model is composed of various constructs, its validity may be estimated by measuring the degree of separation between constructs (discriminant validity), as well as the unidimensionality of these constructs (convergent validity). Convergent validity is confirmed if the indicators load only on the constructs to which they belong. Evaluating convergent validity is carried out by analyzing *t* values (significance),  $R^2$  values (linearity), and factor loadings (correlation). As recommended by Hair et al. (1995), convergent validity is further supported by checking for construct reliability and average variance extracted. A basic requirement for confirmation of discriminant validity is that the correlation between latent variables be significant but not equal to 1, which would suggest unidimensionality that spans across constructs (Jöreskog and Sörbom 1993).

In this part of the study, business relationships functioned as the units of analysis, representing focal points in the networks that underlie international business ventures. Furthermore, when analyzing the results of the structural models, we used control variables to check for differences between groups (e.g., size, age, and knowledge intensity). In some cases, a model that was statistically valid for one group was invalid for another. If the models are robust, these differences may reveal interesting information to be analyzed on the basis of theory.

## Summary of the Articles

The articles involved in this study all revolve around an overarching theme: knowledge combination in networks and business creation among international SMEs. The different studies do, however, focus on distinct properties and processes adhering to this issue. The studies also apply various methods, which allow the topic to be approached from different angles. The individual content of the articles is presented in the following section and is summarized in Table 3.

### Article 1: Network Resource Combinations in the International Venturing of Small Biotech Firms

(Co-authored with Henrik Agndal; published in January 2010 issue of *Technovation*. Earlier version was awarded the American Marketing Association's Global Special Interest Group's Best Paper Award at the Global Business Innovation & Development Conference held in Rio de Janeiro, 2008)

#### Topic and Intended Contribution

This article contributes to the rapidly growing literature on smaller high-tech firms' commercialization of innovations through international venturing. Studies often argue that to achieve success, firms must be able to mobilize unique constellations or combinations of resources. The resources under a firm's control should be combined in such a way that they provide a particular venture with an advantage over competing ventures. This is commonly referred to as the resource-based view (RBV). Recent research on the internationalization of smaller firms, however, stands in contrast to this "inward view" of resource constellations. Within their own organizations, smaller firms often cannot mobilize all the resources required for international ventures. Empirical evidence reveals that resource constellations, considered critical for global competitiveness, notoriously span organizational boundaries (i.e., the proprietary assumptions of the RBV concerning resource constellations should be relaxed to incorporate resource constellations that are leveraged through the network). We refer to these as network resources—external resources

embedded in a firm's network that affect business outcomes. Network resource combinations, therefore, bring together from network relationships complementary resources whose value is enhanced by combination, providing the internationalizing firm with an advantage over other ventures. By integrating the resource-based view with a network perspective on resources, this article contributes to the growing body of knowledge regarding the internationalization of smaller biotech firms. In particular, it looks at how these firms commercialize innovations by combining resources in their networks so as to enter new foreign markets with existing products and to enter existing foreign markets with new products.

## **Method**

In this multiple case study, a cross-case analysis is conducted in which resource combination in networks is investigated with reference to two dimensions: new international market ventures and new international product ventures. Three biotech firms form a subset in the international market venture dimension, and three biotech firms form a subset in the international product venture dimension.

## **Findings**

This study reveals that smaller biotech firms combine a variety of resources when exploiting opportunities involving new products and new markets. We found both similarities and differences regarding resource combination in networks, depending on the nature of the venture. Whereas the new international product ventures exploited a variety of network resources in line with more multifaceted challenges (redefining the product, redefining the market), the new international market ventures concentrated on a narrower scope of network resources, primarily focused on marketing issues. Hence, the new international product ventures required more complex resource combinations encompassing a greater scope of their network than did the new international market ventures. This required open boundary strategies for the successful exploitation of network resources.

The study shows that when exposed to network partners, taken-for-granted resource configurations are contested, which, in turn, fosters the development of higher order resources or capabilities. This capability to draw on and combine complementary resources can be described as network resource combination capability. In practical terms, this means that by staying responsive to developments in international networks, firms are prepared to act on network resources when windows of opportunity open. When acting on such opportunities, firms have to be able to coordinate the particular network relationships in which these disparate resources reside. This can be done only by first mapping activities and resource flows spanning across organizations. However, the combination of network resources hinges on the interaction between network partners, the nature of which determines how effectively resources are transferred and synthesized. We therefore suggested that the tenets of network resource combination capability encompass the ability to interact effectively with network partners, the ability to identify complementarities between network resources, and the ability to coordinate network resources proactively to a specific end. In effect, network resource combination capability dictates the scope and extent to which network resources can be deployed and, in our study, seems to have been especially valuable for new international product ventures that draw on resources in both the upstream network (e.g., technological resources) and the downstream network (e.g., market and reputational resources).

| Study     | Dominant Theoretical Perspectives   | Independent Variable                                       | Dependent Variable       | Effective Sample | Unit of Analysis       | Findings   |
|-----------|---|--|--------------------------|------------------|------------------------|--|
| Article 1 | Resource-based view, network theory   | Network resource combination                               | Market/product venturing | 6 Biotech SMEs   | Venture                | Resource combination in networks is identified as a viable force in the development of international ventures.   |
| Article 2 | Entrepreneurship theory, network theory                                     | Knowledge combination in networks                          | Market/product venturing | 4 Biotech SMEs   | Venture                | Knowledge combination in networks is found to influence the development of international ventures.   |
| Article 3 | Entrepreneurship theory, network theory                                     | Knowledge combination in networks                          | Product venturing        | 1 Biotech SME    | Venture                | Knowledge combination in the upstream and downstream networks is found to have a distinct influence on the development of international product ventures.            |
| Article 4 | Media richness theory, network theory, inter-firm knowledge transfer theory | Personal interaction                                       | Technology development   | 188 SMEs         | Business relationships | Personal interaction is found to have an indirect effect on international technology development that is mediated by knowledge transfer.                             |
| Article 5 | Entrepreneurship theory, network theory                                     | Network development, knowledge combination                 | Knowledge creation       | 188 SMEs         | Business relationships | Network development is found to have a positive direct effect on knowledge creation and an even stronger indirect effect that is mediated by knowledge combination.  |
| Article 6 | Entrepreneurship theory, network theory                                     | Supplier/customer network knowledge, knowledge combination | Knowledge creation       | 188 SMEs         | Business relationships | Customer network knowledge is found to have a positive effect on knowledge combination. Knowledge combination, in turn, has a positive effect on knowledge creation. |

*Table 3: Summary of the Articles Included in This Thesis*

## **Article 2: Knowledge Combination in Networks: Evidence From the International Venturing of Four Small Biotech Firms**

(Published in the May 2010 issue of *International Entrepreneurship and Management Journal*)

### **Topic and Intended Contribution**

Although international forms of venturing are critical for the sustained economic growth of small firms, the phenomenon remains surprisingly unexplored by researchers in the field of international business. A reason for this neglect is that the extant literature in the discipline has centered on new firms rather than on new business engagements. More research is thus needed on international forms of venturing, which can provide new business opportunities that entail sustained economic growth to small firms. This study aims to bridge parts of this research gap by addressing some of the possible factors underlying the international venturing of small firms. Building on previous network studies, this study formulates the argument that knowledge combination in networks is a critical prerequisite for seizing business opportunities in foreign markets. The paper probes the structural and dynamic mechanisms of networks by arguing that networks can open up a multitude of avenues in which knowledge can flow and intersect in innovative combinations and, thereby, stimulate international venturing. Essentially, the specific purpose of this study is to investigate similarities and differences regarding knowledge combination in networks in the international venturing of four small biotech firms.

### **Method**

In this multiple case study, a cross-case analysis focuses on two new product ventures (new product in an existing foreign market) and two new market ventures (existing product in a new foreign market).

### **Findings**

This study demonstrates that a proactive strategy of identifying and implementing knowledge combination in networks is a necessity in international venturing. However, the findings reveal different strategic

tendencies, depending on the nature of the venture (namely, international product ventures and international market ventures). Proactive participation in networks enables the identification of knowledge combinations and provides the means of implementing knowledge combinations. A mechanism underlying the identification of knowledge combinations seems to be the capability to be sensitive to information about actors in international networks and, thereby, receive intelligence about external competence. For the subsequent implementation of knowledge combinations, firms rely on interaction mechanisms in business relationships. Interaction is important because it facilitates the processes through which participants share knowledge and make it into combinations. Hence, this study suggests that small firms need to possess the flexibility to search the network for knowledge combinations and the stability to dedicate the time and effort to implement these combinations in network relationships. This dual perspective of strategizing in networks has not been thoroughly examined by related network studies on smaller firms' international venturing. Thus, this study contributes to a further understanding of international venturing by acknowledging that knowledge combination of firms tends to require multifaceted means and objectives. In this vein, the study provides detailed insights by comparing the similarities and differences between international product ventures and international market ventures in the identification of knowledge in networks as well as the implementation of knowledge combinations.

### **Article 3: The International Product Venturing of a Biotech SME: Knowledge Combination in Upstream/Downstream Networks**

(Accepted for publication as a chapter in *European Entrepreneurship in the Globalizing Economy*, edited by Prof. Alain Fayolle and Prof. Kiril Todorov)

#### **Topic and Intended Contribution**

Recent studies on international SMEs have revealed that the overall success of these firms hinges on their performance in international product venturing. Consequently, SMEs that are able to launch product solutions in foreign markets may expect rewards that involve reinforced competitiveness and stimulated international growth. Still, little is known



about the determinants of international product venturing in the context of SMEs. Because SMEs are typically resource constrained, it is reasonable to assume that knowledge combination in these firms is not restricted to the boundaries of the firm but takes place in external networks as well. By building on this reasoning, the study explores how knowledge combination in networks underlies the international product venturing of SMEs. In this vein, the study advances the argument that international product venturing requires knowledge input from both upstream networks (i.e., suppliers) and downstream networks (i.e., customers). This division may help us understand how the mobilization of a diversified scope of network relationships presents abundant options for knowledge combination. For example, although knowledge may be combined within the confines of either upstream or downstream networks, it can be advantageous for firms to implement knowledge combinations that reach across these networks. For instance, innovative product solutions may come from the combination of technological knowledge that resides in upstream networks and concerns what products could be developed and market knowledge that resides in downstream networks and concerns what products should be developed. The purpose of this study is to examine knowledge combination within and across upstream/downstream networks within the realm of the international product venturing of a biotech SME.

## **Method**

The study builds on a single case approach analyzing an international product venture. The unit of analysis is the international product venturing of a small biotech firm.

## **Findings**

The results of the case study show that knowledge combination in upstream/downstream networks is an important component underpinning the international product venturing of SMEs. In fact, the case study shows that the firm seeks opportunities for knowledge combination by proactively scanning upstream and downstream for knowledge complementarities. Knowledge combination, however, takes place not only within

upstream/downstream networks but also across these categories. Of the three types of knowledge complementarities, complex complementarities were shown to provide the most critical underpinning for international product venturing because they create innovative outcomes by involving a broader scope of networks. In the context of the international SME, these findings may have two major implications for theory: (1.) A dichotomous view of the network may be advantageous when studying these phenomena. Networks are often treated homogeneously, which leads to a failure to recognize specific intrinsic dynamics. By changing the perspective and shedding light on different mechanisms of the coordination of knowledge in upstream/downstream networks, important insights may arise, as happened in this study. Future studies can preferably adopt this integrated network approach and test whether the external validity of this framework covers a broader spectrum than that of the international product venturing of biotech SMEs. (2.) The findings suggest that innovation in the international product venturing of SMEs is spurred by knowledge combination that is systemized in networks. This implies that firms may need to identify knowledge complementarities in network relationships and apply the proper form of governance to implement knowledge combinations. The business relationships that are most critical for knowledge combination often involve complex complementarities. These complementarities require extensive resources and dedication for the implementation of knowledge combinations. Hence, it is crucial that research on the international product venturing of SMEs not regard every relationship in isolation. Instead, more research should study the network at large so as to generate new knowledge about how to optimize the commercial potential of each knowledge combination.

## **Article 4: The Effect of Personal Interaction on the International Technology Development of SMEs**

(Co-authored with Emilia Rovira Nordman; published in the May 2009 issue of *Small Enterprise Research*)

### **Topic and Intended Contribution**

In recent years, it has become a widely shared conception among researchers and practitioners in the field of international business that SMEs rely heavily on technology development to enhance business performance in foreign markets. This notion is rooted in the idea that international technology development enables SMEs to align their business operations to the particular conditions of foreign markets, which leads to competitive advantages. Extant research has underscored the importance of leveraging the external competence of foreign customers to provide explanations for how resource-constrained SMEs can successfully exploit opportunities for new technological solutions. Customer relationships seem especially instrumental in providing knowledge that facilitates technology development in the foreign market context. To date, however, there is no clear consensus regarding appropriate media strategies for SMEs when developing new technology in customer relationships. Although plenty of research has been devoted to less personal modes of interaction, such as the use of information and communication technology, the relationship between personal interaction and international technology development is still largely unexplored in the realm of SMEs' foreign customer relationships. The purpose of this article is to uncover the alleged effect personal interaction has on international technology development with regard to SME foreign customer relationships. Furthermore, the article examines the mediating effect of knowledge transfer between personal interaction and international technology development in foreign customer relationships.

### **Method**

This study investigates 188 relationships between SMEs and their foreign customers. The data are derived from questionnaires revolving around a selected business relationship. A model of personal interaction and

international technology is devised on the basis of three hypotheses. Subsequently, this model is statistically analyzed with LISREL.

### **Findings**

The results demonstrate that the effect of personal interaction on international technology development is not direct but rather is mediated by the construct of knowledge transfer. The lack of a direct effect between personal interaction and international technology development is somewhat unexpected because previous theory suggests a direct relationship between the constructs of personal interaction and technology development. The indirect effect of personal interaction on international technology development is, however, proven to be positive and powerful within the realm of the structural model. Personal interaction strengthens the relational interface between firms—namely, knowledge transfer—which in turn has a positive effect on international technology development. The theoretical implication of this finding is that personal interaction is not an instrument for technology development in and of itself. Rather, personal interaction plays a pivotal role in coordinating and contextualizing heterogeneous knowledge, thus paving the way for knowledge transfer. By enhancing the capacity to transfer knowledge in customer relationships, personal interaction is indeed a sufficient undercurrent for international technology development.

### **Article 5: Network Development and Knowledge Creation within the Local Market: A Study of International Entrepreneurial Firms** (Forthcoming in *Entrepreneurship and Regional Development*)

#### **Topic and Intended Contribution**

Whereas models of international entrepreneurship highlight the importance of knowledge for successful internationalization, little is known about how international entrepreneurial firms actually create knowledge within the confined setting of a specific local market. The lack of attention paid to the local perspective reflects a research deficiency in the field, especially considering the magnitude of research showing that developing

regional awareness by participating in local networks creates distinctive business benefits. In this vein, this study aims to contribute to international entrepreneurship theory by examining whether network development at the local market level can serve as leverage for knowledge creation in local business relationships. Network development is argued to enhance the understanding of local market structures and make firms more inclined—and better able—to create knowledge in local market business relationships. The basis of this argument is that networks provide a multitude of opportunities for the exploitation of previously unexploited combinations of knowledge.

## **Method**

Data were gathered from surveys conducted with an effective random sample of 188 small and medium-sized enterprises in Sweden. The questions revolved around a specific business engagement in a local foreign market. A LISREL-based analysis was performed to test the three hypotheses deduced from the theory.

## **Findings**

First, in line with the theoretically deduced assumptions of this article, the findings from the structural model offered strong evidence for the notion that local network development is of critical importance for enhancing knowledge creation in local business relationships for international entrepreneurial firms. The findings show that network development spurs knowledge creation for international entrepreneurial firms in local markets. This may be explained by the notion that network development integrates firms into the local network, which, in turn, gives them access to knowledge and contextualizes their interpretation of that knowledge. Second, to amplify our understanding of the constructs that influence knowledge creation, the mediating role of knowledge combination was investigated. The structural model revealed that network development had a positive impact on knowledge combination. The results indicate that network development opens up possibilities for the formation of knowledge combinations. That is, network development enables firms to

identify, access, share, and integrate knowledge in ways that trigger knowledge creation in business relationships. Hence, network development is a strong requisite for knowledge combination in the realm of the local market. In turn, the model provided evidence that knowledge combination had a positive impact on knowledge creation. In fact, the effect of knowledge combination on knowledge creation was even stronger than the effect of network development on knowledge creation. Hence, knowledge combination serves as a powerful catalyst in the knowledge creation process and even magnifies the effect of network development. On the basis of these findings, it can be concluded that activities of network development and knowledge combination are intimately related in the local market operations of international entrepreneurial firms. Ongoing network development is necessary to identify and implement emergent opportunities for knowledge combination in network relationships.

## **Article 6: Knowledge Combination and Knowledge Creation in a Foreign Market Network**

(Published in the April 2009 issue of *Journal of Small Business Management*)

### **Topic and Intended Contribution**

This article rests on the assumption that knowledge is dispersed among different individuals and entities. When dispersed pieces of knowledge are combined, new knowledge may be created. Building on the notion that resource constraints make international entrepreneurial firms dependent on external knowledge, it is assumed that a portion of knowledge combination takes place in networks. Although networks are widely known to stimulate innovative behavior in international entrepreneurial firms, little is known about the actual factors that influence knowledge creation in these settings. The purpose of this article is to investigate the impact of network knowledge and knowledge combination on entrepreneurial firms' knowledge creation. Specifically, this article attempts to do the following: (a) add to the growing knowledge paradigm within international entrepreneurship theory by providing explanations for the instrumental processes underlying knowledge creation and (b) provide specific insights into international entrepreneurship theory regarding the particular effects

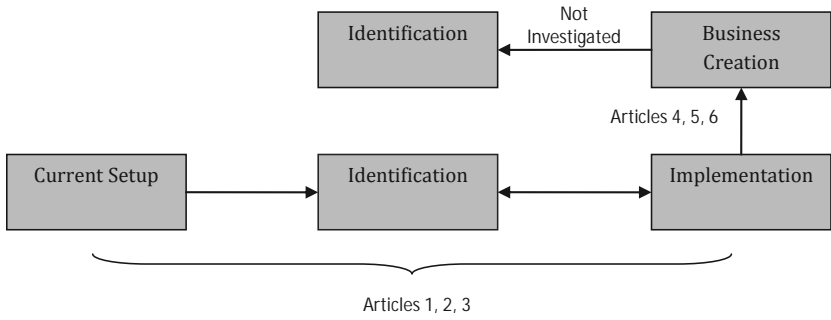
that different types of network knowledge (supplier network knowledge and customer network knowledge) have on the processes of knowledge combination and knowledge creation.

## **Method**

The study investigates 188 relationships between SMEs and their foreign customers. The data are derived from questionnaires revolving around a specific business engagement. Three hypotheses are developed and tested in a structural equation model using LISREL.

## **Findings**

The findings from the structural model offer strong indications that knowledge combination is a central activity that enables knowledge creation in foreign markets. The results suggest that the processes by which international entrepreneurial firms create knowledge for business purposes are dynamic. Hence, to create knowledge for the purposes of developing procedures and product offerings, firms must constantly renew knowledge by combining it in different ways. The article studied the roles of both the foreign supplier network and the foreign customer network in the process of knowledge combination. Specifically, it investigated how dependence on supplier and customer network knowledge affects the knowledge combination construct. The structural model reveals several interesting findings by showing that dependence on customer network knowledge has a positive effect on knowledge combination. Within the contextual realm of the model, this finding indicates that firms consider knowledge from the customer network to be valuable when exploiting new combinations of knowledge. The findings reject the hypothesis that dependence on supplier network knowledge has a positive effect on knowledge combination. This result indicates that knowledge from the supplier network is not substantially involved (in a direct sense) in the process of knowledge combination in this context.



*Figure 7: The structure of this thesis; the main focus of the separate articles.*



## Concluding Discussion

Business creation is the backbone of success for international SMEs. By continually renewing their business models, firms can cope with change—or even invoke change—in the global competitive landscapes of which they are part. This is, of course, not an easy task. These firms face distinct challenges from each foreign marketplace. A business model that is successful in one market may very well shatter and fall apart elsewhere. Previous research has suggested that effective leverage of external knowledge can generate an innovative impetus that enables SMEs to deal with new environments. This thesis tackles this compelling issue, namely, by providing insights into the effects of network knowledge combination on business creation in foreign markets.

By attempting to shed light on the concept of network knowledge combination and its alleged relationship with business creation, this thesis foreshadowed two contributions: First, the thesis investigated the conceptual viability—and empirical substance—of network knowledge combination. By integrating the network approach and theory on knowledge combination, this thesis set out to illuminate the major drivers behind international entrepreneurship among SMEs. The thesis offers a broad outlook by arguing that critical knowledge is often generated in intricate processes outside the firm, predominately in network relationships. Second, this study aimed to examine explicitly the effect of network knowledge combination on business creation in international SMEs. In so doing, further insights into the actual determinants that shape the competitiveness of these firms can be gained. These contributions are both theoretical and empirical in nature. The theoretical contribution concerns the development of a new theoretical concept and its effects, whereas the empirical contribution regards the applicability of this theory in the context of SME business operations in foreign markets. The following question naturally surfaces: Are these objectives accomplished in the six individual studies? Although each study brings discrete insights, the sum of results merges into reasonably unified and general contributions. The first research question, mirroring the first intended contribution, reads: How is knowledge combined in the networks of international SMEs?

## **First Major Contribution to Literature on International SMEs: Validation of the Concept of Network Knowledge Combination**

The findings of the studies support the ideas of Powell et al. (1996), indicating that firms may choose interdependence over independence in the pursuit of successful knowledge development. That is, rather than using external relations as temporary mechanisms to gain competences that firms do not master themselves, firms use network knowledge to expand all their competences. In practice, knowledge that is leveraged outside the boundaries of the firm can produce valuable synergies that eventually contribute to competitiveness. Firms that embrace the dynamics of networks can avoid becoming mired in outmoded business practices that deteriorate profitability and growth. Although internal organizational systems can be effective, they may, over time, foster a culture in which business models are taken for granted, meaning that the basis of firm competitiveness is not thoroughly evaluated regularly. Network partners can alleviate such problems by ceaselessly contesting the efficiency and applicability of current practices. They may also provide leads to market-specific opportunities, enabling firms to differentiate efficiently. New perspectives may help firms detect problems and adapt to cultural and institutional conditions. Hence, contrary to common belief, international SMEs may not participate in networks as a consequence of being small. They may actually refrain from expanding their internal organizations to maintain resilience with regard to developing knowledge and new business. As a result, international entrepreneurship can grow among groups of network actors, forming entrepreneurial networks. SMEs may operate in global industries, and these networks—often worldwide—can help firms approach opportunities with global strategies, thus helping firms determine which markets possess important customers, collaborators, and suppliers and how these relationships should be coordinated.

Knowledge residing in networks is considered a key resource for international SMEs because it can be continually transported, transformed, and resurrected in an infinite number of combinations across network relationships. Network knowledge combination, of course, does not come without effort. Firms often have to span large geographical distances to

maintain contact with numerous partners; they also need to dedicate time and effort to translate complex data into business acumen. By staying open to both current and changing conditions in the external environment, firms can navigate toward network positions from which they can make optimal use of knowledge. Therefore, firms will always move toward new openings, rupturing existing structures and modes of business. The studies of this thesis stress the notion that network knowledge combination is a dynamic mechanism that strongly underpins SMEs' activities in foreign markets. This concept invokes useful new insights that contribute to research on international entrepreneurship in general and research on international SMEs in particular. Like any growing body of knowledge, these fields are not short on ambiguity. Researchers of different schools of thought have applied theories of networks and knowledge without fully reconciling these concepts. Thus, making it necessary to move beyond the boundaries of the firm and realize that knowledge-based opportunities can be exploited by the entrepreneur on a larger scale. This thesis intends to tackle this problem by proposing an integrated approach, which merges the concepts of knowledge combination and networks into a multidisciplinary framework, to understand the international operations of SMEs.

Article 1, for example, contests the longstanding propriety assumption of the resource-based view, which prescribes resources as belonging to the individual firm. Conversely, this study provides empirical evidence supporting the fact that SMEs actively extract critical resources from network relationships and also command the external processes by which these resources are exerted. The fact of the matter is that the scope of resources deployed in these ventures far belies the size of many of the investigated firms. Networks help firms scale their operations to break into new markets and fields of practice. Networks provide firms with a diverse set of resources, as well as effective conduits to deploy these resources. The findings show that firms aspire to function as nodes in networks, parceling out viable network resources in the exploitation of international ventures (i.e., new products and new markets). The adoption of a network perspective on the resource-based view may contribute to a more accurate understanding of the scope and content of organizational mechanisms that are involved in the strategies of international ventures. Based on the

assumption that networks are conducive to resource combinations, the outlook on the basic requisites of international entrepreneurship and international ventures may be widened. Although this study does not account for the knowledge dimension in an explicit way, it is clear that knowledge components are important ingredients in resource combinations. Using this finding as basis for further discussion, Article 2 explicitly outlines a theoretical base for the concept of network knowledge combination. It also studies the concept empirically in the realm of SMEs' international ventures. The study finds empirical support for the theoretically deduced notion that the process of knowledge combination can be divided into two principal phases: identification and implementation. Specifically, the study reveals that participation in networks opens pathways for the identification and implementation of knowledge combinations. The identification of knowledge combination is catalyzed by the capability to absorb external intelligence and resources. The implementation of knowledge combinations is governed by various forms (and degrees) of interaction between network partners. Interaction assists participants in sharing knowledge with each other and synthesizing it into meaningful combinations. Hence, Article 2 suggests that SMEs need to possess both the perceptiveness to identify knowledge combinations and the endurance to implement these combinations. Only through entrepreneurship in networks can firms release the full potential of international operations. Article 4 concurs with the findings of Article 2, positing that interaction between firms is pivotal to leverage matching pieces of knowledge in networks. Personal modes of interaction in particular seem crucial to interpret and utilize knowledge, not least of which when it is difficult to formalize. The machinery that orchestrates knowledge combination, however, is complex and cannot be taken apart piece by piece. In this vein, Article 3 acknowledges that network knowledge combination stems from a vast number of interdependencies between knowledge components. Thus, research on SME international product ventures should focus on the provision of coverage for the network at large rather than on discrete network relationships. Any combination of knowledge needs to be projected with some sort of coherence onto the overall configuration to which it belongs. The results of Articles 1, 2, and 3 divulge that the greater the degree of complexity of the business operations

in which SMEs engage, the greater the depth and scope of the network combinations. The business strategies of many of these firms may, as a result, encompass an intricate mix of numerous network relationships. If effectively leveraged for coordinated collective action, these relationships may confer synergetic effects that boost the business potential of knowledge combination. Research on international SMEs should therefore turn greater attention to analyzing how network structures carry business activities and how knowledge combinations are conceived and regenerated over time as network structures evolve. In compliance with empirical observations, firms need to allocate time, resources, and effort carefully to a magnitude that balances against the particular conditions and capacities of each network relationship. Moreover, to maximize the thrust from resources deployed in these relationships, firms need to make certain that each relationship is well coordinated with the network at large.

## **Second Major Contribution to Literature on International SMEs: The Impact of Network Knowledge Combination on Business Creation**

The conceptual and empirical work has, to this point, supported the notion that knowledge combination is a valid concept, particularly when examining the foreign business operations of international SMEs. That is, according to previous research on international SMEs, sources of competitiveness in foreign markets develop not only within firms but also in collaboration with other firms and individuals. An outward view of knowledge is therefore proclaimed as highly useful when analyzing the international operations of smaller firms. The adoption of such a view provides a better understanding of the different routes available to firms when pursuing opportunities in the global business environment. Although the concept of network knowledge combination has proved useful as a framework for understanding key operations of international SMEs, it has to this point merely alluded to the concept of business creation. Hence, the second intended contribution of this thesis is to investigate explicitly the proposed link between network knowledge combination and business creation in this context. The research question that captures this objective

reads as follows: What is the relationship between knowledge combination in networks and new business creation in international SMEs?

Article 4 shows that personal interaction and knowledge transfer have a clear effect on business creation activities involving technology development. This finding implies that social mechanisms (i.e., personal interactions) are instrumental in easing the exchange of knowledge between international SMEs and their network partners. The results thus indicate that personal interaction spurs the implementation of knowledge combinations across relationships, leading to higher performance in technology development. Article 5 offers straightforward empirical evidence, revealing a positive correlation between knowledge combination and business creation. The study also includes a network dimension, showing that network development confers tectonic shifts in the overall network architecture that reveal latent opportunities. That is, network development can disclose possibilities for combining previously unconnected pieces of knowledge. The study indicates that international SMEs can actively coordinate critical knowledge in networks for the purpose of creating new business. By employing a diverse set of network relationships, firms can tap into a variety of knowledge input. A portion of this external input may be complementary to each other or internal input and thereby generate new business solutions. Network development is therefore extremely important because it determines what knowledge flows are available to firms and how these flows can be synthesized to achieve synergies. Based on these findings, it is assumed that network development both facilitates and constrains the development of knowledge combinations. Article 6 involves a confirmatory inquiry that explicitly models how knowledge input from customer and supplier relationships influences knowledge combination and business creation in international networks. The results show that knowledge from customer relationships has a greater impact than knowledge from supplier relationships on business creation. Overall, however, the study provides ample evidence to support the notion that network knowledge increases in value when combined. That is, the study statistically proves that knowledge combination in networks positively affects business creation.

The sum of these findings leads to the notion that networks create the overarching structures that provide opportunities—and the knowledge of how to act on these opportunities. The ability of SMEs to create new business has sometimes been rather obscurely described as an act of creativity. Creativity, however, does not emerge from nothing. The study has reinforced the idea that business evolves on the basis of knowledge, which allows firms to break away from current practices and develop unique business solutions. In short, business creation stems from what is known within the firm and—equally important—what is known within the network of the firm. The knowledge of the firm and the knowledge of the network cannot be separated. The findings of the thesis suggest that the liability of smallness among international SMEs may have been overrated by previous research, at least concerning its alleged effects on business creation. In fact, SMEs that are able to employ network knowledge for innovation may enjoy several advantages as a result of being small. They do not have to carry the bulk of competences within their organizations but can readily tap into diverse flows of knowledge that reside outside their own boundaries. This may enable firms to stay open to emerging opportunities on several fronts and thereby outperform competitors. The results of the study support the notion that external networks may sometimes be more powerful vehicles for innovation than activities that are carried out under the roofs of individual firms. This idea can be explained by the concept that networks enforce progressive adaptation in markets, openness to new ideas, and constant reassessment of current business operations. Network studies on international SMEs, however, have in the past rarely embraced the notion that individual firms can take control of situations by employing external relationships for business creation. Conversely, traditional network theorists have advocated that networks evolve almost deterministically, shaped by collective action. It is, of course, true that every network relationship is not within the grasp of firms. Based on observations in the studies of this thesis, however, entrepreneurial action can be manifested by constellations of individuals and organizations that collectively exploit knowledge for certain purposes.

## General Contributions to International Entrepreneurship Theory

International SMEs rarely find themselves in a static position but rather are constantly on the move toward new openings in niche markets where there are no or few dominating incumbents (larger, more affluent firms). These are, one might argue, the terms of their existence. The findings suggest that turbulent and ever-changing business conditions call for entrepreneurial capabilities that enable SMEs to leverage external knowledge. The concept of network knowledge combination reconciles the notions of knowledge and networks into a framework that is argued to be highly explanatory for the overall entrepreneurial pursuit of firms in foreign markets.

Most studies in international entrepreneurship have viewed the entrepreneurial act as the discovery and exploitation of opportunities in foreign markets (Oviatt and McDougall 2005). Researchers have stipulated international entrepreneurship to be strongly represented by proactive behavior that is based on intentional strategies. This thesis, however, proposes that the discovery and exploitation of international opportunities constitute a far more complex process than previously thought. From a network perspective, international entrepreneurship appears to oscillate between proactive and reactive behaviors. When international ventures are actually instigated, unforeseen challenges tend to surface, and firms need to turn them into advantages. International ventures are woven into networks where the extent of international opportunities unfolds little by little as firms intensify their foreign market operations. Although firms can indeed influence networks by proactive strategies, they are at the same time influenced by networks, which, in turn, calls for reactive strategies. For example, when knowledge and resources are combined across network actors for the purpose of creating new business, side effects may occur that require responses. It is here postulated that international entrepreneurship should not be limited to models working on the assumption that firms follow deliberate international strategies resulting in certain patterns of internationalization in terms of pace or age at internationalization (e.g., born global theory). Entrepreneurship in the international arena may, in fact, be more accurately pinned down by the cognition that guides the pursuit of opportunities, enabling firms to create new business. This is the notion that should be at the very heart of international entrepreneurship.



Regarding smaller firms, it is here further proposed that entrepreneurship may involve a shared cognitive framework that spans numerous network relationships, which ultimately drives the entrepreneurial exploitation of international ventures. As previously mentioned, firms have to be both proactive and reactive in these structures because actions in networks tend to have ramifications that firms need to handle. For example, the planned launch of a new product in one market (proactive) may trigger a demand for complementary products, perhaps to be developed in collaboration with suppliers in another market (reactive). Apart from spinoffs, it is also conceivable that opportunities are transformed entirely when different types of network knowledge are combined. For example, new technology that is developed in collaboration with suppliers may turn out to be completely different from what was first anticipated, thus forcing firms to find new application areas and new customer segments. It is here claimed that the capabilities of many smaller firms are, to a large extent, embedded in network relationships and develop in tandem with changes in the overall network structure. Opportunities for new business thus exist only at certain points in time and space and may quickly disappear and reappear as a result of network dynamics (e.g., changing customer requirements, increased competition, or new supplier technology). Hence, internationalization may unfold as an ongoing entrepreneurial activity of creating new business in ever-evolving network contexts.

Furthermore, although it is undoubtedly pertinent for researchers in the field of international entrepreneurship to investigate the patterns and speed of internationalization, this thesis has focused on the more neglected pre-internationalization and start-up stages of international ventures. By focusing on these discrete stages, this thesis reveals more about the actual mechanisms by which new international business is created. It is evident that smaller firms tend to mobilize the extended knowledge bases of networks when expanding internationally. Eventually, these dynamic structures underpin the formation of international ventures and form the intricate grounds for their competitive advantages. Hence, this study gives some answers as to the actual drivers of small business success in international markets. Researchers in the field are encouraged to take a more “boundary-less” view of firms, given that the knowledge to cope with

(or provoke) entrepreneurial behavior to a large extent is created in the interplay with others. If firms were detached from critical network relationships, their entrepreneurial capabilities could very well be compromised (in the same way that they could be reinforced if the firms were connected with compatible partners). In some instances it may even be more accurate to talk about entrepreneurial networks than entrepreneurial firms.

### **Concluding Model and Directions for Future Research**

The entrepreneurial capability to exploit opportunities in foreign markets is heavily influenced by the overall cognitive structure of the network in which the firm is embedded. International SMEs create business in foreign markets by orchestrating knowledge from a variety of network relationships. At any given moment, networks harbor latent opportunities that can be triggered by the successful combination of different sets of skills. Consequently, the spread of knowledge in networks provides a substantial impetus to the formation of unique business solutions. Essentially, innovation is conceived in conjunction with the knowledge bases of different organizations and individuals. Hence, differentiation and improvements of business models often take place outside the boundaries of firms. Although models in international entrepreneurship have previously underscored the discrete merits of knowledge and networks, few attempts have been made to integrate these into a unified framework. This thesis offers a novel perspective for understanding the requisites of entrepreneurial opportunity seeking and opportunity exploitation in foreign markets. This could well serve as a platform for further research in international entrepreneurship and generate new knowledge about, for example, interorganizational management practices, core entrepreneurial capabilities, and mechanisms for internationalization and growth.

The findings lead to the idea that independence—which in the past has been regarded a virtue—does not necessarily benefit international SMEs, or may even be corrosive when it comes to business creation. In essence, this explains why SMEs tend to rely more heavily on relationship portfolios than on technology portfolios to promote diversification and innovation. If firms

do not stay open to external stimuli, new ideas can be sourced only from the internal organization. A strict reliance on internal resources may be a straitjacket for firms because organizations often produce redundant knowledge and ideas. That is, internal cognitive structures are upheld and constrained by shared mindsets and organizational cultures. This means that firms can be invigorated by new perspectives of network actors. It is here argued that network knowledge combination sheds new light on the paradox of how firms can continue to capitalize on the competences on which they were founded over time without becoming stagnant (Floyd and Wooldridge 1999). The findings of this thesis imply that SMEs' knowledge is rejuvenated when exerting their capabilities to combine knowledge in networks, thus implying that core competences can be sustained over time. Obviously, this reasoning is far from the neoclassical view on markets, which regarded individual customers and suppliers as virtually independent entities. From a network point of view, it is indeed more difficult to pinpoint exactly where knowledge is created because it is hard to tell where the firm ends and industry starts. Nonetheless, the findings show that international SMEs cannot neglect networks as a dynamic source of knowledge development. Through networks, these firms are able to use knowledge more quickly and effectively than suggested by previous research on business relationships and networks (which tend to rest on the assumption that network relationships are always time consuming to develop). In some of the observed cases, networks are formed around advanced technological projects that last a mere 2 to 3 years before objectives are achieved and partnerships are loosened or dissolved. This finding suggests that a vital part of being an international entrepreneur is being prepared to shift or adjust strategies regarding markets and products rapidly. Firms that are able to leverage networks tend to be those that recognize the fact that it is more efficient to deploy network knowledge than to develop all competences in-house. This may confer early-mover advantages in emerging markets on SMEs. In this light, it is not surprising that networks have also been observed to serve as springboards to foreign markets. Studies have showed that smaller firms, especially those in niche industries that need to seek a broader customer base, are often part of globe-spanning networks from the outset. The observations point to the fact that firms use the support of network connections at the domestic and

international market levels when entering particular foreign markets. Network connections on the global level can thus promote entrance, local adaptation, and integration in an indefinite number of regional networks worldwide.

The inclination of SMEs to compete in ever-changing niche markets is usually reflected by a strategy to steer away from the competition of large, incumbent firms. Yet another competitive challenge for smaller firms is that—because of limited resources—they cannot easily repel new entrants in their markets. Consequently, these firms are constantly on the move to new markets or new market segments. The findings of this thesis suggest that these conditions call for flexible networking, where networks can be triggered for prompt action that extends firms' operations into new markets and changes the strategic course of firms. In this endeavor, new knowledge combinations across network actors can be induced by staying open to new ideas and new relationships. Acting on opportunities from new knowledge combinations involves dismantling latent resources to create business solutions that meet emerging demands in the global marketplace. Although it may be costly to change strategic directions and reconfigure network relationships on a regular basis, the benefits usually outweigh the detriments. In fact, switching costs generally appear to be reasonably low among network-oriented firms because investments are spread among network members. Flexible networking is also likely to breed synergies and creative ideas, both in terms of reinforcing firms' abilities to anticipate market potential and advancing technological/product frontiers. Hence, to keep pace with global competition, SMEs need to maintain not only lean internal organizations but also fast decision-making systems in their external networks. There are many challenges, however, to consider when operating in networks. For example, firms are engaged in a constant struggle to manage networks that span geographical distances, to be sensitive to change (e.g., regulations, deregulations, shifting demand, shifting supply) in both globe-spanning networks and international markets, to screen markets for key actors, to evaluate existing relationships, to coordinate production with market demand even though they are sometimes far apart, to find appropriate means of communication and

coordination, and to devise routines with international applicability to shift strategies swiftly when necessary.

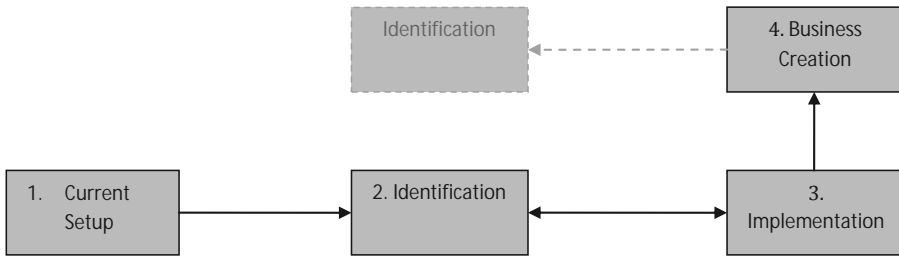
Before the model of network knowledge combination is revisited and the synthesized findings of the six articles are presented, some overarching characteristics of the concept are addressed. Namely, the network knowledge combination perspective implies that processes of business creation in international SMEs are boundary spanning, entrepreneurial, and dynamic. These hallmark characteristics will be reviewed, and their potential implications to the international SME literature will be addressed. Firstly, the notion that business creation is boundary spanning means that novelty often stems from distinct constellations of knowledge combinations that cut across several relationships in the network. It is clear that powerful ramifications may emanate from merging pieces of knowledge in separate network relationships. Synergy effects that accrue from such processes are elusive phenomena that have not been extensively dealt with either by organizational theory or by practitioners. It is here proposed that one must explore multilateral processes to obtain a detailed understanding of the still very enigmatic success factors of international SMEs. Hence, there is a need for new insights into multi-organizational governance, providing managers with guidelines for how to manage such situations. More effective accounting methods for measuring performance in networks are also needed. This could allow firms to consolidate activities, knowledge, and resources in networks to produce desired effects. This would bring enhanced clarity into processes that, in many cases, are obscured and difficult to distinguish. Switching costs could then be reduced as processes, and properties of the network could be better evaluated, substituted, and transformed. Cost, accounting, and coordination issues regarding network knowledge combination in international markets are, hence, vital areas for future research.

Secondly, it is pointed out that network knowledge combination is largely entrepreneurial, implying that firms can harness an ability to create business in networks by bridging the gaps between pieces of knowledge that are scattered among network actors. The primary characteristic of this inclination is a risk-taking and opportunity-seeking behavior where the entrepreneur uses past knowledge as a reference to handle new situations.

Such firms tend to be willing to experiment with alternatives even though they face outcome ambiguities. In so doing, they can find latent niches and uncover new paths for business. The ability to navigate toward advantageous network positions makes successful firms stand out from the masses. The idea of network knowledge combination as a capability—which to a large extent is embedded in network relationships—enabling firms to exploit entrepreneurial opportunities has not been explored in small business research, nor by scholars in the field of international entrepreneurship. The field has had a history of keeping age and speed of internationalization as standard presumptions rather than focusing on the cognitive aspects that are arguably even more representative of actual entrepreneurial behavior. This thesis could serve as a point of departure for researchers to look deeper into the links between various capabilities-perspectives (e.g., network knowledge combination-capability) and international entrepreneurship.

Network knowledge combination is, moreover, a dynamic process, which means that existing knowledge combinations drive future knowledge development. When entering foreign markets, firms can gain access to scattered expertise that aligns knowledge development with local mindsets, cultures, and institutions. As firms combine knowledge in foreign market networks, their perspectives are widened, and they are able to look farther afield for new acumen. Network knowledge combination will expand the perceived network horizon and set the direction for firms' pursuit of future opportunities. Technological knowledge received from key suppliers, for example, may push firms' overall intellectual capacity and increase their capabilities to deploy efficiently production facilities, capital, patents, and R&D personnel. Market knowledge, furthermore, is drawn from key customers and affects the deployment of resources as the strategic core of firms (manager and staff networks, distribution channels, brands, products, marketing personnel). Market knowledge is an important component in knowledge combinations because it allows firms to optimize the use of all resources available to the firm (by aligning technology to market needs). Results show that firms that are active in customer networks are more likely to receive market knowledge than firms that are less active. As a result, these active firms are better able to maximize the use of their entire

resource base. They know *what* to focus on strategically for the future, rather than just knowing *how* to execute daily business activities for the present. In many respects, knowledge combination is not a straight path, meaning that new opportunities can materialize along the way. Currently obscured domains of knowledge may suddenly become visible as firms continue to develop network relationships. Hence, while implementing knowledge combinations, firms may discover new ways of doing things in response to ideas that are born through this dialogue. The process is a catalyst unto itself, suggesting a self-perpetuating model of business creation. Finally, it is noted that the dynamic perspective of network knowledge combination is opening up new avenues for future research on the link between networking and strategic renewal in international SMEs. These findings may also have implications for how internationalization is viewed. Johanson and Vahlne (2009) claim that firms will go where they see opportunities. The results of this study add to this notion by showing that firms are led by opportunities, as implementation notoriously unfolds in unpredictable ways. In short, an increased reliance on a knowledge-network perspective adds more complexity to what is viewed as “the path of internationalization” because processes therein tend to include many twists and turns that lead to countless ramifications. Under circumstances in which firms rely heavily on networks and knowledge, it is meaningless to model general patterns for how firms internationalize because the paths on which they embark tend to be broken or forked. Based on the large empirical sample of this study, which spans many business sectors, network knowledge combination seems to be important not only for firms belonging to knowledge-intensive industries. Firms need to advance knowledge about markets, customers, and product applicability regardless of industry (an exception to this notion is found in Article 5, where the model was not valid for firms with many patents). Figure 8 displays the basic structure of network knowledge combination, implying a dynamic process of self-perpetuating business creation. The figure elucidates a model that is entrepreneurial and where processes—to a varying degree—take place across organizational boundaries. The outcomes will shape firms’ future strategic options and breathe content and purpose into the network structure.



*Figure 8: Model on the relationship between network knowledge combination and business creation in international SMEs.*

1. *Current setup*: Firms' network connections, both domestic and global, determine what options are available to firms and may help them integrate their business strategies with the needs and wants of customers in foreign markets. The current network configuration is formed to rationalize and economize the execution of prevailing business models (i.e., transactions are often standardized to promote efficiency). SMEs operating in rapidly evolving markets tend to maintain a certain amount of slack in their operations, which enables them to pursue new opportunities when old ones dry up. The current setup of the network determines the current network position and what paths are available to the firm in terms of knowledge opportunities.
2. *Identification*: Risk taking and opportunity seeking are the hallmarks of entrepreneurial activity at the point of SMEs' exploitation of opportunities. Moreover, small size and limited internal resources contribute to an outward outlook on how to do business—meaning that inter-organizational dependence may be regarded as an asset, or a strategic path, rather than a liability. Firms use interpersonal and inter-organizational contacts to combine previously unconnected pieces of knowledge. In this search, they may intensify the interaction with current and/or new network partners so as to receive



intelligence about competences that could potentially form the basis of new business solutions. Thus, firms that function more effectively as brokers between different network relationships possess a greater chance of accessing non-redundant knowledge. Such knowledge may spark synergies that firms can use to augment their innovative capacity. In contrast to research that describes the smallness of firms as a constraint for foreign expansion, the findings of this thesis provide strong evidence that small size may enable firms to mix their core competences quickly with a diverse range of existing and emerging knowledge applications in their business habitats—ultimately pushing business creation and foreign expansion.

3. *Implementation*: In this phase, firms seek to find the best way to use knowledge. The implementation phase is, thereby, best coordinated by close interaction that can stimulate knowledge transfer and knowledge creation. Outcomes (e.g., products, technology, market shares) and operational costs of knowledge combinations are not easily measured on an a priori basis, which is why firms need to adopt a certain propensity toward risk and a willingness to experiment with alternatives. This means that projects can take turns that were not calculated—for better or for worse. Regardless of how the process unfolds, the network structure will be transformed in terms of setup and purpose (to a varying degree). New knowledge combinations are realized, resulting in a new overall constellation of knowledge in the network. In effect, firms end up in new network positions that have implications on their strategic outlooks and practices.
4. *Business creation*: Staying ahead of the competition is vital to repositioning the firm strategically. Business creation thus matches the knowledge base with market developments. The ability to take control of opportunities for business creation has been found to vary among firms and could be described as a capability that can be reinforced as firms accumulate experiences regarding network operations in one or many foreign markets. Business creation can take different forms, from incremental to transformative outcomes. The implications of different outcomes are not thoroughly investigated in this thesis and are left as a subject for future research.

|                                   | Current Setup                           | Identification  | Implementation  |
|-----------------------------------|---|---|---|
| <b>Strategy</b>                   | Exploitation, aiming for efficiency     | Planning, opportunity seeking                                 | Experimentation, revising plans                           |
| <b>Network position</b>           | Stable                                  | Brokerage   | Assuming a new position                                   |
| <b>Network structure</b>          | Settled                                 | Reconfiguring (shifting interdependencies)                    | Transforming (e.g., governance, mindsets, and objectives) |
| <b>Mechanisms of coordination</b> | Predominately standardized transactions | A mix of standardized transactions and reciprocal interaction | Predominantly reciprocal interaction                      |

*Table 4: Overview of Characteristics of Network Knowledge Combination*

In summary, this model provides a new perspective that augments the understanding of the entrepreneurial processes ingrained in network structures, which greatly influence business creation and, by extension, the internationalization of SMEs. The model links the concepts of networks and strategy and provides explanations for how firms can curb internal stagnation by sourcing heterogeneous knowledge in networks. Table 4 summarizes the general characteristics of the different components of network knowledge combination in international SMEs.

## **Managerial Implications: How Networks Influence International Entrepreneurship in Smaller Firms**

Knowledge combination in networks can infuse value in business processes and accelerate entry and penetration into foreign marketplaces. Undoubtedly, firms run the risk of being blindsided by uncertainties emerging from the global arena. Hence, it can be advantageous to maintain a lean internal organization that is resilient when confronted with challenges and open to opportunities residing in the external environment. Based on the findings of this thesis, lessons can be learned regarding the importance of breaking habits and being open to new practices. This is important because the world outside is constantly changing and imposing new requirements for firms. In the case of international firms, this task is even more daunting and multifaceted. These firms tend to face various foreign markets, all posing unique circumstances in terms of networks, culture, and institutions. Whereas sourcing may be spurned as a failure of internal development, such strategies may lead to far more opportunities than could ever be achieved within a single firm.

### **Entrepreneurial Networks as Sources of Business Opportunities**

It is widely recognized that an entrepreneurial drive is essential to invent and reinvent business in a fast-moving global marketplace. Smaller firms that compete in many different markets need support from international networks to stay innovative and competitive on a global level. Contrary to common belief, it seems that international entrepreneurship is more dependent on external relationships than the presence of a single passionate individual within the firm. Thus, it appears as though the entrepreneurial orientation—which is so important to exploit opportunities in international markets—is primarily released through interaction with others. Network relationships may span international boundaries and constitute dynamic communities of innovation. Combining the unique competences of a variety of network actors can reinforce creativity and result in business innovations that are more powerful than the sum of their parts. Hence, network relationships allow firms to adapt and differentiate,

which is particularly important in competitive markets in the international arena. Firms should waste no time in entering and developing entrepreneurial networks because these networks can confer advantages, especially during the early stages of internationalization when firms need to grasp quickly the structure of uncharted foreign markets. Business solutions created in entrepreneurial networks tend to align better to international markets because they are not biased by the background of one organization alone. Managers of smaller firms should recognize that the image of the independent entrepreneurial hero is often a false idol. It is likely that entrepreneurial networks have greater potential than individuals to stimulate business creation, primarily by producing heterogeneous knowledge that can serve as a hotbed for innovation. Networks also provide the opportunity to experiment with new business solutions because investments and risks are shared by multiple network partners. By interacting in a variety of network relationships, firms are inevitably scrutinized from the multiple perspectives of different international partners. Partners can contest existing ways of doing business, which prevents firms from becoming hampered by “taken-for-granted” mentalities. They can also kindle new ideas, provide connections to key actors, and sketch out new strategic road maps. Preferably, firms should embrace and seek inspiration from an external impetus. They should also be prepared to expose their own ideas to others. Firms that are reluctant to share knowledge and are thereby never second-guessed are likely to miss out on valuable input. In the long term, this could very well be corrosive for business. To foster a knowledge-sharing atmosphere in networks, it is important that all participating firms perceive that they have a fair chance of benefiting from projected outcomes. Management and reward systems also need to promote some degree of experimentation and creative tension among parties.

### **Entrepreneurial Networks as Leverage of Firm Competences**

Small businesses that undergo internationalization are likely to benefit from finding and nurturing a very limited number of niche competences in areas where they have advantages over competitors. Although it may appear as though a firm is putting all its eggs in the same basket, a network

strategy can be a more powerful tool for diversification than a large product portfolio because it enables firms to use their competences in countless new application areas, especially when combined with the competences of others. Firms should therefore opt for a diversified relationship portfolio rather than a technology/product portfolio. Success in developing business in networks hinges on the ability to question operations and premises on which current competitive advantages are built. Firms should constantly look for new business solutions that intersect with future market demands without losing the connection to their core ideas. Highly specialized skills can indeed make firms more valuable as collaborators and thereby increase their chances of accessing the knowledge of potential partners. By staying true to what they do best, firms can maintain lean organizations and quickly jump on new opportunities that can be devised in entrepreneurial network constellations. This may accelerate knowledge development and confer early-mover advantages. Management of entrepreneurial networks is bound to evolve as a managerial skill that has major potential to cut costs in the internal organization and allow for greater specialization because a larger amount of knowledge can be leveraged externally. Knowledge combination that transcends organizational boundaries implies that firms have to push for coordinated action in several business relationships simultaneously, often in complex and iterative processes. In so doing, counterparts ensure that discrete pieces of knowledge are compatible with each other. Knowledge combination in international business poses unique challenges because network partners tend to be internationally dispersed. For example, to implement knowledge combinations between international suppliers and customers, managers may have to bridge large geographical gaps to align customer requirements with technological development. For this purpose, sophisticated information and communication tools can be effective as they provide fast connections at relatively low costs (intranets, videoconferences, chats, social communities, social media, e-meetings). For more complex knowledge combination, face-to-face meetings still appear useful in stimulating knowledge transfer and innovation. Firms may need to work in project groups where representatives from different firms (and business functions) in the network can meet and share knowledge about business operations and future projects. Because interaction strategies that require human involvement are often costly, it is important that they are

primarily applied in relationships that are presumed to contain considerable economic potential. Network relationships are different and should not be treated even-handedly. Resources should be directed where business value is most likely to be extracted. By providing effective management in foreign market networks, firms may become better equipped to align their internal knowledge with the knowledge of counterparts. Recognizing the benefits of the sometimes hidden capacity of combining knowledge in networks can reinforce the market orientation of firms and make them more competitive in the global arena.

## **Entrepreneurial Networks as Catalysts of Global Business Development**

Foreign markets are not isolated entities. In the global village economy of today, industrial markets cross national borders and key customers and suppliers are present worldwide. This is particularly true for smaller firms operating in niche industries. These industries are typically represented by a limited number of geographically dispersed organizations and individuals that comprise a global community. A natural consequence of this condition is that firms in these industries need to acquire knowledge not only about the distinct foreign markets they plan to enter but also about the entire global industry of which they are part. As the findings of this thesis show, this knowledge may concern worldwide intelligence about emerging market segments, new competitors, reference customers, policymakers, innovative suppliers, and purchasing decision makers—to mention only a few. Hence, when breaking into a given national market, firms need to be aware that the marketplace in question is part of a larger context. Operations in one market may have considerable ramifications for business in other markets. International growth for smaller firms is no longer a matter of dealing with one market at a time; it is about dealing with all markets simultaneously. Managers should aim for comprehensive oversight to see how actors in networks are globally connected, as well as what type of knowledge complementarities exist between them. Better awareness of these issues will multiply the strategic options of firms and push business innovation to new levels. This thesis shows that firms gain from identifying key actors that occupy central positions not only in foreign market

networks but also in global networks. By liaising with a critical cadre of influential partners, firms can quickly get a grip on key markets. These relationships can, furthermore, function as powerful springboards to new markets. Critical network relationships can extend firms' resource bases by providing critical knowledge, resources, legitimacy, and actual links to other viable network partners. Hence, the right connections can boost firms' integration in the global network and create opportunities for business creation. Knowledge received from customers could put the firm on the right strategic path and thereby optimize the use of all resources available to it. By working diligently to expand potential opportunities in networks, firms can direct their resources with greater accuracy and efficiency. In this endeavor, firms have to evaluate network partners so as to locate the bright spots where they can source knowledge and leverage key resources.





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## APPENDIX A: The Survey





## Survey – Internationalisation in Business Networks

Businesses often think of entering an international market as difficult. Problems concerning differing rules, the ability to evaluate other companies and cultural differences can become insurmountable obstacles. The ability to utilise knowledge based on previous experiences and to harness the company's network of various business contacts to increase knowledge has often proved key in success abroad. Nevertheless, few studies have been carried out into how companies acquire, transfer and harness knowledge in international business networks. We would therefore like to examine how the content of various business contacts and new advances in IT affect companies' ability to acquire, transfer and harness knowledge, and how this in turn influences companies' development. We need your help to be able to answer these questions and would therefore like to ask you to please complete this survey.

The results will be used for education, publications in international journals, books on internationalization in networks and further dissemination to you, the practitioners with international operations. Preliminary results can be viewed on our website: [www.hhs.se/inet](http://www.hhs.se/inet). We will also arrange a conference for those who complete the survey. The conference will be held at the Stockholm School of Economics in 2009 where we will be presenting the results and holding workshops based on different industrial sectors. The survey is being sent to small and medium-sized enterprises with significant international operations. It is important that you complete the whole survey to enable us to carry out meaningful analyses of the material. **All answers will be treated in confidence.** If you have any questions, please contact Jukka Hohenthal or Emilia Rovira.

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Dr. D. Deo Sharma

Professor

SSE

Dr. Angelika Lindstrand

Assistant Professor

SSE

Dr. Kent Eriksson

Professor

RIT

Your name and position in the company (job title)

Name \_\_\_\_\_ Job title \_\_\_\_\_

Are you interested in taking part in a conference on these issues Yes  No

The survey consists of three parts. In Section A we would like you to provide general information about your company. In Section B we would like you to choose and answer questions about a specific international business contact. In Section C we would like you to answer questions about the players related to the chosen international business contact.

A. GENERAL

How many patents does your company have? \_\_\_\_\_

How many new products/services have you launched in the past year? \_\_\_\_\_

How many new customers have you sold to in the past year? \_\_\_\_\_

How many new suppliers have you bought from in the past year? \_\_\_\_\_

In which year did you have your first foreign sale? \_\_\_\_\_

What percentage of the company's sales do the five largest customers account for: \_\_\_\_\_

What percentage of the company's purchases do the five largest suppliers account for: \_\_\_\_\_

|   | Not at all | Completely |   |   |   |   |   |
|---|------------|------------|---|---|---|---|---|
| We depend on our five largest suppliers for our product/service development | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
| We depend on our five largest customers for our product/service development | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
| Our customers depend on us for their product/service development            | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
| Our suppliers depend on us for their product/service development            | 1          | 2          | 3 | 4 | 5 | 6 | 7 |

We reach our customers abroad through (tick the options you use):

- Direct export
- Agent
- Distributor
- Wholly-owned subsidiary
- Majority-owned subsidiary
- 50/50-owned subsidiary
- Minority-owned subsidiary

Alliance/Business partner

What percentage of your sales are abroad \_\_\_\_\_ %

#### A SPECIFIC INTERNATIONAL BUSINESS CONTACT

Please choose an international business contact. The business contact must have resulted in actual business being done. Examples of business contacts could be:

- Dealings with a distributor or another intermediary in another country
- Dealings with a customer in another country

Choose a business contact that is important to your company. Please answer the following questions about the business contact:

What type of product/service is the business contact connected with?

\_\_\_\_\_

What is the service/product ratio of the business contact?

0-20% service  21-40%  41-60%  61-80%  81-100%

In which year was the business contact initiated? \_\_\_\_\_

Who initiated the communication?

Customer  You  Third party in host country  Swedish third party  Third party in another country

How or who is the business contact handled by?

Direct export

Agent

Distributor

Wholly-owned subsidiary

Majority-owned subsidiary

- 50/50-owned subsidiary
- Minority-owned subsidiary
- Alliance/Business partner

What is the foreign country? \_\_\_\_\_

How long have you had operations in the country? \_\_\_\_ years

What percentage of your sales does this market account for? \_\_\_\_ %

Have you developed or established new business relations by meeting people at the customer company in your spare time? Yes  No

|  |                        | Not at all |   |   |   |   |   | Completely |
|--|------------------------|------------|---|---|---|---|---|------------|
| Has the business contact resulted in new:                        | -products              | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -techniques/technology | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -procedures            | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -personnel             | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
| How important is the business contact to your company as regards | -knowledge             | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -revenue               | 1          | 2 | 3 | 4 | 5 | 6 | 7          |

|  |                   | Not at all |   |   |   |   |   | Completely |
|--|-------------------|------------|---|---|---|---|---|------------|
| The following factors have been obstacles in the relationship with the business contact: | -language         | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -business culture | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -legislation      | 1          | 2 | 3 | 4 | 5 | 6 | 7          |
|  | -authorities      | 1          | 2 | 3 | 4 | 5 | 6 | 7          |

|   |  | Not at all |   |   |   |   |   | Completely |
|---|--|------------|---|---|---|---|---|------------|
| The relationship with the business partner is | -investments specific to this business partner | 1          | 2 | 3 | 4 | 5 | 6 | 7          |

|                          |  |               |
|--------------------------|--|---------------|
| characterised by:        | -frequent exchange of information              | 1 2 3 4 5 6 7 |
|                          | -the partner fulfilling its obligations to you | 1 2 3 4 5 6 7 |
|                          | -mutual adaptations                            | 1 2 3 4 5 6 7 |
|                          | -mutual investments                            | 1 2 3 4 5 6 7 |
|                          | -innovative knowledge development              | 1 2 3 4 5 6 7 |
|                          | -innovative product development                | 1 2 3 4 5 6 7 |
|                          | -general exchange of knowledge                 | 1 2 3 4 5 6 7 |
|                          | -joint problem-solving                         | 1 2 3 4 5 6 7 |
| The business partner is: | -easy to replace                               | 1 2 3 4 5 6 7 |
|                          | -important as a reference customer             | 1 2 3 4 5 6 7 |
|                          | -a source of knowledge                         | 1 2 3 4 5 6 7 |
|                          | -a source of innovations                       | 1 2 3 4 5 6 7 |
|                          | -a source of capital                           | 1 2 3 4 5 6 7 |

|  |                             | Not at all    | Completely |
|--|-----------------------------|---------------|------------|
| In the business relationship, how familiar is the business partner's:              | -product                    | 1 2 3 4 5 6 7 |            |
|  | -production process         | 1 2 3 4 5 6 7 |            |
|  | -service content            | 1 2 3 4 5 6 7 |            |
|  | -distribution method        | 1 2 3 4 5 6 7 |            |
|  | -knowledge                  | 1 2 3 4 5 6 7 |            |
|  | -competence                 | 1 2 3 4 5 6 7 |            |
|  | -method of solving problems | 1 2 3 4 5 6 7 |            |
| How does the business contact differ from the company's other contacts as regards: | -product                    | 1 2 3 4 5 6 7 |            |
|  | -production process         | 1 2 3 4 5 6 7 |            |
|  | -service content            | 1 2 3 4 5 6 7 |            |
|  | -distribution method        | 1 2 3 4 5 6 7 |            |

|  |              |               |
|--|--------------|---------------|
| We have invested in the relationship in the form of: | -time        | 1 2 3 4 5 6 7 |
|  | -adaptations | 1 2 3 4 5 6 7 |
|  | -capital     | 1 2 3 4 5 6 7 |
|  | -personnel   | 1 2 3 4 5 6 7 |

|                                  |                  |               |            |
|----------------------------------|------------------|---------------|------------|
|                                  |                  | Not at all    | Completely |
| The product/service you sell is: | -imitable        | 1 2 3 4 5 6 7 |            |
|                                  | -adaptable       | 1 2 3 4 5 6 7 |            |
|                                  | -well-documented | 1 2 3 4 5 6 7 |            |

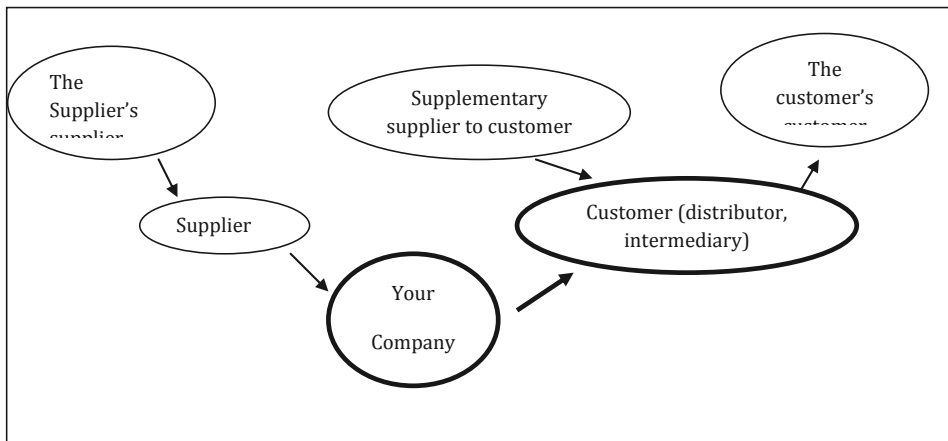
|  |                       |               |            |
|--|-----------------------|---------------|------------|
|  |                       | Not at all    | Completely |
| What sources of information were important in establishing the business contact? | -customers            | 1 2 3 4 5 6 7 |            |
|  | -suppliers            | 1 2 3 4 5 6 7 |            |
|  | -consultants          | 1 2 3 4 5 6 7 |            |
|  | -competitors          | 1 2 3 4 5 6 7 |            |
|  | -authorities          | 1 2 3 4 5 6 7 |            |
|  | -banks                | 1 2 3 4 5 6 7 |            |
|  | -databases            | 1 2 3 4 5 6 7 |            |
|  | -newspapers/magazines | 1 2 3 4 5 6 7 |            |

| How many times does your company have contact with this company via: | Daily                    | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  |                          | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |
| -personal meetings   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|                     |                          |                          |                          |                          |                          |                          |                          |                          |
|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -Internet           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -intranet           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**B. PLAYERS RELATED TO YOUR BUSINESS CONTACT IN THE BUSINESS NETWORK**

Companies do not operate in isolation, instead they often have several related players, such as customers and suppliers, who they work with. A company and its related players can be said to be linked to each other in a business network. The diagram below shows an example of such a business network.



In this survey you are defined as the Company, the Supplier as your supplier of products/services and the Supplier's supplier as your supplier's supplier. The customer can simply be a customer, a distributor or another intermediary. The customer's customer is this party's customer. The relationship between you and the customer is the business contact.

Supplementary supplier refers to a supplier that provides products/services that are essential for your customer to be able to use/refine your product/service.

**We would now like you to answer the questions below bearing in mind the current players related to the chosen business contact.**

We have divided these players into two categories: 1) players on the chosen business contact's market, i.e. local players 2) Swedish or international players from other markets than the chosen business contact's market.

(Later in the survey you will be asked about experiences of previous related players that have had an influence on the chosen business contact and if the business contact has led to new business relations.)

**Current local players on the foreign market related to the business contact**

If the question is not relevant to your company please tick Not at all.

| Local customer's customer  |  |                          | Not at all               |                          | Completely               |                          |                          |                          |   |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| On the foreign market, how dependent is the chosen business contact on your most important local customer's customer's | -product   |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -research and development  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -willingness to collaborate  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -willingness to adapt  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -joint procedures  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -knowledge   |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -modernity, original ideas, contribution to new business opportunities |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
| -social relations  |  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |   |
| How many times does your company have contact with this local customer's customer via:                                 | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |   |
|  |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |   |
| -personal meetings   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -phone   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -Internet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -e-mail  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |



|                     |                          |                          |                          |                          |                          |                          |                          |                          |
|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -intranet           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Local customer's supplier of supplementary products and services  |  | Not at all               | Completely               |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| On the foreign market, how dependent is the chosen business contact on your customer's most important local supplier of supplementary products and services as regards: | -product   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -research and development  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -willingness to collaborate  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -willingness to adapt  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -joint procedures  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -knowledge   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -modernity, original ideas, contribution to new business opportunities | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -social relations  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| How many times does your company have contact with this supplier of supplementary products and services via:  | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|   |  | 1                        | Sever al                 | 1                        | Sever al                 | 1                        | Sever al                 |                          |
| -personal meetings  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Internet   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -intranet   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Local supplier         |          | Not at all | Completely |   |   |   |   |   |
|------------------------|----------|------------|------------|---|---|---|---|---|
| On the foreign market, | -product | 1          | 2          | 3 | 4 | 5 | 6 | 7 |

|  |  |                          |                          |                          |                          |                          |                          |                          |   |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| how dependent is the chosen business contact on your most important local supplier's       | -research and development  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -willingness to collaborate  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -willingness to adapt  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -joint procedures  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -knowledge   |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -modernity, original ideas, contribution to new business opportunities |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
|  | -social relations  |                          | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7 |
| How many times does your company have contact with this most important local supplier via: | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |   |
|  |  | 1                        | Sever al                 | 1                        | Sever al                 | 1                        | Sever al                 |                          |   |
| -personal meetings   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -phone   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -Internet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -e-mail  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -intranet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |
| -video conferencing  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |

|  |                             |            |            |   |   |   |   |   |
|--|-----------------------------|------------|------------|---|---|---|---|---|
| <b>Local supplier's supplier</b>   |                             | Not at all | Completely |   |   |   |   |   |
| On the foreign market, how dependent is the chosen business contact on your most important local supplier's supplier's | -product                    | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -research and development   | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -willingness to collaborate | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -willingness to adapt       | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -joint procedures           | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -knowledge                  | 1          | 2          | 3 | 4 | 5 | 6 | 7 |

|   |  |                          |                          |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | -modernity, original ideas, contribution to new business opportunities |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
|   | -social relations  |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
| How many times does your company have contact with this most important local supplier's supplier via: | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|   |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |
| -personal meetings  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Internet   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -intranet   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|   |  |                          |                          |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <b>Local competitor</b>   |  |                          |                          | Not at all               | Completely               |                          |                          |                          |
| On the foreign market, how dependent is the chosen business contact on your most important local competitor's | -product   |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
|   | -pricing policy  |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
|   | -research and development  |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
|   | -modernity, original ideas, contribution to new business opportunities |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
|   | -social relations  |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |
| How many times does your company have contact with this local competitor via:                                 | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|   |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |
| -personal meetings  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|           |                          |                          |                          |                          |                          |                          |                          |                          |
|-----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -Internet | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Local consultant, authority, etc.  |                         | Not at all | Completely |   |   |   |   |   |
|--|-------------------------|------------|------------|---|---|---|---|---|
| On the foreign market, how dependent is the chosen business contact on your most important local consultant or authority etc. on the chosen foreign market | -consultant             | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -authority              | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -bank                   | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -industry organisations | 1          | 2          | 3 | 4 | 5 | 6 | 7 |

**Current Swedish and other international players related to the business contact**

What group of players is the chosen business contact most dependent on? Tick **one** option:

Your Swedish related players

Your International related players (excluding the chosen market)

Please answer the following questions bearing in mind the option chosen above.

| Customer   |  | Not at all               | Completely               |                          |                          |                          |                          |                          |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| To what extent is the chosen business contact dependent on your most important (Swedish or international) customer's | -product   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -research and development  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -willingness to collaborate  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -willingness to adapt  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -joint procedures  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -knowledge   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -modernity, original ideas, contribution to new business opportunities | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -social relations  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| How many times does your company have contact with this customer via:  | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|  |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |
| -personal meetings   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Internet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -intranet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Customer's customer  |                             | Not at all | Completely |   |   |   |   |   |
|--|-----------------------------|------------|------------|---|---|---|---|---|
| To what extent is the chosen business contact dependent on your most important (Swedish or international) customer's | -product                    | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -research and development   | 1          | 2          | 3 | 4 | 5 | 6 | 7 |
|  | -willingness to collaborate | 1          | 2          | 3 | 4 | 5 | 6 | 7 |

|  |  |                          |                          |                          |                          |                          |                          |                          |  |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| customer's   | -willingness to adapt  |                          | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |  |
|  | -joint procedures  |                          | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |  |
|  | -knowledge   |                          | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |  |
|  | -modernity, original ideas, contribution to new business opportunities |                          | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |  |
|  | -social relations  |                          | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |  |
| How many times does your company have contact with this customer's customer via: | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |  |
|  |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |  |
| -personal meetings   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| -phone   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| -Internet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| -e-mail  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| -intranet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |
| -video conferencing  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |

|  |  |               |  |  |  |  |  |            |
|--|--|---------------|--|--|--|--|--|------------|
| <b>Customer's supplier of supplementary products and services</b>  |  | Not at all    |  |  |  |  |  | Completely |
| To what extent is the chosen business contact dependent on your most important (Swedish or international) customer's supplier of supplementary products and services as regards: | -product   | 1 2 3 4 5 6 7 |  |  |  |  |  |            |
|  | -research and development  | 1 2 3 4 5 6 7 |  |  |  |  |  |            |
|  | -willingness to collaborate  | 1 2 3 4 5 6 7 |  |  |  |  |  |            |
|  | -willingness to adapt  | 1 2 3 4 5 6 7 |  |  |  |  |  |            |
|  | -joint procedures  | 1 2 3 4 5 6 7 |  |  |  |  |  |            |
|  | -knowledge   | 1 2 3 4 5 6 7 |  |  |  |  |  |            |
|  | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |  |  |  |  |  |            |

|   | -social relations        |                          |                          |                          | 1 2 3 4 5 6 7            |                          |                          |                          |                          |  |  |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|--|
| How many times does your company have contact with this customer's supplier of supplementary products and services via: | Daily                    | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |                          |  |  |
|   |                          | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |                          |  |  |
| -personal meetings  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |
| -phone  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |
| -Internet   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |
| -e-mail   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |
| -intranet   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |
| -video conferencing   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |

| Supplier   |  | Not at all               |                          |                          |                          |                          |                          |                          | Completely               |  |  |  |  |  |  |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|--|--|--|--|--|
| To what extent is the chosen business contact dependent on your most important (Swedish or international) supplier's | -product   | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -research and development  | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -willingness to collaborate  | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -willingness to adapt  | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -joint procedures  | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -knowledge   | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
|  | -social relations  | 1 2 3 4 5 6 7            |                          |                          |                          |                          |                          |                          |                          |  |  |  |  |  |  |
| How many times does your company have contact with this supplier via:  | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |                          |  |  |  |  |  |  |
|  |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |                          |  |  |  |  |  |  |
| -personal meetings   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |  |  |  |  |  |

|                     |                          |                          |                          |                          |                          |                          |                          |                          |
|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -phone              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Internet           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -intranet           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Supplier's supplier   |  | Not at all               |                          | Completely               |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| To what extent is the chosen business contact dependent on your most important (Swedish or international) supplier's supplier's | -product   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -research and development  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -willingness to collaborate  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -willingness to adapt  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -joint procedures  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -knowledge   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -modernity, original ideas, contribution to new business opportunities | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|   | -social relations  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| How many times does your company have contact with this supplier's supplier via:  | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|   |  | 1                        | Several                  | 1                        | Several                  | 1                        | Several                  |                          |
| -personal meetings  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Internet   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -intranet   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -video conferencing   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



| Competitor   |  | Not at all               |                          | Completely               |                          |                          |                          |                          |
|--|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| To what extent is the chosen business contact dependent on your most important (Swedish or international) competitor's | -product   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -pricing policy  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -research and development  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -modernity, original ideas, contribution to new business opportunities | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
|  | -social relations  | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| How many times does your company have contact with this competitor via:  | Daily  | A week                   |                          | A month                  |                          | A quarter                |                          | No contact               |
|  |  | 1                        | Sever al                 | 1                        | Sever al                 | 1                        | Sever al                 |                          |
| -personal meetings   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -phone   | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -Internet  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| -e-mail  | <input type="checkbox"/>   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| Consultant, authority, etc.   |                         | Not at all |   | Completely |   |   |   |   |
|---|-------------------------|------------|---|------------|---|---|---|---|
| To what extent is the chosen business contact dependent on your most important (Swedish or international) | -consultant             | 1          | 2 | 3          | 4 | 5 | 6 | 7 |
|   | -authority              | 1          | 2 | 3          | 4 | 5 | 6 | 7 |
|   | -bank                   | 1          | 2 | 3          | 4 | 5 | 6 | 7 |
|   | -industry organisations | 1          | 2 | 3          | 4 | 5 | 6 | 7 |

**YOUR PREVIOUS EXPERIENCES OF PLAYERS FROM THE LOCAL AND OTHER MARKETS**

In this section of the survey, we would like you to answer questions about your **previous experiences of players on various markets (local, Swedish or international) which have had an influence on the chosen business contact.** In other words, experiences that already

existed in the company when you entered into the chosen business contact. This could, for example, relate to experiences of working with a particular type of player on a certain market which led you to decide to work with similar players this time too in the chosen business contact. They could also be experiences that have led you to work in a completely different way.

**Your previous experiences of players on the business contact’s local market:**

|   |  | Not at all | Completely  |
|---|--|------------|-------------|
| To what extent is the chosen business contact dependent on your previous experiences of <b>local customers’</b>   | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |
|   | -development of procedures   | 1          | 2 3 4 5 6 7 |
|   | -knowledge   | 1          | 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1          | 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences of <b>local customers’ customers’</b>  | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |
|   | -development of procedures   | 1          | 2 3 4 5 6 7 |
|   | -knowledge   | 1          | 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1          | 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences of <b>local customers’ suppliers of supplementary products and services’</b> | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |
|   | -development of procedures   | 1          | 2 3 4 5 6 7 |
|   | -knowledge   | 1          | 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1          | 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences  | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |

|   |  |               |
|---|--|---------------|
| of local suppliers'   | -development of procedures   | 1 2 3 4 5 6 7 |
|   | -knowledge   | 1 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences of local suppliers' suppliers' | -co-operation  | 1 2 3 4 5 6 7 |
|   | -adaptations   | 1 2 3 4 5 6 7 |
|   | -development of procedures   | 1 2 3 4 5 6 7 |
|   | -knowledge   | 1 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |

|  |  | Not at all    | Completely |
|--|--|---------------|------------|
| To what extent is the chosen business contact dependent on your previous experiences of local competitors' | -product   | 1 2 3 4 5 6 7 |            |
|  | -pricing policy  | 1 2 3 4 5 6 7 |            |
|  | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |            |
| To what extent is the chosen business contact dependent on your previous experiences of local              | -consultants   | 1 2 3 4 5 6 7 |            |
|  | -authorities   | 1 2 3 4 5 6 7 |            |
|  | -banks   | 1 2 3 4 5 6 7 |            |
|  | -industry organisations  | 1 2 3 4 5 6 7 |            |

**Your previous experiences of Swedish or international players:**

With regard to previous experiences, what group of players is the chosen business contact most dependent on? Tick **one** option:

Your experiences of Swedish players

Your experiences of international players (excluding the chosen market)

Please answer the following questions bearing in mind the option chosen above.

|   |  | Not at all | Completely  |
|---|--|------------|-------------|
| To what extent is the chosen business contact dependent on your previous experiences of Swedish or international customers'   | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |
|   | -development of procedures   | 1          | 2 3 4 5 6 7 |
|   | -knowledge   | 1          | 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1          | 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences of Swedish or international customers' customers'  | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |
|   | -development of procedures   | 1          | 2 3 4 5 6 7 |
|   | -knowledge   | 1          | 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1          | 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences of Swedish or international customers' suppliers of supplementary products and services' | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |
|   | -development of procedures   | 1          | 2 3 4 5 6 7 |
|   | -knowledge   | 1          | 2 3 4 5 6 7 |
|   | -modernity, original ideas, contribution to new business opportunities | 1          | 2 3 4 5 6 7 |
| To what extent is the chosen business contact dependent on your previous experiences of   | -co-operation  | 1          | 2 3 4 5 6 7 |
|   | -adaptations   | 1          | 2 3 4 5 6 7 |

|                                     |  |               |
|-------------------------------------|--|---------------|
| Swedish or international suppliers' | -development of procedures   | 1 2 3 4 5 6 7 |
|                                     | -knowledge   | 1 2 3 4 5 6 7 |
|                                     | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |

|  |  | Not at all    | Completely |
|--|--|---------------|------------|
| To what extent is the chosen business contact dependent on your previous experiences of Swedish or international suppliers' suppliers' | -co-operation  | 1 2 3 4 5 6 7 |            |
|  | -adaptations   | 1 2 3 4 5 6 7 |            |
|  | -development of procedures   | 1 2 3 4 5 6 7 |            |
|  | -knowledge   | 1 2 3 4 5 6 7 |            |
|  | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |            |
| To what extent is the chosen business contact dependent on your previous experiences of Swedish or international competitors'          | -product   | 1 2 3 4 5 6 7 |            |
|  | -pricing policy  | 1 2 3 4 5 6 7 |            |
|  | -modernity, original ideas, contribution to new business opportunities | 1 2 3 4 5 6 7 |            |
| To what extent is the chosen business contact dependent on your previous experiences of Swedish or international                       | -consultants   | 1 2 3 4 5 6 7 |            |
|  | -authorities   | 1 2 3 4 5 6 7 |            |
|  | -banks   | 1 2 3 4 5 6 7 |            |
|  | -industry organisations  | 1 2 3 4 5 6 7 |            |



## **APPENDIX B: The Articles**





## Article 1

### **Network Resource Combinations in the International Venturing of Small Biotech Firms**

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## Network resource combinations in the international venturing of small biotech firms

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### ABSTRACT

Integrating the resource-based view (RBV) with a network perspective on resources, this article contributes to the growing body of knowledge regarding the internationalization of smaller biotech firms. In particular, it looks at how these firms commercialize innovations by combining resources in their networks in order to enter new foreign markets with existing products and to enter existing foreign markets with new products. Six cases indicate that network resource combinations vary with the nature of the venture; whereas new international product ventures (NIPVs) exploit a broad set of network resources in concordance with the multifaceted challenges intrinsic to these endeavours (i.e., both redefining the product and redefining the market), new international market ventures (NIMVs) depend on a more narrow scope of network resources, deployed with the primary aim to expand and deepen the customer base in foreign markets. The article concludes by proposing a model of the components of network resource combination capability.

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### 1. Introduction

International venturing is often crucial to biotech firms since they belong to what may be described as an inherently global marketplace. For example, high cost of innovation in combination with increasing specialization and shorter product life cycles means that many biotech firms must make their products available to a wider customer base than offered by the home market, with as short a time-to-market as possible (Al-Laham and Souitaris, 2008; Rovira Nordman and Melén, 2008). Success, therefore, depends not only on the product as such, but on how skilful the firm is at commercialising it across countries.

Studies often argue that firms must be able to mobilize unique constellations or combinations of resources to be successful (e.g., Barney, 1991). That is, the resources under a firm's control should be combined in such a way that they provide a particular venture with an advantage over competing ventures (cf. Nelson and Winter, 1982). This is commonly referred to as the resource-based view (RBV). Penrose (1959) presents this as a dynamic interplay between firm-specific resources and market opportunities, where growth is achieved through an intertwined process of resource acquisition and opportunity exploitation; new resources generate

new unique resource constellations that, in turn, present new opportunities that may be exploited to the firm's benefit.

In the past few decades the major tenets of Penrose's framework and RBV have been incorporated into models of internationalization. It is analogically argued that resources accumulated within the firm drive the exploitation of opportunities in foreign markets (Johanson and Vahlne, 1977; Kogut and Zander, 1993; Autio et al., 2000; Peng, 2001). Exploitation of opportunities, in turn, may generate new resource constellations, underlying innovative international business solutions (Kirzner, 1973; Zahra et al., 2006).

Recent research on the internationalization of smaller firms, however, stands in sharp contrast to this "inward view" on resources constellations. It has been found that within their own organizations, smaller firms often cannot mobilize all the resources required for international venturing. Rather, empirical evidence reveals that resource constellations critical for global competitiveness often span across organizational boundaries (e.g., Sullivan Mort and Weerawardena, 2006). That is, the proprietary assumptions of the RBV concerning resource constellations should be relaxed to incorporate resource constellations that are leveraged through the network. This may be referred to as *network resources*, i.e. external resources embedded in a firm's network that affect business outcomes (Gulati and Singh, 1998; Gulati, 1999; Lavie, 2006). *Network resource combination*, therefore, means bringing together complementary resources from network relationships; resources whose value is enhanced by combination, providing the internationalizing firm with an

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advantage over other ventures (cf., Yli-Renko et al., 2001; Buckley and Carter, 2004).

In line with this argument, studies have addressed the importance of network resources in the internationalization of smaller firms and have found these to be of great significance (Bell, 1995), not least in the biotech industry (Gertler and Levitte, 2005). In fact, studies indicate that without drawing on resources in the network, many international ventures would never be exploited at all (Karra et al., 2008). There is still, however, relatively limited knowledge of how network resources are combined to enable international venturing in small biotech firms. More specifically, we do not know which network resources are used and if network resource combinations depend on the nature of the venture.

By integrating the resource-based view and the network perspective, this article answers a call for more research on the link between resources and the pursuit of opportunities in foreign markets (Rialp et al., 2005). More specifically, its main contribution is to investigate the association between network resource combinations and the exploitation of international ventures undertaken by smaller biotech firms.

The following section reviews the literature on network resource combinations and international venturing. The theoretical point of departure is that networks extend the resource base of firms and, thereby, act as engines of innovation. We then distil seven types of network resources important in the international venturing of small biotech firms. The subsequent theoretical platform is based on the rationale that resource combinations form the cornerstones of two types of international ventures: new market ventures and new product ventures. This logic justifies the selection of six ventures for empirical inquiry and subsequent analysis. Based on empirical observations it is found that, whereas the complexity of network resource combinations appears to vary depending on the nature of the venture, network resource combinations are crucial for all the studied ventures and particular network resource combination capabilities are required.

## 2. Network resource combinations—literature review

### 2.1. Resource combinations

The resource-based view is founded on the assumption that resources are heterogeneous in nature (Barney, 1991). For example, whilst some resources can be bought and sold, others are neither readily tradable nor easy to assess (Wernerfelt, 1984; Hall, 1992; Peteraf, 1993). Since resources can only be a source of sustained competitive advantage if they are difficult to substitute or imitate (Barney, 1991), the value of a resource increases if there is uncertainty about a firm's grounds for efficiency preventing presumptive imitators from knowing exactly what to benchmark and how to do it (Lippman and Rumelt, 1982).

The heterogeneity of resources also means that a firm's resource constellation, in at least some way, is unique. Unique resource combinations may, for example, enable a firm to produce with greater efficiency or to better satisfy customer needs than other firms (Peteraf, 1993). Emerging theory posits that in order for firms to create and sustain long-term competitive advantages, though, firms have to continually *recombine* resources to innovate in response to changes in the environment (Teece et al., 1997; Eisenhardt and Martin, 2000; Johnson et al., 2004; Zahra and Filatotchev, 2004; Newbert et al., 2008). This view is grounded in the notion that when resources are combined, they become embedded in a system that limits their transferability (Madhok, 1997). Resources that were previously conceived of as generic in

themselves can, thereby, be transformed into higher order competences that open up for the exploitation of new business opportunities.

### 2.2. Network resources

The formation of new market structures in modern business sectors such as the biotech industry has, to some extent, blurred traditional boundaries between competitors and collaborators (Audretsch, 2001). Business innovation is not only instigated within firms as a response to outside competitive forces, but increasingly takes the form of interorganizational collaboration as idiosyncratic resources are disseminated through business networks.

Powell et al. (1996) note that while the biotechnology industry went through rapid global development in the 1980s, it became clear that the full range of resources required to exploit business opportunities often could not be easily accumulated under one roof. Therefore, many biotech firms began exploring ways of leveraging resources controlled by partners in internationally dispersed networks. Although apparently there are no established, comprehensive frameworks of network resources, studies on biotech firms indicate that they may include technological, market, human, financial, reputational, and various physical resources (e.g., Powell et al., 1996; Ahn and Meeks, 2008; Gassel and Pascha, 2000).

Effective deployment of *technological resources* has proven to be important in the exploitation of international ventures among firms in various high-tech industries. Within this context, studies have revealed that technological resources often are leveraged in network relationships where synergetic competences are synthesized (Autio et al., 2000). Technological resources are often crucial for innovation and can lead to business breakthrough even when their market applicability is not readily apparent (cf., Abernathy and Utterback, 1978). These resources may include firms' knowledge about key technology as well as R&D capacity, and is sometimes consolidated by patents and trademarks (Coff, 2003).

Furthermore, *market resources* include the competences required to do business in a certain foreign market (Fang et al., 2007). For example, studies have found that market resources derived from network relationships can increase a firm's ability to exploit opportunities because they confer awareness of customer problems and preferences (Blomstermo et al., 2004; Johanson and Mattsson, 1988). Such knowledge about markets is often experiential and becomes embedded in firms and their networks through change in routines and procedures (Eriksson et al., 1997). In the biotech industry, market resources are often vital for the commercialization of technology as they contribute to the synchronization of science and business agendas (Ireland and Hine, 2007).

Gertler and Levitte (2005) claim that *human resources* are extremely important in the biotech industry where it is crucial to have access to highly educated people ("embodied knowledge") to be able to develop new business opportunities. Knowledge-based resources are, thus, not always integral to the firm as such, but are often directly related to individuals such as managers and staff (Thompson and Heron, 2005), or key scientists (Boardman, 2008). The development of *human resources* is also interconnected with the development of the venture, implying that individuals are difficult to replace (Ruzzier and Antoncic, 2007).

Furthermore, a firm's reputation in its network is essential for business because reputation may be a source of competitive advantage by enhancing firms' long-term ability to attract foreign customers (Galbreath, 2005; Suh and Lyn, 2007). Correspondingly, Rialp et al. (2005) assert that *reputational resources* constitute a

major requisite for rapid international expansion among smaller firms.

However, knowledge-based resources are often not sufficient for international venturing; firms may also need financial and physical means to turn opportunities into business. Audretsch (2001) notes that designing a new product that complies with regulative standards and then marketing that product may call for a level of *financial resources* that far exceeds the internal budgets of most small biotech firms. Lack of capital may, therefore, be a major stumbling block when smaller firms exploit business opportunities in foreign markets.

*Physical resources* may involve the plants, inventory space and equipment needed to facilitate the exploitation of business operations in foreign markets (Brush et al., 2002). These resources may, e.g., be critical in the implementation of R&D projects in international biotech ventures, where standards for sophisticated facilities and equipment are usually high (Hall and Bagchi-Sen, 2007).

### 2.3. Network resource combinations

The feasibility of exploiting a business opportunity may not necessarily be limited by the internal processes of a particular organization. Rather, exploitation may be enabled by drawing on relationships with other members of the network. Therefore, complementing extant research relating to the resource-based view of the firm, this article focuses on how firms exploit opportunities through combinations of dispersed resources available in networks. In fact, idiosyncratic network relationships may confer a multitude of resource combinations that could never be achieved within a single organization, and the combination of disparate network resources may generate the type of synergies that are at the very heart of innovation (Dyer and Singh, 1998). Based on extensive empirical evidence, Johanson and Vahlne (1990, 2003) claim that resources in networks are leveraged by continuous interaction between firms, allowing resources to be disseminated across network relationships.

The concept of “network” includes not only those actors directly connected to a specific economic agent, such as its customers and suppliers, though, but also comprises indirectly connected relationships, such as customers’ customers and suppliers’ suppliers that exist in the global marketplace (Blomstermo et al., 2004). Therefore, firms can potentially leverage resources not only through directly connected relationships, but also through indirectly connected relationships. For instance, indirectly connected actors may have access to distinct resources that are potentially valuable to combine (Burt, 1992). It can, thus, be advantageous for firms to create bridges across geographically dispersed relationships (Johanson and Mattson, 1988).

Different types of networks pose unique challenges for small firm managers when searching out and exploiting opportunities, though. Uzzi (1997) argues that the type and quality of relationships between firms shape the network and define which opportunities are available, as well as whether firms can exploit these opportunities. The relationship between the firm and the network is, thus, dialectical in the sense that the firm’s innovations contribute to shaping the network structure, whereas the network structure sets the stage for a firm’s ability to innovate. Similar to Schumpeter’s (1934) idea of an entrepreneur who disrupts structural stability, firms have to be proactive in order to exploit opportunities in the network, implying that they need to work towards changing existing combinations of network resources.

### 2.4. Network resource combinations in international ventures

For the past two decades, a large number of studies on small firm internationalization have focused on so-called international new ventures (INVs), i.e. firms that are international from inception or early on in their history (see, e.g., Rennie, 1993; Oviatt and McDougall, 1994, 2005; Knight and Cavusgil, 2004; Coviello, 2006; Liu et al., 2008). Often, high-tech firms are in focus in these studies (Yli-Renko et al., 2002). In particular, this literature emphasizes two factors that explain how INVs are able to exploit opportunities in foreign markets (see, e.g., Madsen and Servais, 1997; Crick and Jones, 2000; Sharma and Blomstermo, 2003; Fan and Phan, 2007), namely (1) successful involvement in networking activities and (2) proactive behavior.

First, INVs can be developed in the interplay between the firm and its network partners where competitive advantages are gained through superior leverage of network resources (Rialp et al., 2005). In effect, firms source external competences and goods to extend their resource base and to open up new avenues for business innovation. For example, international collaboration may generate awareness of particular conditions in foreign markets, thus enabling firms to respond to customer needs (Spence et al., 2008). The viability of the external resource perspective is further emphasized by studies of biotech ventures; when investigating Canadian biotech start-ups, Baum et al. (2000) found that the use of network resources reduced liabilities of smallness and newness and, thereby, stimulated innovative behavior. In short, network resources may spur internationalization by mitigating market uncertainties and by providing leverage for ground-breaking business solutions. Networking *capabilities* are, therefore, crucial for the exploitation of many emerging international opportunities (Sullivan Mort and Weerawardena, 2006). In particular, this is the case for small biotech firms that simultaneously have to deal with significant technological complexity and limited resources, not least regarding market knowledge.

Second, firms that proactively pursue opportunities in foreign markets enabled by network resource combinations may experience greater international growth than those that do not. Spence and Crick (2006) substantiate this argument by claiming that the internationalization of small high-tech firms is, in fact, an inherently entrepreneurial act in itself; such firms deliberately seek out new potential resource combinations in networks to exploit opportunities in foreign markets. Correspondingly, biotech firms have been found to often opt for interdependence—e.g., by drawing together the resources controlled by various actors in their networks—over independence in the pursuit of external resources for business innovation (Powell et al., 1996). Proactivity is, thus, often a prerequisite not only to identify opportunities nested in foreign market networks, but also in exploiting them.

### 2.5. Synthesis and research questions

In summary, we have put forward the following arguments: Unique resource combinations are a source of long-term competitive advantage. This reasoning can be applied analogically to explain international venturing. Small firms, not least in the biotech industry, may internally lack many of the resources needed to successfully exploit international opportunities which means that they seek to combine market, technological, human, reputational, financial and physical resources available through the direct and indirect relationships that constitute their networks.

These firms also constantly face pressure to rapidly align technology with customer needs in order to generate innovations that allow them to stay ahead of global competition in an industry

characterized by a rapid pace of change (van der Valk et al., 2009). Drawing on network resources is, therefore, of particular importance to the resource-constrained small biotech firm. Although the challenges involved in carrying out such combinations should not be underestimated, they may be related to the nature of the particular venture; whereas most of the small, high-tech firm internationalization studies cited in our review focus on INVs, international venturing, of course, does not have to be associated with the creation of a new firm. To the contrary, drawing on Ansoff's (1957) classic product/market matrix, introducing existing products in new foreign markets (new international market ventures [NIMVs]) and the introduction of new products in existing foreign markets (new international product ventures [NIPVs]) are, arguably, much more common international ventures. Utilizing network resources to exploit such ventures should be no less relevant than what is the case for INVs. For example, Prashantham (2008) contends that marshalling resources in networks enables firms to tap into expanding customer segments in new markets. Network resources can also help to prevent current business advantages from becoming outmoded by supporting the launch of new products (Prashantham, 2008).

Extant research, however, has relatively little to say on the topic of which specific resource categories are needed for NIMVs and NIPVs, how different resources are combined to exploit such ventures, and whether the ways in which resources are combined vary with the nature of the venture. We, therefore, pose the following three research questions:

1. How does network resource combination contribute to the exploitation of new international product ventures of smaller biotech firms?
2. How does network resource combination contribute to the exploitation of new international market ventures of smaller biotech firms?
3. Do network resource combinations contribute differently to new international market and product ventures?

The preceding sections also argue that drawing together and combining resources in the network to exploit opportunities on foreign markets constitute a proactive undertaking. That is, new resource constellations do not form by themselves; they are, to a large extent, contingent on activities performed by the internationalizing firm (Tolstoy, 2009). This implies that to exploit new ventures in foreign markets through network resource combinations, the firm must possess certain capabilities that enable consolidation of the resources of multiple connected organizations to achieve a specific end. Since extant literature does not seem to provide any specific answers regarding which these capabilities are, we pose a fourth research question:

4. Which capabilities are needed to successfully combine network resources to exploit new international market and product ventures?

### 3. Method

#### 3.1. Research approach

The research approach used here can be termed a multiple-case study. Case research is often recommended when investigating complex phenomena (e.g., Yin, 1994), and the multiple-case approach is especially common in business innovation research that aims to identify new phenomena and to observe variance in

these phenomena (e.g., McAdam and McClelland, 2002; Numprertchai and Igel, 2005; Ireland and Hine 2007). This approach also allows researchers to contrast findings from individual cases to identify idiosyncratic and more prevalent tendencies (Yin, 1994); that is, findings from individual cases can be compared to, supplemented with, and substantiated by other cases.

The case unit is considered to be a new international venture. Within each case, analysis is focused on resources acquired from the network and how these are combined in the exploitation of the new international business opportunity. The study does not aim to provide generalized answers in a statistical sense but rather to achieve theoretical or analytical generalization (cf., Yin, 1994).

#### 3.2. Study design

Six new international ventures have been studied. Three constitute cases of introducing existing offerings in new markets (NIMV1–3), whereas three constitute ventures that introduce new offerings on existing markets (NIPV1–3). Sampling was purposive, aiming to achieve both theoretical and literal replication in the selection of cases (Yin, 1994). Theoretical replication is achieved through the two types of ventures (NIMV and NIPV); literal replication involves selecting more than one venture in each category. Six cases constituted a good compromise between saturation in terms of new findings and manageability in terms of size of empirical material. This is consistent with Eisenhardt (1989) who states that according to her experience, four to ten cases usually provide a good basis for generalizing to theory from case material. These six venture cases are drawn from six case firms, all of which belong to the Swedish biotech industry. The case firms were identified using the Swedish industry index in the database 'Market Manager'.

All biotech firms in the study are small in size, corresponding to the European Commission's (1996) definition of a small enterprise (primarily, less than 50 employees). Constancy was, thus, maintained in regard to industry and size, to ensure meaningful cross-firm comparisons. An overview of the six case firms (see Table 1) shows that they were founded between 1985 and 1999. They have between 6 and 40 employees, with an average turnover of €3.5 million.

Personal interviews were the main form of data collection. In all, 18 interviews were conducted with 13 respondents in the six case firms (see Table 1). This study used a key informant approach, which is a common practice in marketing research (Phillips, 1981). Key informants included CEOs, market managers and technical directors, all individuals directly involved in decisions relating to the six ventures. Attempts were made to interview more than one respondent about each case. This was achieved in all but one case where the firm only had six employees, just one of whom was able to answer our questions in regard to the specific venture. All interviews except one were conducted face-to-face at the site of the firms' head office (the exception was an interview conducted via telephone and e-mail because the respondent resided in Australia).

The interviews were semi-structured, and questions revolved around the content of resources used in the ventures, where these resources were found in the network, and how resources were deployed in combinations with other resources. Approximately 30 h of interview data were collected. Interviews were tape-recorded and transcribed verbatim.

In all cases, interview data were substantiated by other forms of data drawn from sources such as annual reports, firms' marketing material, newspaper articles, firms' websites, and financial databases.

**Table 1**  
Overview of firm characteristics and data collected.

| Firm (alias)/ venture | Founded | Employees (2006) | Turnover million euro (2006) | International from inception | Number of respondents | Number of interviews | Type of venture studied | Type of Product       |
|-----------------------|---------|------------------|------------------------------|------------------------------|-----------------------|----------------------|-------------------------|-----------------------|
| BioRes/NIPV1          | 1997    | 22               | 3.0                          | Yes                          | 4                     | 6                    | New product             | Respiratory devices   |
| BioDetect/<br>NIPV2   | 1998    | 24               | 1.1                          | No                           | 2                     | 2                    | New product             | Bio-detectors         |
| BioECG/NIPV3          | 1999    | 6                | 1.2                          | Yes                          | 1                     | 2                    | New product             | ECG systems           |
| BioAnti/NIMV1         | 1986    | 20               | 3.8                          | Yes                          | 2                     | 4                    | New market              | Engineered antibodies |
| BioBact/NIMV2         | 1999    | 33               | 6.5                          | No                           | 2                     | 2                    | New market              | Bacteria cultures     |
| BioCard/<br>NIMV3     | 1985    | 40               | 5.5                          | Yes                          | 2                     | 2                    | New market              | Cardiac monitors      |

The analysis largely revolved around a few central themes derived from literature regarding the basic tenets of firms' exploitation of international ventures (i.e., resources, networks, type of venture). The study also followed a pragmatic approach, meaning that central themes for analysis were selected on basis of their ability to provide viable representations of the research problem (Creswell, 2003). The analysis was carried out in several steps. First, based on interview and supplemental data, an overview was created of each case, with particular focus on the resources required for that venture and where the resources were found. Then, a comparison was made across cases in each of the two categories (NIMVs and NIPVs) to identify trends in resource combinations. Throughout, literature in the area was consulted for purposes of contrasting and further explaining the main findings. Tables were used to provide structure, stringency, and comparability across cases.

#### 4. Six international ventures in the biotech industry

We first provide a brief overview of the Swedish biotech industry. Thereafter each new international venture is presented with specific focus on its content and which resources were combined. For all six ventures, a table of resources (see Table 2) is created to support further discussion. This provides the reader with "raw case observations" without necessitating detailed descriptions of six cases (cf., Bernstein and Singh, 2006; Rasmussen et al., 2006).

Sweden has the highest number of biotech companies per capita in the world.<sup>2</sup> Because many of these firms need a larger market than that provided by Sweden alone, they must mobilize resources to compete internationally. Currently, the biotech industry accounts for over 20 percent of Swedish net exports. Biotech firms are increasingly the focus of internationalization research and innovation research. This can partly be explained by their rapidly evolving, global and knowledge-intensive industry; if internationalization processes evolve more rapidly, they are easier for researchers to follow in or near real time.

##### 4.1. Case: NIPV1 (case firm: BioRes)

BioRes sells respiratory devices used in clinical studies and for patient care. In order to penetrate the potentially lucrative patient care market in the Netherlands, the firm realized that it needed to make its products more user-friendly and to add some new functions.

NIPV1 is a venture dependent on new resource combinations comprising external resources in the network. To undertake the product development that was required to exploit the venture opportunity, BioRes needed new expertise within the areas of software technology, hardware technology, and sensor technology. The firm actively pursued new relationships with suppliers as well as customers in order to acquire these crucial technological resources. In particular, the firm managed to summon a network of collaborating firms, including an American firm that develops software, a German firm that develops sensor technology, and a Swedish firm that develops hardware. The firm actively took the role of issuing product specifications, contributed with its own technological knowledge, and coordinated the project.

Regarding customer contacts, the firm used researchers in the Netherlands to provide feedback on prototypes as well as for clinical testing. In addition to being a source of local market knowledge, these Dutch researchers played an important role as they influenced purchasing decisions at the hospitals with which they were affiliated (Fig. 1).

##### 4.2. Case: NIPV2 (case firm: BioDetect)

The opportunity for a new international venture arose when BioDetect's CEO made a private trip to Australia. He then decided to approach the local customs authorities with some sales information about the firm's biodetectors. There was some interest and actually a few sales, but it soon became apparent that BioDetect's current products would not meet all the Australian customs authorities' requirements. Nonetheless, they placed an order, although it included various requirements for remodelling. New network resources were then needed to pursue the opportunity, predominantly regarding customer insights into potential application areas and product requirements.

NIPV2 is, thus, highly dependent on customer feedback in its effort to customize a feasible product. To extract the knowledge needed, the firm interacted frequently with the customer and was able to acquire important input for product improvements. The venture also required external competences from consultants involving the implementation of new software applications (programming) and a new hardware frame. The consultants were soon integrated into the project and worked closely with the firm's own staff at the home office. BioDetect's specific contribution to the project was to make the separate resources of suppliers and customers fit together, and to assemble the product into a functional unit. This was achieved by constantly working on modifications regarding product specifications and maintaining close interaction with both the customer and suppliers. The launch of the new product met the overall demands of the

<sup>2</sup> <http://www.swedenbio.com> (2009-01-25).

**Table 2**  
Resources deployed for combinations in new international ventures.

| Venture             | Deployed resources  |   |  |  |  |  |
|---------------------|---|---|--|--|--|--|
|                     | Market resources  | Technological resources   | Human resources  | Reputational resources   | Physical resources   | Financial resources  |
| BioRes/<br>NIPV1    | Collaborates in a local network of influential opinion leaders to receive product feedback. "Our product has gone through three to four iterations where we discussed it with customers, first on a functional level, then on a conceptual level, and then on a prototype level".                 | Collaborates with international suppliers to develop new software, hardware, and sensor technology. Owns the patents for the product. "For this project we needed the technological competence of collaborators, namely software technology, hardware design, and sensor technology". | The firm has assigned some staff to the venture to collaborate with both suppliers and customers. "We have assigned marketing staff to contact local customers and engineers to work with suppliers... Engineers also need to work with customers to receive feedback and give technical support". | Important local opinion leaders and a renowned hospital serve as references. "When you market something that is completely new, like we do, you need to know critical key-opinion leaders in the market to be able to sell your products".                                   | Some change in the manufacturing- and inventory-systems. New routines for assembling the products had to be established due to new components and suppliers.   | The firm has decided on issuing new stock to receive capital to finance technological development.   |
| BioDetect/<br>NIPV2 | Collaborates with the local customer in order to receive product feedback. "Tapping into the experiences of customers is very important to learn about service requirements, outdated components, weaknesses in user interface, and application areas of the technology".                         | Has its own R&D department. Collaborates with suppliers to develop new software applications and hardware design. Owns the patents for the product.   | The firm has assigned some staff to the venture to collaborate with both suppliers and the customer.   | The customer has served as reference to acquire new customers in other segments of the Australian market. "The business engagement has resulted in a business deal with a local firm that wants to use our technology to detect illegal substances in working environments". | Some change in the manufacturing- and inventory-systems. The firm has hired new manufacturers of components.   | Shareholders have loaned capital to the firm and the firm has decided on issuing new stock to finance technological development. "As a young firm we have been extremely dependent on raising capital. For this reason we have issued new stock several times to finance technological development". |
| BioECG/<br>NIPV3    | Collaborates with the local distributor to receive feedback on sales performance.   | Conducts all R&D in-house. Critical components are purchased from suppliers. Owns the patents for the product. "We had an R&D department that worked full-time, for several years to come up with this technology".   | The entire staff has at some point been assigned to the venture to collaborate with the German customer. "Germany has become our most important market which has led to a strong commitment from our side. All employees are involved in the operations in some way".                              | Some prestigious hospitals both in the Swedish and the German market serve as references to receive new customers. "Selling the product to the Heidelberg-hospital has drawn positive attention to us and has definitely rendered new business".                             | New manufacturing and distribution systems. "We make sure to find suppliers for components to our product ourselves. If we let the manufacturer make these decisions the expenditures will be high due to rising component costs".                 | The owner has infused capital into the venture to finance technological development and marketing activities.  |
| BioAnti/<br>NIMV1   | Collaborates with a distributor and a number of local potential customers. "We have regular work-shops revolving around our technology in India. The reason for this is to spread the knowledge about the technology to customers, and teach distributors how to be able to promote the product". | Conducts most R&D in-house. Occasionally the firm licenses antibodies from suppliers. "The production of an antibody takes a year, so if the customer needs a specific antibody on short notice, we may license it from suppliers".   | The firm has assigned some staff to the venture (predominantly managers) to collaborate with customers.  | The firm is unknown in the local market and lacks references.  | No change in the manufacturing- and inventory-systems.   | The firm has used its own capital to finance marketing activities in the venture. "So far we have not used the money of risk-capitalists, government funding, or collaborators. We aim to finance all our activities through our own revenues".  |
| BioBact/<br>NIMV2   | Collaborates with the local customer to receive product feedback. "It is important to communicate with the customer because they possess knowledge about how their ingredient should be used, and the advantages of this use".  | Uses existent technology in the venture. Owns the patents for the product.  | The firm has assigned some staff to the venture to work with the customer.   | A Swiss customer served as a reference to initiate the venture. "We were able to contact the Japanese customer through a Swiss customer that thought that our products would be interesting for them".   | Some change in the manufacturing- and inventory-systems because the firm has to ensure that the customer has a product stock available. The firm also has instigated manufacturing routines to customize the product for the customer when needed. | The firm has used its own capital to finance marketing activities in the venture. "The firm pursues a strategy of growing organically and can therefore finance new ventures solely on revenues".  |
| BioCard/<br>NIMV3   | Collaborates with the local distributor in order to receive product feedback.   | Conducts R&D in-house. If needed, it hires external consultants. Owns the patents for the product. "We are methodical when establishing new business in foreign   | The firm has assigned some staff to the venture to collaborate with the distributor.   | The distributor served as a reference to initiate a partnership with a German hospital.  | Some change in the manufacturing- and inventory-systems because the firm has to ensure that the distributor has a product stock available.   | New stock was issued to finance marketing activities in the venture. "The venture is a part of an explicit international strategy that was stipulated by the board of directors. The capital   |



Table 2 (continued)

| Venture | Deployed resources |  |                 |                        |                    |  |
|---------|--------------------|--|-----------------|------------------------|--------------------|--|
|         | Market resources   | Technological resources  | Human resources | Reputational resources | Physical resources | Financial resources  |
|         |                    | markets. We use consultants that help us scan the market for eligible customers and distributors". |                 |                        |                    | of the new issue of stock is designated to be used in international ventures". |

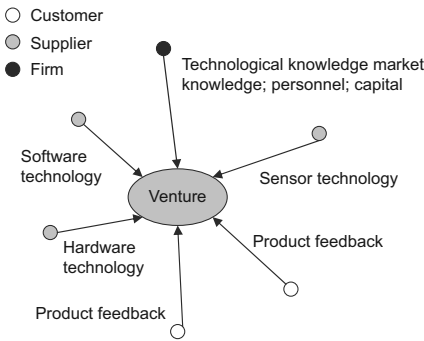


Fig. 1. Resource combination in BioRes/NIPV1.

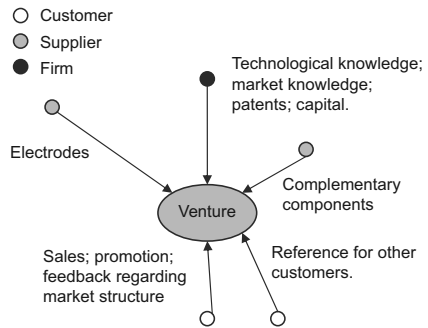


Fig. 3. Resource combination in BioECG/NIPV3.

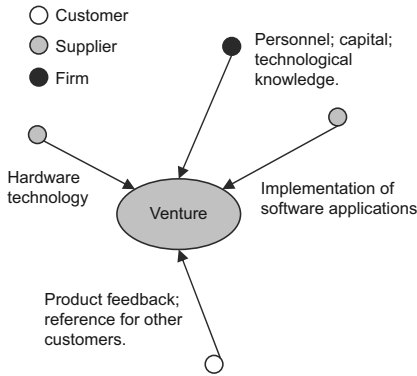


Fig. 2. Resource combination in BioDetect/NIPV2.

customer and the venture was, consequently, considered a success (Fig. 2).

4.3. Case: NIPV3 (case firm: BioECG)

After closing its wholly owned subsidiary in Germany due to financial difficulties, BioECG contracted a German distributor to manage its sales there. The firm recognized that it lacked the expertise to effectively penetrate the market itself, and was convinced that business would improve if operative work was delegated to an actor with local market knowledge. The local distributor had extensive knowledge about the competitive situation in the market and quickly came up with suggestions

for suitable improvements of the product offering. Subsequently, the firm began to design a new offering, involving a wider range of complementary functions and novel technological applications to its current electrocardiogram system. The ECG systems were developed using mainly in-house competence, although the venture did rely on external suppliers for critical components, such as durable electrodes. The in-house competence primarily consisted of technological knowledge, which to a large part was consolidated in patents.

NIPV3 had previously pursued a strategy of competing on basis of quality rather than price, because it was unable to match the low prices of competitors in the German market. However, in dialogue with its German distributor, the firm realized that it had to cut production costs to reduce the price of the product to a more competitive level. Consequently, the firm engaged in thorough screening of viable new suppliers of complementary components that could manufacture to lower costs without compromising quality. By coordinating various resources in both the supplier network and the customer network, the firm could launch a new product offering and gain an increased market share in Germany (Fig. 3).

4.4. Case: NIMV1 (case firm: BioAnti)

Since BioAnti neither had any previous experience in the Indian market nor an established network among local researchers, when the firm decided to try to increase its sales of engineered antibodies there, a natural first step was to approach one of the firm's suppliers in India with a proposal of partnership. According to this proposal the supplier would also become distributor of the firm's products. The product line of the Indian distributor contains products complementary to those of the BioAnti. Therefore, BioAnti and the distributor planned to develop a more elaborate relationship comprising joint offerings. BioAnti

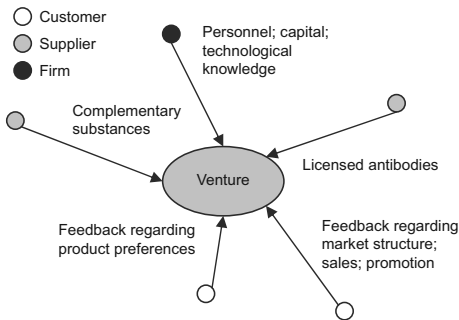


Fig. 4. Resource combination in BioAnti/NIMV1.

did not undertake specific adaptations of the product (antibodies for use in clinical research), though. Rather, to meet the needs of the venture's Indian customers, products were typically based on the existing technological knowledge of the firm. In the event that a new type of antibody would be needed, appropriate products were licensed from suppliers. Regarding marketing activities in NIMV1, the distributor conducted the lion's share of sales and product promotion in India. BioAnti did, however, undertake some efforts of its own to arrange seminars for local researchers to gain acceptance for its technology. These local researchers were considered potential customers as well as individuals that could increase legitimacy for the firm's products in the Indian market. Hence, researchers that had positive attitudes towards the technology provided valuable opportunities for entries into the market. BioAnti, thus, worked closely with the distributor to create innovative technological modifications that could meet the specific needs among customers in the local market. It also established some critical relationships with customers to gain insights about the market, boost reputation, and enhance future product development (Fig. 4).

#### 4.5. Case: NIMV2 (case firm: BioBact)

The opportunity for the venture arose as one of BioBact's existing customers in Switzerland worked as a consultant for a Japanese dairy-producer; the Swiss customer actually recommended BioBact's products to the Japanese customer. The parties were then introduced, and it was decided that BioBact should deliver engineered cultures of bacteria to be used in yogurt production at the facilities of the Japanese customer. The venture required many resources in the initiation stage as the bacteria needed to be tailored to the Japanese customer's specific products. NIMV2 did not use a distributor or other intermediary in its operations for this purpose, though. Instead expert staff worked jointly with the customer to acquire the feedback about which bacteria to apply to different products and what modifications could be made to make products compatible with market demand. Knowledge about the market was, thus, crucial for the venture to optimize the deployment of its technological resources. To quickly acquire these resources, BioBact interacted intensively with the customer in the initiation stage of the venture (both face-to-face and using various communication tools). When working with the customer, the firm drew on existing technological knowledge embedded in the firm's network of external researchers; thus, new resource combinations concerning technology in this venture were kept at a minimum. The venture generated

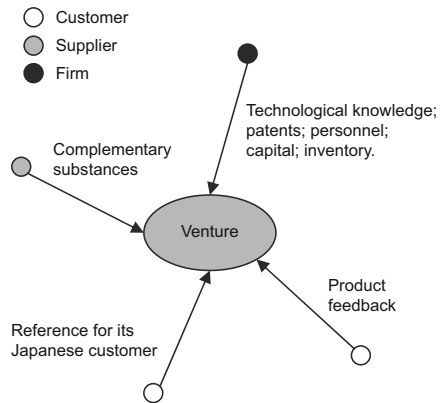


Fig. 5. Resource combination in BioBact/NIMV2.

steady business and BioBact became well known in the local industry, which opened up for more business opportunities with other customers in the Japanese market (Fig. 5).

#### 4.6. Case: NIMV3 (case firm: BioCard)

BioCard wanted to expand sales of its cardiac monitors into the Belgian market. The firm knew of a Belgian distributor that had previously sold similar products for a Danish firm and deemed that company suitable for this task. The distributor possessed important connections with Belgian hospitals, and could thus provide a viable entry to customers in the market. BioCard initiated the first contact with the distributor; it was not difficult to convince the distributor to form a partnership because BioCard's products were highly compatible with the distributor's own product range.

The venture was part of an international expansion plan initiated by the firm's board of directors. As a result of this strategic decision, the venture needed a variety of new resources. Although in regard to technology the venture mostly made use of existing resources in the firm, external consultants were hired to implement new software applications developed to suit the needs of the local customers.

BioCard, however, diligently searched for knowledge about the Belgian market to be able to adapt its product offering to local hospital practices and preferences. Few efforts were made to approach end customers directly to find such information, though, and BioCard primarily tried to access product feedback and customer information through the distributor. In fact, discussions with the distributor were carried out daily, primarily using e-mail and telephone, but occasionally also at schedule personal meetings, primarily in the start-up phase of the venture. Consequently, network resource combinations including market knowledge were crucial for the firm to be able to enter the Belgian market and exploit the opportunity that materialized through NIMV3 (Fig. 6).

## 5. Cross-case analysis

We first address resource combinations in NIPVs (Section 5.1), then in NIMVs (Section 5.2). Subsequently, we compare the two types of ventures (Section 5.3) and, finally, address capabilities needed for network resource combinations (Section 5.4).

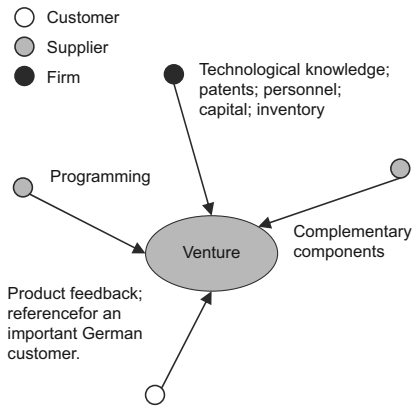


Fig. 6. Resource combination in BioCard/NIMV3.

### 5.1. Network resource combinations in new international product ventures

When looking at the specific resource combinations undertaken for the three new product ventures, new capital was required to finance the costly product development processes associated with all cases. Moreover, NIPV3 incorporated an extensive amount of physical resources (production facilities) in their network resource combinations by instigating new network relationships with manufacturing firms. NIPV1 and NIPV2 could, for the most part, rely on existing physical resources, though. That is to say, they made use of their own manufacturing facilities and those already accessed through existing partners.

Technological resources were a particularly important input in the resource combinations in all the new product ventures. To acquire and successfully combine technological resources, cooperation with suppliers was especially critical for the exploitation of NIPV1 and NIPV2. Interestingly, the firms behind these ventures acted as brokers combining geographically dispersed resources in both supplier relationships and customer relationships (cf., Burt, 1992). For instance, NIPV1 coordinated these relationships by arranging frequent project-group meetings and used an intranet to enable the sharing of technological resources between participating suppliers. Hence, both face-to-face interaction and use of information and communication tools was important to implement resource combinations across network relationships. In effect, the case shows that effective communication enabled the firm to manage multiple network relationships simultaneously and, thereby, also to create a fit between the competences of different collaborators.

In an attempt to acquire market resources, both NIPV1 and NIPV2 paid regular visits to customers in their respective markets, the purpose being to obtain product feedback to combine with the existing configurations of technological resources. Similarly, NIPV3 paid close attention to the competitive situation in the German market, and the venture undertook several changes in price levels and developed supplemental products.

Observations from these three cases support the notion that combining market resources with technological resources is of particular importance in international product ventures. To develop competitive products, firms also proactively coordinated resources across numerous network relationships, creating com-

plex resource combination patterns. The firms, e.g., tapped suppliers on innovative ideas as well as customers on expert feedback and, subsequently, combined these inputs (cf., Crick and Jones, 2000; Rialp et al., 2005; Yli-Renko et al., 2002) to ensure that the new international product ventures aligned technological innovations with customer preferences (cf., Zahra and Filatotchev, 2004). These findings are consistent with research showing that market resources and technological resources are complementary for the international smaller firm; one enhances the other (Knight and Cavusgil, 2004).

Reputational resources appear also to have been critical for the development of all the product ventures studied. Perceived risk relating to novel, and largely untested, products seems to be alleviated when referring to shared experiences with well known and reputable customers. NIPV3, for instance, used a renowned hospital as a reference case when attracting new customers.

Furthermore, the ventures also relied on human resources in their various collaborations with suppliers and customers. There are several examples of how local presence of staff, as well as of how face-to-face interaction, broadened the scope of network resource combinations. The value of other resources, such as technological and market resources, seems to be greatly enhanced when combined with human resources (cf., Gertler and Levitte, 2005). For example, the personnel of the firms behind NIPV1 and NIPV2 interacted effectively with both customers and suppliers and were, thus, able to negotiate for important resources across network relationships.

In summary, from the cases it is evident that new international product ventures are resource consuming and comprise complex combinations of a variety of resources across several coordinated network relationships. One reason behind this is that extensive alterations of technology tend to require subsequent alterations of marketing activities to successfully target appropriate customer segments. That is, the biotech firms had to both redefine the product and redefine the market in these ventures (cf., Ireland and Hine, 2007). In the cases we have studied, the managers also seem to be well aware of this at the outset and therefore pursue what they perceive to be appropriate resource combinations in what may be termed a largely proactive and outward-oriented manner.

### 5.2. Network resource combinations in new international market ventures

The three new market ventures apparently did not require significant amounts of external capital, especially not in the case of NIMV1 and NIMV2. Input of capital was mobilized in the case of NIMV3, though, because the board of directors wanted to promote particularly rapid international expansion to increase the firm's global market share.

Further, the new market ventures mainly used existing physical resources available to their firms, either through direct ownership or through established partner firms. However, NIMV2 and NIMV3 constructed new systems of local inventory and logistics to cut delivery times to international customers.

Naturally, combinations involving market resources were of great importance for the new market ventures. They all drew on the knowledge of their customer networks to increase their understanding of their respective markets, an observation in line with studies on internationalizing smaller firms, underscoring the importance of customers as a source of knowledge (cf., Blomstermo et al., 2004; Yli-Renko et al., 2001). Hence, firms' abilities to extract value from resources residing among customers were essential in adapting products to local preferences as well as in penetrating additional customer segments for the purpose of driving market demand.

Whereas market knowledge seems to be the most important component in resource combinations in these ventures, technological resources were not insignificant. Such resources were needed to undertake modifications to align products with the specific conditions of new foreign markets. For instance, NIMV3 implemented new software applications on the basis of feedback from its Belgian customers. By drawing on the varied competences of suppliers as well as customers, the firm could improve its ability to transform technological developments into a usable product that met demanding customer standards. Hence, the intertwined input of complementary technological resources and market resources seems to be an important foundation of successful resource combinations also in new international market ventures (cf., Yli-Renko et al., 2001).

Reputational resources were clearly also important in the expansion of the customer base in the new market ventures (cf. Suh and Lyn, 2007). They were used somewhat differently in the various cases though; whereas NIMV2 primarily drew on reputational resources to enter the market, the case of NIMV3 shows that these resources were used to expand the venture after market entry. That is, the case of NIMV3 revealed that BioCard was able to sign a contract with a German hospital by capitalizing on the reputation acquired in the Belgian market, using the customer there as a reference.

Human resources that were deployed in the ventures in all cases comprised staff cooperating with customers. The personnel often consist of individuals with a diverse set of skills enabling them to coordinate market resources residing in customer relationships and technological resources residing in supplier relationships. This is, for example, evident in the case of NIMV2, where staff worked jointly with the customer to learn about feasible technological modifications.

In general, the bulk of technological development in the new international market ventures was coordinated in standardized processes, either within the firm or in collaboration with suppliers. Conversely, the new international market ventures seem to maintain closer relationships with customers. Firms interact intensively with customers to tap into knowledge specific to the markets they enter. They also use references of important customer relationships to build a local and international reputation.

In summary, creating combinations including a diversified content of resources helped these firms promote existing technology in new markets. The optimal way of combining resources also frequently appears to have been put to the test through customer dialogues, preventing the ventures from becoming stagnant, a constant risk in a highly dynamic industry like the biotech industry (Powell et al., 1996).

### 5.3. Differences in network resource combinations between ventures

When comparing the NIMVs and the NIPVs, we find some notable differences. Although all six ventures drew on various network resources, the combinations differed in scale, scope, and depth.

The new international product ventures required extensive interaction in both supplier relationships and customer relationships (cf., Johanson and Vahlne, 1990). The ventures were highly complex since firms had to both develop new technology and to some extent also cater to new customer segments as a consequence of introducing a new product. Product ventures, therefore, had to mobilize a broader scope of resources compared to new international market ventures which primarily drew on existing technology.

In the same vein, we find that a broader set of skills was needed for NIPVs; biotech firms involved in these ventures functioned as coordinators of external resources dispersed in networks rather than seeking opportunities within their own internal organizations. Because network resources are heterogeneous, the collaboration in every network relationship is unique (Dyer and Singh, 1998). Arguably, the degree of success in the new international product ventures is, thus, defined by firms' abilities to simultaneously coordinate action across several network relationships.

In the case of NIMVs, networking activities were apparently somewhat less demanding, though, as firms already possessed an established set of routines in the supplier network. In regard to marketing aspects, though, the case firms tended to be highly responsive to new resource input as well as engaged in extensive collaboration and close interaction with their foreign customers. An explanation for this is that firms need to modify their marketing practices to fit the particular conditions of the foreign markets that they are entering (cf., Blomstermo et al., 2004). As a part of this effort, biotech firms employ network resources derived from customers to design appropriate strategies (cf., Ahn and Meeks, 2008).

In summary, for the six ventures studied here, exploitation of novel business solutions seems to be positively influenced by the ability to act on external resource input.

The findings indicate that new international product ventures are, to a large degree, driven by combinations of resources existing in both the "downstream" (primarily customers) and "upstream" (primarily suppliers) sections of the networks, as firms need to leverage network relationships to improve both marketing activities and technology development. In line with Lavie (2006), the cases show that firms involved in these ventures attempted to keep their organizations flexible and agile to be able to quickly scour the network for necessary resources. New international market ventures, in comparison, required less innovation involving the entire organization and were more strictly focused on acquiring market resources.

### 5.4. Network resource combination capabilities

The preceding sections of the analysis provide numerous hints concerning various capabilities that the firms in the study drew on to successfully exploit international new market and product ventures.

At a general level, the study shows that when exposed to network partners, taken-for-granted resource configurations are contested, which, in turn, fosters the development certain competences or "higher order resources" (cf. Uzzi, 1997; Dyer and Singh, 1998; Madhok, 1997; Zahra et al., 2006). More specifically, this capability to draw on and combine complementary resources can be described as a *network resource combination capability* (see Fig. 7). In practical terms this means that by staying responsive to developments in international networks, firms are ready to act on network resources when windows of opportunity open up regarding new products and/or new markets (Prashantham, 2008). When acting on such opportunities, firms have to be prepared to actively coordinate the particular network relationships in which these disparate resources reside (Johanson and Mattson, 1988; Sullivan Mort and Weerawardena, 2006). This can only be done by first mapping activities and resource flows spanning across organizations. However, the execution of network resource combinations hinges on the interaction between network partners, the nature of which determines how effectively resources can be transferred and synthesized (cf., Dyer and Singh, 1998; Johanson and Vahlne, 1990, 2003).

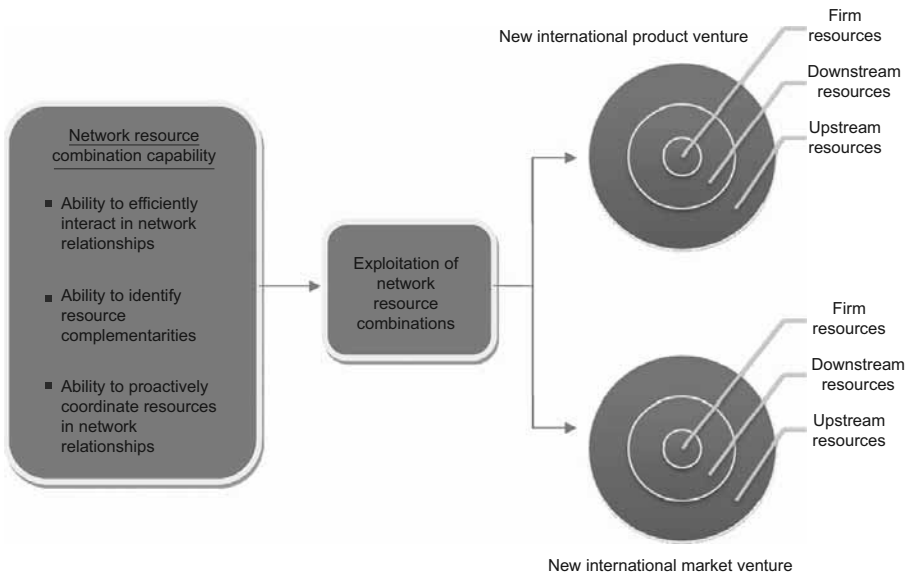


Fig. 7. The proposed tenets of the "network resource combination capability" and its effects on the exploitation of two types of new international ventures.

We therefore suggest that the tenets of *network resource combination capability* incorporate (1) the ability to effectively interact with network partners, (2) the ability to identify complementarities between network resources in the overall network, and (3) the ability to proactively coordinate network resources to a specific end (see Fig. 7). In effect, network resource combination capability dictates the scope and extent to which network resources can be deployed, and—in our study—seems to have been especially valuable for new international product ventures, since these draw on resources available in both the upstream network (e.g., technological resources) and in the downstream network (e.g., market and reputational resources).

## 6. Concluding discussion

### 6.1. Main contributions

Combining the resource-based view with a network perspective on resources, this article studies smaller biotech firms' commercialization of innovations through international venturing. The findings confirm our initial suggestion that resource limitations prompt firms to seek out resources available in their networks and combine these resources to exploit opportunities to enter new markets and to sell new products on existing markets. These results are also in line with previous studies of biotech firms in local settings, studies that have shown that resources residing outside the boundaries of the firm act as a catalyst for innovativeness and business creation (Lavie, 2006).

As an empirical contribution, we identify similarities and differences regarding resource combination in networks, depending on the nature of the venture. Whereas the new international product ventures exploited a broad set of network resources in line with more multifaceted challenges (redefining the product and redefining the market), the new international market

ventures focused on a more narrow scope of network resources, primarily concentrated on marketing issues. Hence, the new international product ventures required more complex resource combinations, spanning across a broader range of network relationships than the new international market ventures. This, in turn, required more 'open boundary strategies' to pave the way for successful network resource exploitation.

Our theoretical contributions primarily comprise insights regarding the conceptualization of a network resource combination capability, denoting a firm's ability to extract value from network resources. Such a capability is reflected in interaction within individual network relationships as well as coordination of the network at large, manifested by combinations of complementary resources that cut across organizational boundaries. The adoption of this perspective may contribute to a more profound understanding of the scope and content of organizational mechanisms involved in strategies of international expansion and innovation. By operating on the assumption that networks are conducive of strategic deployment of resources we may broaden our outlook on the basic requisites of international entrepreneurship and international venturing.

### 6.2. Implications for practice

Based on our findings, we list four recommendations for managers to consider. Although some of these insights may be applicable to settings other than those studied in this article, here we make no assumptions concerning the generality of our recommendations.

- Market ventures appear often to have underexploited capacity residing in their supplier networks. Such supplier-related resources could fruitfully be leveraged at the early stages of the venture to facilitate adaptation of products to the requirements of foreign clients.

- Face-to-face interaction is an important tool in getting to know the market, even if firms increasingly rely on high-tech information and communication tools. Personal meetings are, however, still paramount to transfer knowledge-based resources. Firms in high-tech industries, such as the biotech industry, may therefore benefit greatly from crafting explicit interaction strategies.
- The involvement of both customers and suppliers in product and market development projects may lead to cross-fertilization of ideas. Moreover, firms can trigger innovation by tapping into technological competences from suppliers and expert customers; suppliers may have experience from the market and know what works and what does not; customers can effectively reflect market preferences.
- Since international expansion is resource consuming for smaller firms and since choosing the wrong partnerships may be corrosive for business, it is important to screen the network. Firms should use reliable network contacts to guide them to network partners that are willing to share resources for common objectives. Firms need to make sure that resources are complementary to their own, or at least have the potential to become compatible through mutual adjustments.

### 6.3. Limitations and suggestions for future research

Some limitations of this study must be recognized. These give rise to suggestions for future research.

This study focuses on the ventures of small, Swedish biotech firms. As such its findings are highly contextual, and attempts should be made to replicate the study in other industries and countries. To achieve greater generality we also suggest that our findings be tested on a broad scale. In particular, the current study opens up for future research to elaborate on the significance of network resource combination capability as an antecedent of new international venture exploitation. The model (Fig. 7) could serve as a point of departure for studies employing structural equation modelling investigations on larger samples. Such studies should provide detailed insights into the construct validity of the key concepts of this study and, also, generate statistical evidence regarding the strength of correlations between the constructs of the model. Future research should also try to more clearly address the performance consequences of network resource combinations.

The uncertainties inherent in international venturing in combination with the complexities of products in the biotech industry seem to drive the exploitation of business opportunities in collaboration with other firms. Hence, future studies on biotech firms' new international ventures should extend beyond the borders of single firms to include networks of interconnected suppliers, customers and other stakeholders. An important limitation of this study, though, is that data were collected only from one actor in the network of each venture. It is possible that other members of the network may, on occasion, have disagreed with our respondents. Additional insight could be gained from future studies involving dyadic data sets and more comprehensive studies at the network level.

Furthermore, whilst our study has not explicitly addressed the role of managers' social capital in identifying and accessing network resources, findings nonetheless imply that social capital plays a crucial role throughout this process. Future studies should investigate the association between network resource combination capability and social capital in terms of (1) the nature of relationships between actors, e.g., in terms of trust and commitment, (2) the structure of the network in which resources are embedded, e.g., in terms of firms' positions there, and (3) perceptions among network members of resources as more or less combinable (cf., Nahapiet and Ghoshal, 1998).

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## Article 2

### **Knowledge Combination in Networks: Evidence from the International Venturing of four Small Biotech Firms**

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**Abstract** Although international forms of venturing are critical for the sustained economic growth of small firms, this phenomenon remains surprisingly unexplored in international small business research. This study aims to contribute to this field by shedding light on the underlying factors of the international venturing of these firms. In this endeavor, the study rests on the assumption that knowledge combination in networks is a critical requisite for seizing business opportunities in foreign markets. Hence, the specific purpose of this study is to investigate how knowledge combination in networks underlies the international venturing of four small biotech firms. The findings demonstrate that international venturings are sharply influenced by proactive strategies of identifying and implementing knowledge combinations that spans across internationally dispersed network relationships. The findings also reveal that different strategies of knowledge combination in networks are pursued depending on the nature of the venture (namely, international product ventures and international market ventures).

## Knowledge Combination in Networks: Evidence from the International Venturing of four Small Biotech Firms

### Introduction

This study draws attention to the striking fact that the actual process of international venturing rarely has been applied as the level of analysis in international small business research. That is, extant literature in the discipline has centered on the emergence of *new firms* rather than on *new business engagements* (cf. Dess et al. 2003). Venturing is here conceptualized as “the process by which members of an existing firm bring

into existence products and markets which do not currently exist within the repertoire of the firm” (Venkataraman, MacMillan, and McGrath 1992, p. 488). More research is clearly needed to elucidate the underpinnings of international forms of venturing, not least because of their importance for the global expansion of small firms. Hence, this study aims to contribute to international small business literature by unravelling the key requisites that underlie these processes.

The bedrock assumption of this study is the widely shared notion that small international firms compensate for resource deficiencies by tapping networks on knowledge (Bell 1995; Coviello 2006; Coviello and Cox 2006; Freeman and Cavusgil 2007; Crick and Jones 2000; Jones 1999; Karra, Phillips, & Tracey 2008; Loane, Bell, and McNaughton 2007; Lu and Beamish 2006; Saarenketo, Puumalainen, Kuivalainen, and Kyläheiko 2004; Sharma and Blomstermo 2003, Zahra, Matherne, and Carleton 2003, Ojala 2009). It is argued that networks can open up a multitude of avenues for knowledge to flow and intersect in innovative combinations and, thereby, stimulate international venturing. Networks are here understood as the directly and indirectly connected actors in a firm’s environment. Moreover, knowledge combination is viewed as the combination of previously unconnected bits of knowledge for developing new business (Buckley and Carter 1999).

In specific, the purpose of the study is to investigate how knowledge combination in networks underlies the international venturing of four small biotech firms. (Biotech firms were selected because they belong to a highly competitive global industry, where international venturing is critical for survival.). In search of consistent and contrasting findings regarding this subject, a distinction is made between two central activities pertaining to international venturing: (1) the launch of a new product and (2) the entry into a new market (see Ansoff’s, 1957, strategies of diversification). The first activity represents an international market venture (IMV), which entails the entry of a firm with an existent product in a new foreign market. The second activity represents an international product venture (IPV), which involves a firm’s launch of a new product in an existent foreign market. The article also investigates two dimensions of knowledge combination in networks. These dimensions involve the identification of opportunities for knowledge combinations in networks and the

implementation of these knowledge combinations. The aim of adopting this type of classification system is to provide a comprehensive understanding of the investigated concept.

In line with the research purpose, three investigative research questions are devised:

1. How is the identification of knowledge combination in networks associated with IMVs and IPVs?
2. How is the implementation of knowledge combination in networks associated with IMVs and IPVs?
3. How does the identification/implementation of knowledge combination in networks differ between IMVs and IPVs?

The remainder of this article consists of five principal sections. The literature related to international venturing and knowledge combination in networks is reviewed, and a theoretical framework is created. The methodology of an empirical inquiry into the phenomenon is then introduced. The findings of this study are subsequently presented, followed by an analysis and a discussion. A summary of the findings and an examination of the limitations and managerial implications of the study are then put forth.

## **Conceptual background**

### **The concept of knowledge combination in networks**

Knowledge combination has traditionally been outlined as attributing to the capability to leverage unexploited knowledge accumulated within the firm (Kogut and Zander 1992). Recent research on smaller firms, however, indicates that the applicability of knowledge combination not only exists within the boundaries of the firm but also spans across external network relationships (e.g., Yli-Renko, Autio, and Sapienza 2001). When endeavoring to combine knowledge in networks, firms need to find out where knowledge is located,

as well as how to mobilize the means for it to be combined (Buckley and Carter 2004; Nahapiet and Ghoshal 1998). From a larger perspective, it has been argued that the successful pursuit to combine these dispersed bits of knowledge in ways that are superior to other firms may lead to the establishment of temporary competitive advantages (Kirzner 1973; Nelson and Winter 1982; Schumpeter 1934).

Knowledge combinations materialize where separate bits of knowledge intersect. In the business world, the process of knowledge combination involves a pursuit of synergizing distinct competences to achieve commercial benefits. (In this article, the concepts of *knowledge* and *competence* are used interchangeably.) Moreover, the process of knowledge combination is, to a large extent, governed by different knowledge complementarities that either preexist or emerge in network relationships. Following Buckley and Carter's (1999) classification of knowledge complementarities, they may be additive, sequential, or complex. Additive complementarity is the most simple form and means that bits of knowledge found in separate locations are of direct relevance to each other and are bound to coincide for a common task (e.g., A's knowledge about production costs is relevant to B's knowledge about market demand when assigning a price to a certain product). They may also be sequential, which occurs when knowledge flows are directed to adhere to a certain one-way path so that knowledge at one location functions as input before knowledge at another location is acquired (e.g., A's product knowledge influences B's knowledge acquisition concerning targeted market segments to ensure the best combined outcome). Furthermore, they may be complex, which occurs when separate bits of knowledge interact through mutual spillovers (e.g., A's strategies for research and development [R&D] operations needs to be aligned with B's knowledge about customer preferences—and vice versa—for optimal combination). Awareness about knowledge complementarities may make firms better able to combine knowledge in local networks as single outcomes may become more compatible with the rest of the network (Lee, Chen, Kim, and Johnston 2008).

Although some studies suggest that networks develop from actions of collectives and are, therefore, difficult to influence (cf. Jack, Dodd, and Anderson 2008), other studies have shown that individual firms in many cases can proactively explore and exploit knowledge-based opportunities in

networks, which may imply that existing networks are extended and new networks are developed (Sullivan Mort and Weerawardena 2006). Research in the field of international small business increasingly emphasizes that firms tend to gravitate towards new openings, rupturing existing structures and modes of business (Coviello 2006). The relative freedom that firms may have to pursue their own goals in networks is, according to network theorists, determined by their flexibility and independence toward other network actors (Burt 1983). Hence, for firms to differentiate themselves from competitors, they have to question the status quo by continually recombining knowledge (Eisenhardt and Martin 2000; Teece, Pisano, and Shuen 1997, Tolstoy 2009)

## **Two phases of knowledge combination in networks**

Shane and Venkataraman (2000) suggest that the pursuit of opportunities of firms can be ascribed to two phases: The identification of opportunities and the implementation of opportunities. In this section, we incorporate these two phases into a framework to illuminate the concept of knowledge combination in networks (in the realm of international ventures).

### **Identification of knowledge combination in networks**

Identification of opportunities for knowledge combination involves detecting openings for combining dispersed bits of knowledge in networks (Nahapiet and Ghoshal 1998). Powell, Koput, and Smith-Doerr (1996) find that international networks can function as fluid structures that enable firms to combine competences into various constellations. The network perspective implies that identification of knowledge combinations in international venturing takes place in both directly and indirectly connected network relationships because the acquisition of knowledge in one network relationship is likely to influence the search for knowledge in another relationship, in a different part of the network (Ritter, Wilkinson, and Johnston 2004). For instance, user feedback that is received in a firm's customer relationship ( $A \rightarrow B$ ) may have implications in its search for new technological solutions in a certain supplier relationship ( $B \rightarrow C$ ) (Buckley and Carter 2004). Hence, the identification of knowledge opportunities in

network relationships does not occur in isolation but rather is contextualized by the surrounding network (cf. Granovetter 1973).

The process of identifying opportunities for knowledge combination develops from knowledge that is currently available to the firm (Shane 2000); that is, the existing stock of knowledge acts as a filter that influences what is seen as valuable, both in regard to existing network relationships and potential network relationships (Sharma and Sallis 2007). Tapping into the knowledge of networks may be of particular importance for small firms that pursue venturing in foreign markets because they may be exposed to both a liability of smallness (Baum 1996) and a liability of newness (Stinchcombe 1965). Hence, networks help firms to overcome their smallness by providing the means to access external knowledge. Networks may also help firms to overcome liabilities of newness in foreign markets by opening up possibilities for the flow of knowledge concerning promising customer segments, specific preferences, and technological competence (Nordman and Melén 2008). By finding a central network position firms can explore for opportunities to act as a broker between complementary pieces of knowledge (Burt 1983). To remain competitive in foreign markets, firms must continually question current network positions and search for new input for knowledge combinations (Knight and Cavusgil 2004).

### **Implementation of knowledge combination in networks**

Drawing on Buckley and Carter (1999), it is here contended that different types of knowledge complementarities set the conditions for implementation of knowledge combination in networks. The implementation of knowledge combination is carried out by varying degrees of interaction that underlie the interpretation and conduit of knowledge (Nonaka 1991). When knowledge complementarities are additive, knowledge is directly combined and the degree of required interaction is usually low. In cases of sequential knowledge, knowledge complementarities are combined through a series of events, and the degree of interaction is usually somewhat higher because the knowledge input of firm B needs to be based on the previous knowledge input of firm A. However, when knowledge complementarities are complex, the implementation of knowledge combination generally requires a reciprocal



exchange that involves high levels of interaction for involved parties to be able to draw on continual knowledge spillovers. Hence, any business venture may rest on the basis of numerous types of knowledge complementarities. This condition calls for a mixture of measures when implementing knowledge combinations. To minimize costs and optimize the use of knowledge when managing network relationships, firms need to strive for proper governance for each specific complementarity (Gulati and Singh 1998).

Thorpe, Holt, McPherson, and Pittaway (2005) find that business opportunities are most effectively seized by firms that are able to become integrated in foreign market networks. This ability enhances their understanding of local conditions, as well as increases their control over knowledge that can be deployed in combinations (Coviello 2006). For instance, Fink and Kraus (2007) argue that network relationships bring firms closer to foreign markets and increase the speed and effectiveness of applying knowledge for business solutions. Furthermore, the international venturing of small firms has been observed to involve a broad scope of the international network. The practice of implementing knowledge combination in these firms tends to involve simultaneous interaction and knowledge transfer with both suppliers and customers (Löfgren, Tolstoy, Johanson, and Sharma 2008).

### **Applying the theoretical framework: devising a model of international venturing**

This study is based on the idea that knowledge combination in networks is a crucial factor in the international venturing of small firms. In this vein, the study makes a distinction between processes by which firms identify opportunities for knowledge combination in networks and the processes by which firms actually implement these combinations of knowledge. Previous studies have proved that knowledge derived from networks is useful for international firms (Blomstermo, Eriksson, Lindstrand, and Sharma 2004). Knowledge combination in networks is here argued to allow smaller firms to stay resilient in the foreign environment, and provide synergies which trigger the development of new ventures. As depicted in Figure 1, the current set-up of knowledge combinations in networks influences the

identification process by filtering the search for new knowledge input. Implementation of knowledge combination implies that network knowledge input is intersected, leading to new outcomes that disrupt the current set-up of network knowledge. Hence, the model indicates a dynamic process, an ongoing interplay between current knowledge combinations and the opportunity for new knowledge combinations.

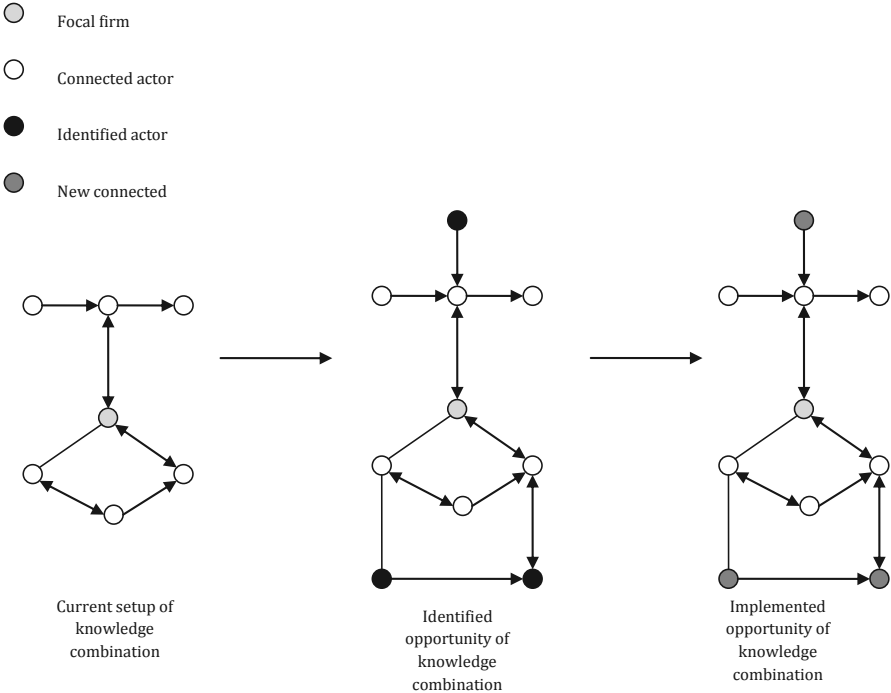


Fig. 1 The dimensions of knowledge combination in international ventures.

# Methodology

## Research approach

This study investigates a complex and sparsely explored phenomenon: the association between knowledge combination in the networks of small firms and international venturing. Therefore, comparative multiple-case logic was deemed an appropriate research approach. The single-case approach serves the purpose of generating new insights, whereas the multiple-case approach allows researchers to contrast findings from individual cases to identify idiosyncratic and more prevalent tendencies (Yin 1994). Findings from individual cases can, for example, be contrasted to, supplemented with, and substantiated by other cases.

The unit of analysis in each case is represented by a foreign business venture of a small firm. Within each case, the analysis focuses on the identification of knowledge in the network and how this knowledge is combined in the exploitation of new ventures. The purpose of the study is not to provide generalized answers in a statistical sense but rather to achieve theoretical generalization (cf. Yin 1994), which is achieved through the formulation of three propositions concerning the knowledge combination in networks.

## Study design

This study investigated four cases of new international ventures: two cases were of ventures that introduced existing offerings in new markets (IMV1 and IMV2), whereas two others were of ventures that introduced new products in existing markets (IPV1 and IPV2). The number of selected cases seemed to constitute an appropriate balance concerning saturation in terms of new findings and manageability in terms of the amount of empirical data. Eisenhardt (1989) states that based on her experience, four to ten cases usually provide a solid basis for generalizing from case material to theory. The four cases comprised biotech firms that are located in Stockholm, Sweden, and were sorted using the industry-index in the database, Market Manager. The study design aspired for both theoretical and literal replication in the selection of firms (Yin 1994). Theoretical replication was

achieved through the two types of ventures (new market and new product), whereas literal replication was made possible by selecting more than one firm in each category. All firms in the study were biotech firms, and all were small in size, corresponding to the European Commission's (1996) definition of a small enterprise. To ensure meaningful cross-firm comparisons, constancy was, thus, maintained with regard to industry and size. The relevance of including these firms in this study is further explained by their dependence on external knowledge while active in foreign markets, a common trait of smaller biotech firms. Furthermore, the fact that they are all from the same geographically delimited region minimizes the possibly confounding effects of government incentives, taxes, and infrastructure advantages. An overview of the firms (see Table 1) shows that they were founded between 1968 and 1998. When the study was conducted, these firms employed between 22 and 40 individuals and had an average turnover of €4.9 million.

**Table 1** Overview of firm data

| Firm     | Founded | Employees (2006) | Turnover million €(2006) | No. of respondents | No. of interviews | Type of venture studied | Type of product             |
|----------|---------|------------------|--------------------------|--------------------|-------------------|-------------------------|-----------------------------|
| Biotech1 | 1997    | 22               | 3.0                      | 4                  | 6                 | IPV1                    | Respiratory devices         |
| Biotech2 | 1998    | 24               | 1.1                      | 2                  | 2                 | IPV2                    | Bio-detectors               |
| Biotech3 | 1985    | 40               | 5.5                      | 2                  | 2                 | IMV3                    | Cardiac monitoring system   |
| Biotech4 | 1968    | 37               | 10                       | 1                  | 2                 | IMV4                    | Antibiotic diagnostic tests |

Personal interviews were the main form of data collection. In all, 12 interviews were conducted with nine respondents (see Table 1). This study uses a key informant approach, which is a common practice in marketing research (Phillips 1981). The individuals whom we considered key informants, and singled out as such, consisted of chief executive officers

CEOs), market managers, and technical directors who were involved in making decisions related to foreign operations. Approximately 10 hours of interview data were collected. Interviews were digitally recorded and transcribed verbatim. Several measures were taken to ensure the quality of the research process. Attempts were made to interview more than one respondent about each issue, which was achieved in all but one case, where only one individual at the head office was deemed suitable to answer the questions because all the other competent individuals were located overseas. All interviews, but one, were conducted face-to-face at the site of each firm's head office. (The exception was an interview conducted via telephone and e-mail because the respondent resided in Australia.) Interview data were supplemented with archival data such as annual reports, firms' marketing material, newspaper articles, firms' websites, and financial databases. These data were collected to provide triangulation in validation of interview material (Creswell 2003).

## **Analysis**

The analysis was carried out in several steps. Initially, an overview was created of each case, with a focus on knowledge combination that was required for the venture. Next the principal concept of the study—knowledge combination in networks—was investigated by examining two categories of ventures (new market and new product ventures) to identify trends in the phenomenon. Then knowledge combination was compared across two dimensions: identification and implementation. To enhance the internal validity when investigating identification, the focus was set on analyzing the scope of knowledge combinations that was required for each venturing and the firms' access to knowledge in terms of their network positions. The examination of the implementation phase revolved around the type of knowledge complementarity (which sets the conditions for knowledge flows) and the degree of interaction in network relationships (indicating that knowledge is shared and combined). Throughout the analysis, literature in the area was consulted for purposes of contrasting and further explaining the main findings. In the subsequent discussion, findings are tied to the extant literature to strengthen both the internal and external validities of the study.

## Cases

Two IMVs and two IPVs were investigated. A brief overview of each international venture with a specific focus on its content is presented. As a basis for further discussion, all four international ventures and the different dimensions of knowledge combination are depicted in Table 2.

### IPV1

The product (respiratory device) of IPV1 had previously been applied in clinical studies in the Dutch market. To reach a broader customer base in patient care, the firm realized that the product needed to undergo drastic changes concerning usability and functionality. To commence the development of a new generation of the product, the firm leveraged the external expertise of suppliers within the areas of software and hardware design. The firm also became engaged in the local customer network to learn more about customers' views and preferences concerning the product. Product development was carried out through iterative exchanges between both suppliers and customers. In the end, the project was considered a success, resulting in a smaller and more functional product.

### IPV2

The opportunity for IPV2 arose when the CEO of the firm went on a private trip to Australia and decided to approach the local customs authorities to promote the firm's product (a device that is used to detect certain biological substances). The customs authorities saw great potential in using the product for detecting illegal substances and placed an order for a few units. The customer, however, eventually realized that the firm's product in its current form would not meet its requirements of detecting certain narcotics and explosives and, therefore, requested a complete remake of the product. To rise to this challenge, the firm needed external expertise, predominantly regarding customer insights into potential application areas and

requirements. The product development stage in IPV2 was considered successful, and the product was adopted for use by the customer.

## **IMV1**

IMV1 was the result of an expansive international strategy that had been instigated and financed by the board and majority owners. Before entering the Belgian market, the firm had been recommended by trusted contacts in the industry to sit down and discuss with a local distributor that previously had successfully distributed similar products (cardiac monitors) for a Danish firm. Consequently, the firm and the distributor met and assessed each other as suitable business partners. An agreement, which included specified guidelines prepared by the partners on how the product should be promoted in Belgium, was signed. Moreover, the firm has tapped into local customer expertise to be able to make small adjustments in the product but has not yet made any advanced changes. The firm considers the venture a success because it has created more opportunities in both the local market and other international markets.

## **IMV2**

IMV2 was instigated when the firm contacted a Spanish distributor on the basis of recommendations from the personal network of its CEO. The distributor, a large and influential local player within the local market, was deemed competent to promote the firm's product (a test plate that provides a diagnosis for antibiotic resistance). The initiation of IMV2 in the Spanish market was part of a strategic decision by the firm to increase its focus on the European market and to steer away from more geographically distant markets that had not proved to be lucrative. Because the product had not been previously marketed or used in the Spanish market, the firm recognized a need to pursue a strategy that involved scanning the local market customer networks to better understand the premises of the local market.

**Table 2** Dimensions of knowledge combination in international ventures

| Venture | Content of venture  | Identification of knowledge combination in networks   | Implementation of knowledge combination in networks  |
|---------|---|---|--|
| IPV1    | -The firm is launching a new generation of a respiratory device used for clinical studies and patient care in the Dutch market.                                       | -Knowledge combination requires extensive search for knowledge and input.<br>-The firm occupies a central position in the network             | -Knowledge combination requires occasional interaction with the distributor (predominantly sequential and additive knowledge complementarities).<br>-Knowledge combination requires frequent interaction with suppliers and customers (predominantly complex knowledge complementarities).   |
| IPV2    | -The firm is undertaking a complete remake of its bio-detection device to be used by Australian customs for detection of substances (e.g., narcotics and explosives). | - Knowledge combination requires extensive search for knowledge input.<br>-The firm occupies a central position in the network                | -Knowledge combination requires occasional interaction with suppliers (predominantly complex and sequential knowledge complementarities)<br>-Knowledge combination requires frequent interaction with customers (predominantly complex complementarities).   |
| IMV1    | - The firm is engaging in a relationship with a distributor in the Belgian market to promote its cardiac monitoring system.   | - Knowledge combination requires moderate search for knowledge input.<br>-The firm occupies a relatively non-central position in the network. | -Knowledge combination requires occasional interaction with suppliers (predominantly sequential knowledge complementarities).<br>-Knowledge combination requires occasional interaction with the distributor (predominantly sequential and additive knowledge complementarities).<br>-Knowledge combination requires occasional interaction with customers (predominately sequential and complex knowledge complementarities). |
| IMV2    | - The firm is engaging in a relationship with a distributor in the Spanish market to promote its antibiotic diagnostic tests.   | - Knowledge combination requires moderate search for knowledge input.<br>-The firm occupies a relatively non-central position in the network. | - Knowledge combination requires rare interaction with suppliers (predominantly sequential complementarities).<br>- Knowledge combination requires occasional interaction with the distributor (predominantly sequential and additive knowledge complementarities).<br>- Knowledge combination requires occasional interaction with customers (predominantly sequential and complex knowledge complementarities).              |



## Cross-case analysis

This section makes a division between the identification and implementation phases of knowledge combination in the international ventures under investigation. At the end of each of these presentations, a comparison is made between the IMVs and the IPVs.

### The identification phase of knowledge combination

#### *Identification in international product ventures*

IPV1 involved the undertaking of the firm to develop and produce a second generation of its respiratory device. The firm's internal competences were not sufficient or pertinent for the implementation of the desired features for the product. Therefore, the firm was forced to search for external input for knowledge combinations. These competences predominantly involved knowledge about sensor technology, software, and hardware design. For the purpose of incorporating these highly complex competences, the firm teamed up with a highly reputed German developer of sensor technology, with which it had not previously collaborated. The firm also approached an American software developer and a Swedish hardware developer, which both had delivered high-quality solutions in previous collaborations. From a marketing perspective, the firm pursued a strategy that entailed focusing on a few influential researchers (customers) in the Dutch market. The firm tapped these researchers for knowledge through feedback that was accumulated in joint prototype testing. In addition, the firm sought prospective input about specific preferences in the market, methods for medical treatment, and extended application areas for the product. This knowledge was important because it could be subsequently used in knowledge combinations with technological competence to better customize the product. The targeted researchers were found through personal networks or by efforts in which the firm actively made contact with them and offered products for clinical studies and complimentary

technical support (free of charge). The firm also scheduled regular customer visits to the local market distributor to learn more about the structure of the market (i.e., who makes the buying decisions, who are the influential researchers that may legitimize the technology by using it, and what are the institutional incentives).

The firm in IPV2 was faced with the challenge of launching a complete remake of its product to enable its customer (the Australian customs authorities) to detect the specific biological materials of their choice. The firm mobilized internal competences to establish new chemical applications and new sensor applications for the detection of particular narcotics and explosives that the customer required of the device. The remodeling of sensor technology required new software and hardware frames. The firm had to seek external input for knowledge combinations regarding these new frames. The firm contracted a Swedish software developer that had previously participated in the development of the firm's technology in its infancy, as well as a Swedish hardware developer that had also been involved in developing early prototypes of the product. The requirements for the software and hardware frames could not be readily specified by the firm and its suppliers because this work depended on the outcomes concerning the development of new chemical and sensor applications. With regard to marketing activities, the firm undertook major efforts to redesign the product to suit the Australian customer. Throughout the product development process, the firm ensured that it received continual customer/user feedback concerning the content and functionality of the product features. Specifically, the firm searched for market knowledge to be combined with technological competence in an effort to align technology with customer requirements. In this case, the market knowledge mainly involved intelligence of customer preferences regarding the hardware design, the software design, and the application areas of the product.

### ***Identification in international market ventures***

Health care routines are carried out differently depending on the country. Hence, in IMV1, the firm had to modify the functions of its product to meet the standards concerning usability and applicability that are specified by hospitals in the local Belgian market. To find solutions to these issues, the

firm needed to make minor adjustments in the product software concerning graphical interface and monitoring applications. The firm possessed the internal competence to create the blueprints concerning how the software technology should be developed; however, it needed to combine this knowledge with external knowledge to realize the outlined specifications. The external knowledge that was required was tapped from software developers that possessed the competence to make these requirements materialize through coding and tests. For this purpose, the firm hired external consultants from firms with which it had previously worked on similar projects. From a market perspective, the firm became acquainted with its distributor in the Belgian market by using external consultants to scan the market for collaborators. To evaluate the contact further, the market director visited the customer about ten times before an agreement was established. The firm used the distributor as a source of knowledge about the market structure and customer preferences. This knowledge was combined with technological competences in making modifications in the product. The firm was able to use the information and referral of the distributor to instigate a business relationship with a prestigious German hospital, thus further reflecting exploration in the downstream network. However, the firm lacks direct relationships with buyers/users in the local market, which explains why more complex knowledge about the market and technology has not yet been acquired.

In IMV2, the firm's product needed to be compatible with the specific types of antibiotics on which the customer wanted to conduct tests. Based on an analysis of the particular antibiotics the Spanish customers use, the firm made requirements for test plates (on which bacteria are cultivated), which were ordered from a local Spanish supplier (with which it had previously worked in this market, as well as on similar projects in other markets). Hence, knowledge was standardized and, therefore, relatively easy to specify. To market the product effectively, the firm used the personal contacts of its CEO to establish a relationship with its Spanish distributor. Moreover, the firm also conducted its own marketing activities by actively short-listing and making contact with local researchers who could provide knowledge about the market and the demands for new technology. Hence, customer knowledge was used to enhance the firm's understanding of the market and was combined with the existing technological competences of

the firm. The explicit strategy of contacting these researchers involved seeking intelligence among personal contacts about eligible partnerships or studying the networks of the distributor. The firm made persistent attempts to educate researchers about the benefits of its technology and to sponsor them with products. By doing so, the firm aspired to apply its products in scientific studies that may further bring legitimacy to the firm in the market. Moreover, the firm frequently arranges events for researchers where they are invited to seminars and informed about the technological advances of the firm.

### *Case comparison*

It is evident from the cases that IPVs, to a greater extent than IMVs, rely on explorative strategies regarding knowledge combination in networks. Moreover, the critical technological competence that is sought as input for IPVs is often complicated and takes time to acquire. In contrast, it seems less challenging for firms in IMVs to attain the competences they seek, which may be explained by the fact that they predominantly require standardized competences to complement their extant technology. Moreover, three of four cases (IPV1 was the exception) showed that firms explore for technological knowledge by using partnerships with suppliers with which that they had worked on previous projects. It also seemed consistent across the categories of IMVs and IPVs that firms put plenty of effort into tapping customers on market knowledge. In this endeavor, both established customer relationships and new customer relationships were mobilized. A notable difference between these cases is that firms involved in IMVs primarily searched for knowledge about market developments, whereas firms engaged in IPVs also needed to acquire customers' expertise regarding technological knowledge that is crucial for new product development. Another difference is that IPVs required that firms occupied central network positions to act as direct link between the supplier level and the customer level. In IMVs, firms did not integrate these levels as closely.

## **The implementation phase of knowledge combination**

### *Implementation in new product ventures*

The implementation of opportunities for knowledge combinations in IPV1 required close collaboration between the firm and two international suppliers. For knowledge to be shared across organizational boundaries, a cross-organizational project group comprising members from the participating actors was assembled. The group met weekly to monitor the evolution of the product development process. The firm was represented by personnel from R&D, sales, marketing, and service support, whereas supplier firms were mostly represented by engineers. The firm was the project leader in the venture and coordinated work by maintaining daily contact by telephone and email with each participating partner. IPV1 was also facilitated by the implementation of an intranet that sorted and organized information and knowledge generated by the project partners, thus enabling all participating parties to obtain a broad overview of the project. To implement the knowledge input of customers/users during the product development process, the firm maintained close contact with a group of important researchers in the Dutch market. The researchers were a part of the product development since the initiation of the project and provided continual input reflecting their wants and needs. Throughout the product development project, the firm assigned local representatives to be present in the Dutch market to provide prototypes for researchers to use in clinical tests. During this testing period, the representatives were able to acquire regular feedback regarding researchers' opinions of technology, usability, and application areas of the product. To offer further support, the local representatives also functioned as a link between the customers and the technical experts at the head office.

Similarly, in IPV2, the firm worked in a cross-organizational project group comprising representatives from the firm and two supplier firms. The firm was represented by engineers and chemists, and the supplier firms were represented by engineers. The project group met frequently to allow for iterative knowledge exchange so as to ensure that hardware and software designs were compatible with chemical applications and sensor technology. The firm was the organizing node of the collaboration (project leader) and played a leading role in defining the product requirements. However, the firm recognized that receiving feedback from suppliers was indeed influential when formulating these requirements. The venture also involved

collaborating closely with the customer. During the initiation phase of the venture, the firm assigned a large number of its staff members (including the CEO, product specialists, and R&D staff) to be present in the local market. These representatives worked in cross-organizational project groups with the customer and met on a daily basis, with the objective of sharing knowledge across organizational boundaries. When the first successful prototype was launched, there was no longer any financial incentive to maintain face-to-face interaction. Hence, the firm could then remove its local representation from the market. The firm, however, continued to maintain daily contact with the customer by telephone and e-mail, thus allowing the delivery of support and feedback to occur via a two-way communication system.

### *Implementation in new market ventures*

Occasionally, small modifications in the firm's existing cardiac monitoring technology were necessary in IMV1. To respond to random customer demands for product modifications, the firm developed new requirements for the system that were passed on to suppliers to implement through coding and tests. The firm collaborated with three supplier firms regarding these issues, resulting in a total of twelve individual consultants being assigned to the task. No project groups were needed; the business relationships were regulated by contracts that stipulated directions for quality and time limits. With regard to the firm's customer relationships in the Belgian market, the firm did not have regular contact with its end customers; it instead maintained contact with its distributor on a daily basis by telephone and e-mail. The information that was exchanged in this interaction revolved around the design of the product offerings, market structure information, and customer feedback. The firm combined some of the feedback from its customers with its own internal competences to carry out product improvements. However, some of the feedback was put in the "pipeline" for future reference, including the development of new generations of the technology. In addition to daily support, the firm invited the distributor, as well as distributors in other markets, to an annual event, where competences and information are shared during educational seminars about the product and its areas of application.

In the case of IMV2, the firm recognized no need for major changes in its product. The relationship with its main supplier was handled by simple transactions (i.e., the firm ordered critical, but relatively standardized, test plates when needed). On occasion, however, the firm received test plates that were not compatible with the specifications of the customers. In these cases, the plates were returned to the supplier for correction. Hence, the implementation of knowledge combinations in supplier relationships merely involved occasional interaction. On the customer side, the firm maintained contact with its distributor on a weekly basis by telephone and e-mail. The contact involved market-related issues such as sales results and product feedback from local customers (mediated by the distributor). The firm considered user input to be critical and, therefore, invited the distributor, as well as local influential researchers and end customers, to attend annually held workshops at the head office in Sweden. As a counter-initiative, the distributor arranged workshops and seminars for representatives from the firm to travel to Spain and make presentations for end customers and influential researchers in the market.

### *Case comparison*

All firms in this study required interaction to implement knowledge combinations in network relationships. However, IPVs seemed to require somewhat closer and more frequent interaction than IMVs, which may be related to the fact that IPVs involved more complicated technological knowledge in comparison to IMVs. Hence, it was observed that IPVs were run by projects where knowledge was continually shared between the firm and participating suppliers. In contrast, IMVs were characterized by sequentially ordered supplier relationships containing simple transactions of an order and delivery character. Generally, across all cases, interaction in the customer network seemed crucial for firms to gain knowledge input about market demands and local requirements. However, IPVs seemed to require closer and more frequent interaction than IMVs in this area. One explanation for this finding is that IPVs require highly specified customer feedback to be used for product development, whereas IMVs merely use customer feedback for minor responses to market developments. Hence, knowledge combination in customer relationships of IPVs is demanding and

requires extensive reciprocal interaction, which, in turn, requires a local presence and face-to-face encounters.

## Discussion

The study supports findings of internationalization theories on smaller firms because all ventures seem to depend on knowledge in the external network (e.g. Coviello and Cox 2006). Evidence from the studied cases brings a new perspective to the field by showing that knowledge combination is crucial for the development of new business (Kogut and Zander 1992; Yli-Renko et al. 2001). This study also reveals that knowledge combination is a property of not only individual firms but also the network at large. Thus, in line with network theory (Burt 1983) and international entrepreneurship theory (Sullivan Mort and Weerawardena 2006), international ventures seem to develop from firms' proactive initiatives in networks. The following section addresses consistent and contrasting findings concerning the exploration and the exploitation of knowledge combination in IPVs and IMVs.

### Identification of knowledge combinations

In the pursuit of finding potential input for knowledge combination, the firms under investigation in this study made attempts to access and evaluate the potential of suppliers before recruiting them into partnerships. To a large extent, firms contacted individuals and firms that they had previously worked with in business projects. The ability to identify knowledge in networks thus seems to be influenced by previous knowledge and experience of foreign market operations (cf. Shane 2000; Sharma and Sallis 2007). These types of experiences keep actors informed about the network and enable them to employ the competences of both directly and indirectly connected actors in international venturing (Ritter et al. 2004). In addition, firms were observed to benefit from the flexibility to constantly seek central network positions where they could act as links between suppliers and customers (Burt 1983). In comparison to firms involved in



IMV, the cases show that IPVs had a greater proclivity to integrate the supplier level and the customer level by acting as a close link between them. Moreover, firms involved in IPVs were more inclined to search for knowledge input among suppliers. Common for both IMVs and IPVs was that firms seemed to expend a substantial amount of effort exploring for market knowledge among customers. Hence, most of the firms made active attempts to reduce their dependence on distributors by striving to tap knowledge closer to the market and the actual users. In summary, the cases showed that all firms engaged in the pursuit of venturing aspired to identify knowledge combination in networks. However, firms involved in IPVs required more options for knowledge combination in comparison to firms involved in IMVs. One explanation may be that the launch of new products demands an intricate mix of knowledge input that both satisfies market needs and stimulates technological breakthrough (Yli-Renko et al. 2001).

### **Implementation of knowledge combinations**

The cases suggest that different knowledge complementarities require varying degrees of interaction (see Buckley and Carter 1999). In the present study, knowledge complementarities between firms and their suppliers seemed to be predominantly complex in the case of IPVs. Hence, the high complexity of supplier relationships in IPVs requires extensive interaction for knowledge to be transferred and, subsequently, combined (Nonaka 1991). In contrast, IMVs comprised sequential knowledge complementarities in firms' supplier relationships. This finding means that knowledge combinations can be implemented by simple transactions that follow standardized sequential schema (Buckley and Carter 1999). Moreover, both IPVs and IMVs comprised knowledge combinations involving distributor relationships and end customer relationships. In both cases, distributor relationships seemed to be characterized by additive and sequential knowledge complementarities. Similar to the findings of Buckley and Carter (1999), no pure form of additive complementarities were found because some sort of transaction was prevalent in all cases. However, relationships with end customers appeared to be of a more complex nature and especially critical in IPVs. This observation can be explained by the fact that firms in these cases used customer knowledge as input for product development processes. Customer knowledge is valuable to these firms

because it conveys local technological preferences and, therefore, is often complementary to the technological knowledge that is generated in supplier relationships. Separate bits of knowledge from customers and suppliers can thus be combined to achieve better product outcomes. This finding supports the notion that knowledge complementarities are interconnected in networks and need to be adjusted to each other (Ritter et al. 2004).

In line with Gulati and Singh (1998), the study reveals that each investigated venture consists of numerous different types of complementarities that are encapsulated by networks. Based on firms' knowledge and experiences of working in networks, these complementarities can be identified. Moreover, the complementarities can be collectively marshalled in cases where firms are able to create systems in which a larger set of knowledge complementarities can work together in the development of a new venture. Based on the insights of the cases, it seems beneficial to maintain different complementarities, depending on the business situation (Gulati and Singh 1998). In situations where a high degree of new knowledge is required, firms may strive for close network relationships (i.e., complex complementarities) to pursue open-ended objectives. In situations where a lower degree of knowledge is required, firms may maintain more loosely coupled network relationships (i.e., additive and sequential complementarities) to pursue efficiency in transactions.

## Conclusions

The purpose of this article was to investigate how knowledge combination in networks underlies the international venturing of four small biotech firms. In so doing, the intended contribution was to shed light on the underlying factors of the international venturing of these firms and, thereby, provide new insights into the international small business field.

The findings of the study show strong evidence that proactive participation in networks enables the identification of knowledge combinations and provides the means of implementing knowledge combinations. A mechanism that underlies the identification of knowledge combination appears to be the pursuit of “outward strategies” that enable firms to receive intelligence about external competences as well as to assess the relevance of these competences in a contextual meaning. This ability is primarily based on firms’ resilience to structural change, implying that successful firms are programmed to navigate towards advantageous network positions. From these positions they can gain control and oversight of critical network relationships and leverage external competence. In the second phase – regarding the implementation of knowledge combinations – firms rely on interaction mechanisms that span organizational boundaries. Interaction is important because it facilitates processes by which participants share knowledge and make it intersect into combinations. Hence, this study suggests that small firms need to possess the flexibility to search the network for knowledge combinations and the stability to dedicate time and effort to implement these combinations in network relationships. This dual perspective of deliberately leveraging networks for business development has not been thoroughly examined by related network studies on smaller firms’ international venturing (e.g., Freeman and Cavusgil 2007; Sullivan Mort and Weerawardena 2006). Thus, this study contributes to a further understanding by acknowledging that knowledge combination in networks is indeed a complex capability that can be proactively exploited by firms to get ahead of competitors. Moreover, the study also provides detailed insights into the topic by comparing the similarities and differences between IPVs and IMVs in the identification phase as well as the implementation phase. That is, strategies regarding knowledge combination in networks are preferably designed in

consideration of the contents and objectives of the venture. For instance, the technological orientation of an international product venturing generally entails more complicated network exchanges than a market-oriented international market venturing, which may be related to the fact that it involves both the experimentation of new technology and, consequently, a redefinition of the market.

Combining knowledge in networks should be recognized as a key managerial skill that has major potential to scale up operations and allow for greater specialization in core competencies since a larger amount of complementary knowledge is leveraged through external actors. To follow up on this explorative inquiry and to generalize the findings, additional research is highly recommended. This research should preferably be based on larger data sets and methods of confirmatory statistical analysis.

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## Article 3

### **The International Product Venturing of a Biotech SME: Knowledge Combination in Upstream- and Downstream-Networks**

Forthcoming as a chapter in *European Entrepreneurship in the Globalizing Economy*, edited by Prof. Alain Fayolle and Prof. Kiril Todorov



**Abstract:** Research has underscored that international product venturing is critical for the competitiveness of SMEs in foreign markets. Despite this scholarly consensus we still have limited knowledge about the predictors of international product venturing of SMEs. This article advances the argument that knowledge input from both upstream- and downstream-networks provides a multitude of options for knowledge combinations and therefore determines the trajectory for international product venturing. The purpose of this study is, hence, to examine knowledge combination within and across upstream/downstream networks within the realm of the international product venturing of a biotech-SME.

*Key words: international product venturing; SME; knowledge combination; upstream network; downstream network; knowledge complementarity; entrepreneurship.*

## **The International Product Venturing of a Biotech SME: Knowledge Combination in Upstream- and Downstream- Networks**

### **1. Introduction**

In the global marketplace, where product life cycles are becoming increasingly shorter, firms need to be constantly prepared to re-assess their core activities of business. Recent studies on international small- and middle-sized enterprises (SMEs) have demonstrated that the overall prosperity of these firms hinges on their performance in international product venturing (Indarti, van Geenhuizen, and Gadjah, 2005; Mesquita and Lazzarini 2008; Ruzzier, Antoncic, Hisrich 2007). Consequently, SMEs that are able to successfully launch new product solutions in foreign markets may expect reinforced competitiveness and stimulated international growth.

The concept of international product venturing is here defined as the undertakings of an existing firm to introduce a new product in a foreign market (cf. Venkataraman, MacMillan and McGrath 1992). Even though the interest for international product venturing of SMEs is rapidly increasing, we still know little about the predictors behind this phenomenon. To remedy this research deficiency this study leans on the magnitude of related research in the field of international entrepreneurship that suggests knowledge combination to be a critical driver of business innovation (Cui, Griffith, & Cavusgil 2005; De Clercq, Sapienza, Crijns, 2005; Gassmann & Keupp 2007; Knight & Cavusgil, 2004; Murray & Chao, 2005; Rialp, Rialp, and Knight 2005; Yli-Renko, Autio & Sapienza 2001; Zahra and Filatotchev 2004; Zhou 2007). Because SMEs typically are resource-constrained, it is reasonable to assume that knowledge combination in these firms is not restricted to the boundaries of the firm, but also takes place in external networks. By building on this idea, the study explores how knowledge combination in networks underlies the international product venturing of SMEs. The study outlines that international product venturing requires knowledge input from both upstream networks (i.e. suppliers) and downstream networks (i.e. customers). This division may help us understand how the mobilization of a diversified scope of network relationships opens up a multitude of avenues for knowledge to flow and intersect. For example, even though knowledge may very well be combined *within* the confinement of either upstream networks or downstream networks (c.f. Handfield, Ragatz, Petersen, and Monczka 1999; von Hippel 1988; Lengnick-Hall 1996), it can be advantageous for firms to also implement knowledge combinations that reach *across* these networks (Ritter, Wilkinson, and Johnston 2004). For instance, innovative product solutions may emanate from combinations of technological knowledge in critical supplier relationships, concerning what products *could* be developed, and market knowledge that resides in important customer relationships, concerning what products *should* be developed. Networks are here understood as the connected customers and suppliers in a firm's environment. Knowledge combination, in turn, is conceptualized as the combination of previously unconnected bits of knowledge for the purpose of developing new business (Buckely and Carter 1999). In the subsequent empirical inquiry of this article, a biotech SME serves as unit of analysis. The biotech firm was considered to represent a pertinent case as it belongs

to a global knowledge-intensive industry where international product venturing is imperative for survival.

Against this backdrop, the purpose of this study is to examine knowledge combination within and across upstream/downstream networks, within the realm of the international product venturing of a biotech SME. Thereby, the study intends to contribute to SME-theory regarding the predicting mechanisms of international product venturings. To provide further direction for this study, three investigative research questions are constructed:

1. How is knowledge combination applied within upstream networks in the international product venturing of a biotech SME?
2. How is knowledge combination applied within downstream networks in the international product venturing of a biotech SME?
3. How is knowledge combination applied across upstream/downstream networks in the international product venturing of a biotech SME?

The remainder of this article consists of five principal sections. Firstly, the literature related to international product venturing and knowledge combination in networks is reviewed and a theoretical framework is created. Then, the method of an empirical inquiry into the phenomenon is introduced. Findings from this project are subsequently presented and followed by an analysis and discussion. The paper ends by a conclusion and a discussion concerning managerial implications.

## **2. Theoretical Perspective**

This section provides a theoretical background to the investigated phenomenon – international product venturing of SMEs. Thereafter, it presents theoretical underpinning of the knowledge combination in networks, where a distinction is made between upstream networks and downstream networks.

## 2.1 International Product Venturing in Networks of SMEs – A Theoretical Background

Research on international SMEs builds on the assumption that these firms are distinct from larger international firms because of several unique traits. For instance, SMEs that are proactively establishing new ventures in foreign markets – from inception or at a later state – are often described as entrepreneurial by nature (Fletcher 2006). Consequently, international product venturing of SMEs can be largely understood as an ongoing act of entrepreneurship (Spence and Crick 2006). The bulk of research on international SMEs has considered knowledge as a key driver to identify/exploit entrepreneurial opportunities in foreign environments (see Rialp, Rialp, and Knight 2005 for review). This can be explained by the prevailing conception that knowledge enables firms to cope with specific foreign market conditions and, thereby, paves way for effective adaptations to preferences of local customers. Throughout the past few decades, SME-research has been undercurrented by the notion that SMEs possess inherent advantages over larger firms in pursuit of knowledge-based opportunities. These advantages are explained by observations implying that they carry less bureaucracy and, therefore, have quicker feet in adjusting to emerging knowledge requirements (Liesch and Knight 1999). However, there is another side to the coin implying that small size also may inflict impediments for SMEs. Hurdles are generally argued to originate from inherent resource constraints that may impose liabilities of smallness (Baum 1999). Consequently, SMEs often have to compensate for internal resource deficiencies by seeking leverage of knowledge-based resources that are outside their immediate control. In these cases, firms' networks may be extremely important arenas where complementary bits of knowledge can be acquired and leveraged for product venturing (Dowling and Helm 2006).

Whereas knowledge input from networks varies in content, research alluding to SMEs' product venturing has primarily stressed a critical need for technological knowledge and market knowledge (Wiklund and Shepard 2003). On the one hand, technological knowledge involves expertise about the core features of the product offering. On the other hand market knowledge revolves around the knowledge about customer preferences,

competitive situations, and emerging customer segments that are related to the product offering. This idea is supported by Yli-Renko, Autio, and Sapienza (2001) who studied 180 high tech ventures and discovered that market knowledge acquired in customer relationships is a strong prerequisite for competitive advantages in foreign markets. In addition, in a review of studies on international retail SMEs, Hutchinson, Quinn, and Alexander (2005) find that supplier relationships are of critical importance for extracting technological knowledge input that can be exerted for contriving new product solutions. Hence, SMEs may benefit from participating in knowledge sharing networks, comprising both customers and suppliers. Deploying knowledge in both upstream networks and downstream networks may present an abundance of business opportunities that may push international product venturing to new levels. Moreover, in order for knowledge to be acquired and shared in such networks, relationships need to be close, though flexible enough for firms to be able to adjust to the inevitable changes in a competitive business environment (Dyer and Nobeoka 2000). The next section discusses the concept of knowledge combination in networks in closer detail.

## **2.2 Knowledge Combination in Networks**

Recent research on smaller firms indicates that the applicability of knowledge combination is not confined to the boundaries of firms, but encapsulates their external networks as well (Thorpe, Holt, Macpherson, and Pittaway 2005). Although, activities of knowledge combination in networks are challenged by the fact that knowledge is dispersed, meaning that different connected network actors know different things. Hence, to reap the commercial benefits of the knowledge of others, mechanisms of knowledge combination in networks needs to be taken into account.

Knowledge combinations materialize when separate bits of knowledge intersect. In the realm of a business context, this implies that distinct bits of knowledge are orchestrated to achieve commercial benefits. The outcomes of knowledge combination – and the means by which they are realized - are to a large part determined by the different types of complementarities that exist between separate bits of knowledge (cf. Thompson 1967). In line with Buckley and Carter's (1999) classification of knowledge complementarities,

they may be additive, sequential, or complex. Additive complementarity is the most simple form and means that bits of knowledge in separate locations are of direct relevance to each other and designated to coincide for a common task (e.g. A's knowledge about production costs is relevant for B's knowledge about market demand when determining a price for a certain product). Also, they may be sequential, which occurs when knowledge flows are directed to follow a certain one-way path so that knowledge at one location functions as input prior to that acquisition of knowledge at another location (e.g. A's knowledge about product features influences B's knowledge acquisition concerning market-selection tactics for optimal combined outcome). Further, they may be complex which occurs when separate bits of knowledge interacts through spillovers (e.g. A's knowledge about R&D needs to be adjusted to B's knowledge about areas of customer use – and vice versa – for maximized results). The consideration of knowledge complementarities in networks may make firms better able to combine knowledge in local networks as outcomes may become aligned with market characteristics and local technological requirements (Lee, Chen, Kim, and Johnston 2008). Moreover, the enactment of knowledge combination is not only circumstantiated by knowledge complementarities, but also by the nature and location of knowledge. In cases where knowledge is more tacit in nature it is more difficult to understand and codify (Polanyi 1967). In this case knowledge combinations may require intensive interaction and socialization to be implemented (Nonaka 1991). In the cases when knowledge is geographically remote firms may need local representation or sophisticated technology to allow for knowledge flows between organizations (Knight and Cavusgil 2005).

Even though activities in networks may develop from collective movements that are difficult to influence (Jack, Dodd, & Anderson 2008), studies have shown that individual firms can be able to proactively pursue knowledge-based opportunities in networks. Such conduct may imply that existing networks are extended and new networks are developed (Sullivan Mort and Weerawardena 2006). The relative freedom that firms may have to pursue their own goals in networks is, according to network theorists, determined by their flexibility and independence towards other network actors (Burt 1983). Hence, for firms to stay in pace with the ever changing



business environment they have to maintain this freedom by questioning current premises and continually implement knowledge combinations that differ from competitors (Teece, Pisano, & Shuen 1997; Eisenhardt & Martin 2000; Nonaka, Toyama, Byosière, 2001)

### 2.3 Theoretical Framework

This study contends that knowledge can be combined both *within* and *across* SMEs' upstream/downstream networks. This division of network categories is considered meaningful as it constitutes a balanced model regarding firms' technological orientations (roughly represented by activities in the upstream network) and firms' customer orientations (roughly represented by activities in the downstream network). Moreover, studies on international product venturing have argued that firms require both input of technological knowledge and market knowledge (Wiklund and Shepard 2003). Hence, to achieve diversity and richness in knowledge combinations, knowledge input may preferably be acquired from both upstream networks and downstream networks.

Knowledge combination *within* the upstream network can involve a number of suppliers that are recruited for projects of international product venturing. These firms may have to establish different forms of collaborations to provide conduit for the flow of knowledge and allow it to be combined between actors (Dyer and Hatch 2006). Knowledge combination *within* the downstream network can involve a certain amount of customers that provide feedback regarding product features (Schroeder, Bates, Junttila 2002). Knowledge combination *across* the upstream network and the downstream network implies that knowledge input from each of these dimensions have been intersected into knowledge combinations. An example of this is when customer feedback affects suppliers' technological outlining of new product requirements.

In a first step, Figure 1 depicts the current setup of knowledge combination of a firm. In a second step, the firm has identified an opportunity to connect new actors that can contribute with knowledge input in the upstream/downstream networks. In a third step, these knowledge combinations are realized and a new setup of knowledge combination is

formed. This new setup form the basis of what is known in a particular network, and influences (filters) the recognition of future opportunities of knowledge combination (Cohen & Levinthal 1990)

In line with the intrinsic arguments of this study, the implications of knowledge combination may not be delimited to a single network-category. To the contrary, considering the connectedness of networks (Cook and Emerson 1984), it is likely that knowledge spillovers bring about knowledge combinations across network categories. These knowledge spillovers are typically triggered in cases where the complexity of knowledge complementarity is high, creating a demand for interactivity (cf. Buckley and Carter 1999).

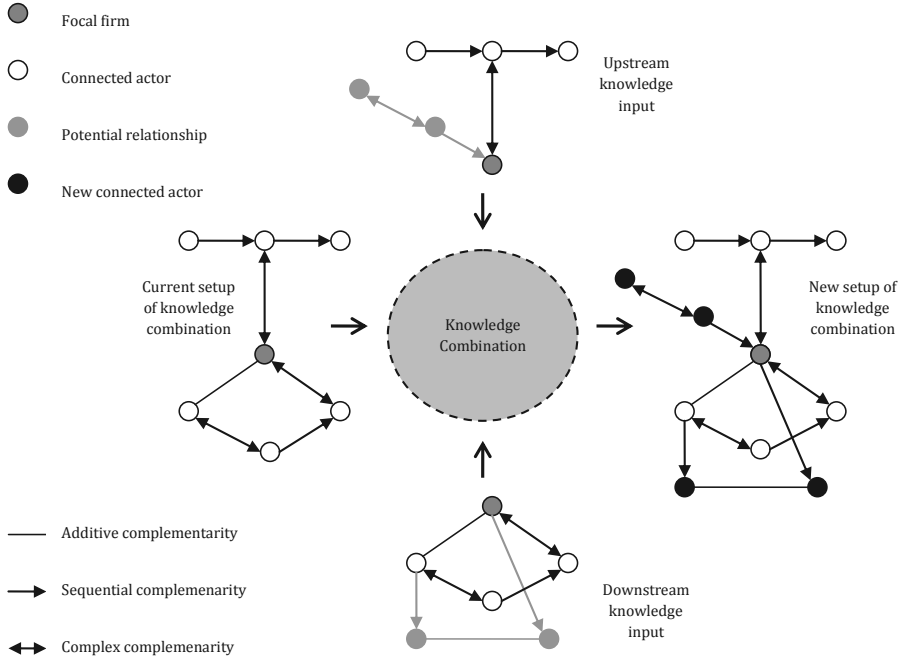


Figure 1: Knowledge combination in upstream/downstream networks

### 3. Methodology

This study investigates a complex and sparsely explored phenomenon. Consequently, a single-case approach is chosen as it serves the purpose of generating rich insights for new theory development (Yin, 1994). The unit of analysis is represented by the international product venturing of a small biotech firm (An overview of firm characteristics is presented in Table1). The analysis focuses on how knowledge is combined within and across upstream/downstream networks in the international product venturing. The investigated biotech firm was chosen on the basis of critical-case sampling: I.e. the selected firm is relevant because international product venturing is imperative for its overall competitiveness, a common trait of biotech SMEs.

The firm is located in Stockholm, Sweden, and was singled out by the support of an industry-index in the database Market Manager to make sure that it indeed belonged to the biotech industry. It was also selected on basis of the criterion that it corresponded to the European Commission's (1996) definition of a SME. Personal interviews were the main form of data collection. In all, 6 interviews were conducted with 4 respondents. The study uses a key-informant approach, which is a common practice in marketing research (Phillips, 1981). The individuals we considered as key-informants, and singled out as such, consisted of senior executives that were involved in decisions related to foreign operations. These consisted of the CEO, the sales director, the marketing director, and the technology director. Several measures were taken to guard for quality in the data collection. Attempts were made to interview more than one respondent about each issue. Furthermore, interview data were in all cases substantiated with other forms of data, derived from sources such as annual reports, firm marketing material, newspaper articles, firm website, and financial databases. All interviews were conducted face to face at the site of the firm's head office. The respondents were assured that they and the firm would be treated anonymously in forthcoming studies to make them comfortable to share information. Approximately, 6 hours of interview data were collected. Interviews were digitally recorded and transcribed verbatim. Interview data was supplemented with archival data and relevant documents collected from the firms and commercial data-bases. This data

was collected to provide triangulation in validation of interview material (Creswell 2003). By the support of this data it was possible to chronologically structure the interview data, and evaluate the substance of miscellaneous facts and statements.

| Founded | Employees (2006) | Turnover Million Euro(2006) | Number of respondents | Number of interviews | Type of Product     |
|---------|------------------|-----------------------------|-----------------------|----------------------|---------------------|
| 1997    | 22               | 3.0                         | 4                     | 6                    | Respiratory devices |

Table 1: Overview of firm characteristics and collected data.

The analysis is carried out in several steps. Firstly, a brief outline of the case is presented. Then, by pursuing a replication logic (Yin 1994), a cross-unit analysis was conducted involving two network categories (upstream and downstream), and three types of knowledge complementarities (additive, sequential, and complex). Throughout, literature in the area was consulted for purposes of contrasting and further explaining main findings. In the subsequent discussion findings are tied to the extant literature to reinforce both the internal and external validity of the study.

#### 4. The International Product Venturing of a Biotech-SME – A Case Study

The empirical inquiry starts out with a short overview of the investigated international product venturing. Thereafter, a cross-unit analysis is conducted to examine how various types of knowledge complementarities (additive, sequential, and complex) in different categories of networks (upstream and downstream) constitute knowledge combinations in international product venturing. The cross-unit analysis regarding these dimensions is summarized in Table 2.

## **4.1 Brief Outline of the International Product Venturing**

Alpha provides a technologically advanced respiratory device used for clinical research in hospitals and universities. The studied international product venturing had its origin in the fact that firm believed that the product was becoming outdated and in need of drastic improvements. For that reason, Alpha decided to develop a new generation of the product, which would be launched first in the Dutch market. Because of limited internal resources, the firm was dependent on knowledge input from various sources in the external network—namely, the upstream supplier network and the downstream customer network—to achieve those objectives. The firm began to collaborate with suppliers and customers and combined knowledge both within and across these networks. Two main objectives were set up to guide the product development process: to design a more usable interface and to make the product significantly smaller. At the end of the project, the initial objectives were met: The device was significantly reduced in size (from 40 kg to 0.8 kg), and the usability of the interface was improved. The firm even received a prestigious industry-award for the new design. Hence, this case indicates that successful international product venturing rests on the bedrock of various knowledge combinations that reside both within and across upstream/downstream networks.

## **4.2 Cross-Unit Analysis**

### **4.2.1. Knowledge combination within the upstream network**

In the realm of the international product venturing, the firm needed to tap the upstream network on knowledge regarding both new sensor technology (to reduce the size of the product) and a new design (to make the product more usable for customers). To obtain access to competencies in the upstream network, the firm instigated three major collaborative relationships involving: (1.) an international sensor developing firm (sensor technology), (2.) an international software technology firm (new software-based applications), and (3.) a domestic hardware developing firm (new design of product-surface). Alpha also ensured that the product met the

standards of the customers' supplier of complementary products (which provides a customized gas that is necessary to calibrate the product). For knowledge to be shared and combined between the different participating firms, a project group was formed. Alpha was represented by personnel from R&D, sales, marketing, and service support, whereas the supplier firms primarily were represented by engineers. Parts of the group meet weekly in various configurations, depending on the phase of the development. For example, in one phase of the project the supplier of software solutions needed to insert a new complex component in the product. For this sake it involved the supplier of this component in project meetings to make sure that the component was compatible with the technology of the other participating firms. Alpha is, however, functions as the project leader and has the main responsibility of the project. In the capacity of the organizing node in the upstream-network, the firm has daily contact with each participating partner by telephone and email. Alpha also has implemented an intranet to bring together all information and knowledge generated by its project partners, thus enabling all participating parties to get a complete project overview.

| Knowledge complementarity | Knowledge combination within upstream networks  | Knowledge combination within downstream networks  | Knowledge combination across upstream/downstream networks  |
|---------------------------|---|---|--|
| Additive                  | (No observation)  | (No observation)  | (No observation)   |
| Sequential                | Complementary products are ordered from a supplier (calibration gas), and combined with extant technology.                  | Distributor's knowledge about the Dutch market structure is combined with the firm's internal market knowledge.                                 | (No observation)   |
| Complex                   | Knowledge regarding sensor technology, software, hardware is combined between the firm and its suppliers in project groups. | Customers' market knowledge is, in iterations, combined with the firm's internal technological knowledge when outlining product specifications. | Customers' knowledge about technology/application areas is combined with suppliers' technological knowledge through iterative prototype testing. |

Table 2: Overview of cross-unit analysis.

**4.2.2. Knowledge combination within the downstream network**

Knowledge combination within the downstream network primarily involved market knowledge that affected the strategic choices for the design of the product-offerings in the Dutch market. Although the firm used a distributor to gain access to customers and to take care of marketing activities, it also ran its own operations in the market. In doing so, the firm strived to not become overly dependent on the distributor and was thereby able to receive first-hand information about particular market conditions. For instance, to gain access to market knowledge input, the firm scanned

the Dutch customer network for certain influential customers (researchers and medical doctors) to establish partnerships with. From such partnerships, the firm solicited researchers' ideas and preferences about product features and possible application areas. Subsequently, on basis of this knowledge the firm learned that there was an unexplored, and possibly lucrative, market in patient care where the product could be applied. By choosing this strategic direction the product had to be equipped with several new features that were required by different types of diagnostic treatments in patient care. The product also had to be drastically reduced in size to be easier to handle for hospital personnel and patients. From its collaborations with customers, the firm was able to distilled valuable market knowledge which was combined with internal knowledge when sketching the initial requirements for how the product should be designed to meet the particular preferences of the customers in the Dutch market. In the realm of the international product venturing, the firm has not experienced any difficulties in making contact and establishing partnerships with influential customers. To the contrary, specialist-customers were usually enthusiastic when being invited to work with advanced medical instruments at the cutting-edge of technological development.

#### **4.2.3 Knowledge combination across upstream/downstream networks**

Knowledge was continually combined across the upstream/downstream network in the investigated international product venturing. The interactions between these two network categories were manifested by processes of prototype testing, indirect customer feedback that is partly mediated by Alpha between its customers and suppliers, and direct customer feedback that was transmitted directly from the customers to the suppliers through joint customer visits comprising representatives from both Alpha and its supplier firms. The product development project was structured as follows: (1) The product was initially being tested on a conceptual level. This meant that ideas were expressed for customers to comment upon. Customer feedback on these initial thoughts was usually addressed in the project group (consisting of representatives of the firm and its suppliers). (2) Then, the product was tested on a functional level. This meant that initial experiments were conducted to test the technique.



Customers were not involved in this phase. (3) Finally the product was tested on a prototype level. In this phase, the firm and certain members of the supplier firms formed a group where they discussed the viability of the prototypes jointly with customers. Subsequently, Alpha and the suppliers worked to reach a consensus regarding what product improvements that should be implemented. This process included the assessment of several construction proposals. The international product venturing was described a complex process where single technological modifications or customer comments often had consequences for other connected aspects regarding the technology and usability of the product. Various challenges of reaching a final solution could not be overcome simultaneously; therefore, the firm had to interact with both suppliers and customers regularly throughout the course of the project to decide which adjustments to make for the project to move forward. Consequently, the project developed through iterations between and across actors in the supplier network as well as actors in the customer network, resulting in new combinations of knowledge across network categories.

Figure 2 displays the content and direction of knowledge flows between Alpha and its suppliers (upstream) and customers (downstream).

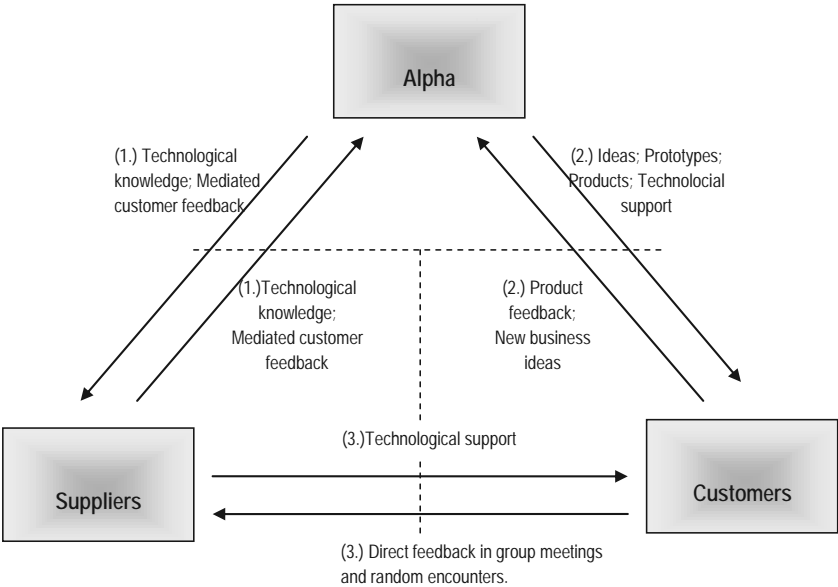


Figure 2: Direction of knowledge flows and intersection points for knowledge combination within and across network categories in the case of Alpha.

(1.) The figure shows that the Alpha and its suppliers are engaged in mutual exchange of technological knowledge. Moreover, both Alpha and its suppliers apply the feedback they previously have received from customers in their mutual collaboration. Mediating feedback from customers is complex and requires iterative interaction that is directed both upstream and downstream in the network. The mediation of knowledge allows knowledge to travel across network categories. (2.) On basis of the collaboration with suppliers, Alpha is able to derive conceptual ideas and prototypes that are tested on customers. By using the technology, customers can come up with suggestions for product improvements that they communicate to Alpha. (3.) On occasion, Alpha arranges group meetings where customers and suppliers can discuss user/technology issues without a middleman. In addition, occasionally experts from the supplier firms are present when customers conduct clinical tests to evaluate the performance of their components. Hence, knowledge-flows do reach across network categories. As demonstrated by the case, this may occur through direct encounters or by mediation of a “broker firm”.

## 5. Discussion

To gain insights about how knowledge combination is applied in networks in the international product venturing of SMEs, three investigative research questions were formulated. In this section these questions are separately discussed on the basis of empirical findings and theory.

### *1. How is knowledge combination applied within upstream networks in the international product venturing of a biotech SME?*

In line with Dyer and Hatch (2006), the case shows that the upstream network is of vast importance for generating input for knowledge combination. Further, it is evident that complex complementarities are the

ones that are in focus in the firm's upstream network. Hence, the firm seems to allocate most of its personnel, money, and time to manage supplier relationships. The reasons for this is that these relationships hold a latent potential of generating competitive advantages that can be exploited by knowledge combinations. The relationships that are characterized by complex complementarities seem to be close and cooperative (Dyer and Nobeoka 2000). Simultaneously, they appear to be flexible in the sense that relationships can dissolve or be programmed on a new course when opportunities for knowledge combination are detected (Sullivan Mort and Weerawardena 2006). The interaction in these relationships appears to facilitate the exchange of tacit knowledge, which facilitates the implementation of knowledge combinations (Nonaka 1991). The interaction between actors is, however, somewhat hampered by the geographical distances that divides them. Consequently, as the firm does not have sufficient resources arrange face-to-face meetings for every occasion in its distant relationships, it relies on technical aids (e.g. intranet) to combine knowledge (Knight and Cavusgil 2005).

*2. How is knowledge combination applied within downstream networks in the international product venturing of a biotech SME?*

Consistent with extant theory (e.g. Schroeder et al. 2002), the international product venturing of the investigated SME appears to be supported by knowledge input from the downstream network. Corresponding to Yli-Renko et al. (2001), certain key customers provide opportunities for knowledge combinations by sharing market knowledge and technological knowledge. Market knowledge is chiefly used by the case-firm (1.) to modify the product and (2.) to find new application areas for the product. For instance, Alpha learned from its customers that the product had great potential in the area of patient medical care. The proactive strategy to act on this knowledge had implications for the design of the product as well as for which customers the firm decided to target. Hence, these proactive efforts of the firm influenced the construction of the setup of knowledge combinations in the network (Sullivan Mort and Weerawardena 2006). Furthermore, many of the knowledge complementarities in the firms customer relationships are sequential (such as the distributor relationship and relationships with buyers) and do not require much interaction. However, in the network relationships where critical technological/market

knowledge is acquired, complementarities seem to be of a higher complexity (similar to the upstream network). Knowledge in these relationships is observed to have the ability to spill over to the firm's strategic decision-making regarding the formation of the international product venture (i.e. targeted customers, contents of product offering).

*3. How is knowledge combination applied across upstream/downstream networks in the international product venturing of a biotech SME.*

An important aspect of network-theory is that network relationships are connected across the categories of upstream/downstream networks (Ritter et al. 2004). This notion is much prevalent in the case of the investigated SME where there is connection between the upstream/downstream networks that is bridged by knowledge combinations. The importance of combining knowledge across these categories is substantiated by the argument that such conduct can lead to exploitation of a wide diversity of knowledge complementarities, laying the foundation for product venturing that cover the gamut of business considerations (von Hippel 1988). That is, knowledge from the upstream network may help firms overcome technological constraints, whilst knowledge from the downstream network may help firms to align the product to foreign market conditions (Though, the case shows that customers also provide technological knowledge input of immense significance). Even though some of the knowledge complementarities between these networks are sequential, the larger part seems to be of a more complex nature. In practical terms, this means that both suppliers and customers are involved in iterative processes where flows of knowledge either run directly between them, or are mediated by the focal firm. No observations of additive complementarities were found in the empirical data. This is consistent with Buckley and Carter (1999), who claimed that it is unusual with pure forms of additive complementarities in reality.

## 6. Conclusion

The intended contribution of this article was to offer insights into the predictors behind international product venturing of SMEs and, thereby, add to SME-research within this field. Leaning on related research in the field of international entrepreneurship, the study sought for explanations by focusing on knowledge combination in upstream/downstream networks. The results of the case study indeed show that knowledge combination in upstream/downstream networks is a cornerstone of international product venturing of SMEs. In fact, the findings show that the firm seeks opportunities for knowledge combination by proactively scanning the upstream/downstream for knowledge complementarities. The empirical observations verify the notion that knowledge combination does not only take place within upstream/downstream networks, but also across these categories. Considering all three types of knowledge complementarities, the findings indicate that complex complementarities provide the most critical underpinning for international product venturing. These complementarities seem to involve a broad scope of the network and entail the most innovative outcomes. In the context of the international SME, these findings may have two major implications for theory: (1) a dichotomous view of the network (i.e. upstream/downstream) may be an advantageous perspective when studying these phenomena. A reason for this is that impetus for new business may accrue in the friction of aligning customer input and supplier input. When the upstream/downstream categories are taken into account, we may be better equipped to recognize the specific intrinsic dynamics that underlie product development. Future studies can preferably adopt this integrated network approach and test whether the external validity of this framework covers a broader spectrum than international product venturings of biotech SMEs. (2) The findings suggest that innovation in international product venturing of SMEs is spurred by knowledge combination that is systemized in networks. This implies that firms may need to identify knowledge complementarities in network relationships and apply the proper form of governance to facilitate the subsequent implementation of knowledge combinations. The business relationships that are most critical for knowledge combination often comprise complex complementarities. These complementarities require a

great magnitude of time and dedication to parcel out viable business acumen and implement new knowledge combinations. Hence, it is crucial that research related to international product venturing of SMEs do not regard relationships in isolation. Rather, more research should study the network at large to generate new knowledge about how to optimize the commercial potential of each knowledge combination. For instance, the observations of the study imply that firms need to carefully allocate time and effort to balance against the knowledge potential of each network relationship. This is important as international SMEs quickly can run out of business as a result of excessive spending and faulty strategic decisions.

## 7. Managerial Implications

The findings of this study entail several implications for managers to consider in endeavours of international product venturing. So far, the lion's share of these implications relate to the operations of managers in SMEs, as further research is recommended to substantiate the external validity.

Managers should ceaselessly monitor their business environment and maintain a broad oversight of external business processes. It is imperative sketch outlines for how business relationships in upstream/downstream networks are connected and what type of knowledge complementarities that exist between them. With this information at hand, more effective resource allocation could be achieved and firms are able to maximize the potential of external knowledge. Effective use of resources in the network steers clear of strategic off-roads and promotes speed in the configuration of knowledge combination in networks.

Further, it is important for both managers and venture capitalists not only to direct resources to the internal development of technological competence within firms (e.g. R&D) of firms, but also make explicit plans to develop firms' abilities to tap external competence in upstream/downstream networks. Such conduct could stimulate cross-fertilization in networks and, thereby, trigger cooperative forms of entrepreneurship that stretch across organizational boundaries.

Finally, to ensure the realization of knowledge combination it is important that managers take action to effectively bridge geographical gaps between their suppliers and customers. For this purpose sophisticated information- and communication tools (intranets, video-conferences, chats, e-meetings) could be helpful. For more complex knowledge combination, face-to-face meetings may still be necessary to push knowledge transfer across organizational boundaries. As interaction-strategies that require human involvement often are costly, it is important that they are primarily applied in relationships that, on beforehand, have been evaluated as potentially profitable.

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## Article 4

### The Effect of Personal Interaction on the International Technology Development of SMEs

Co-authored with Emilia Rovira Nordman, Published in *Small Enterprise  
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**Abstract:** This study investigates the potential effect of personal interaction on international technology development in relationships between small and medium-sized enterprises (SMEs) and their foreign customers. The mediating effect of knowledge transfer between these firms and their customers is also examined. The results of a LISREL analysis of 188 relationships between SMEs and their foreign customers demonstrate that the effect of personal interaction on international technology development is not direct but rather is mediated by knowledge transfer. Hence, the study suggests that before international technology development can be enhanced, knowledge transfer needs to be established.

**Keywords:** SMEs, internationalisation, personal interaction

## The Effect of Personal Interaction on the International Technology Development of SMEs

### Introduction

A widely shared conception amongst researchers and practitioners in the field of international business is that small and medium-sized enterprises (SMEs) continuously rely on technology development to enhance business performance in foreign markets. International technology development is an innovative activity that enables SMEs to create a competitive advantage by aligning their business operations with the specific conditions of foreign markets. International technology development is here understood as the creation of new technology that underlies business operations in foreign markets (Yli-Renko, Autio, & Sapienza, 2001).

Extant research has shown that research-constrained SMEs can successfully exploit opportunities of new technological solutions by leveraging the external competence of foreign customers (Komulainen, Mainela, & Tahtinen, 2006; Yli-Renko et al., 2001). However, no clear consensus regarding appropriate media strategies of SMEs when developing new technology in customer relationships has been reached. Although numerous studies have investigated less personal modes of interaction, such as the use of information and communication technology (ICT) (e.g., Azumah, Koh, & Maguire, 2005; Knight, 2001), the connection between personal interaction and international technology development is still largely unexplored in the realm of foreign customer relationships of SMEs. Against this background, this study attempts to contribute to research on internationalising SMEs based on the argument that personal interaction in foreign customer relationships is at the nexus of international technology development. Hence, the specific purpose of the article is to examine the effect of personal interaction on international technology development in the relationships between SMEs and their foreign customers. Personal interaction is here viewed as rich modality interaction (i.e., face-to-face communication and telephone communication) that facilitates knowledge-demanding processes, such as technology development (Daft & Lengel, 1986; Murray & Peyrefitte, 2007). This objective is consistent with recent research that has called for more studies investigating the interpersonal communication and resilience of rich modality interaction (Molony, 2007; Murray & Peyrefitte, 2007).

As an additional contribution, this article also examines whether personal interaction may configure social settings in which knowledge can be transferred in foreign customer relationships. Knowledge transfer is here viewed as the process by which knowledge is mutually shared between firms (Nonaka, 1994). Knowledge transfer between organisations is critical for international technology development because it allows the integration of complementary pieces of knowledge across organisations. Consequently, knowledge transfer in customer relationships may align innovation activities with local market conditions and lead to synergetic outcomes, such as new technology (Audretsch & Feldman, 1996; Quintana-García & Benavides-Velasco, 2006).

The remainder of the article is structured as follows: A review of previous literature discussing different aspects of personal interaction, knowledge transfer and international technology development is presented. Based on this literature review, three hypotheses are proposed. We then describe the method and findings of the data analysis. Finally, a concluding discussion, as well as implications, limitations and future research ideas, is presented.

## **Theoretical framework and hypotheses presentation**

Internationalising SMEs often compete on the basis of technology, which intensifies the challenges associated with managing research and development (R&D). By seeking linkages and participating in alliances with foreign business partners, SMEs can cut costs and increase performance in international technology development (OECD, 2002). We propose that the use of many ICT tools alone may not be sufficient for SMEs to manage technology development in foreign customer relationships because such relationships are bound to involve knowledge transfer between firms that cannot be fully mediated by the constrained frames of codification of ICT. Research suggests that rich modality interactions have unique traits that can enable an efficient transfer of knowledge, especially so-called tacit knowledge (or know-how) that is hard to formalise and communicate (Murray & Peyrefitte, 2007; Tödtling & Kaufmann, 2001). Rich modality interactions may, therefore, have an edge over some ICT tools (like e-mail and intranet) when interacting with customers for the purposes of technology development because this process is often dependent on accurate and immediate feedback, which is facilitated by a high degree of personal involvement.

Even though ICT tools like video and web conferencing also allow immediate feedback, previous observations have revealed that SMEs often have not adopted these kinds of ICT tools because of a lack of resources, awareness and/or skills for ICT adoption (OECD, 2002). Moreover, the

organisational changes following ICT investments are frequently perceived by firms as costly (Basu & Fernald, 2008) and may therefore be waived.

Previous studies about interaction quality have shown that communication media differ in the richness of the information processed. The quality of the communication media is based on the media's feedback capability, the utilised communication channels, language variety and personal focus. The more a medium incorporates these characteristics, the richer it is (Daft & Lengel, 1986; Suh, 1999). In the hierarchy of media richness, face-to-face communication is richest, followed by telephone, e-mail and print communications (Treviño, Webster, & Stein, 2000). Because this study aims to capture the personal elements of interaction, the analysis is based on the top two levels of media richness, face-to-face interaction (the highest) and telephone interaction (the second highest) (Suh, 1999). Hence, these two means of interaction are indicators of personal interaction because they provide the parties in a business relationship with multiple sources of information, like body language (in face-to-face encounters) and tone of voice (in both face-to-face and telephone encounters). Furthermore, both of these means of interaction have a personal focus and enable the use of natural language (Daft & Lengel, 1986). They also allow for real-time feedback, inflection, timing of response and—in the case of meetings and telephone conferences—multiple participants (Murray & Peyrefitte, 2007).

Companies often have to engage in close and deep interactions with their customers. Therefore, business exchange can be viewed as an intricate process between parties (who are neither anonymous nor faceless) in which social interaction and technical adaptations are closely intertwined (Håkansson & Waluszewski, 2002). Personal interaction amongst firms' business units facilitates innovative activities via the exchange of new ideas that may not be readily relayed by the use of more formal mechanisms (Ghoshal, Korine, & Szulanski, 1994). Previous studies have also shown that the bulk of product or technological development in business relationships does not take place solely in either supplier or customer organisations but rather interactively between them (Jokioinen & Soumala, 2006; Thorpe, Holt, Macpherson, & Pittaway, 2005). Interaction between firms when developing new technology (i.e., participation in R&D projects, engineering and scientific activities) is ultimately grounded in the individual interpretation of complex, uncodifiable messages that require closeness between the sender



and the receiver (Piscitello & Sgobbi, 2003). Different communication platforms can, thus, substantially affect behaviours and outcomes in business relationships. For instance, electronic communications may be less helpful than more personal forms of communication in open-ended situations where participants require instant and accurate feedback (Frohlich & Oppenheimer, 1998), which often may be the case in situations involving international technology development. Correspondingly, Noteboom (1999) suggests that personal interaction may reduce the cognitive distance between interacting parties and make knowledge accessible and deployable for purposes of technology development. Furthermore, the perceived gap reduction between organisations may facilitate coordination in this type of relationship—without parties having to specify appropriate behaviour beforehand (Filippi & Torre, 2003). Hence, personal interaction in customer relationships diminishes the spatial and/or cognitive distance to markets and enables firms to adapt technological advances to local conditions (e.g., Audretsch & Feldman, 1996; Rovira, 2005). Based on research indicating that personal interaction entails particular benefits in technology development projects, we hypothesise the following:

**Hypothesis 1:** Personal interaction has a positive effect on SMEs' international technology development in foreign customer relationships.

Knowledge is one of the most important assets a firm can possess and, therefore, constitutes a highly strategic factor (Johanson & Vahlne, 1977). Competitive advantages of knowledge may be determined by its degree of tacitness. Nonaka (1991) put forth that "Tacit knowledge consists partly of technical skills—the kind of informal, hard-to-pin-down skills captured in the term "know-how" (p. 98). Tacit knowledge is important because it is more inimitable than other types of knowledge and, therefore, often more valuable in competitive business situations. These qualities entail that tacit knowledge is difficult to formalise and communicate (Polanyi, 1966). Previous studies have, however, indicated that personal interaction facilitates the efficient transfer of tacit knowledge (Murray & Peyrefitte, 2007; Tödting & Kaufmann, 2001).

An individual can acquire tacit knowledge without language by using the senses to observe, listen, imitate and practise. Exchange mechanisms, such

as meetings and telephone conversations, containing distinctive traits regarding verbal and non-verbal cues are, therefore, particularly important for the acquisition of tacit knowledge. Because knowledge transfer is more likely to occur between individuals who communicate frequently with each other, organisational members might, therefore, be willing to share knowledge if they have a personal stake in other individuals (Murray & Peyrefitte, 2007). Personal interaction stimulates knowledge transfer in geographical space, thus allowing firms to tap into the regional resources of foreign markets (Oerlemans & Meeus, 2005). Consequently, the need for personal interaction to transfer tacit knowledge has been regarded as a key driver for firms pursuing localised learning and engaging in local industrial agglomerations (Asheim, 1999).

Internationalisation literature describes tacit, or experiential, knowledge about foreign markets as a critical resource for a firm (Johanson & Vahlne, 1977, 2006). Skills necessary for understanding the regional knowledge of the foreign market are more likely to be developed by firms that are willing to partake in interactive learning processes with other firms (Lundvall & Johnson, 1994). Correspondingly, knowledge transfer via business relationships has been emphasised in studies concerning resource-constrained SMEs that are operating in international markets (e.g., Coviello & Munro, 1997; Rovira, 2005). These studies show that knowledge transfer allows SMEs to explore new technological solutions in foreign markets by combining internal and external knowledge resources. In so doing, firms may be able to develop competitive new solutions concerning procedural competences (e.g., R&D) and products/services.

Because tacit knowledge about foreign markets is considered a critical resource for internationalising firms, and that the transfer of such knowledge may be enhanced by improved communication and personal interaction, we propose the following hypothesis:

**Hypothesis 2:** Personal interaction has a positive effect on SMEs' knowledge transfer in foreign customer relationships.

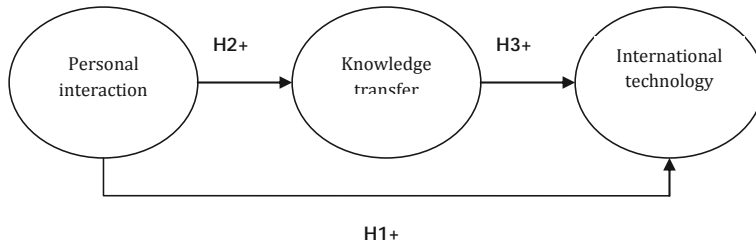
Knowledge is critical in the process of technology development because what an organisation knows determines what it is capable of doing. Internationalisation research has described the exploitation of

technological opportunities as a consequence of privileged knowledge that emanates from knowledge transfer between business partners (Johanson & Vahlne, 2006). In contrast to larger firms, SMEs tend to be equipped with intrinsic innovative qualities that are exerted in continual, and often informal, efforts of technology development (OECD, 2002; Tödtling & Kaufmann, 2001). These qualities may explain why SMEs are inherently more flexible than larger firms and are less likely to be 'locked in' by existing technologies or organisational structures.

According to Katz and Kahn (1966), the innovation process of firms is an open system where input of heterogenous knowledge is transformed into outputs of technological innovations. Correspondingly, many internationalising SMEs rely on business counterparts to grant input to innovation or technology development activities because all necessary resources cannot be leveraged internally (Tödtling & Kaufmann, 2001). Knowledge transfer that leads to technology development often occurs in customer relationships in which the involved parties participate in processes of joint problem solving and experimentation of alternatives (von Hippel, 1988). In addition, a study by Yli-Renko et al., (2001) indicate that international technology development appears to be enhanced when different kinds of knowledge are combined in processes of knowledge transfer in customer relationships. Based on this research, we propose the following hypothesis:

**Hypothesis 3:** Knowledge transfer has a positive effect on SMEs' international technology development in foreign customer relationships.

Previous research has shown that SMEs engaged in innovative activities, like technology development, are more likely to be dependent on foreign business collaborations than other firms (Freel, 2000). To provide insight into SMEs' international technology development in customer relationships, we devised a hypothesised structural model (see Figure 1) based on research indicating that a positive relationship exists between personal interaction and technology development (Ghoshal et al., 1994; Håkansson & Waluszewski, 2002; Rovira, 2005). The model also tests whether SMEs' personal interaction with foreign customers can enhance knowledge transfer, which in turn augments international technology development.



**Figure 1.** Relationships between the Constructs of Personal Interaction, Knowledge Transfer and International Technology Development.

## Method

To perform this study, a questionnaire was constructed. All constructs that are discussed in this study revolve around an important and specific foreign customer relationship chosen by the respondent. The selected relationship had to conform to the following criteria:

1. The customer is located in a foreign market.
2. The relationship is ongoing and has resulted in realised sales transactions.

This relationship will continuously be referred to as ‘the selected foreign customer relationship’. The questions in the questionnaire are, furthermore, based on the respondents’ knowledge about their firms’ international business development and are measured on a seven-item categorical scale, with ratings ranging from low to high. To strengthen the validity of the study, the variables included in the questionnaire stemmed from empirical observations and theoretical reviews that were conducted within a larger Swedish research project investigating the

internationalisation patterns of SMEs. Within the larger project in progress, variables were developed from three sources: (a) prior questionnaires developed within the project (e.g. Blomstermo, Eriksson, Lindstrand, & Sharma 2004) (b) an extensive literature review on international firms used to identify new measurement scales and (c) case studies on international SMEs conducted between 2003 and 2005 (e.g. Rovira 2005; Löfgren, Tolstoy, Johanson, & Sharma 2008).

## Sample

A stratified random sample of Swedish SMEs was acquired from Statistics Sweden's Business Register in 2003. The firms in this sample shared one common characteristic: At least 10% of their turnovers were from export sales. The sample consisted of two groups: small firms (5–49 employees) and medium-sized firms (50–249 employees). Because the sample firms operated in niche segments in various types of industries, the premises for technology development naturally varied across these firms in terms of complexity and scope. However, in line with the focus of this paper, a common denominator amongst the sample firms was the challenge of gaining competitive advantage, for example by the development of new technological solutions that were aligned with the specific conditions of the foreign markets.

To ensure a high response rate, the questionnaires were collected by conducting personal visits to the sample firms. Because of the time-consuming nature of this collection method, only SMEs in the same geographical area (Mälardalen) were surveyed so as to minimise the collection time required. The Mälardalen area was chosen mainly because of its large size and geographical proximity to the members of the research group. The derived sample of firms from the Mälardalen area consisted of 339 firms. After individuals at these firms were contacted by phone, some firms were excluded because they were too large (i.e., they were not SMEs), they did not sell their product to foreign customers (i.e., they were not internationalising) or they no longer existed. After this reduction, the total sample consisted of 233 SMEs.

## Data collection

Prior to its distribution to the derived sample, the questionnaire was tested on six SMEs in Stockholm and Uppsala. Modifications concerning the scope and content of the questionnaire were subsequently carried out. To ensure strong reliability, the questionnaires were, as mentioned earlier, administered by investigators who personally visited the Swedish SMEs. By visiting the firms, the research group could make sure that the right person answered each questionnaire. The study used a single key informant approach, which is commonly practised in marketing research (Phillips, 1981). Individuals who were considered key informants and singled out as such included chief executive officers (CEOs) and marketing managers who influence decisions related to foreign operations. The duration of each visit ranged from 30 to 60 minutes. To avoid investigator-induced bias, respondents filled out the questionnaires themselves; research group members were present solely as observers. Data were collected from 188 of the 233 SMEs in the sample. The two main reasons for the non-responding firms' declination to participate were (a) a lack of time and (b) a reluctance to release information. Even though a response rate of 81 percent is considerably high in comparison to other similar studies, a non-response bias is always a concern. Because the investigators personally collected the surveys, non-response bias by applying the common test of comparing early vs. late responses (Armstrong & Overton, 1977) could not be conducted. Instead, secondary data collected from the Statistics Sweden's Business Register were used to control for differences between responding and non-responding firms related to industry, size, location and level of internationalisation. No differences between the groups were revealed; thus, a non-response bias is not likely to be a problematic issue when interpreting the findings of the study.

## Data analysis

This study used the linear structural relations (LISREL) statistical package to process data. The validity of LISREL models is measured with regard to both the validity of the entire model and the specific relationships within the model. Convergent validity is confirmed if the indicators load only on

the constructs to which they belong. Evaluation of convergent validity is done by analysis of  $t$ -values (significance),  $R^2$ -values (linearity) and factor loadings (correlation). A basic requirement for confirmation of discriminant validity is that the correlation between latent variables be significant but not equal to 1, which would suggest unidimensionality (Jöreskog & Sörbom, 1993).

The overall fit of LISREL models is checked using the chi-square ( $\chi^2$ ), degrees of freedom and a probability estimate ( $p$ -value). There is an ongoing debate about the appropriate measures to use for assessing nomological validity (Bollen & Long, 1993). Three frequently used measures are goodness of fit (GFI), which checks for sample size effects and should be above 0.90; root mean square error of approximation (RMSEA), which measures population discrepancy per degree of freedom (df) and should be below 0.08; and comparative fit index (CFI), which checks for non-normal distributions. CFI values close to 1 indicate a good fit, and values above 0.90, an acceptable fit (Jöreskog & Sörbom, 1993). Pairwise deletion was used to handle missing values. The model's robustness was also checked using listwise deletion, which yielded a similar result ( $\chi^2 = 8.31$ ,  $df = 7$ ,  $p = 0.30$ )

## Construct analysis

The personal interaction construct captures the personal and human elements of interactions between individuals in business organisations. According to Daft and Lengel (1986), the two richest forms of media are interactions through face-to-face encounters and telephone conversations. Using this categorisation, we created a construct based on the number of face-to-face meetings and telephone conversations that the investigated firms had with their selected foreign customers. We expected daily face-to-face meetings with foreign customers to be difficult for resource-constrained SMEs to afford. However, this indicator generated normal distribution in our initial data analysis. The telephone communication indicator also showed a normal variance.

The knowledge transfer construct comprises three dimensions. The first dimension of the construct determines whether the investigated firms

recognise their selected foreign customers as sources of knowledge (i.e., whether the firms have identified potential input for knowledge transfer) (Nahapiet & Ghoshal, 1998). In accordance with von Hippel's (1988) conception of knowledge transfer as a joint process between firms, the second dimension of the construct involves reciprocal knowledge sharing between firms. Correspondingly, respondents are asked whether their firm's relationship with the selected foreign customer is characterised by a general exchange of knowledge. The third dimension of the construct measures the qualitative aspects of knowledge transfer by determining whether the selected foreign customer's knowledge is perceived as familiar to respondents. Familiarity with a customer's knowledge indicates that knowledge is interpreted and that firms have the capability to transfer knowledge (Cohen & Levinthal, 1991).



| Indicator  | Abbreviation | Factor Loading | t-value | R <sup>2</sup> -value |
|--|--------------|----------------|---------|-----------------------|
| <b>Personal interaction</b>  |              |                |         |                       |
| How many times does your firm have contact with [the selected foreign customer] via personal visits? (8-point categorical scale, 1 = none; 2 = once in a three-month period; 3 = several times in a three-month period; 4 = once a month; 5 = several times a month; 6 = once a week; 7 = several times a week; 8 = daily) | CONBR1       | 0.76           | 9.23    | 0.58                  |
| How many times does your firm have contact with [the selected foreign customer] via telephone calls? (8-point categorical scale, 1 = none; 2 = once in a three-month period; 3 = several times in a three-month period; 4 = once a month; 5 = several times a month; 6 = once a week; 7 = several times a week; 8 = daily) | CONBR2       | 0.77           | 9.35    | 0.60                  |
|  | BRIS3        | 0.76           | 7.87    | 0.58                  |
| <b>Knowledge transfer</b>  |              |                |         |                       |
| The [selected foreign customer] is a source of knowledge. (7-point categorical scale, 1 = not at all; 7 = completely)  | RELBR8       | 0.62           | n.a.    | 0.51                  |
| The relationship with the [selected foreign customer] is characterised by a general exchange of knowledge. (7-point categorical scale, 1 = not at all; 7 = completely)   | FAMIBR5      | 0.52           | n.a.    | 0.27                  |
| In the [selected foreign customer] relationship, how familiar is the business partner's knowledge? (7-point categorical scale, 1 = completely; 7 = not at all)   | TECHDEV      | 1              | n.a.    | 1                     |
| <b>International technology development</b>  |              |                |         |                       |
| The extent to which the selected foreign customer relationship has resulted in new technology. (7-point categorical scale, 1 = not at all; 7 = completely)   |              |                |         |                       |

**Table 1:** *The Constructs and Their Indicators Included in the Structural Model; Note: n.a. = not applicable due to fixed parameter*

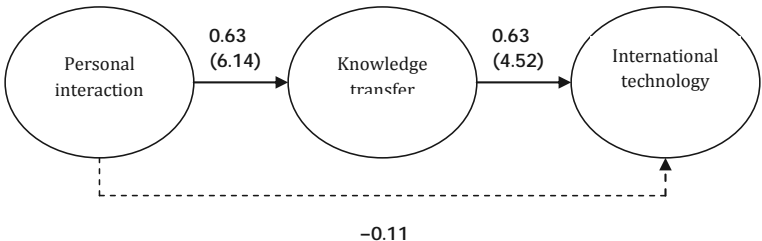
Finally, the dependent construct of the model, international technology development, is a one-indicator construct based on the perception of new technology developed in the selected foreign customer relationship. The

reliability of this single-item construct is set at an arbitrary estimate of 1. Following the recommendations of Jöreskog and Sörbom (1993), this study tested the model by varying this estimate at several equally arbitrary values (0.75, 0.85 and 0.95) and found no basic differences in the structural model.

Table 1 lists the LISREL estimates for all constructs. All *t*-values are above 7.87 and, thus, satisfactory. All *R*<sup>2</sup>-values are above 0.27, indicating a high degree of explanatory power.

## Results

The hypothesised model's key statistical measures support nomological validity ( $\chi^2 = 7.54$ , *df* = 7, *p* = 0.37). RMSEA is 0.020; GFI is 0.99; and CFI measures to 1. Thus, it may be concluded that the model is valid.



**Figure 2:** Structural Model with Factor Loadings: Dotted lines represent non-significant relationships; *t*-values within parentheses.

As shown in Figure 2, Hypothesis 1 is not supported by the model because the relationship between personal interaction and international technology

development is not statistically significant within the causal structure. Based on our theoretical premises, this finding is indeed counterintuitive, which suggests that the relationship between personal interaction and international technology development is somewhat more complex than was first anticipated. The deviation from our theoretical pre-understanding may be explained by the presence of the knowledge transfer construct. The model implies that even though personal interaction is not instrumental for international technology development unto itself, it is an important requisite for knowledge transfer. Hence, the model shows that personal interaction has a positive effect on the knowledge transfer construct, thus confirming Hypothesis 2. This finding supports our theoretical rationale positing that personal involvement is instrumental in disseminating knowledge between individuals and organisations. The model also supports Hypothesis 3, demonstrating that the knowledge transfer construct has a positive effect on international technology development. This finding is consistent with theory claiming that firms need to exchange knowledge with customers to adjust products/services to foreign market conditions. Thus, personal interaction when mediated by knowledge transfer has an indirect effect on international technology development. This finding suggests that knowledge transfer must occur before international technology development can be enhanced. Knowledge transfer is an important component of this model because it bestows personal interaction with guidance and direction, which are necessary in leveraging new technological solutions.

Based on four control variables, possible differences between groups were investigated. Group analysis in LISREL is performed by setting construct relations, indicator relations and an error covariance equal for all groups (Jöreskog & Sörbom, 1993, p. 53). If key statistics are invalid, a difference occurs between the groups. The following control variables were chosen for group analysis of the sample: (a) firm size, (b) foreign market share of total sales, (c) relationship duration and (d) geographical proximity.

Firm size (estimated by the number of employees) was chosen as a control variable to detect differences between the small (6-49 employees) and medium-sized firms (50-249 employees) in the sample, which would have implications for the validity of the SME concept in this research context

(OECD, 2002). LISREL estimates revealed no differences between the groups.

Foreign market share of total shares was selected as a control variable to detect differences between firms based on the relative importance of the market where the selected foreign customers reside. We split the sample into two groups: firms making 20 percent or more of their total sales in the selected foreign market and firms making less than 20 percent of their total sales in the selected foreign market. The resulting LISREL models revealed no differences between groups.

To determine whether time has an effect on the model (which would have theoretical implications on the constructs and relationships of the model), relationship duration was chosen as a control variable. Relationship duration was measured by dividing the sample into two groups: firms that have participated in business relationships with their selected foreign customers for five years or fewer and firms that have participated in business relationships with their selected foreign customers for longer than five years. LISREL estimates revealed no differences between the groups.

Geographical proximity was selected as a control variable to control for differences between firms depending on their geographical distance to markets. Geographical proximity was measured by dividing the sample into two groups: firms that chose to answer questions about a selected foreign customer from one of Sweden's neighbouring countries (Denmark, Finland or Norway) and firms that chose to answer questions about a selected foreign customer from a more geographically distant part of the world. LISREL estimates revealed no differences between these groups.

## **Discussion and managerial implications**

The aim of this study was to examine the effect of personal interaction on international technology development in the relationships between SMEs and their foreign customers and to provide insight into the prospective intermediate effect of knowledge transfer on international technology

development. We determined that the effect of personal interaction on international technology development is not direct but rather is mediated by the knowledge transfer construct. The absence of a direct effect between personal interaction and international technology development is somewhat surprising considering that previous studies indicated a direct relationship between the constructs of personal interaction and technology development (Ghoshal et al., 1994; Håkansson & Waluszewski, 2002; Rovira, 2005). By contrast, personal interaction has an indirect effect on international technology development within the realm of this structural model. This effect, although indirect, is positive and powerful because personal interaction strengthens the relational interface between firms (i.e., knowledge transfer), which in turn has a positive effect on international technology development. These findings support previous studies indicating that positive relationships exist between personal interaction and knowledge transfer (e.g., Murray & Peyrefitte, 2007; Oerlemans & Meeus, 2005) and between knowledge transfer and technology development in foreign business relationships (e.g., Johanson & Vahlne, 2006; Yli-Renko et al., 2001).

The theoretical implication of these findings is that personal interaction, in and of itself, is not an instrument for technology development. Personal interaction instead plays a pivotal role in coordinating and contextualising heterogeneous knowledge, thus paving the way for knowledge transfer. Hence, by enhancing the capacity to transfer knowledge in customer relationships, personal interaction ultimately promotes international technology development.

By showing that personal interaction still plays, and probably will continue to play, an important role for technology development in SMEs' foreign customer relationships, the study contributes to interaction-oriented research on internationalising SMEs. Even though ICT tools certainly may offer efficient and cost-effective opportunities for resource-constrained SMEs when searching for information and communicating with foreign customers, they cannot substitute personal interaction in every situation. Personal interaction is vital for firms faced with complex tasks in business relationships and may justify the time and effort entailed. The results therefore indicate that SMEs need to allocate resources to personal interactions with important international counterparts to facilitate

technological development. The costs of personal interaction should be balanced against the potential benefits brought by international technology development to an internationalising SME. The need for SMEs to invest in personal interaction activities must also be acknowledged by actors such as venture capital investors, governmental institutes and trade organisations. For these actors to be properly equipped to support international growth of SMEs, they first have to understand the challenges involved in international technology development.

Furthermore, the results of this study may have implications for managers. Because SMEs often possess limited resources, they are unable to allocate the resources needed to produce fertile ground for international technological development throughout their entire business network. Although international technology development is often regarded as constituting a firm's competitive edge, investments in international technology are not necessarily profitable. Our findings indicate that managers must be careful in deciding which relationships should be managed by personal interaction and which should be managed by other means. Scanning the market for relationships with eligible, interesting foreign counterparts becomes extremely important because it allows managers to respond to emerging opportunities that lead to international technology development. Such conduct could involve strategic networking, evaluation of potential counterparts' business objectives and corporate culture, benchmarking and cost assessment.

## Limitations and suggestions for future research

This study has three limitations that suggest directions for future research. First, interactive business relationships may be initiated after technology development has taken place (Håkansson & Waluszewski, 2002). This occurrence would imply a reverse causality of the model (i.e., international technology development has a positive effect on personal interaction). Studying a two-way causality would make the model not only more complex but also more dynamic, thereby adding a temporal dimension, which is missing in this article. The non-recursiveness of LISREL analysis

makes testing for a two-way causality impossible in this study but is recommended as a topic for future research to address.

Second, the information collected was taken solely from one side of the dyadic relationships under examination. The extent to which the counterparts of the firms investigated would have concurred with the answers in the data collected is unknown. Additional insight could be gained from future studies involving dyadic data sets.

Third, data were collected at only one point in time; therefore, no temporal changes in the suggested model can be discussed. Further longitudinal studies are needed to determine the effect of time on the results of this paper.

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## Article 5

### **Network Development and Knowledge Creation within the Foreign Market: A Study of International Entrepreneurial Firms**

Forthcoming in *Entrepreneurship & Regional Development*



**Abstract:** The aim of this article is to contribute to international entrepreneurship theory by adopting a foreign market perspective when examining the links between network development and knowledge creation. Network development is argued to enhance the understanding of regional market structures and make firms more inclined – and better able – to create knowledge in foreign market business relationships (business relationships represent focal points in networks). The basis of this argument is that networks provide a multitude of opportunities for the exploitation of previously unexploited combinations of knowledge. Data were gathered from surveys conducted with an effective random sample of 188 small and medium-sized enterprises (SMEs) in Sweden. A LISREL-based analysis was performed to test the three hypotheses deduced from theory. Findings showed that network development has a direct positive impact on knowledge creation and that knowledge combination functions as a mediating construct between network development and knowledge creation.

**Keywords:** international entrepreneurship; network development; knowledge combination; knowledge creation; SME

## **Network Development and Knowledge Creation within the Foreign Market: A Study of International Entrepreneurial Firms**

### **Introduction**

Whereas models of international entrepreneurship highlight the importance of knowledge for successful internationalisation (see review by Rialp, Rialp, and Knight 2005), little is known about how international entrepreneurial firms actually create knowledge within the confined setting of a specific foreign market. The lack of attention paid to the regional perspective reflects a research deficiency in the field, especially considering the magnitude of

research showing that developing awareness by participating in regional networks can entail distinctive business benefits (Johannisson, Ramirez-Pasillas, and Karlsson 2002; Gellynck, Vermeire, and Viaene 2007; van Geenhuizen 2008). In this vein, this study aims to contribute to international entrepreneurship theory by examining whether network development at the foreign market level can serve as leverage for knowledge creation in foreign business relationships. Here, network development is understood as the development of routines across network actors that provides access and a conduit for knowledge (cf. Sullivan-Mort and Weerawardena 2006). Knowledge creation, in turn, is conceptualised as outcomes of modifications and alterations regarding knowledge in business relationships (Yli-Renko, Autio, and Sapienza 2001). Furthermore, the foreign market represents a specific national market in which international entrepreneurial firms operate. Finally, the investigated business relationship denotes a focal point in the network where knowledge creation can be measured.

Although an accepted definition of international entrepreneurship has yet to be formulated, the field is often broadly described as the orientation to proactively explore and exploit opportunities in foreign markets (Oviatt and McDougall 2005). Smaller firms that pursue international opportunities in foreign markets – from inception or at a later stage – are commonly regarded as international entrepreneurial firms (e.g. Fletcher 2006) and, therefore, serve as units of analysis in the empirical inquiry. The stipulated conceptual framework is based on the steadily growing stream within the field of international entrepreneurship suggesting that network development enables firms to identify and exploit knowledge-based opportunities abroad (Bell 1995; Coviello and Munro 1997; Crick and Jones 2000; Sharma and Blomstermo 2003; Coviello 2006; Loane and Bell, and McNaughton 2007; Lu and Beamish 2006). Naturally, effective leverage of networks is particularly salient in the case of smaller entrepreneurial firms with inherently limited internal resources, because it can extend their knowledge base foreign markets (Coviello and Martin 1999). Network development, thus, has the potential to enhance the understanding of market structures and make firms more inclined – and better able – to create knowledge in business relationships located in regional markets (Lechner and Dowling 2003, Owen-



Smith and Powell 2004, Semlinger 2008). Moreover, the widespread conception that knowledge creation in international entrepreneurial firms emanates from the combination of dispersed bits of knowledge is also relevant to the conceptual framework (Zahra and Filatotchev 2004; Cui, Griffith, and Cavusgil 2005; De Clercq, Sapienza, and Crijns 2005; Murray and Chao 2005; Gassmann and Keupp 2007; Zhou 2007). Here, knowledge combination is defined as the activities of connecting previously unconnected bits of knowledge (Buckley and Carter 2004) and is argued to be catered by network development that provides access to knowledge and opens up intersecting avenues where it can be combined. Adhering to this reasoning, knowledge combination is in this study regarded as a mediating link between network development and knowledge creation.

It is clear that network development and knowledge creation have certainly attracted the attention of researchers in the field of international entrepreneurship. However, it is equally clear that few attempts have been instigated to examine the links between these concepts within the confinement of a foreign market. The purpose of this article is to address this research gap by incorporating the foreign market perspective in a model that explicitly studies the prospective impact of network development on knowledge creation in the business relationships of international entrepreneurial firms. This study also investigates the prospective mediating impact of knowledge combination in the realm of the foreign market. In this endeavour, questionnaires from 188 SMEs revolving around their foreign market engagements have been collected. Subsequently, this data have been statistically analysed by structural equation modelling in LISREL.

The section that follows provides an overview of the principal concepts of this study: network development, knowledge combination, and knowledge creation. Hypotheses are then developed by relating these principal concepts to the literature on international entrepreneurship theory. This section is followed by a discussion of data and methods. The article concludes with a presentation of the results and a discussion concerning the contributions of the study.

## Conceptual background

This section provides theoretical underpinning for the independent construct of network development, the mediating construct of knowledge combination, and the dependent construct of knowledge creation.

### The concept of network development

Networks constitute the frameworks for all activities that take place in business relationships (e.g. Mattson 1997). In this article, networks are understood as the directly and indirectly connected human and organizational actors in a firm's business environment (i.e. manifested by customers and suppliers). Greve and Salaff (2003) found that ongoing network development in regional markets is necessary for entrepreneurial firms to acquire complementary resources that serve as input to processes of business innovation. The importance of network development among entrepreneurial firms tends to be especially prevalent in regional markets that are knowledge intensive, entailing outcomes that are hard to predict (Johannisson and Monsted 1997). In correspondence to the topic of this study, such uncertainties are often ascribed to international entrepreneurial firms that pursue business opportunities in foreign markets (Schrader, Oviatt, McDougall 2000). In these situations business relationships may not be readily be consolidated by formalised methods, such as budgets, plans, and cross-ownership, but are rather organised in fluid network communities (cf. Galbraith 1973; Mintzberg 1979). Hence, to improve business abroad, firms first need to improve activities in the networks of the foreign markets. Correspondingly, in a case-study of three international entrepreneurial firms, Coviello (2006) found that the internationalization of these firms was characterized by processes where firms were continually jockeying towards advantageous positions in different regional networks. The importance of gaining an advantageous network position, according to social capital theory,

adheres to the notion that it enables firms to tap into sources of regional market knowledge that fuel business development (Yiu and Lau 2008). Furthermore, network development in this respect may call for regional and cultural proximity that encourages the cultivation of a social environment where dispersed competence can be exchanged between network actors (Johannison 1998). Hence, the mechanisms of network development are often described to pertain to social processes, such as the configuration of informal routines (i.e. based on norms and culture) between and across participating firms (Collins and Smith 2006). The development of these routines may entail three distinctive business implications: (1) connection between the firm and other actors that provide access to resources and knowledge (Granovetter 1973), (2) an increase in the inclination of network actors to share critical knowledge with each other (Szulanski 1996), and (3) an enhancement of the willingness of network actors to invest in the network (Johanson and Mattsson 1987). All these undertakings may further integrate actors in the network and reinforce shared objectives and mutual understandings. Correspondingly, in a study of Toyota's network – involving both suppliers and customers – Dyer and Nobeoka (2000) found that the development of routines across network actors is grounded in the ability to build strong relationships without compromising flexibility.

Although networks can develop as the enactment of a collective of actors (Jack, Dodd, and Anderson 2008), international entrepreneurship theory declares that individual firms sometimes intervene in these processes by proactively identifying opportunities for implementation of routines that extend existing networks or develop new networks (Sullivan-Mort and Weerawardena 2006). Hence, network development tends to involve phases of flexibility where network structures are remodelled on basis of strategic initiatives. It may also involve phases of stability where relationships grow closer to allow for mutual knowledge transfer (Welch, Welch, Wilkinson, and Young 1996). Network theorists refer to the degree to which actors are free to influence activities in such different phases as structural autonomy (Burt 1983). Thus, network development partially reflects the procedural competence that enables firms to leverage the resources of other network actors for their own purposes. In this pursuit, however, firms are faced with challenges that stem from the fact

that network relationships are interconnected. The interconnectedness implies that the contents of one network relationship are likely to influence the development of contents in another relationship at a different part of the network (Cook and Emerson 1984). For instance, user feedback that is received in a particular customer relationship is likely to have implications for technology development in a certain supplier relationship (Buckley and Carter 2004). Hence, every relationship needs to be regarded in relation to the network in which it is embedded. Even though activities involving network development are implemented in individual relationships, their effects may be directed towards the network as a whole. By considering alignment issues and compatibility issues in network development, firms may be better equipped to identify opportunities as well as to attain effective leverage of resources to exploit these opportunities.

### **The concept of knowledge combination**

A firmly grounded notion in entrepreneurship theory is the comprehension that there lies a business potential of combining dispersed bits of knowledge (Hayek 1945). Correspondingly, Zahra and George (2006) argue that firms' entrepreneurial abilities to contrive new combinations of knowledge can yield new insights which facilitate the recognition of opportunities in the competitive landscape. This notion emanates from the seminal work of Cohen and Levinthal (1990) where the authors claim that the creativity of firms is driven by an absorptive capacity which enables the firm to value, assimilate, and apply knowledge. Thus, the pursuit of opportunities of combining knowledge in ways that are superior to other firms may lead to the establishment of temporary competitive advantages (Schumpeter 1934; Kirzner 1973). Over time, knowledge combination implies that knowledge becomes heterogeneously distributed across firms, which makes their assortments of knowledge-based resources – at least in some way – unique (Barney 1991). Firms endowed with a certain assortment of these types of resources may be able to produce with greater economic efficiency and/or better satisfy customer needs than other firms (Peteraf 1993). The events leading to the implementation of knowledge combinations are often described

as entrepreneurial by nature as they involve sudden acts based on intuition or opportunity (Floyd and Wooldridge 1999; Zahra, Sapienza, and Davidsson; Davide-Parrilli and Sacchetti 2008). The process of combining knowledge involves a reframing of the firm's perception of the market and opens up various pathways for the development of ideas for new business solutions (Zahra and George 2006). The sources of knowledge that are involved in these activities may reside either within or outside firm boundaries: Consequently, firms can explore for knowledge combinations by evaluating the potential of knowledge in network relationships (Nahapiet and Ghoshal 1998, Lavie 2006).

Furthermore, knowledge combinations may be of different scope, scale, and depth and may be embedded in different facets of the involved organisations. When knowledge is more difficult to understand and exchange (Polanyi 1967), the costs and efforts of combining it will increase as a series of time-consuming interactions may be needed (Gulati and Singh 1998). Although this type of knowledge is challenging to replicate and combine, it may contribute to firms' competitive advantages because it is difficult to imitate. However, the same unique combinations of knowledge which lead to innovative thinking in the shorter perspective run the risk of becoming institutionalised and difficult to redeploy over time (Madhavan and Grover 1998), thus compromising firms' competitiveness in the long run. Hence, to allow for knowledge combinations to detangle, firms have to be able to question existing perspectives, frameworks, and premises (Argyris and Schön 1978).

### **The concept of knowledge creation**

Whereas knowledge combination determines the trajectory of the overall knowledge configuration that is relevant for a firm's current business operations, the concept of knowledge creation denotes the possible outcome of this and other creative activities (Nonaka Byosiere, Borucki, and Konno 1994). This article rests on the belief that knowledge creation is crucial for entrepreneurial firms because it enables them to differentiate themselves from competitors in foreign markets (Zahra, Nielsen, and Bogner 1999, Molina-Morales 2002; Biggiero 2006). To explain the growth of the firm,

Penrose (1959) stipulated that a dynamic relationship exists between the knowledge of the firm and market opportunities. In line with her reasoning, competitive advantages and growth do not emerge from merely making decisions in the present, but rather from creating knowledge over periods of time. Correspondingly, the knowledge-based view regards knowledge as the most important resource for firms to command over (Kogut and Zander 1992; Spender 1996). From this perspective, knowledge creation develops from the successful leverage of idiosyncratic bits of knowledge (of varying scale, scope, and depth) which may render gradual or radical outcomes.

On the one hand, knowledge creation that is gradual may involve the mere extension of competences (i.e. by imitating knowledge that preexists in the external environment). This type of knowledge creation may be driven by the pragmatic incentive of keeping up with forerunners in the industry so as to increase the chances of survival in the short run. On the other hand, radical knowledge creation may involve the drastic shift of competences (i.e. caused by the experimentation of alternatives leading to cognitive and/or behavioural change) (Agryris and Schön 1978; Fiol and Lyles 1985). Radical knowledge creation may serve to cultivate sustained competitive advantage based on unique features that establishes an uncertainty about a firm's grounds for efficiency, which prevents presumptive imitators from knowing exactly what to imitate and how to do it (Lippman and Rumelt 1982; Lei, Hitt, and Bettis 1996). Establishing a balance between gradual knowledge creation and radical knowledge creation usually serves the best interests of firms because they require short-term profits to stay afloat in the short run, as well as unique competitive advantages to survive over a longer period of time. Consequently, the processes that undercurrent knowledge creation are by necessity dynamic and ongoing: For firms to stay on pace with the ever-changing business environment, they have to create knowledge continually that both imitates and differentiates from competitors' knowledge (Teece, Pisano, and Shuen 1997; Eisenhardt and Martin 2000; Reid, DeMartino, and Zyglidopoulos 2006). In this article, knowledge creation is treated as a holistic concept as outcomes can be placed on a continuum between the extremes of gradual and radical knowledge creation.

## Hypotheses development – knowledge creation in the foreign market of the international entrepreneurial firm

In traditional internationalisation models, firms' international expansion has been described as a function of knowledge (Johanson and Vahlne 1977). The recent emergence of empirical and theoretical work in the field of international entrepreneurship not only has followed in the footsteps of this knowledge-based tradition but also has revitalized international business theory by adding some new perspectives applied to international entrepreneurial firms: Recent research in the field posits that knowledge that is significant for seizing business opportunities in foreign markets may be gathered not only through cumulative and time-consuming processes (as described by e.g. Johanson and Vahlne 1977) but also through proactive development of opportunities for knowledge creation (Chetty and Campbell-Hunt 2004). Knowledge creation is especially crucial in small entrepreneurial firms as they control few resources other than knowledge and, therefore, cannot compete on the basis of, for example, economics of scale (Wiklund and Shepherd 2003). These firms tend to develop skills to identify and exploit knowledge outside their own control, namely, in networks (Thorpe et al. 2005). Whereas most previous studies in the field of international entrepreneurship have taken a holistic viewpoint on networks (i.e. non-distinctive regarding domestic, international, and foreign networks), this study examines the specific impact of network development on knowledge creation within a confined regional setting. The premises for knowledge creation in the foreign market and the development of hypotheses are detailed in the following text.

A thorough review on entrepreneurship theory by Hoang and Antoncic (2003) implies that network development serves as a crucial vehicle in the entrepreneurial process by opening up windows of opportunity for knowledge creation. By developing a supporting network structure, firms can stay better informed about existence, contents, and location of knowledge (Hansen 2002). The increased awareness about knowledge interdependencies, which follows this conduct, contextualises knowledge creation and aligns it with regional

characteristics, such as particular market requirements. In support of this thesis, Powell, Koput, and Smith-Doerr (1996) claim that knowledge creation leading to business innovations are bred by network communities that are fluid and evolving. Network development typically comes into play in contexts where activities are knowledge intense and outcomes are unpredictable, which in both respects are often the case for international entrepreneurial firms entering uncharted territory in foreign markets because of the commonly reduced applicability of control and monitoring mechanisms (Shrader, Oviatt, and McDougall 2000). This observation is concurred by Coviello (2006) who argues that network development spurs international entrepreneurship by paving way for the exploitation of knowledge-based opportunities. Network development can facilitate the pursuit of such opportunities by providing the stability that is necessary for international entrepreneurial firms to endure in the market as well as the flexibility that is required to innovate in response to shifts in market demand (Freeman and Cavusgil (2007).

Welch et al. (1996), claim that the performance of doing business in foreign markets can be enhanced by establishing relationships with many types of network actors and, on this basis, develop an external organizational structure. Hence, developing networks in regional contexts is bound to encapsulate both the customer level (Lengnick-Hall 1996; Brockhoff 2003; Ritter and Walter 2003) and development of the supplier level (von Hippel 1988; Handfield et al. 1999; Dyer and Nobeoka 2000). Network development involving both customers and suppliers provides an understanding of a broad scope of the network and makes firms receptive to more facets of regional conditions. Hence, comprehensive network development may align knowledge creation with market requirements (e.g. concerning customer preferences) as well as with technological requirements (e.g. concerning supplier innovations). Based on this reasoning, network development in the foreign market is hypothesised to enhance knowledge creation at any given focal point of the network.



H1: Within the foreign market, network development has a positive impact on knowledge creation in business relationships of international entrepreneurial firms.

Activities that generate new knowledge do not emerge from nothing but is triggered by new knowledge input (Cohen and Levinthal 1990). According to Dyer and Singh (1998), the development of network relationships can generate opportunities regarding possible, unexploited knowledge combinations, of which firms can take advantage by connecting previously unconnected bits of knowledge. Furthermore, network development may give access to knowledge as well as provide a conduit for the flow of knowledge, allowing it to be shared and integrated into various combinations (Pfeffer and Salancik 1978). Moreover, in line with Sharma and Blomstermo (2003), international entrepreneurial firms tend to work towards integrating both directly and indirectly connected foreign market business relationships to gain leverage of a wide scope of complementary knowledge that, subsequently, can be shared between and across organizations. According to Crick and Spence (2005), such conduct may give international entrepreneurial firms access to first hand knowledge as well as incorporate them into a collective structure which supports their ability to act on that knowledge. Following this reasoning, network development opens up avenues for identifying and implementing knowledge combinations. The role of network development in knowledge combination is explained by the following: (1) the structure of the network, which provides access to network relationships from which firms may tap novel knowledge; (2) the increased sense of mutual orientation that entails network development, which makes the involved actors inclined towards sharing knowledge and experimenting with alternatives concerning knowledge combinations (e.g. Nahapiet and Ghoshal 1998); and (3) the notion that network development involves investments and adaptations related to procedures, technology, and products, which may be required for sustaining readiness and an ability to implement knowledge combinations (Buckley and Carter 1999). International entrepreneurial firms may benefit from regional network development because it may bring them closer to the market, leading to faster, more effective, and relevant behaviour of combining knowledge in

specific business relationships (Yli-Renko, Autio, and Sapienza 2001; Fink and Kraus 2007).

H2: Within the foreign market, network development has a positive impact on knowledge combination in business relationships of international entrepreneurial firms.

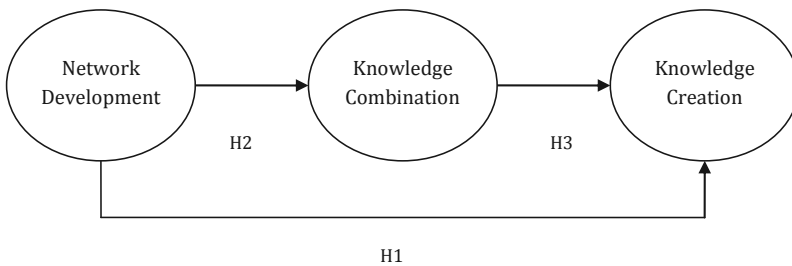
Research on international entrepreneurship has indicated that knowledge is a strong predictor for developing business in foreign markets (Rialp et al. 2005). A commonly held notion among researchers in the field is that business opportunities are exploited more innovatively by knowledge that is proactively developed compared with knowledge that is cumulated by experience over long periods of time (Oviatt and McDougall 1994; Madsen and Servais 1997; Jones 1999). Hence, inherent in international entrepreneurial firms is organisational flexibility, which allows them to take advantage of rising opportunities rapidly by creating new knowledge (Sapienza et al. 2006). Correspondingly, Zahra, Matherne, and Carleton (2003) suggest that the enactment on current and emerging opportunities is materialised by the combination of bits of knowledge that were previously unthought-of. These combinations may constitute new products/services, improvements in existing products/services, and new routines concerning daily business activities (Autio, Sapienza, and Almeida 2000). Knowledge combination in networks thus implies that a bit of knowledge that is mundane in and of itself can be drastically re-evaluated when synthesized with another bit of knowledge in a different location of the network. When such connections are made, existing knowledge often seems new and creative because it changes form combined with other knowledge. Firms that enter foreign markets may soon find themselves circulating in new and diverse flows of knowledge that can function as input for knowledge creation. To maintain competitiveness abroad, international entrepreneurial firms need to adapt to these dynamics by seeking regional knowledge that can supplement their current knowledge base (Mariotti and Piscitello 2001). Knowledge combinations that take place in relationships within the realm of the foreign market network have the potential to align firms' business to the developments in the market and to render innovative market-tailored solutions. Consequently, knowledge

combination is likely to contribute positively to firms' knowledge creation in foreign market business relationships.

H3: Within the foreign market, knowledge combination has a positive impact on knowledge creation in business relationships of international entrepreneurial firms.

The model shown in Figure 1 displays the hypothesised interrelationships among the concepts involved in this study. In correspondence to hypotheses 1, network development is presumed to have a positive effect on knowledge creation by contextualizing learning within the foreign market. Moreover, in line with hypotheses 2, network development provides the structure and mechanisms that are necessary to identify and implement knowledge combinations between network actors. Following hypotheses 3, knowledge combination is instrumental for knowledge creation because it allows novel configurations of knowledge that subsequently may lead to innovation. Hence, network development may not only have a direct effect on knowledge creation within the regional context. It may also facilitate combination of knowledge, and, thereby, have an indirect effect on knowledge creation.

**Figure 1. The hypothesised model.**



## Data and methods

### The questionnaire

To perform this study, a questionnaire was constructed. All key constructs of the study are based on questions from this questionnaire. The questions revolved around an important and specific foreign market business relationship that was chosen by the respondent. The respondent was instructed to select the business relationship based on the following criteria: (1) it is located in a foreign market; (2) it is ongoing; and (3) it has resulted in realised sales transactions. Hence, the selected business relationship constitutes a focal point in the network, where knowledge combination and knowledge creation can be measured, which is difficult to do by aggregate measures without confounding the regional perspective. Therefore, measuring the constructs in a specific foreign market business relationship is deemed to enhance the reliability and internal validity. The questions in the questionnaire were measured on a seven-point Likert scale, with ratings ranging from low to high. To strengthen the validity of the study, the variables included in the questionnaire stemmed from empirical observations and theoretical reviews. More specifically, variables were developed from three sources: (1) previous questionnaires of the research group; (2) a literature review conducted between the years 2002 and 2003 to identify new measurement scales; and (3) case studies conducted between 2003 and 2005, concerning knowledge acquisition and knowledge use within business networks.

### Sampling

Although numerous premises have been listed for what constitutes international entrepreneurial firms, most of these are flawed due to the notion that numerical guidelines, such as export quotes or years before commencing international activities, do not always convey the risk-taking and opportunity seeking behaviour that is inherent in international entrepreneurial activities

(Gabrielsson, Kirpalani, Dimitratos, Solberg, Zucchaella 2008). Hence, drawing on Jones and Coviello (2005), the internationalization process of SMEs is here considered as an inherently entrepreneurial behavioural phenomenon that does not need to be prescribed pre-ordained steps or stages. The firms in the studies sample cover a broad spectrum of industries where the most prevalent contain the areas of engineering, manufacturing, retailing, medical equipment, pharmaceuticals, and biotech. The majority of the firms promote niche products that correspond to a weak domestic demand, and therefore designated for global markets. Thus, in general these firms seem to be attributed by the international opportunity seeking behaviour that characterizes international entrepreneurial firms according to conception of Jones and Coviello (2005).

The criteria to be included in this study were the following: (1) be active in foreign markets and (2) fulfil the definition of a SME<sup>1</sup>. In 2003, investigators received a stratified random sample of international SMEs from Statistics Sweden's Business Register. All firms included in the sample had at least 10% of their turnovers as a result of export sales. Naturally, a large part of the firms used more advanced modes of establishment in the foreign market such as subsidiaries, agents, distributors, and joint-ventures. The sample consisted of two groups: small firms (6–50 employees) and medium-sized firms (51–250 employees). A stratified sample was used to achieve variation in size among SMEs. If the sample had not been stratified, most firms would likely have been small because 97% of firms in Sweden have 50 or fewer employees. To ensure a high response rate, responses were collected during personal visits to firms in the sample. To expedite this time-consuming collection method, investigators focused only on SMEs in the geographical area of Mälardalen (the extended capital region of Sweden). This area was chosen partly because of its industrial concentration and partly because of its geographical accessibility for members of the research group. A sample of 339 firms was drawn from the Mälardalen area. After contacting individuals in these firms via phone, investigators excluded some firms as too large (that is, they were not SMEs) or

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<sup>1</sup> An SME does not exceed 250 employees according to the Organisation for Economic Co-operation and Development (OECD), published in the report entitled 'OECD Small and Medium Enterprise Outlook', 2002

as not selling their product to foreign customers (that is, they were not international) or as no longer existing. After these reductions, the total study sample consisted of 233 SMEs. From this sample, 188 questionnaires were collected, yielding a response rate of approximately 81%. Hence, about 19% of sample firms chose not to participate in the study. The two major reasons for the non-responding firms' declination to participate were (1) a lack of time and (2) a reluctance to release information. Even though a response rate of 81% is considerably high in comparison to similar studies, a non-response bias is always a concern. Because the surveys were collected when meeting with the respondents, we could not detect a non-response bias by applying a common test, such as comparing early versus late responses (Armstrong and Overton 1977). We instead used the secondary data collected from Statistics Sweden's Business Register to control for differences between responding and non-responding firms with regards to industry, size, location, and level of internationalisation. This analysis revealed no clear imbalances between the groups; therefore, a non-response bias is not likely to be a problematic issue when interpreting the findings of the study.

## Data collection

Precautions were taken to ensure the reliability of data before and during the collection stage. Before distribution to the derived sample we conducted a pilot-study where the questionnaire was tested on six SMEs in Stockholm and Uppsala. The investigators visited the respondents at their offices and were present in the room whilst the respondents answered the questionnaires. Respondents were instructed to inform investigators if they experienced any problems with the questions asked. All six respondents indicated that they thought the original questionnaire was too long. After receiving the questionnaire results, the research group met and assessed the test. Their assessment resulted in shortening the questionnaire and modifying certain expressions that the respondents had found confusing. In an attempt to minimise missing values, investigators decided to attach an introductory letter to the questionnaire to assure respondents that the results would be confidentially maintained.

To ensure reliability, the investigators personally administered the questionnaires to the Swedish SMEs. By visiting the firms, the research group sought to make certain that the right person was answering each questionnaire and to ensure a high response rate with a low number of missing values. The study used a single key informant approach, which is common practice in marketing research (Phillips 1981). Individuals who were considered key informants and were singled out as such included chief executive officers (CEOs) and marketing managers who influence decisions related to foreign operations. Each visit ranged from one-half to one hour. To avoid investigator-induced bias, research group members were present solely as observers. When the respondents had completed the questionnaires, the investigators conducted short interviews with them, encouraging them to describe in their own words the foreign assignments around which questions had revolved. Investigators took notes about each interview on blank sheets of paper that were attached to each questionnaire.

### **Construct measurement**

The construct *network development* encompasses firms' experiences of developing routines within networks. These routines, which function both as glue and lubricant to provide access and a conduit for knowledge in networks, are commonly set as proxy for network development in empirical studies (Holmen, Pedersen, and Jansen 2007). The construct captures a regional network in a foreign market and comprises three dimensions of the network: foreign market suppliers, foreign market customers, and foreign market customers of the customers. Two dimensions of customers were applied because it was observed in the collected sample that firms often collaborate with customers on two levels [i.e. intermediate customers and end-customers]. By building on these three dimensions, the construct becomes oriented towards the network rather than single relationships. An intrinsic feature of the construct is, therefore, the idea that firms are involved in network development – not only with directly connected actors but also with indirectly connected actors (Burt 1992).

The construct *knowledge combination* refers to the occurrence of knowledge combinations in a particular foreign business relationship. In line with the ideas of Cook and Emerson (1984), a business relationship reflects a focal point for knowledge combination in the network because it is connected to knowledge embedded in other network relationships. To combine knowledge, firms primarily need to access, interpret, and exchange knowledge. Hence, the ability of firms to access knowledge involves whether the firm recognises the business partner as a source of knowledge (i.e. the firm has accessed potential input for knowledge combination) (Nahapiet and Ghoshal 1998). The mechanism of mutual adjustments is instrumental in allowing the interpretation of valuable bits of knowledge (i.e. tacit knowledge) because they are not readily passed on as commodities (Mintzberg 1979; Nonaka 1991). The exchange of knowledge allows for the implementation of knowledge combinations (Nahapiet and Ghoshal 1998).

The construct *knowledge creation* comprises the outcomes of modifications and alterations of knowledge in the focal business relationship. These outcomes are stipulated to be embedded in three dimensions involving products, procedures, and individuals. The first item encompasses new products that are developed in the relationship. The rate of new product development is a commonly used indicator of knowledge creation in marketing studies (Cohen and Levinthal 1990). The second item entails the creation of new routines, indicating that new knowledge has become embedded in procedures, which underlies the responsiveness to the environment (i.e. how business is done) (Nelson and Winter 1982). The third item involves the grafting of personnel, signifying the exploitation of individual competence (Inkpen 1996).

## LISREL

The linear structural relations (LISREL) statistical package was used to process data. Structural equation modeling, such as with LISREL, is a statistical technique used to study direct and indirect relationships between one or more independent variables and one or more dependent variables. A distinctive



strength of LISREL-based models is the inclusion of latent variables, thus making possible the measurement of abstract concepts that are not measurable directly. These latent variables are higher order constructs, representing the commonalities of a set of indicators. Such latent variables are interpreted as theoretical constructs. The formation of constructs and models, as well as error covariance and correlations, constitutes the fundamental dimensions of the LISREL method. The creation of constructs and models can be described as the structural dimension, whereas error covariance and correlation can be comprehended as the causal dimension. The LISREL technique is usually applied to research involving confirmatory analysis. This method, thus, requires that a researcher anchor a model in theory, a requirement taken into consideration as members of the research group developed their questionnaire based on an elaborate theoretical framework.

An interpretation of the valid structural model should take into consideration that each relation is part of a broader context constituted by the model. Such interpretation should take into account not only direct effects but also indirect effects. One example is a causal chain where construct *a* causes construct *b*, and *b* causes *c*. In this chain, *a* has an effect on *b*, and *b* has an effect on *c*. Furthermore, *a* has an indirect effect on *c*, mediated by *b*. An analysis that omits the indirect effect mediated by *b* will suffer from inadequacies because it will not reveal the total effect (Bollen 1989), with the implication that the relationships cannot be analysed piece by piece; all constructs must be evaluated within the framework of the entire model.

The validity of LISREL models is measured with regard to both the validity of the entire model (nomological validity) and the specific relationships within the model. Because the model is composed of various constructs, its validity may be estimated by measuring the degree of separation between constructs (discriminant validity), as well as the degree of homogeneity of these constructs (convergent validity). Convergent validity is confirmed if the indicators load only on the constructs to which they belong. Evaluating convergent validity is carried out by analysing *t*-values (significance),  $R^2$ -values (linearity), and factor loadings (correlation). As recommended by Hair et al. (1995), convergent validity is further supported by checking for

construct reliability (CR) and variance extracted (VE). A basic requirement for confirmation of discriminant validity is that the correlation between latent variables should be significant but not equal to 1, which would suggest unidimensionality (Jöreskog and Sörbom 1993).

The constructs (displayed in Table 1) seem statistically valid because all CR values are above the recommended 0.7 level and all VE values are above the recommended 0.5 level (Hair et al. 1995). Consistent with statistical convention, all *t*-values are above 5.06, and all  $R^2$ -values, except one, are above 0.21. The exception comprises the fact that suppliers seem to provide somewhat low explanatory power in the network development construct ( $R^2=0,16$ ). An explanation for this may be that firms are more deeply involved in foreign customer networks than in foreign supplier networks. The indicator, however, remains in the model because its deviation from statistical convention is not considered strong and it provides an upstream dimension to the network development construct.

The overall fit of LISREL models is verified using chi-square ( $\chi^2$ ), degrees of freedom (df), and a probability estimate (p-value). There is an ongoing debate about appropriate measures to use for assessment of nomological validity (Bollen and Long 1993). Three frequently used measures are goodness of fit (GFI), which checks for sample size effects and should be above 0.90; root mean square error of approximation (RMSEA), which measures population discrepancy per degree of freedom and should be below 0.08; and comparative fit index (CFI), which checks for non-normal distributions. Values of CFI close to 1 indicate a good fit, and those above 0.90, an acceptable fit (Jöreskog and Sörbom 1993; Murtha, Lenway, and Bagozzi 1998). The hypothesised model's key statistical measures support nomological validity because the chi-square is 33.09, with 24 degrees of freedom at a probability of 0.10222. The RMSEA is 0.045, the GFI is 0.96, and the CFI is 0.98.

Missing values accounted for a mere 0.8% of the total sample and were handled by pairwise deletion. In addition, listwise deletion was used to check the model's robustness (resulting effective sample size of 180) and yielded a similar result ( $p = 0.25736$ ;  $\chi^2 = 24.77$ ;  $df = 21$ ).

**Table 1. The constructs included in the study.**

| Indicator  | Factor loading | t-value | R <sup>2</sup> -value | CR   | VE   |
|--|----------------|---------|-----------------------|------|------|
| <b>Network Development</b>   |                |         |                       | 0.71 | 0.55 |
| To what extent is the [selected] business relationship dependent on your experience of developing routines with local market suppliers? (7-point Likert-scale, 1 = not at all; 7 = completely)           | 0.4            | 5.06    | 0.16                  |      |      |
| To what extent is the [selected] business relationship dependent on your experience of developing routines with local market customers? (7-point Likert-scale, 1 = not at all; 7 = completely)           | 0.73           | 9.37    | 0.54                  |      |      |
| To what extent is the [selected] business relationship dependent on your experience of developing routines with local customers of the customers? (7-point Likert-scale, 1 = not at all; 7 = completely) | 0.85           | 10.73   | 0.73                  |      |      |
| <b>Knowledge combination</b>   |                |         |                       | 0.83 | 0.64 |
| The [selected] business partner is a source of knowledge. (7-point Likert-scale, 1 = not at all; 7 = completely)   | 0.8            | 7.14    | 0.64                  |      |      |
| The relationship with the [selected] business partner is characterised by mutual adjustments. (7-point Likert-scale, 1 = not at all; 7 = completely)   | 0.61           | n.a.    | 0.37                  |      |      |
| The relationship with the [selected] business partner is characterised by a general exchange of knowledge. (7-point Likert-scale, 1 = not at all; 7 = completely)  | 0.73           | 7.05    | 0.53                  |      |      |
| <b>Knowledge creation</b>  |                |         |                       | 0.80 | 0.58 |
| The [selected] business relationship has resulted in new products.(7-point Likert-scale, 1 = not at all; 7 = completely)   | 0.46           | n.a.    | 0.21                  |      |      |
| The [selected] business relationship has resulted in new routines.(7-point Likert-scale, 1 = not at all; 7 = completely)   | 0.79           | 5.43    | 0.62                  |      |      |
| The [selected] business relationship has resulted in new personnel.(7-point Likert-scale, 1 = not at all; 7 = completely)  | 0.75           | 5.42    | 0.56                  |      |      |

*Note:* n.a.= not applicable due to fixed parameter

## Control variables

On the basis of three control variables, group analysis is used to check for differences in the sample. Group analysis in LISREL is conducted by setting construct relations, indicator relations, and error covariance to be equal in all groups (Jöreskog and Sörbom 1993, 53). If the key statistics are not valid, a difference exists between the groups. Firm behaviour may vary with inherent characteristics and experiences; therefore, the following control variables were selected for group analysis in this study:

- Size
- Duration in foreign market
- Knowledge intensity

The control variable of firm size (estimated by number of employees) was chosen to see if there are differences between small firms (1–49 employees) and medium-sized firms (50–249 employees),<sup>2</sup> which would have implications for the validity of the SME concept in this research context.

The control variable of duration in foreign market was selected to determine if there are differences between firms in terms of the time they have been active in the particular market. We split the sample into two groups: The first group of firms has operated in the market for five years or less, and the second group has operated in the market for six years or more. In a previous study, a duration of five years represented a short-term business life cycle whilst a longer period of time represented a long-term duration (A'Hearn and Woitek 2001). Hence, this control variable was selected to investigate the validity of the model in terms of the different time perspectives of firms' market involvement.

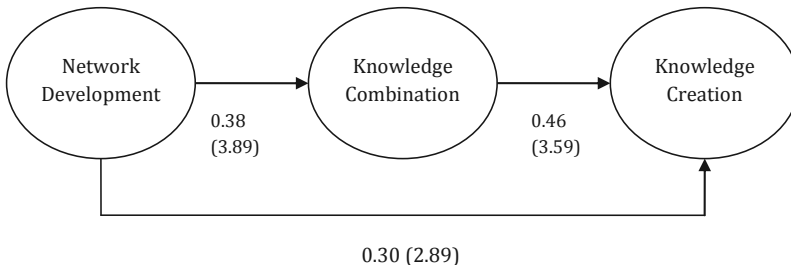
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<sup>2</sup> The distinction between small and medium-sized firms is based on data from the Organisation for Economic Co-operation and Development (OECD), published in the report entitled 'OECD Small and Medium Enterprise Outlook', 2002.

The control variable of knowledge intensity was chosen to explore for differences between firms depending on the extent to which their activities are knowledge intensive, which would imply that the external validity of the study is constrained to certain contexts (e.g. varying in knowledge requirements related to industries, strategies, and markets). Knowledge intensity is measured by asking them to what degree (on a seven-point scale) knowledge is of importance in the selected business relationship. Firms that indicated a response above the median ( $>3$ ) are sorted in the group that contains firms that are considered to be knowledge intensive, and firms that indicated a response equal or below the median ( $\leq 4$ ) are sorted in the group of firms that are not considered knowledge intensive.

## Results

Figure 2. The results of the structural model



*Note:* *t*-values within parentheses.

By showing that network development has a positive effect on knowledge creation, the results of the structural model (Figure 2) support hypothesis 1. Hence, the finding reveals that network development of international entrepreneurial firms positively impact their knowledge creation in the

foreign market. This notion indicates a significance for entrepreneurial firms to be network oriented in regional markets to be able to stay innovative

The structural model also indicates that network development has a positive effect on knowledge combination and therefore confirms hypothesis 2. This finding suggests that network development positively impact knowledge combination by entailing means of identifying and implementing opportunities of knowledge combination in foreign markets.

Finally, hypothesis 3 is verified as knowledge combination is revealed to have a positive effect on knowledge creation. This finding confirms the notion that knowledge combination works as a mediating construct between network development and knowledge creation. Hence, network development enables knowledge combination which, in turn, is an important prerequisite for knowledge combination in foreign markets.

Figure 2 show that both knowledge combination and network development has a positive effect on knowledge creation. However, the model shows that knowledge combination in fact has a stronger impact on knowledge creation in comparison to network development. Moreover, the effect of network development is stronger on knowledge combination, relative to its effect on knowledge creation. This implies that network development facilitate knowledge combination, which in turn lay the basis for knowledge creation in foreign markets. In fact, Figure 2 even implies that the effect of network development is catalysed by knowledge combination.

Finally, the results from the group analysis concerning the control variables (size, duration in foreign market, and knowledge intensity) show no differences among the groups in any of the cases. Whereas it is somewhat counter-intuitive that knowledge intensity rendered no statistical significant differences between groups, it may be assumed that the majority of international entrepreneurial firms deals with knowledge to some extent. That is, even if knowledge requirements are low, firms have to make certain adjustments to the particular conditions of the foreign market.

## Concluding discussion

The purpose of this study was to add a foreign market perspective when investigating the impact of network development on knowledge creation in business relationships of international entrepreneurial firms. By this conduct, the study attempted to make a distinctive contribution to international entrepreneurship theory. Another aim of the study was to investigate the mediating role of knowledge combination when examining the link between network development and knowledge creation.

First, in line with the theoretically deduced assumptions of this article, the findings from the structural model offered strong evidence for the notion that foreign network development is of critical importance for enhancing knowledge creation in business relationships of international entrepreneurial firms. The findings show that network development spurs the knowledge creation of international entrepreneurial firms in foreign markets. This may be explained by the notion that network development makes firms become more integrated into the regional network which, in turn, gives them access to knowledge and contextualises their interpretation of that knowledge.

Second, to gain further insights into the constructs that underlie knowledge creation, the mediating role of knowledge combination was investigated. The structural model revealed that network development had a positive impact on knowledge combination. The results, thus, indicate that network development open up possibilities for the formation of knowledge combination. That is, network development enable firms to identify, access, share, and integrate knowledge in ways that may lead to the creation of knowledge in business relationships. Hence, network development is a strong requisite for knowledge combination the realm of the foreign market. In turn, the model showed that knowledge combination had a positive impact on knowledge creation. In fact, the effect of knowledge combination on knowledge creation was even stronger than the effect of network development on knowledge creation. Hence, knowledge combination serves as a powerful catalyst in the knowledge creating process, and even reinforces the effect of network

development. On basis of these findings, it can be concluded that activities of network development and knowledge combination are intimately related in the context of the foreign market operations of international entrepreneurial firms. Hence, ongoing network development is necessary to be able to identify and implement emerging opportunities of knowledge combinations in network relationships.

This study principally contributes to existent network studies in the field of international entrepreneurship (Bell 1995; Coviello and Munro 1997; Crick and Jones 2000; Sharma and Blomstermo 2003; Coviello 2006; Loane and Bell, and McNaughton 2007; Lu and Beamish 2006), by adding insights that reveal that the regional perspective is important when studying network development of international entrepreneurial firms. Hence, the study indicates that foreign network development enables firms to gain control over separate bits of regional knowledge and provide options to fit this knowledge into various combinations that underlies knowledge creation and reinforced foreign competitiveness. The findings also contributes to current studies on knowledge creation in the field of international entrepreneurship by suggesting that knowledge combination is facilitated, and largely contextualized by networks (compare to e.g. Zahra and Filatotchev 2004; Cui, Griffith, and Cavusgil 2005; De Clercq, Sapienza, and Crijns 2005; Murray and Chao 2005; Gassmann and Keupp 2007; Zhou 2007). From this perspective, entrepreneurial firms networks dwell an enormous business potential that adheres to latent opportunities of knowledge combination. These finding may be especially salient for smaller firms, as the study indicates that sample firms of SMEs develop their networks to be able to deploy external knowledge for business purposes. The locus of knowledge creation may, thus, not reside in the internal organizations of these firms, but in their networks. Furthermore, the practical implications of these findings may be that firms can steer away from internalising knowledge by ownership (foreign direct investments) in cases where they are able to develop knowledge in external networks. An interesting issue for future research would be to compare costs/performance of knowledge creation in a variety of dimensions such as internal networks, domestic networks, international networks, and foreign networks. Other issues concern the effects of new technologies in narrowing spatial and



psychological gaps between internationally dispersed entities, thus supporting the interaction, coordination, transfer, and creation of knowledge in the network. Furthermore, we know little about the distinctive benefits that network development has on the exploration (identification) of knowledge combinations, respectively the exploitation (implementation) of knowledge combinations. Thus, explorative research is needed to distinguish between these dimensions of knowledge combination. Moreover, future studies are needed to convey the similarities and differences in knowledge-creation between processes that are gradual or radical.

The results of this analysis have implications for managers to consider. By providing effective management in foreign networks, firms may become better equipped to align internal knowledge with knowledge of counterparts, as well as to synthesise knowledge across different relationships in the network. Success in acknowledging the benefits of network development can bestow the leverage to create knowledge faster and more in line with regional market requirements. Hence, combining knowledge in business relationships implies that firms may need to organise cross-organisational work groups, where representatives of different firms can communicate about their business operations and visions. This interaction is likely to benefit from the use of technical solutions that expedite the exchange. Sophisticated information tools and communication tools, such as intranets, may be helpful because they can provide an interface with qualitative characteristics, which are instrumental when implementing knowledge combinations. In summary, network development is bound to evolve as a managerial skill that has major potential to cut costs, create synergies when managing knowledge, and allow for greater specialisation on core competencies because a larger amount of knowledge can be leveraged through external actors.

Finally, as limitations of the analysis, it should be noted that the information collected for this study focused solely on one specific actor in the network. To what extent the counterparts of the investigated firms would have had answers similar to our collected data is unknown. Additional insight could come from future studies that use network data sets and comparative approaches. Moreover, the structural equation modelling technique allows for

measurement in only one causal direction. Hence, this study is unable to answer whether there is a feedback loop between knowledge creation and network development, which would be well in line with the theoretical arguments of this study. Future longitudinal studies could investigate this relationship and contribute to the construction of a more dynamic model. Finally, to avoid cultural bias this study comprises national markets of the respondents' choice. Future studies could, however, focus on firms' operations in a fixed single market to allow for non-biased comparisons across different groups of firms.

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## Article 6

### Knowledge Combination and Knowledge Creation in a Foreign-Market Network

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## ***Knowledge Combination and Knowledge Creation in a Foreign-Market Network***

by Daniel Tolstoy

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*This article rests on the idea that knowledge is dispersed among different individuals and entities. For international entrepreneurial firms to create new knowledge, they need to find ways to combine these dispersed bits of knowledge. Because of the notion that resource constraints make international entrepreneurial firms dependent on external knowledge, it is assumed that a portion of knowledge combination takes place in networks. The purpose of this article was to investigate the prospective impact network knowledge and knowledge combinations have on entrepreneurial firms' knowledge creation. Three hypotheses are developed and tested in a structural equation model, using linear structural relations (LISREL, Scientific Software International, Inc.).*

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### ***Introduction***

This article rests on Hayek's (1945) assumption that knowledge is dispersed among different individuals and entities. When dispersed bits of knowledge are combined, new knowledge that no one had previously anticipated may be created (Dew, Velamuri, and Venkataraman 2004).

Although networks are widely known to stimulate innovative behavior in international entrepreneurial firms, little is known about the actual factors that underlie knowledge creation in these set-

tings. This article aimed to contribute to international entrepreneurship theory by examining a model where network knowledge is stipulated as input to the knowledge combinations that drive knowledge creation at the foreign market level. Network knowledge is here conceptualized as knowledge drawn from the network (Blomstermo et al. 2004). Knowledge combination, in turn, is viewed as connecting previously unconnected separate bits of knowledge whose value is enhanced by combination (Buckley and Carter 2004). Further, knowledge creation is conceptualized as

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business outcomes of modifications and alterations of knowledge (Yli-Renko, Autio, and Sapienza 2001). Finally, small and medium-sized enterprises (SMEs) that grow and develop by expanding in foreign markets are commonly regarded as international entrepreneurial firms and, therefore, serve as units of analysis in the empirical inquiry.

Although an accepted definition of international entrepreneurship does not yet exist, it is generally viewed as the proactive effort to identify and exploit opportunities in foreign markets (Oviatt and McDougall 2005). To be able to identify/exploit such opportunities, recent research in the field posits that international entrepreneurial firms must create knowledge on a continual basis (Gassmann and Keupp 2007; Zhou 2007; Cui, Griffith, and Cavusgil 2005; De Clercq, Sapienza, and Crijns 2005; Murray and Chao 2005; Knight and Cavusgil 2004; Zahra and Filatotchev 2004). This study stipulates that networks provide a useful rationale for explaining knowledge creation as they present a multitude of options for leveraging network knowledge that is supplemental to other network knowledge and/or to the firm's internal knowledge (McGovern 2006). This argument is further substantiated by the general comprehension that international entrepreneurial firms are inherently resource constrained and therefore have to tap networks on the knowledge they need for their international endeavors (Coviello 2006; Lu and Beamish 2006; Sullivan Mort and Weerawardena 2006; Saarenketo et al. 2004; Sharma and Blomstermo 2003; Crick and Jones 2000; Wolff and Pett 2000; Jones 1999; Bell 1995; Coviello and Munro 1995). Moreover, previous research in the discipline of international business has shown that firms depend on knowledge derived from different levels of the network (e.g., Lindstrand 2003). Therefore, to capture a broader scope of the network, this study

focuses on knowledge from both the upstream level and the downstream level of a network production chain, that is, the supplier network and the customer network, respectively (Verhees and Meulenbergh 2004). By this conduct, specific insights can be derived regarding the relative benefits of employing supplier network knowledge respective of customer network knowledge in combinations for leveraging other internal/external knowledge.

This article answers a call by Zahra and George (2002), who recognize that there has not been sufficient research on the actual processes through which knowledge is created in the field of international entrepreneurship. The purpose of this study was, thus, to address this gap by examining the interrelationships between network knowledge, knowledge combination, and knowledge creation. In specific, two overarching questions are asked related to international entrepreneurial firms: (1) What impact does knowledge combination have on knowledge creation? (2) To what extent is this knowledge creating process stimulated by network knowledge?

By pursuing this objective, two specific contributions are expected:

- (1) Adding to the growing knowledge paradigm within international entrepreneurship theory by providing explanations for the instrumental processes underlying knowledge creation
- (2) Providing specific insights to international entrepreneurship theory regarding the particular effects different network knowledge (i.e., supplier network knowledge and customer network knowledge) has on processes of knowledge combination and knowledge creation.

The remainder of the article begins with literature review, which is followed by the development of a hypothesized



model comprising three hypotheses. After a methodological discussion, the model is tested in a structural equations model, using linear structural relations (LISREL, Scientific Software International, Inc.) as the statistical technique. The results of the analysis are then presented and discussed. The article concludes with a discussion of the contributions, limitations, and implications of the analysis.

### ***Conceptual Background***

This section contains the theoretical underpinning of the interrelatedness between network knowledge and knowledge combination. Thereafter, the dependent construct of the study, knowledge creation, is addressed.

#### **Network Knowledge as Input to Knowledge Combination**

This study primarily applies network theory and entrepreneurship theory to form the conceptual basis for understanding the dynamics of knowledge combination. Networks (here broadly understood as the organizational and human actors in a firm's business environment) provide the frameworks in which all business activities take place (e.g., Street and Cameron 2007; Achrol and Kotler 1999; Johanson and Mattsson 1987). It is notable that, in the past few decades, knowledge has become an integrated part in network theory. Networks have been portrayed as repositories of knowledge as well as the arenas in which new knowledge is developed. For instance, studies have captured network knowledge through various concepts such as network learning (Blomstermo et al. 2004), relationship memory (Cegerra-Navarro 2007), and even network memory (Soda, Usai, and Zaheer 2004). Consistent with this reasoning, networks have been observed to constitute social communities where network knowledge forms the undercurrents that stimulate innovative behavior (Powell, Koput, and Smith-Doerr 1996).

Furthermore, this study draws on entrepreneurship theory by claiming that innovative behavior is driven by knowledge combination. Entrepreneurship theory has long argued that knowledge combination can open up opportunities given the fact that knowledge is dispersed, meaning that different individuals know different things (Hayek 1945). Hence, dispersed bits of network knowledge may reside both within the internal network of the firm and outside its boundaries. In this vein, this study argues that firms are dependent on network knowledge both in the customer network (Brockhoff 2003; Ritter and Walter 2003; Lengick-Hall 1996) and in the supplier network (Dyer and Nobeoka 2000; Handfield et al. 1999; von Hippel 1988), as a broad scope of network relationships can provide a multitude of avenues for knowledge to intersect. An entrepreneurship perspective implies that combinations of dispersed bits of knowledge that are superior to other firms may lead to the establishment of temporary competitive advantages (Kirzner 1973; Schumpeter 1934). Over time, as firms strive for enhancing their competitive positions through knowledge combination, knowledge becomes heterogeneously distributed across firms, which makes their assortments of knowledge at least in some way unique (Barney 1991). Firms endowed with certain beneficial assortments of knowledge may be able to produce with greater economic efficiency and/or better satisfy customer needs than other firms (Peteraf 1993). Combinations of knowledge may be either realized or latent, with the former viewed as being already exploited by knowledge combinations, whereas the latter represents unexploited opportunities yet to be discovered by the entrepreneur (McGrath 1999). The process of knowledge combination is, thus, entrepreneurial by nature as it involves a sudden act on intuition or opportunity (Floyd and Wooldridge 1999).

These opportunities of knowledge combination may principally be catalyzed by mechanisms of knowledge coordination and knowledge acquisition in either separate or intertwined processes (Buckley and Carter 1999). Knowledge coordination may entail setting dispersed bits of knowledge into a system in which one entity may benefit from another entity's knowledge without necessarily having to *know it* (Buckley and Carter 2004). Depending on the nature of a business's activities and objectives, coordination will vary in cost and require different levels of investment (Gulati and Singh 1998; Johanson and Mattsson 1987). In other cases, network knowledge cannot be combined without being acquired by at least one of the participating entities, which is why it has to be identified, interpreted, and transferred. First, identification involves the assessment of the network partner as a viable source of knowledge (Nahapiet and Ghoshal 1998). Identification of potential opportunities can readily be achieved by establishing a central position in the network, where firms gain access of multiple options of combining network knowledge (cf. Burt 1992). Second, the challenges of interpreting knowledge may vary with the degree to which knowledge is intangible, which requires decodification (Buckley and Carter 1999). Third, transfer of intangible knowledge is commonly undertaken by interactive processes that require socialization among individuals (see, e.g., Nonaka 1994; Polanyi 1967). A social climate that facilitates knowledge transfer may be obtained by maintaining close network relationships that provide conduit for the flow of knowledge and allow it to be shared among actors in the network context (Pfeffer and Salancik 1978). Although the unique combinations of knowledge that are implemented by these mechanisms may lead to competitive advantages in the short run, they run the risk of becoming institutionalized

over time, thereby inert and difficult to redeploy by combinations (Madhavan and Grover 1998). This may slow down the pace and scale of knowledge creation in firms, thus compromising firms' competitiveness in the long run (Hannan and Freeman 1984). Hence, to allow for knowledge combinations to detangle, firms have to be able to question existing perspectives, frameworks, and premises (Argyris and Schön 1978).

### **Knowledge Creation**

To explain the growth of the firm, Penrose (1959) stipulates a dynamic relationship between the knowledge of the firm and market opportunities. Following her arguments, competitive advantages and growth do not emerge from merely making decisions in the present but from creating knowledge over periods of time. Correspondingly, the knowledge-based view regards knowledge as the most important resource and firms as superior to individuals in creating knowledge (Spender 1996; Kogut and Zander 1992). From this perspective, knowledge creation can develop from the combination of knowledge held by the firm and connected actors in the network and may occur gradually or radically.

On the one hand, knowledge creation that is gradual may involve the mere extension of competences, that is, by imitating knowledge that preexists in the external environment. This type of knowledge creation may be driven by the pragmatic incentive to keep up with forerunners in the industry to increase chances of survival in the short run. On the other hand, radical knowledge creation may involve the drastic shift of competences, that is, by the experimentation of alternatives leading to cognitive and/or behavioral change (Fiol and Lyles 1985). Radical knowledge creation may serve to cultivate sustained competitive advantage because of unique features that establish an uncertainty about a

firm's grounds for efficiency, which prevents presumptive imitators from knowing exactly what to imitate and how to do it (Lippman and Rumelt 1982). In a business context, knowledge creation typically involves the development of new competitive products (Cohen and Levinthal 1990), as well as procedural competences regarding how business operations are run by the firm (Nelson and Winter 1982). A balance of gradual and radical knowledge creation regarding these aspects, arguably, serves the best interest of firms. This argument is based on the fact that firms require short-term profits to stay afloat in the short run, as well as unique competitive advantages to survive in a longer perspective. Consequently, the process of knowledge creation is, by necessity, dynamic and ongoing. In order for firms to stay in pace with the ever-changing business environment, they have to continually create knowledge that both imitates and differentiates from competitors' knowledge (Eisenhardt and Martin 2000; Teece, Pisano, and Shuen 1997). In this article, knowledge creation is treated as a holistic concept that can be placed on a continuum between the extremes of gradual and radical knowledge creation. The ability of creating knowledge may be of particular importance in an environment that is highly challenging, such as operating in a foreign market.

The remainder of this article uses a dynamic knowledge-based view as a lens through which to examine the intrinsic processes of international entrepreneurship. Ever since the launch of the Uppsala model, which regards firms' international expansion as a slow process driven by the accumulation of market knowledge (Johanson and Vahlne 1977), firms' internationalization has often been described as a function of the knowledge they have acquired in foreign markets. The recent emergence of research in the field of international entrepreneurship has embraced this

knowledge-based tradition and revitalized it by adding some new perspectives: Research in international entrepreneurship posits that knowledge that is significant for seizing business opportunities in foreign markets is not accumulated through incremental, time-consuming processes (as described in the Uppsala model) but rather is proactively developed in processes of knowledge creation (Chetty and Campbell-Hunt 2004). The premises and conditions for knowledge creation in international entrepreneurial firms are discussed in more detail in the following section, and various hypotheses about such creation are developed.

### ***Hypothesis Development: Knowledge Creation by International Entrepreneurial Firms***

In a review of studies on international entrepreneurship, Rialp, Rialp, and Knight (2005) claim that the knowledge-based view serves as an important tool for understanding the international expansion of entrepreneurial firms. International entrepreneurial firms depend on keeping knowledge creation in line with the dynamics of local market conditions (Knight and Cavusgil 2004). Hence, knowledge per se is not sufficient in a global economy where local market conditions are constantly changing; it has to be continually renewed. As a result, Zahra, Matherne, and Carleton (2003) suggest that international performance is driven by firms' ability to create knowledge by combining it for purposes that suit the requirements of the international market. More specifically, international entrepreneurial firms compete on their ability to create new knowledge that facilitates the improvement of product offerings as well as responsiveness to market conditions (Autio, Sapienza, and Almeida 2000). In summary, to create new knowledge that enhances competitiveness in foreign markets, firms

must be equipped to act on opportunities by implementing knowledge combinations in ways that have not previously been carried out (Madhok 1997).

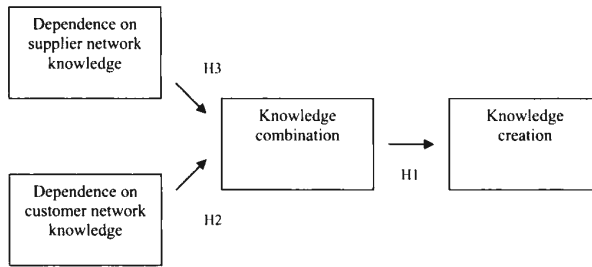
International entrepreneurial firms are uninhibited by their past and may be better equipped to develop new knowledge and pursue emerging opportunities whereas established firms may possess positional advantages (Sapienza et al. 2006). A built-in notion in the principles of international entrepreneurship is that business opportunities are exploited more rapidly and innovatively with knowledge that is proactively developed as opposed to knowledge that is acquired by experience over time (Crick and Jones 2000; Jones 1999; Oviatt and McDougall 1994). Hence, firms' international endeavors are not determined to any great extent by their past but, instead, may emerge from enacting knowledge complementarities that were previously unthought of. Such actions, carried out through knowledge combinations, put firms in line with the dynamics of local market preferences and technological structures. Therefore, knowledge combination will enhance the knowledge creation of firms in foreign markets.

*H1: Knowledge combination has a positive effect on an international entrepreneurial firm's knowledge creation.*

Many international entrepreneurial firms suffer from resource constraints in their aspirations to develop business in foreign markets. Because all of the resources that are essential for a firm's survival cannot be controlled through ownership, firms become dependent on external resources in the network (Zahra, Matherne, and Carleton 2003). For example, in a study of small international software firms, Coviello and Munro (1995) found that those firms gained access to their prime share of knowledge by linking themselves to

established networks. Hence, networks are vital external providers of various kinds of knowledge not only from directly related relationships but also from indirectly related relationships (Sharma and Blomstermo 2003). It is thus crucial for international entrepreneurial firms to gain access to networks in foreign markets as such networks allow for knowledge input through which opportunities can be seized (Yli-Renko, Autio, and Sapienza 2001). In line with the intrinsic arguments of this study, firms are dependent on both customer network knowledge and supplier network knowledge as these categories supply a variety of knowledge that is instrumental for knowledge combination (Uzzi and Lancaster 2003; Henderson and Cockburn 1994). Following Thorpe et al. (2005), knowledge derived from these networks may, in the case of entrepreneurial firms, principally consist of market knowledge (customer preferences, insight into commercial potential, and proximity to emerging markets) and technological knowledge (technological innovations). Market knowledge is typically associated with the customer network but may also be acquired from the supplier network. Likewise, technological knowledge is typically associated with the supplier network but may also be acquired from the customer network. Moreover, although knowledge combinations within networks may partly take place by international entrepreneurial firms' merely reacting to exogenous stimuli, they may also occur through conscious, planned efforts by the firms (Freeman, Edwards, and Schröder 2006; Sullivan Mort and Weerawardena 2006). Hence, similar to Kirzner's (1973) idea of the entrepreneur as someone who disrupts structural stability; firms need to be able to pursue proactively opportunities in the network—implying that they need to work toward changing existing knowledge combinations or finding new ones. Thus, firms that depend on

**Figure 1**  
**The Hypothesized Model**



network knowledge (i.e., supplier network knowledge and customer network knowledge) are likely to have more incentives and options to combine knowledge.

*H2: Dependence on customer network knowledge has a positive effect on an international entrepreneurial firm's knowledge combination.*

*H3: Dependence on supplier network knowledge has a positive effect on an international entrepreneurial firm's knowledge combination.*

Figure 1 consolidates the hypotheses into a model that includes four conceptually built constructs and five relationships between them.

### **Methodology** **The Questionnaire**

To perform this study, a questionnaire was constructed. All constructs that are discussed in this study are based on questions from this questionnaire and revolve around a specific business relationship in a local (foreign) market, chosen by the respondent. Hence, the local market represents a specific foreign-market environment in which firms operate. The respondent was

further instructed to select the relationships on the criteria that is ongoing, and this has resulted in realized sales transactions. Hence, the selected business relationship constitutes a focal point in the network, where knowledge combination and knowledge creation can be measured. The questions in the questionnaire are measured on a seven-item Likert scale, with ratings ranging from low to high. To strengthen the validity of the study, the variables included in the questionnaire stemmed from empirical observations and theoretical reviews. More specifically, variables were developed from three sources: (1) this research group's prior questionnaires; (2) a literature review conducted between the years 2002 and 2003 to identify new measurement scales; and (3) case studies conducted between 2003 and 2005 concerning knowledge acquisition and knowledge use within business networks.

### **Sampling**

In this article, the criteria for international entrepreneurial firms are that they are active in foreign markets and that they are SMEs. Hence, in 2003, investigators received a stratified random sample of international SMEs from Statistics Sweden Business Register. All of the

firms (belonging to various industries) included in the sample had at least 10 percent of their turnovers as a result of export sales. The sample consisted of two groups: small-sized firms (6–50 employees) and medium-sized firms (51–250 employees). A stratified sample was used to achieve variation in size among SMEs. If the sample had not been stratified, most firms would likely have been small because 97 percent of firms in Sweden have 50 or fewer employees. To ensure a high response rate, responses were collected during personal visits to firms in the sample. To expedite this time-consuming collection method, investigators focused only on SMEs in the geographic area of Mälardalen (the extended capital region of Sweden). This area was chosen partly because of its large size and partly because of its geographic accessibility for members of the research group. A sample of 339 firms was drawn from the Mälardalen area. After contacting individuals in these firms via phone, investigators excluded some firms as too large (i.e., they were not SMEs), as not selling their product to foreign customers (i.e., they were not international), or as no longer existing. After these reductions, the total study sample consisted of 233 SMEs. From this sample, 188 questionnaires were collected, yielding a response rate of approximately 81 percent.

### **Data Collection**

Precautions were conducted to ensure reliability in data collection. Before being distributed to the derived sample, the questionnaire was tested on six SMEs in Stockholm and Uppsala. Respondents were visited at their offices. Investigators were present in the room while respondents answered the questionnaires, and respondents were instructed to tell investigators if they experienced any problems with the questions asked. All six respondents indicated they thought the original questionnaire was too long. After receiv-

ing the questionnaire results, the research group met and assessed the test. Their assessment resulted in shortening the questionnaire and modifying certain expressions that the respondents had found confusing. In an attempt to minimize missing values, investigators decided to attach an introductory letter to the questionnaire to assure respondents that results would be held confidential.

To ensure strong reliability, the questionnaires were administered by investigators personally visiting the Swedish SMEs. By visiting the firms, the research group sought to make certain that the right person was answering each questionnaire and to ensure a high response rate with a low number of missing values. The study used a single-key-informant approach, which is a common practice in marketing research (Phillips 1981). Individuals who were considered key informants and singled out as such included chief executive officers and marketing managers who influence decisions related to foreign operations. Each visit ranged from half to 1 h. To avoid investigator-induced bias, respondents filled out the questionnaires themselves; research group members were present solely as observers. When the respondents had completed the questionnaires, investigators conducted short interviews with them, encouraging them to describe in their own words the foreign assignments around which questions had revolved. Investigators took notes about each interview.

Data were collected from 188 of the 233 SMEs in the sample. Hence, about 19 percent of sample firms chose not to participate in the study. Non-response analysis revealed that these firms did not participate because of lack of time or reluctance to release information.

### **Construct Operationalization**

Based on a theory that underscores the significance of knowledge in the sup-

plier network (Dyer and Nobeoka 2000; Handfield et al. 1999; von Hippel 1988), the construct *dependence on supplier network knowledge* encompasses the extent to which firms depend on knowledge from business partners in their supplier network. This construct is captured by two dimensions of the supplier network: dependence on the knowledge of local market suppliers and dependence on the knowledge of local market suppliers of complementary products. By building on both of these dimensions, the construct becomes oriented toward the supplier network rather than individual supplier relationships. The supplier network has been shown to be important for international firms because it provides knowledge that is useful in foreign markets (Lindstrand 2003). An intrinsic feature of this construct is the idea that knowledge is drawn not only directly from the separate sources in the supplier network but may also indirectly via mediating entities (Burt 1992).

In line with theory that have highlighted the significance of knowledge in the customer network (Brockhoff 2003; Ritter and Walter 2003; Lengick-Hall 1996), the construct *dependence on customer network knowledge* is formed. The construct refers to the extent to which firms depend on knowledge from individuals and organizations in their customer network. This construct also consists of two dimensions: dependence on knowledge from local customers and dependence on knowledge from local customers' customers. By building on both of these dimensions, the construct becomes oriented toward the customer network rather than individual customer relationships. Knowledge from the customer network is an established notion in international business literature as it is thought to provide valuable insights into particular market conditions (Nonaka 1994). An intrinsic feature of this construct is also the idea that knowledge is drawn not only directly from the sepa-

rate sources in the customer network but also indirectly via mediating entities (Burt 1992).

The construct *knowledge combination* refers to the occurrence of knowledge combinations in a particular foreign business relationship. Following Cook and Emerson's (1984) idea, any network relationship is connected to other network relationships and may therefore represent a focal point for knowledge combination in the network. The first dimension of the construct involves whether the firm identifies the business partner as a source of knowledge, thus holding viable potential input for knowledge combination in a particular network setting (Nahapiet and Ghoshal 1998). Also, knowledge has to be interpreted in order for a firm to understand how to use it in knowledge combinations (Buckley and Carter 1999). Thus, the second dimension contains the question of whether the business partner's knowledge is familiar to the firm. The third dimension involves coordination, which is an important dimension in knowledge combination (Buckley and Carter 2004). Knowledge coordination is often described as an interactive process that can be carried out through the mechanism of mutual adjustments (Thompson 1967). In addition, knowledge combination may require knowledge transfer, implying that involved parties share knowledge reciprocally. Hence, the fourth dimension of the construct involves knowledge transfer and is indicated by the degree of knowledge exchange between the involved parties (Nonaka 1994).

The construct *knowledge creation* refers to the result of knowledge creation in the focal relationship. The first dimension encompasses new products that are developed in the relationship. The rate of new-product development has often been used as an indicator of the creation of new knowledge (Cohen and Levinthal 1990). The second dimension of the construct involves the new routines that are

developed in the relationship. The development of new routines indicates the creation of new knowledge about procedures, which implies an ability to respond to the business environment (Nelson and Winter 1982).

### LISREL Analysis

This study used LISREL statistical package to process data. Structural equation modeling, such as with LISREL, is a statistical technique used to study direct and indirect relationships between one or more independent variables and one or more dependent variables. A distinctive strength of LISREL-based models is the inclusion of latent variables, making possible the measurement of abstract concepts that are not measurable directly. These latent variables are higher-order constructs representing commonalities of a set of indicators. Such latent variables are interpreted as theoretical constructs. The formation of constructs and models, as well as error covariance and correlations, constitutes the fundamental dimensions of the LISREL method. The creation of constructs and models can be described as the structural dimension, whereas error covariance and correlation can be comprehended as the causal dimension. The LISREL technique is usually applied to research involving confirmatory analysis. This method thus requires that a researcher anchor a model in theory, a requirement taken into consideration as the research group developed their questionnaire based on an elaborate theoretical framework.

Interpretation of the valid structural model should take into consideration that each relation is part of a broader context constituted by the model. Such interpretation should take into account not only direct but also indirect effects. One example is a causal chain where construct *a* causes construct *b*, and *b* causes *c*. In this chain, *a* has an effect on *b*, and *b* has an effect on *c*. Furthermore,

*a* has an indirect effect on *c*, mediated by *b*. An analysis that omits the indirect effect mediated by *b* will suffer from inadequacies because it will not reveal the total effect (Bollen 1989), with the implication that the relationships cannot be analyzed piece by piece; all constructs must be evaluated within the framework of the entire model.

The validity of LISREL models is measured with regard to both the validity of the entire model (nomological validity) and the specific relationships within the model. Because the model is constituted by various constructs, its validity may be estimated by measuring the degree of separation between constructs (discriminant validity), as well as the degree of homogeneity of these constructs (convergent validity). Convergent validity is confirmed if the indicators load only on the constructs to which they belong. Evaluation of convergent validity is carried out by analysis of *t*-values (significance), *R*<sup>2</sup>-values (linearity), and factor loadings (correlation). As recommended by Hair et al. (1995), convergent validity is supported by checking for construct reliability and variance extracted. The constructs (displayed in Table 1) show acceptable convergent validity, as all *R*<sup>2</sup>-values are above 0.19 and all *t*-values are above 3.62. There are, however, two observations where variance extracted is short of the recommended 0.5 level (0.42 and 0.41), as well as two observations in which construct reliability is short of the 0.7 level (0.68 and 0.57) (Hair et al. 1995). However, considering that those numbers represent relatively minor deviations from statistical convention and that the constructs are theoretically sound, it is not considered statistically or theoretically justified to add indicators to the constructs for the sake of explaining a larger portion of the variance. Further, a basic requirement for confirmation of discriminant validity is that the correlation between constructs should be significant but not equal to 1, which



**Table 1**  
**The Constructs and Their Indicators**

| Indicator   | Factor Loading | t-Value | R <sup>2</sup> -Value | CR   | VE   |
|---|----------------|---------|-----------------------|------|------|
| <b>Dependence on supplier network knowledge</b>   |                |         |                       |      |      |
| To what extent is the (selected) business relationship dependent on your experience of local market suppliers' knowledge?   | 0.67           | 8.25    | 0.45                  | 0.73 | 0.58 |
| To what extent is the (selected) business relationship dependent on your experience of knowledge from local suppliers of complementary products?                      | 0.84           | 9.84    | 0.71                  |      |      |
| <b>Dependence on customer network knowledge</b>   |                |         |                       |      |      |
| To what extent is the (selected) business relationship dependent on your experience of local market customers' knowledge?   | 0.83           | 10.87   | 0.68                  | 0.68 | 0.62 |
| To what extent is the (selected) business relationship dependent on your experience of knowledge from local customers' customers?                                     | 0.75           | 9.99    | 57                    |      |      |
| <b>Knowledge combination</b>  |                |         |                       |      |      |
| The (selected) business partner is a source of knowledge. (seven-point Likert scale, 1 = not at all; 7 = completely)  | 0.79           | 7.24    | 0.62                  |      |      |
| The relationship with the (selected) business partner is characterized by mutual adjustments. (seven-point Likert scale, 1 = not at all; 7 = completely)              | 0.60           | N.A.    | 0.36                  | 0.74 | 0.42 |
| The relationship with the (selected) business partner is characterized by a general exchange of knowledge. (seven-point Likert scale, 1 = not at all; 7 = completely) | 0.75           | 7.13    | 0.56                  |      |      |
| In the (selected) business relationship, how familiar is the business partner's knowledge to the firm?  | 0.44           | 4.90    | 0.19                  |      |      |
| <b>Knowledge creation</b>   |                |         |                       |      |      |
| The (selected) business relationship has resulted in new products. (seven-point Likert scale, 1 = not at all; 7 = completely)   | 0.48           | N.A.    | 0.23                  | 0.57 | 0.41 |
| The (selected) business relationship has resulted in new routines. (seven-point Likert scale, 1 = not at all; 7 = completely)   | 0.77           | 3.62    | 0.60                  |      |      |

CR, construct reliability; N.A., not applicable; VE, variance extracted.

**Table 2**  
**The Results of the Structural Models**

| The Structural Model  |                |         |
|---|----------------|---------|
| Paths   | Factor Loading | t-Value |
| Knowledge combination<br>→ Knowledge creation                       | 0.60*          | 3.35*   |
| Dependence on customer network knowledge<br>→ Knowledge combination | 0.38*          | 2.74*   |
| Dependence on supplier network knowledge<br>→ Knowledge combination | 0.01           | 0.08    |

$\chi^2 = 38.07.$

$df = 31.$

GFI = 0.96.

RMSEA = 0.035.

CFI = 0.99.

$p$ -value = .1786.

CFI, comparative fit index; GFI, goodness of fit index; RMSEA, root mean square error of approximation.

\*Denotes significance at the .05 level.

would suggest multicollinearity (Jöreskog and Sörbom 1993). All constructs seem sound in this respect. A further check for multicollinearity among constructs (to ensure discriminant validity) was conducted through a confirmatory factor analysis where all construct were tested in a measurement model (where the constructs were not allowed to correlate). The test indicates that the constructs are valid as the fit between the constructs, and the model is good ( $\chi^2 = 37.73$ ; degrees of freedom [ $df$ ] = 29; comparative fit index [CFI] = 0.99), and the measurement model is statistically significant ( $p = .128$ ). Hence, based on the confirmatory factor analysis, multicollinearity does not appear to be a problem when studying the constructs.

The overall fit of the subsequent structural model was checked by using chi-square ( $\chi^2$ ), degrees of freedom ( $df$ ), and a probability estimate ( $p$ -value). There

is ongoing debate about appropriate measures to use for assessment of nomological validity (Bollen and Long 1993). Three frequently used measures are goodness of fit, which checks for sample size effects and should be above .90; root mean square error of approximation, which measures population discrepancy per  $df$  and should be below 0.08; and CFI, which checks for nonnormal distributions. CFI close to 1 indicates a good fit, and values above 0.90 indicate an acceptable fit (Murtha, Lenway, and Bagozzi 1998; Jöreskog and Sörbom 1993). As displayed in Table 2, the model seems to be statistically valid as it meets all of these requirements.

#### Control Variables

Further, using three control variables that were tested on different groups, this study investigated whether there were differences between firms. Group analy-

sis in LISREL is carried out by setting the construct relations, indicator relations, and error covariance to be equal in all groups (Jöreskog and Sörbom 1993, p. 53). If the key statistics are not valid, then there is a difference between the groups. The control variables we chose to perform a group analysis on the sample were as follows:

- Knowledge intensity
- Firm size
- Foreign market's share of total sales

Knowledge intensity can be defined as the extent to which a firm depends on knowledge inherent in its activities and outputs as a source of competitive advantage (Autio, Sapienza, and Almeida 2000). This control variable was chosen by considering the critical importance of knowledge in this particular study. Knowledge intensity can be measured by using patents as a proxy (Singh 2007; Coff 2003). In this study, we created two groups: one consisting of firms that own patents and the other consisting of firms that do not. Firm size is estimated by the number of employees. Firms were divided into one group of small firms (6–50 employees) and one group of middle-sized firms (51–250 employees).<sup>1</sup> To use the variable foreign market's share of total sales, we split the sample into two different groups, one consisting of firms that make 20 percent or more of their total sales to the selected foreign market, and the other consisting of firms that make less than 20 percent of their total sales to the selected market.

## **Results**

The results of the structural model (see Table 2) show that knowledge com-

bination has a positive effect on knowledge creation, thus confirming H1. Hence, this finding supports the main argument of this study, indicating that knowledge combination underlies knowledge creation of the studied international entrepreneurial firms.

H2 is confirmed, which reveals that dependence on customer network knowledge has a positive effect on knowledge combination. This specific finding should be of interest for scholars in international entrepreneurship as it indicates that an orientation toward customers, as well as customer knowledge, spurs knowledge-creating processes.

H3 is rejected. The models, thus, do not reveal any significant relationship between the constructs dependence on supplier network knowledge and knowledge combination. An explanation for this somewhat surprising result may be given by assumption that entrepreneurial firms not to any great extent are involved in partnerships with suppliers on the specific studied markets. For instance, suppliers may instead reside in other international markets (or in the domestic markets) of the studied firms.

The results of the group analysis involving the control variables of size and foreign market's share of total sales reveal no differences between groups. However, the group analysis that is based on the control variable knowledge intensity shows differences between groups: The structural model containing firms without patents is not validated by key statistics although valid in the group comprising firms that have patents. An obvious reason may be that firms that are less knowledge intensive will have fewer incentives and options for combining and creating knowledge.

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<sup>1</sup>The distinction between SMEs is based on data from the Organisation for Economic Cooperation and Development in its report *OECD Small and Medium Enterprise Outlook, 2002* (Paris: OECD, December 2002).

## ***Conclusion***

First, this article investigated the effect of knowledge combination on knowledge creation in the context of international entrepreneurial firms. The purpose of studying this relationship was to contribute to the knowledge paradigm in international entrepreneurship by enhancing the understanding of the processes that underlie knowledge creation in foreign markets. In line with the theoretically deduced assumptions of this article, the findings from the structural model offer strong indications that knowledge combination is a central activity enabling knowledge creation in foreign markets. The results suggest that the processes by which international entrepreneurial firms create knowledge for business purposes are dynamic. Hence, in order to create knowledge for the purposes of developing procedures and product offerings, firms must constantly renew knowledge by combining it in new ways.

Second, the article studied the roles of both the foreign supplier network and the foreign customer network in the process of knowledge combination. Specifically, it investigated how dependence on supplier network knowledge and customer network knowledge affects the knowledge combination construct. The structural model reveals several interesting findings by showing that dependence on customer network knowledge has a positive effect on knowledge combination. Within the contextual realm of the model, this finding indicates that firms consider knowledge from the customer network to be valuable when exploiting new combinations of knowledge. However, the findings reject the hypothesis that dependence on supplier network knowledge has a positive effect on knowledge combination. This result indicates that knowledge from the supplier network is not involved to any significant extent, in a direct sense, in the

process of knowledge combination in this specific context. This result can be explained by the fact that entrepreneurial firms generally pursue global sale strategies where they are involved in customer relationships in numerous foreign markets, whereas they only partake in supplier relationships in a few of these markets. Hence, the local foreign-market perspective of this study appears to be somewhat constraining when studying the effect of dependence on supplier network knowledge. Nonetheless, within the realm of the local foreign market, the findings indicate that customer network knowledge input is more important than supplier network knowledge input. This result should be considered in the light that the impact of supplier/customer network knowledge input from a broader scope of networks (e.g., including international networks and domestic networks) is yet to be further explored.

Although more relevant in consideration of the customer network than the supplier network, it can be concluded that network knowledge has a positive effect on knowledge combination. Hence, the network can serve as a powerful and dynamic structure in providing input to processes of knowledge creation. This finding introduces a new perspective on the possibilities that are available to international entrepreneurial firms. They may not need to internalize knowledge by ownership as long as they can create it through combinations between themselves and external entities. It is recommended that future research address the questions that arise about processes involving knowledge combination and knowledge creation in foreign-market networks of international entrepreneurs. An interesting issue to investigate is the cost (relative to performance) of creating knowledge in external networks rather than in a firm's internal network. Other issues concern the performance of new technologies in narrowing spatial and psychological

gaps between internationally dispersed entities, thus supporting coordination, acquisition, and creation of knowledge in the network.

The results of this analysis have implications for managers to consider. Combining knowledge in relationships not only between firms but also in the network implies that a firm has to participate actively in several business relationships simultaneously in iterative processes. By doing so, firms may be able to ensure that customer network knowledge, supplier network knowledge, and internal knowledge are compatible. A supply-chain perspective will not serve a firm's best interests, as it allows for only a sequential ordering in an environment that demands reciprocal relationships involving all knowledge-creating participants. Human interaction is an important mechanism in these processes because it enables knowledge from all contributors to be acquired and coordinated—and thus combined to serve a business purpose. Combining knowledge between and across business entities implies that firms may need to work in project groups where representatives from different firms in the network can meet and communicate about their business operations and visions. Sophisticated information tools and communication tools, such as intranets, may also be helpful because they can provide an interface that has qualitative similarities to personal interaction. In summary, knowledge combination in networks is bound to evolve as a managerial skill that has major potential to cut costs in the internal organization and allow for greater specialization on core competencies because a larger amount of knowledge can be leveraged through external entities.

Finally, as limitations of the analysis, it should be noted that the information collected for this study focused solely on one specific actor in the network. To what extent the counterparts of the investi-

gated firms would have had answers similar to our collected data is unknown. Additional insights could come from future studies that use network data sets and comparative approaches. Furthermore, judging from the results of the group analysis using the variable of knowledge intensity, the external validity of this study is limited to firms involved in knowledge-intense operations. Also, because our data were collected at one point in time, the temporal aspects of the model are captured only in the recollections of the respondents. Moreover, the study has broadly distinguished between the supplier network and the customer network in an attempt to capture a wide scope of a local-market supply chain. However, a firm is likely to also be faced by other facets of foreign-market networks that influence business activities, for example, institutional networks comprising government, authorities, and universities.

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