



BI Norwegian Business School - campus Oslo

# GRA 19502

Master Thesis

Component of continuous assessment: Thesis Master of Science

Knowledge Sources and SME Internationalization

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Start: 02.03.2017 09.00

Finish: 01.09.2017 12.00

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Master Thesis

# -Knowledge Sources and SME Internationalization-

Hand-in date:  
01.09.2017

Campus:  
BI Oslo

Examination code and name:  
GRA 19502 Master Thesis

Programme:  
Master of Science in Business, Major in Strategy & Major in International Business

*"This thesis is a part of the MSc programme at BI Norwegian Business School. The school takes no responsibility for the methods used, results found and conclusions drawn."*

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## **Acknowledgements**

We would like to acknowledge some individuals who greatly helped us accomplish this thesis and who provided guidance and support. First of all, we would like to thank our supervisor, Gabriel R. G. Benito, who provided critical guidance that always gave us the confidence to move forward throughout the challenging thesis process. We would also like to thank Linda Rademaker for her helpful comments regarding our topic and early guidance on the project. We thank Oslo Business Region, the Quebec Technology Association and others for their interest in our topic. Finally, we would like to thank our parents, who had a lot of patience and lent a great amount of support throughout the thesis process.

## **Abstract**

Our thesis focuses on the knowledge that small and medium firms need to internationalize. Our study reviews relevant literature on internationalization and combines several theoretical lenses to take an integrated approach to analyzing how knowledge sources are relevant to SME internationalization. This includes ideas from the knowledge-based view, network theory, theory of international new ventures, upper echelon theory, and organizational learning theory. Thus, our approach is a broader, and high level discussion of how knowledge sources relate to internationalization.

Through a mixed-method approach using exploratory surveys and interviews, our analysis helped us create a greater understanding of the knowledge sources involved in knowledge-intensive, high-tech, SME internationalization and resulted in the identification of several key knowledge sources that are thought to be associated with a higher international performance. Customers, international partnerships, prior management and employee international knowledge and experience, and government resources, such as export agencies/consultants, are identified as the most important knowledge sources to consider. It is proposed that optimal combinations of knowledge resources, built using these sources, can enhance firm capabilities, leading SMEs to greater levels of internationalization.

## **Introduction**

### ***Background***

For countries like Canada and Norway, which have relatively small domestic markets, substantial economic growth opportunities exist in the international environment. Most countries only have a small number of highly successful multinational enterprises (MNEs) and have economies composed of many small and medium enterprises (SMEs) that are an engine of growth. Although traditionally the domain of very large resource-rich companies, international markets are becoming more and more accessible by SMEs. Thus, for many countries that participate in international business, the international success of their small and medium enterprises is of increasing economic importance in a globalizing world. Therefore, there is also a rising need to understand best practices for internationalization.

As barriers to international business continue to drop, in our highly-connected world, smaller countries need to be globally competitive. For countries like Canada and Norway, there is a strong need to diversify the economy to compete in the industries of the future. They are faced with finite natural resources which are, of course, commodities. The question is then, how can these countries promote the international competitiveness of their knowledge-based small and medium enterprises? How can young firms learn to successfully venture out into foreign markets?

In our increasingly knowledge-based societies, we now commonly see that those who have the most significant knowledge assets can compete most effectively, and the saying runs true that knowledge is power. Therefore, this thesis aims to investigate how young technology firms can get the knowledge that they need to internationalize and compete in global markets. Using the knowledge-based view of strategic management, we aim to examine how small, medium, and start-up firms use knowledge sources that are related to their ability to internationalize.

A recent OECD study found that limited firm resources and a lack of managerial knowledge about internationalization are still constraints to SME



internationalization (OCED, 2009). The report also argues that SMEs' stock of knowledge resources and quest to leverage knowledge assets residing in external actors push and pull them into international markets. External environmental factors such as network, sector and region-of-origin factors seem to stimulate their internationalization. Per this report, several countries have support programs that seek to redress internationalization barriers, as well as respond to the top drivers and motivations for SME internationalization.

Finally, the report calls for further empirical research, employing a questionnaire survey and case study approach to provide deeper insights into the challenges facing the international SME. This served as the inspiration for our interest in discovering more about how firms source managerial knowledge related to internationalization from their external environment, and supports the relevance of our study.

International business has been previously dominated by large multinational enterprises (MNEs), but globalization and advances in technology are enabling a growing presence of the SME in international business (Knight & Kim, 2009). In contrast to large MNEs, SMEs don't have substantial financial and tangible resources. Therefore, they face greater complexity in internationalizing and must have unique advantages relative to larger firms (Knight & Kim, 2009). Internationalization can be thought of here as the geographical expansion of economic activities over a national country's border (Ruzzier, Hisrich, & Antoncic, 2006) or the process of increasing involvement in international operations (Welch & Luostarinen, 1988).

The internationalization of SMEs has been analyzed using theories from the resource-based view, knowledge-based view, network theory, and upper echelon theory. However, few studies have attempted to integrate these different ideas in one framework, which is surprising given that they all have been argued to explain the firm's internationalization (Fernhaber, McDougall-Covin, & Shepherd, 2009; Fletcher & Harris, 2012). Therefore, in our study, we will attempt to integrate elements from different theories that have been used to explain the relationship between knowledge in SMEs and international performance.

### ***Research objectives***

In our research, we will not consider the complex process of knowledge integration and transformation within the firm, but rather take a more macro perspective, acknowledging that this knowledge transformation process occurs and has inputs and outputs. We are more interested in the inflows of knowledge to these firms, and how the nature of those inflows affects the internationalization process of the firm. We assume that successful firms have created a competitive advantage with their knowledge, consistent with theory under the knowledge based view. Our topic is more concerned with studying what internal and external sources of knowledge are used by small firms for their internationalization, and how useful those firms perceive these knowledge sources to be.

Based on the literature surrounding international new ventures and the knowledge-based view, we expect that knowledge sources in the firm's external environment play an important part in the firm's internationalization and that knowledge is accumulated and integrated by the firm's members. We believe that knowledge about the way that small firms get knowledge from identifiable knowledge sources, and evaluating how useful they are in helping these firms internationalize, is valuable to managers of firms that intend to internationalize. It may also be useful to policy makers as they design and implement policies to assist SMEs in their internationalization.

Of course, many other factors are relevant to the internationalization of small firms, but we want to focus on the importance and influence of knowledge factors as drivers of internationalization. It is also of interest to ask these types of firms if knowledge sources have contributed to the creation of firm specific advantages and to the international performance of these firms.

In our study, we focus on firms from Canada and Norway, and knowledge sources such as government programs and resources, consultants, alliances, partners, institutions as well as other relevant sources of knowledge. We directly asked firm managers what their use of and benefit from knowledge sources was through questionnaires and in-depth case studies, and developed a conceptual framework on how internal and external knowledge sources relate to the degree of

internationalization. A majority of empirical studies have a single-country orientation rather than comparing behaviour across countries; and it is argued that multi-country studies can provide additional dimensionality to understandings of internationalization (De Clercq, Sapienza, Yavuz, & Zhou, 2012).

Although there are large volumes of research on international SMEs, this body of knowledge remains somewhat fragmented and lacks a cohesive theoretical framework (Gassmann & Keupp, 2007). Therefore, we are still limited in our understanding of how SMEs gain an international presence, and the elements of their international competitive advantage (Gassmann & Keupp, 2007). We aim to contribute to the research on SME internationalization by conceptualizing a framework of the use of different knowledge sources, and showing how this affects international performance.

### ***Research questions***

This thesis attempts to answer the following two questions: *Where do SMEs get the knowledge that they need to internationalize, and how do these knowledge sources influence their extent of internationalization?*

The thesis is structured as follows; first, we review some of the relevant literature regarding the knowledge based view, relevant internationalization theories, knowledge in SME internationalization research, and relevant findings regarding how different knowledge sources impact SME internationalization. Next, we explain our theoretical approach and describe the chosen research methods. Following this, we present the results of our survey analysis and interview analysis. We finish with a discussion, conclusion and suggestions for further research.

## **Review of the literature**

### ***Knowledge-based view of strategic management***

The knowledge-based view of strategic management is grounded in the resource-based view (Barney, 1991), which suggests that organizational knowledge is a key source of competitive advantage. Furthermore, the knowledge based view assumes that the critical input in production and the primary source of value is knowledge

(Grant, 1996). Grant (1996) suggests that firms exist as institutions for producing goods and services because they can create conditions under which multiple individuals can integrate their specialist knowledge. Furthermore, it is suggested that organizations only learn by tapping the learning of their members, or by ingesting new members who have new knowledge. Decarolis and Deeds (1999) reiterate that knowledge is the most strategically important of the firm's resources, that heterogeneous knowledge bases and capabilities among firms are the main determinants of performance differences, and that firms have differential access to external knowledge.

The resource-based view, or RBV, (Barney, 1991), argues that the nature of the firm's strategic resources can determine a firm's sustainable competitive advantage. According to the RBV, performance differences between firms can be explained by measuring the value, rareness, inimitability, and substitutability of a firm's resources. However, a common criticism of the RBV is that it assumes resources are relatively static, especially when considering rapidly changing environments. The knowledge-based view is a more dynamic extension of the RBV, because we know that knowledge is continuously developed and shaped by the members of the firm and interaction with their environments (Nonaka, Toyama, & Nagata, 2000).

Knowledge is also a primary input in the creation of organizational capabilities. Grant (1996, p. 116) defines an organizational capability as an "outcome of knowledge integration: complex, team-based productive activities...dependent upon [a] firms' ability to harness and integrate the knowledge of many individual specialists." This is linked to a firm's competitive advantage, as it is proposed to depend upon the firm's mechanisms of knowledge integration. Grant (1996) also highlights a few key aspects of how knowledge relates to competitive advantage. Firstly, the more common knowledge that exists among the team (language, shared meanings, absorptive capacity), the more efficient integration is likely to be. Sustainability of competitive advantage will also depend on the inimitability of the capabilities that underlie the advantage. A key point that Grant (1996) makes, and that we apply in our study, is that a broader scope of knowledge integrated in a capability should make it less imitable, and therefore more of a competitive advantage. Lastly, like many other researchers, we expect that the concept of

absorptive capacity affects the ability of individuals in our study to recognize and absorb new knowledge. Absorptive capacity (Cohen and Levinthal 1990) is the capability to recognize, assimilate, and apply information to use (Kuivalainen, Puimalainen, Sintonen, & Kyläheiko, 2010). Furthermore, absorptive capacity is largely influenced by one's background, experience, and education.

Knowledge has also been directly linked to the process of innovation. Nonaka et al. (2000, p. 1) argue that knowledge and skills give firms a competitive advantage because "it is through this set of knowledge and skills that a firm is able to innovate new products/processes/services, or improve the existing ones more efficiently and/or effectively." They also argue that the purpose of the firm is to continuously create knowledge.

In our thesis, we adopt the view that knowledge is strategically the most important resource of the firm; that it is acquired, held, and transferred by individuals; and that an organization can gain a sustainable competitive advantage through its knowledge integration mechanisms. Also, we consider that organizational capabilities are formed as outcomes of the knowledge integration process. Following Nonaka et al. (2000, p. 2) we define knowledge as "a dynamic human process of justifying personal belief towards the truth" and see knowledge as context-specific, relational, dynamic, and humanistic. Thus, our thesis focuses on understanding individuals' thoughts and actions, as the theory of organizational knowledge is based on the nature of human beings, and the complex nature of human interactions (Nonaka et al., 2000).

Finally, it is widely considered that there are two main types of knowledge: tacit, and explicit (Nonaka et al., 2000). Tacit knowledge is gained through experience and is path-dependent, whereas explicit knowledge is codifiable and can be easily transferred between individuals. Explicit knowledge can also be thought of as easy to transfer "information" (Kuivalainen et al., 2010). Following prior theory, we assume that tacit forms of knowledge will be more associated with a firm's competitive advantage, and ergo its performance. Explicit forms of knowledge are still expected to contribute to a firm's advantages, but to a lesser degree than tacit knowledge. Following this logic, we expect that knowledge learned through

experience will be more important in explaining a firm's performance than knowledge gained more explicitly.

### *Theories of internationalization*

Three theories have stood out as major explanations of the internationalization behaviour of firms. The Eclectic Paradigm, Uppsala model, and international new venture theories have been used in past decades to suggest why firms undertake international activities, and explain differences between international firms. The Eclectic Paradigm and Uppsala model have mostly been applied to large MNEs, and the lack of a theory to explain the phenomenon of rapidly internationalizing firms led to the development and rise of international new venture theory. International new venture theory is particularly relevant to our thesis, as it deals with internationalizing firms that have fewer resources to begin with, and that use unique strategies to gain an international presence.

#### *Eclectic Paradigm*

The Eclectic Paradigm (Dunning, 1980) is a core concept in the field of international business strategy. It is a further development of internalisation theory, and aims to explain why firms undertake foreign activities. Per the paradigm, firms will internationalize if they possess a level of ownership, location, and internalisation advantages (termed OLI advantages). Firms that possess ownership advantages (O advantages), or firm specific advantages (FSAs), can exploit them internationally as these are not easily imitated by other firms in the international environment. The greater the competitive O advantages, the higher the likelihood that the firm will engage in foreign direct investment (FDI) to exploit these advantages internationally. Firms that find location advantages (L advantages), in addition to ownership advantages, benefit from cost or differentiation advantages from operating in a specific geography, and are more likely to invest in foreign production or activities in particular regions. Factors of production are heterogeneous across regions, and therefore there can be certain advantages associated with individual regions. Finally, those firms that also have internalisation advantages (I advantages) can achieve greater value by directly owning and managing their foreign assets/activities, and are therefore proposed to be the most likely to perform FDI. This is because they can produce more value by organizing

the activities themselves, rather than licencing out their operations, since the activities are unique and specific to the capabilities and/or nature of that firm. If one breaks down the theoretical base of the Eclectic Paradigm, it mainly relies on the concepts of competitive advantages (FSAs), transaction cost economics (internalisation), and location-based advantages to explain the level of international commitment and international strategy of firms (Dunning, 2000). Market failure causes firms to engage in international production, and differential factor endowments as well as modes for transacting products across national boundaries affect the location and structuring of foreign operations (Dunning, 1988). Dunning incorporates these ideas into the eclectic paradigm to create a general paradigm for international business. He created the OLI framework as a collection of sub-paradigms, and it is intended to be used as an over-arching paradigm, that can be used to address a broad spectrum of research questions. Therefore, the way that the OLI framework is applied is context-dependent and differs among researchers (Eden & Dai, 2010).

Dunning has revisited and updated the eclectic paradigm several times since the 1980s. In 1995, Dunning acknowledged that the eclectic paradigm must be modified to account for the role of innovation in sustaining and upgrading the competitive advantages of firms; that firms may engage in FDI and alliances to learn about foreign technology and markets; and to acknowledge the importance of networks and collaborative agreements in increasing a firm's competitive advantage. He also reaffirmed the usefulness of internalisation theory as an analysis tool, as long as it is extended to incorporate the dynamic learning activities of firms (Dunning, 1995).

The parameters of the OLI framework are contextual for firms, in that firms from different countries, different industries and that have different strategies, will have differing configurations regarding the OLI variables. Following this, there are four main reasons why firms perform FDI. The first is *market seeking* FDI, which is a strategy designed to pursue a particular foreign market. *Resource seeking* FDI is designed to gain access to natural resources. *Efficiency seeking* FDI has the goal of creating a more efficient division of labour or creating specialization of assets, and this strategy usually follows either of the first two strategies. Finally, *strategic asset*

*seeking* FDI is designed to protect or augment the existing O advantages of the firm or to reduce those of their competitors (Dunning, 2000).

Since SMEs rarely initially have the resources to perform FDI, or to set up foreign assets and operations, we expect that they must rely more on O advantages for their initial internationalization process. They must possess advantages which allow them to compete across borders, and to overcome liabilities of foreignness and newness. Many SMEs now take advantage of internet technologies and alternative ways of organizing business relationships, such as through partnerships, to perform international business without having to make large investments of capital. We expect that high-tech, knowledge-based firms, are mainly market seeking, and if they perform FDI, it is probably to take advantage of their superior knowledge-based O assets to win in foreign markets. However, since many high-tech SMEs may view the whole world as a potential market, there are likely to be other reasons why SMEs choose certain countries to internationalize to first. For instance, more current OLI frameworks suggest that firms undertake FDI to integrate knowledge assets across regions and across complementary firms, explaining the rise of alliance capitalism, and which can be thought of as a form of *strategic asset seeking* FDI. In this case, being multinational can become an advantage in itself, as firms strengthen their O advantages through capabilities to access, organize, and integrate knowledge intensive assets around the world (Dunning, 2000). However, the eclectic paradigm, with its focus on MNEs and FDI, may not be the best theoretical frame to analyze the international SME. As mentioned, SMEs are less likely to invest large amounts of resources in FDI, such as in setting up international production, or undertaking acquisitions. Regardless the eclectic paradigm is useful as an overall reference and starting point for explanations of international behaviour.

### *Uppsala Model*

One of the seminal contributions to international business research was that of Johanson and Vahlne (1977), who created a model of the internationalization process of the firm, commonly called the Uppsala model. Johanson and Vahlne (1977) argued that market knowledge is an essential component of firm internationalization and that it is gradually acquired, integrated and used over time.



They proposed that knowledge about foreign markets should grow as the company's commitment to foreign markets increases incrementally. Following this, the key way for firms to get internationalization knowledge is by gradually increasing their involvement in foreign market operations. The model has come under criticism, however, due to the existence of firms that can rapidly internationalize, without taking the gradual knowledge building approach. This phenomenon gave rise to studies on born global firms and international new ventures, explored in the next section.

In 2009, Johanson and Vahlne revisited their 1977 internationalization model to update it based on network theory; adopting the view that internationalization is based on reciprocal relationships. They describe building relationships as an informal process, and argue that they take a long time to develop, especially if greater psychic distance is involved. It is argued that networks extend the knowledge base of the firm and that knowledge creation is an outcome of the interaction between producers, users and partners. Furthermore, insidership to a relevant network is a necessary but insufficient condition for successful business development. Per their new model, internationalization is undertaken to strengthen the firm's position in a business network, and networks serve as a catalyst to identifying and exploiting opportunities. Therefore, networks influence the firm's choice of geography and entry mode. Opportunities then, discovered through networks, are argued to be the main driver of internationalization (Johanson & Vahlne, 2009).

#### *International new venture theory*

There has been a lot of interest the past couple of decades in the phenomenon of early internationalization of firms at or near their founding. This concept has been referred to as "born global" (Knight & Cavusgil, 2004; Rennie, 1993), "international new venture (INV)" (Oviatt & McDougall, 1994), or "international entrepreneurship" (Oviatt & McDougall, 2005). Theory surrounding this phenomenon is a bit fragmented and various definitions have been proposed over the years, however, it mainly deals with the rapid internationalization of new and small firms, in contrast to the traditional, stage based, internationalization model (Johanson & Vahlne, 1977). The literature has acknowledged that these firms

typically have few tangible resources to begin with, and therefore must leverage other forms of resources to successfully internationalize and compete in international markets. These new ventures also need to overcome constraints related to newness and smallness in order to internationalize (Knight, Madsen, & Servais, 2004).

The international entrepreneurship literature has highlighted the importance of international knowledge as a key intangible resource leading to internationalization (Fernhaber et al., 2009). The importance of knowledge and learning in the internationalization of firms is well researched, and INV research identifies knowledge accumulation and learning as key influences for the internationalization of small firms (Fletcher & Harris, 2012). Gassmann and Keupp (2007) refine the definition of born globals, arguing that they can be considered business organizations that, from or near their founding, seek superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries. They also believe that the knowledge-based view is especially suitable as a conceptual foundation for the analysis of these types of firms. Following this, we elected to focus on how SMEs source the knowledge that they need for internationalization, since it is considered such an important aspect for the success of small firms.

It is important to clarify our definition of international new ventures for our thesis. Different definitions have been proposed over the years: Oviatt and McDougall (1994, p. 49) defined international new ventures as “business organisations that, from inception, seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries.” Knight and Cavusgil (2004, p. 124) defined born global firms as “business organisations that, from or near their founding, seek superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries”; i.e. at least 25% foreign sales within three years of founding. Crick (2009) differentiates between born globals and international new ventures (INVs), suggesting that the latter expand more regionally in scope, whereas the former are more truly global in scope. To be truly global, Ohmae (1985) suggests that the firm needs to be present in the “Triad” markets of North America, Europe and the Pacific Rim. Finally,

Oviatt and McDougall (2005, p. 540) defines international entrepreneurship as “the discovery, enactment, evaluation and exploitation of opportunities—across national borders—to create future goods and services.” For the purposes of our thesis, we define international new ventures as small or medium enterprises less than six years old (common range in the literature for INVs) that have initiated international sales or have international business activity. Although we sampled firms of different ages and levels of international activity, our sample does contain many firms that can be considered INVs by this definition.

### ***Knowledge and SME internationalization***

Knowledge has been argued to play an especially important role in the internationalization of small and medium firms, due to the general lack of tangible resources available to these types of firms. SMEs are viewed as having fewer resources to internationalize than their larger counterparts, and therefore it is believed that the resources they must rely on to internationalize are knowledge-based and of a tacit nature (Fernhaber et al., 2009; Kuivalainen et al., 2010). Following Kuivalainen et al. (2010), we consider that the competitive advantage of the knowledge-intensive firm, and hence, the basic motive behind internationalization is based on knowledge-related organizational resources and capabilities. Moreover, it is suggested that the presence of certain types of resources and capabilities can trigger the internationalization of the firm or change its pattern.

Companies that have a high reliance on knowledge assets can be said to have a high knowledge intensity, and managing these assets should be a key component of the company’s strategy. Autio, Sapienza, and Almeida (2000, p. 913) define knowledge intensity as the extent to which a firm depends on the knowledge inherent in its activities and outputs as a source of competitive advantage.” For example, a firm’s R&D investment is often seen as an indicator of the level of knowledge intensity. Information, communication and technology firms or ICT for short, can be said to have a high knowledge intensity, and therefore we selected this industry as our main industry of interest in this study. Knowledge is likely to be of critical importance to these types of firms, and therefore they are particularly relevant to studies using the knowledge-based view (Kuivalainen et al., 2010).

There are a multitude of studies on the internationalization of SMEs, however they don't have clear interconnections or an overarching theoretical base. Many of the articles relevant to our topic appear to focus on either upper echelon theory, network theory, the resource-based view, or the knowledge-based view. The articles identify different sources and types of knowledge related to the internationalization process for smaller firms.

### ***Knowledge types and sources relevant to SME internationalization***

As indicated, knowledge variables are an important determinant of international performance for small firms, but which knowledge assets are essential for superior international performance? Are more knowledge assets always better than fewer, or are there optimal combinations? Of course, doing quantitative studies on knowledge assets is problematic because these assets are difficult to define and measure, and, although some may be capable of codification, others are tacit and complex to understand (Denicolai, Zucchella, & Strange, 2014). However, the knowledge-based view generally argues that the greater the knowledge resources of the firm, the better its performance should be. Therefore, it stands to reason that if we can differentiate between the levels and types of knowledge in firms, we should be able to make assumptions about performance differences. For instance, Åkerman (2015) argued that the more active a firm is in using the multitude of available sources of knowledge, the better the firm's ability to grow on international markets. This implies that having more knowledge inputs from diverse sources could potentially impact the firm's performance positively. Although, this is not necessarily true, as Denicolai et al. (2014) found that more internally generated and externally generated knowledge might not always lead to better international performance. Instead, they suggest that corporate decision-makers need to find the optimal combinations of technological knowledge assets and complementary assets, and of internally generated and externally acquired intangible knowledge assets. So in their opinion, it is not the amount of knowledge that matters, but it is finding the optimal combination of knowledge resources. Finally, they call for an examination of smaller firms from different countries and on a greater number of types of knowledge assets.

It has been proposed that several domains of knowledge are relevant for internationalization, these being market knowledge, technological knowledge, and internationalization knowledge (Denicolai et al., 2014; Fletcher & Harris, 2012). Market knowledge is essentially knowledge about foreign markets and how to conduct business there. Technological knowledge is that related to creating products and services that can be delivered to the international market; and internationalization knowledge is that related to international management know-how, and the ability to coordinate and run international operations (Fletcher & Harris, 2012).

In a similar study to ours, Fletcher and Harris (2012) examine what new knowledge smaller firms need as they learn to internationalize and which specific sources they acquire it from. They argue that internationalization knowledge (which they define as firm specific knowledge concerning how to manage internationally) is critical for a sustainable process of internationalization and that it is most likely to be sourced vicariously from government bodies and specialist consultants, rather than network relationships. They also argue that grafted experience, through recruitment, is more likely to be a source of technological and market knowledge than internationalization knowledge. In another case study, Fletcher, Harris, and Richey (2013) found that their firms got internationalization knowledge from internal experts/direct experience, the internal creation of information systems, external advisors/consultants and external senior recruitment/hires. These studies were some of the first that tried to identify specific sources of knowledge and the types of knowledge received from those sources in SMEs. However, they did not really try to explain how optimal knowledge source combinations could be formed and how the use of certain knowledge sources impacts a firm's international performance. Clearly though, they brought more specificity to how small firms source the necessary knowledge needed to internationalize. It remains unclear how critical each type of knowledge is, how these types interplay to lead to performance, and how these knowledge types are sourced from the internal and external environment of the SME. Although they identified some sources that they argued were most likely to provide certain types of knowledge, this remains to be investigated further, and in different contexts, to build a greater understanding of how knowledge sources, types, and international performance are related.

In another study on how small firms from small domestic markets get knowledge, Haahti, Madupu, Yavas, and Babakus (2005) studied Norwegian and Finnish firms, and found that informal cooperative strategy impacts export performance, moderated by the level of knowledge intensity. SMEs that had a focus on improving their knowledge of export markets demonstrated better export performance, implying that being proactive about gathering knowledge is important. They recommended that to improve export performance, SMEs should consider forming partnerships with other SMEs; and, that public officials should encourage and facilitate cooperation among SMEs. Furthermore, they argue that SMEs should focus on building relationships with foreign partners to increase their knowledge intensity. This supports the idea that networks and partnerships are a critical component of successful internationalization for the SME.

It has been hypothesized that international experience has a positive effect on degree of internationalization (DOI) and international performance (Kuivalainen et al., 2010). This is because SMEs should have superior tacit knowledge about global opportunities and superior capabilities that can be leveraged to possess an international competitive advantage and overcome entry barriers. Measuring the effects of technological, marketing, management, and financial capabilities on DOI and international performance, they found that the only significant result was that greater financial capabilities seemed to be associated with a higher DOI. This led them to suggest that an SME's venture capital partnerships, and capabilities to secure financing are important elements of a firm's ability to internationalize. This is an interesting result, since venture capital backed by internationalization knowledge is not always readily available in most countries, and the fact that we see enterprises with so few resources internationalizing, makes this result sound incomplete. How would one then differentiate between firms that have secured equal financing? Knowledge-based capabilities are likely to be involved in performance differences and access to finance seems like a necessary, but too simplistic, explanation for a firm's ability to internationalize.

Supporting the idea that firms need to learn from their external environment, Pellegrino and McNaughton (2015) studied four New Zealand-based INVs, and

found that their focus of learning changed as internationalization increased. In earlier stages, congenital learning (prior knowledge and experience inherited from the founder (Huber, 1991)) was most important, but as the companies internationalized, they relied to a greater extent on experiential, vicarious, searching and noticing learning processes. Their learning shifted from focusing on product knowledge to knowledge about foreign markets and the internationalization process. In later stages, experiential learning increased in importance as well as learning from hiring locals or acquiring foreign companies.

Finally, Knight and Kim (2009) explored the relationship between international business competence (IBC) and international performance. Defining IBC as “the extent to which the SME adopts a bundle of international competences to carry out international business activities in foreign markets in an effective way,” they found that greater IBC seemed to have a positive effect on performance. The level of international business competence was suggested to be related to having an international orientation, international marketing skills, international innovativeness and international market orientation. Having greater competence in these four areas should improve the organization’s IBC, which in turn should enhance an SME’s international performance (in terms of sales growth, market share, profitability, and export intensity). However, it was not explored how these four areas (international orientation, international marketing skills, international innovativeness, and international market orientation) are developed. They suggested that future research should investigate internal and external factors of SMEs that influence IBC. They also conjecture that a firm’s management characteristics could be an important factor for IBC. Therefore, it is possible that a firm’s optimal knowledge resource combination has elements from internal and external sources, and that their competitive advantage relies on how this knowledge is integrated and combined. We need a greater understanding of how international business competence is developed, given that it is proposed to have a positive effect on SME international performance.

## *Internal knowledge sources*

### *Influence of the top management team*

Several articles have argued that ventures whose managers have prior international experience are more likely to internationalize early than those without such experience (Casillas, Moreno, Acedo, Gallego, & Ramos, 2009; De Clercq et al., 2012; Oviatt & McDougall, 2005). In their comprehensive literature review, De Clercq et al. (2012) combined the findings of major theoretical papers regarding knowledge and learning in early internationalization research. They found that vicarious and congenital learning seem to play a central role in both the venture's decision to internationalize early and its subsequent processes. Experiential learning, searching and grafting are more present in studies on the post-entry phases of early internationalization. Also, they suggest that certain knowledge acquisition types are well suited for deep learning, such as experiential and vicarious, whereas other types are better for rapid learning, such as grafting and targeted search. Therefore, it is possible that SMEs gain knowledge in different ways from different sources at different stages of their internationalization.

Nummela, Saarenketo, Paavilainen-Mantymaki, and Puumalainen (2010) also studied the effect of prior experience of the entrepreneurial team on the company's internationalization. They proposed that prior international work experience, prior entrepreneurial experience, and having someone with an international education in the entrepreneurial team should positively affect the company's internationalization. Although their findings were mixed, the logic behind their propositions was sound. Citing major international learning contributions from Autio et al. 2005; Dunning 1981; Stinchcombe 1965; Zaheer 1995; and Johanson and Vahlne 1977, they argued that prior learning and experience should help the entrepreneur overcome the liabilities of foreignness and newness.

Based on upper echelon theory (Hambrick and Mason, 1984), Hsu, Chen, and Cheng (2013) find that there may be a positive relationship between CEOs who are more educated and/or possess greater international experience and better internationalization performance. In support of this, Reuber and Fischer (1997) show that internationally experienced management teams have a greater propensity



to develop foreign strategic partners and to delay less in obtaining foreign sales after start-up, and that these behaviours are associated with a higher degree of internationalization. They also demonstrate that a firm's size and age do not in themselves determine the capacity of the firm for internationalization.

It has also been suggested by INV and international entrepreneurship theorists that founding entrepreneurs and top management teams' prior knowledge, abilities and experience supports the early internationalization of INVs (Oviatt & McDougall, 1995), but these firms also accumulate knowledge from their external environment. Fernhaber et al. (2009) found that international knowledge from external sources, such as a new venture's alliance partners, venture capital firms, and firms in the headquarter location, was positively associated with the new venture's level of internationalization. They also argued that these external sources compensated for lower internal sources of internationalization knowledge.

### ***External network factors***

#### *The formal external network*

When we say formal network, we mean those relationships that can be easily identified and are of a contractual nature, such as alliances, partnerships, and venture capital relationships. These are easily recognized knowledge sources that have been proposed to influence the small firm's learning, knowledge and internationalization. Many studies have investigated the effects of a firm's prior experience and network on its internationalization process (Bell, McNaughton, Young, & Crick, 2003; Casillas et al., 2009; Gassmann & Keupp, 2007). However, some focus more on using network theory to explain the knowledge acquisition of the firm. For instance, it has been argued that different alliance partners possess different resources and that SMEs should form alliances with partners who can provide them with the crucial resources needed in international expansion (Lu & Beamish, 2001). Freeman, Hutchings, Lazaris, and Zyngier (2010) propose that early internationalizing smaller born-global firms develop new knowledge based on developing relational trust, networks, partnerships, and tacit knowledge using their established business and social networks. The extent of the firm's international network is likely to be important, but following the above, it is considered that the specific composition of the firm's network is likely to be an important factor.

Network theory has argued that network ties may be redundant, meaning that you inefficiently get the same knowledge from different network partners. Following this, firms must carefully select partners to avoid redundancy, maximize their legitimacy in the network, as well as minimize being exploited by opportunism (Baum, Calabrese, & Silverman, 2000). Although a detailed explanation of these factors is outside the scope of this thesis, we acknowledge their importance in the building and composition of the firm's network.

In one example, Musteen, Francis, and Datta (2010) found that networks are important to the internationalization process of SMEs. They recommend that SME managers consider the structure and content of their networks, and that they should be mindful of the background and expertise of their international contacts. However, they argue that managers can become over-reliant on personal international ties, and that this can cause them to make erroneous decisions or to place too much weight on the knowledge and opinions of their personal network. Their study indicates that decisions made based on information obtained from such ties may lack the level of quality that is important to success. Finally, their findings also promote the benefits of having geographically diverse networks. According to them, CEOs with such networks have access to a larger pool of vital information and can pursue opportunities that best match their product offering and competitive abilities. Furthermore, they recommend that policy makers facilitate internationalization by organizing specific events (trade fairs, international conventions) where small businesses can develop the needed ties.

In a detailed study on internal and external knowledge sources, Fernhaber and McDougall-Covin (2009) found that venture capital partner reputation and international knowledge serve as a catalyst to new venture internationalization. They argue that intangible resources can be leveraged and vicariously exploited through external partnerships. So, new ventures that are resource constrained can vicariously exploit external resources to achieve larger scale strategies such as internationalization. Per their argument, there appears to be a dual importance of considering both internal and external resources as a bundle. Finally, in further support for the importance of external network factors, Decarolis and Deeds (1999) measure knowledge inflows into the firm for biotechnology firms, and suggest that

knowledge flows may be captured by a firm's geographical location and through alliances.

### *The informal external network*

Clearly, it is thought that external partnerships, alliances, and network connections affect the internationalization process of the firm, but how about knowledge from sources that are not so easily identifiable? Knowledge comes in from all different directions, and some of it may not be easy to trace to one interaction. This we term as the informal external network, and it captures knowledge sources such as the informal personal network of firm managers and employees, knowledge spill-over effects from operating in a particular location, and knowledge gained through the continuing interaction of firm members and the external environment.

For instance, Benito, Solberg, and Welch (1993) found that Norwegian exporters favoured informal contacts as a basis for information gathering in the context of exporting and export-related activities. Norwegian firms identified customers and internal sales people as the most important sources of information, and this information was largely related to market entry and change of foreign agent strategies. This knowledge acquisition is difficult to trace, and the exact nature, form and transfer of knowledge is hard to identify, but at least firms could clearly identify the general sources of such knowledge.

In another example, Yli-Renko, Autio, and Tontti (2002) found a positive and significant relationship between management contacts and foreign market knowledge, suggesting that management can learn about foreign markets through their informal network. They also find a positive and significant relationship between customer involvement and foreign market knowledge. Furthermore, they found that foreign market knowledge is positively related with international sales growth, suggesting an important link between network knowledge and international performance.

Much research has supported the effects of industry clustering on knowledge transfer. In a related example, Fernhaber et al. (2009), alongside alliances, also investigated the effect of firms in the headquarter location on new venture

internationalization. Their findings supported that firms in the headquarter location were positively associated with a venture's level of internationalization; implying that there are some knowledge spill-over benefits present in certain locations, and due to certain surroundings, or a clustering effect.

The presence of local clustering may affect the internationalization process of the firm. Davenport (2005) suggests that new ventures with highly innovative solutions can take two potential growth trajectories. If local intra-sectoral firms exist, the new venture could collaborate with those firms and then that interface would become the key knowledge acquisition mode. Following this, joint exporting initiatives would lead to co-internationalization with other local firms. Conversely, if no local intra-sectoral firms exist, then the new venture can rapidly internationalize, and the international inter-sectoral interface will become the key knowledge acquisition mode. In this second path, the firm will focus on customizing their products and services for international customers.

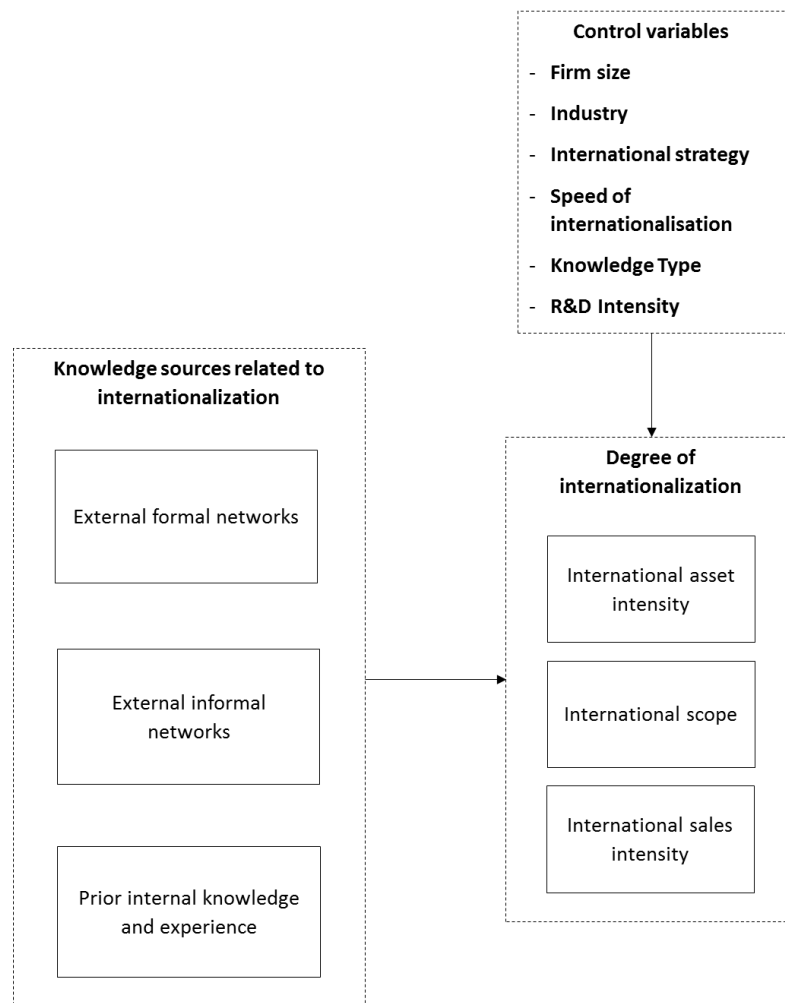
Perhaps the internationalization process of small high tech firms is not so well organized, and follows a more chaotic pattern. Spence (2003) found that Canadian high-tech SMEs may internationalize by an iterative process, driven by opportunities that present themselves in existing networks and serendipitous encounters. Canadian SMEs were found to pick low involvement strategies through direct exporting and via distributors. Evolving towards higher commitment modes seemed to be primarily influenced by external funding. So, regardless of the various knowledge sources that exist, firms may take a more passive or risk-avoiding approach, due to other factors.

### ***Synthesis of prior theoretical concepts***

It is clear from reviewing prior theory on our subject that certain variables stand out as influencers of SME internationalization. These are internal variables, such as the CEO's, founder's, employee's or top management team's prior international knowledge and experience; external formal variables, such as international knowledge gathered from customers, partnerships and alliances; and external informal variables, such as knowledge accumulation from personal network contacts, clusters of firms, or even competitors.

To combine these theories, and research the optimal combinations of internal and external knowledge sources, we began our study with the following preliminary framework to help guide our research. This framework suggests that the more diverse the knowledge sources are, and the more useful they are, should have a direct impact on the extent, or degree, of internationalization of an SME. This line of reasoning is consistent with prior theory and the knowledge-based view. However, we do expect that there are other important variables that affect the degree of internationalization (DOI) of the firm, and that the use and usefulness of knowledge sources may not be directly connected to DOI, but indirectly connected through more intangible variables that are difficult to identify, let alone measure. Therefore, we used this preliminary framework to guide the direction of our study and we principally attempted to create a greater understanding of the link between knowledge sources, and a firm’s degree of internationalization.

**Figure 1: Preliminary framework**



## **Data collection and research methods**

### ***Research Strategy***

We took a constructionist ontological orientation in our research. We approached our analysis with the idea that the perspectives and thoughts of the leaders of organizations would be able to help us conceptualize and categorize the phenomenon under study. Thus, we interviewed and surveyed mostly CEOs or founders of organizations, as they are generally accepted as the best source of information about a firm's strategic issues.

Our epistemological orientation is interpretivist. We study the cause and effect relationships between knowledge and internationalization by researching the meaning of these concepts for those involved in it. Through our surveys and interviews we have interpreted the social actor's interpretation of their world and actions, and we have compared our interpretation with existing theory to arrive at a conceptual framework that we believe can help explain how to improve the internationalization of the smaller firm. We don't believe that the constructs described in our research are separable from the social actors, and they are difficult to grasp and measure outside of an interpretive context, in which their meaning is defined by the social actors themselves.

We decided to pursue our research using a mixed-method exploratory approach, with an emphasis on qualitative research and induction. We wanted to explore possible connections between a set of knowledge sources and a company's extent of internationalization. However, we were not sure which of the knowledge sources would be most relevant to an SME's extent of internationalization. We were also not sure exactly how these knowledge sources would link to a greater degree of internationalization, and therefore we decided to do in-depth interviews to get a deeper understanding of the relationship between knowledge sources and internationalization. Following this, we did a concurrent mixed-method approach and a convergent parallel design to arrive at our findings and conclusions by comparing our interview and survey results with each other and prior theory.

The mixed method approach was chosen because we already had a set of knowledge source variables that we knew were important, and were probably related to SME internationalization, but we did not have a deep understanding of which knowledge source variables to test in a deductive setting. Therefore, using the survey approach, we were able to get wider input on the use and perceived usefulness of our pre-conceived knowledge sources. Using our interviews, we were able to go more in-depth and triangulate results. It was thought that by using a mixed method approach, we could discover insights and patterns between the two methods, and explore the commonalities and differences to arrive at a greater understanding of the phenomenon. The same categories of knowledge sources were investigated in both the surveys and the interviews, based on the guiding preliminary framework.

Our research mainly takes an inductive approach in that it tries to identify, through surveys and interviews, which knowledge sources are most important to the internationalization of technologically-intense, knowledge based SMEs. Through analyzing our data in both methods, we hoped to be able to find interesting results that may support or extend existing theory, and we hoped that our survey method might support findings from our interview method and vice-versa. We also wanted to take advantage of triangulation of findings to arrive at more robust conclusions.

### ***Unit of analysis***

Our unit of analysis is the individual. In this context, the individuals are managers; specifically, international strategy decision makers, focusing mostly on the CEO, President, or Founder of the firm. As mentioned, we believe that these individuals are the most appropriate to research in this context, given that they are considered to be the most knowledgeable about their organization's strategic issues.

### ***Survey research methodology***

We created an exploratory survey designed to work together with the interviews as part of a mixed method approach to the research question: *Where do SMEs get the knowledge that they need to internationalize, and how do these knowledge sources influence their extent of internationalization?*

After reviewing the literature, we expected that using a quantitative approach to research the acquisition of knowledge within SMEs would be vague and challenging. For this reason, we intended to use a mixed method approach so we could draw on the strengths of both the qualitative and quantitative research methods to get a clearer and broader picture. As expected, we had difficulties creating a proper sampling frame and had to settle on a non-probability sample. The survey was therefore not intended to be used to estimate characteristics of a larger population, but to be a pilot survey or a first study into a field of interest. The survey is primarily intended to help us make suggestions for future research and highlight topics of interest within the research topic. Secondly, the survey was intended to put the findings from the interviews in a larger context, so to be better able to extract patterns and highlight the most interesting findings.

Despite not having a clear sampling frame that could work in both Canada and Norway, the sampling was done strategically to target companies of interest. We targeted limited liability companies founded from 2007 to 2015, that had at least one employee, international sales, and were registered in the Oslo region, Montreal, or Toronto. Furthermore, we targeted companies active in knowledge intensive industries. Using a mix of methods, we created a list of companies of interest. We did this using databases, finding lists of relevant companies from industry and start-up websites, and by contacting local clusters to ask for companies that fit the profile. Then, using company websites, we looked for proof of international activity. After the list was completed, we contacted CEO's or founders of the companies by email to ask if they would fill out the survey.

Using Qualtrics survey software, we sent information about the survey in Norwegian or English to respondents by email, with a personal link to the survey in English. The survey was sent with two or three reminders (one extra for started but non-completed responses) to the target group over a period of 6 weeks, most of which had not agreed to participate in advance. Of the 760 companies that received the survey, 134 started the survey, and 69 were completed. We believe the response rate of 9% (69/760) is within expectations for this type of survey, and is sufficient for our purposes. Furthermore, the survey was targeted at CEOs, who are known to have busy time schedules, and considering the length as well as detail of the survey,



we feel this response rate is acceptable. To supplement our targeted companies, we also reached out to our network to ask relevant companies to self-select to participate in the survey. This yielded an additional 9 companies, bringing our total responses to 78 completed surveys.

Several measures were taken to ensure the validity and reliability of the results. The measures were selected and operationalized in accordance with standard practice within the research field (variables explained in appendix 1). In cases where we did not find a standard practice, we conferred with our thesis supervisor and corporate partners to ensure relevant and accurate measures. Terminology was defined in separate sections before they were used in questions. Since we incorporated this feedback and insight in our survey design, the result was that 80% of the survey respondents found the survey topic interesting, and asked to receive a copy of the finished analysis.

Before sending out the survey, the questionnaire was tested by a small group of potential respondents. Improvements were made after conferring with test respondents, our thesis supervisor, our partner organizations Innovation Norway, Oslo Business Region, and several local clusters and industry organizations in Norway and Canada. These organizations later helped us identify potential candidates for our survey and helped give weight to our research. To motivate our respondents, we included information about our partner organizations, as we knew that contacting CEOs and founders, with busy time-tables, about a master's level school survey could result in low respondent engagement. The survey was estimated to take only 10-15 minutes to complete, but the respondents were given 7 days from opening the survey to make a complete response.

Great effort was made to ensure that we directly contacted the most knowledgeable person within the company about the issues in our survey topic. Sometimes this was the current CEO, other times the founder of the company, depending on their current involvement in the company. Using LinkedIn and company websites, we found the right individual to contact and used different methods to obtain their direct email addresses; including online tools, company websites and calling the company or individual of interest directly. When sending out the survey, we

checked whether the used email address was still operational, whether an autoresponder was used on the email, and if the email was received. To limit non-response bias, we updated invalid email addresses and in some cases contacted the respondents directly to make sure that everybody in our sample received the email. Online tools were used and tests were made to limit the number of emails falling into the spam category of recipients' emails.

Before the analysis started, we vetted the survey respondents to see if they fulfilled our requirements of being respondents with first-hand experience from international strategy decision making from relevant companies. Even though we found their data to be consistent with the remaining surveys, we conservatively excluded 10 responses from the survey that did not fully fit our selection criteria and were left with 68 relevant responses upon which to do our analysis.

The final sample consists of 68 firms from Norway (53%), Canada (43%), or from various other countries (4%). The firms are predominantly within knowledge intensive industries; ICT or software technology (60.3%), Health and life sciences (7.3%), Digital media (5.9%), Consulting (5.9%), Energy and environment (4.4%), E-Commerce (4.4%), Aerospace and defence (4.4%), or other industries (7.4%). The firms were all between 2 and 30 years of age (since founding), many of which were under 10 years old (57.4%). Our sample contained no purely domestic firms, as they were either born global firms (33.8%) or other firms that became international within the first 25 years (66.2%). Our sample firms size (by number of employees) was divided into micro firms with less than 10 employees (33.8%), small firms with less than 50 employees (42.2%), medium-sized firms with less than 250 employees (20.6%), and large firms with less than 500 employees (2.9%) or more than 500 employees (1.5%). The respondents were CEOs or Founders (94.1%) or other international strategy decision makers (5.9%) within the selected firms.

### **Measuring the degree of internationalization**

Following Fernhaber et al. (2009) and Sullivan (1994), we decided to operationalize the degree of a firms' internationalization by creating an index of three variables: international sales intensity (foreign sales as % of total sales), international asset

intensity (foreign assets as a % of total assets) and international scope (number of continents a venture has sales in). As there are no particularly robust measures of a firm's degree of internationalization, we found this measure acceptable for the purposes of our thesis, to get a rough idea of how international the firms in our sample were.

We created the internationalization index by adding a company's international sales intensity, international asset intensity and international scope together. These variables were given equal weight in our index. We coded our measures of international sales intensity, asset intensity, and scope, as six-point ordinal scales (1-6). In other words, managers were asked to select different levels of sales intensity, asset intensity and scope, based on six categories of responses. We chose to code these measures as ordinal data to improve the response rate of our survey, given the sensitivity of asking for accurate sales data. To analyze a company's extent of internationalization, we added together these individual 6-point ordinal data points to create an internationalization index, which has a possible range of 3 to 18. We also consider this constructed variable as ordinal data, since it is based on ordinal data scales and we can't identify the distance between values (for instance between a score of 5 and a score of 9). Additionally, the ordinal values measured were not equally spaced, and therefore can't be accurately treated as interval data.

To give an example of how the index works, if a firm had an international sales intensity between 1% and 10%, international asset intensity between 1% and 10% and an international scope of operating in only one continent, then their international index would have a relatively low score, at  $2 + 2 + 1 = 5$ . Alternatively, a firm could fit into a higher bracket of international sales intensity, asset intensity, and scope, and would be considered to have a higher degree of internationalization, for example with a top score of 6 (international sales intensity greater than 75%) + 6 (international asset intensity greater than 75%) + 6 (operates in six continents) = 18. This measure allowed us to gauge the SME's level of internationalization, and although it does not capture the exact numbers for sales and asset intensity, we thought that we would be more likely to get participation from private companies (many SMEs are private and are reluctant to share any data) if we used this measure.

### *Interview research methodology*

Our interviews were focused, in-depth, and unstructured, although we did use an interview guide to inform the general topics. Consistent with methods recommended by Eisenhardt (1989), we selected cases from a population based on theoretical sampling. In this case, we selected a set of 8 firms that are all considered to be SMEs in the information and communications technology industry; half from Canada, and half from Norway. We have also chosen to include firms that have different situations and levels of internationalization to analyze the phenomenon of interest across types of firms. Combination with our questionnaire results makes triangulation of results possible and provides stronger substantiation of constructs (Eisenhardt, 1989). Interviews were also kept flexible to allow for probing of emergent themes.

We took a grounded theory approach to analyze our interviews. We recorded our interviews with a microphone, created written transcripts of those recordings, and did selective coding of the interview transcripts. Codes from different interviews were then compiled in a table side by side and were color-coded based on similarities. Next, themes were developed based on the similarities between the codes. Codes were placed in a new table under the themes, and then the themes were linked back to the interview data. Categories and a conceptual framework were then created based on analyzing the similarities and differences between cases, and comparing them with existing literature and dimensions suggested by our preliminary framework. We stopped collecting interview data after we achieved theoretical saturation, and our choice of 8 interviews is consistent with recommendations that the number of cases should ideally be between 4 and 10 (Eisenhardt, 1989).

### *Profile of interviewees and their firms*

We interviewed eight individuals who are part of their organization's senior management. Seven out of the eight interviewees were CEOs, Presidents, and Founders of their organizations. One was a senior executive of the company. The companies are knowledge intensive and rely heavily on intangible assets for their

competitive advantage. All of the companies we interviewed were small enterprises with less than 250 employees.

All the interviewed companies had taken or were currently taking steps to internationalize and, as such, could answer our questions about the internationalization of their firm. The sample of companies had a varying degree of international activity and intensity, ranging from little international presence to significant international activities, allowing us to make some assumptions about the differences between these companies.

The firms were all relatively young, with the oldest firm in the sample at 21 years old (although the business had changed substantially over the years, with the most recent permutation being established around 2012), and the youngest firm at 2 years old. This variety gave us insight into different types of thinking based on the experience of the firm. This helped us make some assumptions about the evolution of international strategy decision making in these types of firms.

Overall, we believe that our sample is a reasonable representation of small enterprises attempting to grow an international presence outside of Canada and Norway. The interviews allowed us to investigate the possible relationships between variables at a deeper level than in the survey.

**Table 1: Profile of the companies we interviewed**

	Industry	Extent of internationalization	Size	Founded	Location
Company A	Software development	<ul style="list-style-type: none"> <li>- International sales intensity: 60%</li> <li>- Employees in the U.S. and Mexico</li> <li>- Global presence through VARs</li> </ul>	19 employees	2011	Ottawa
Company B	Software development	<ul style="list-style-type: none"> <li>- International sales intensity: 80%</li> <li>- Offices in Europe, the U.S. and Australia</li> </ul>	200 employees	1996	Montreal

Company C	Software development	<ul style="list-style-type: none"> <li>- International sales intensity: 36%</li> <li>- Most of their sales are in North America, with a small presence in Europe</li> </ul>	60 employees	2002	Montreal
Company D	Software development	<ul style="list-style-type: none"> <li>- International sales intensity: 50%</li> <li>- Office in Luxembourg</li> <li>- Sales in Europe</li> </ul>	~50 employees	2010	Toronto
Company E	Software services and consulting	<ul style="list-style-type: none"> <li>- International sales intensity: 30%</li> <li>- Presence in Europe and North America</li> </ul>	~45 employees	2015	Oslo
Company F	Software as a service (SaaS)	<ul style="list-style-type: none"> <li>- International sales intensity: 95%</li> <li>- Customers in 4 continents</li> </ul>	2 employees	2010	Oslo
Company G	Software as a service (SaaS)	<ul style="list-style-type: none"> <li>- Have users in Sweden, Denmark, Germany, India and the U.S.</li> <li>- U.K. subsidiary</li> </ul>	3 employees	2012	Oslo
Company H	Software technology	<ul style="list-style-type: none"> <li>- Little to no international presence</li> </ul>	7 employees	2005	Oslo

### *Topics covered in the interviews*

We used an interview guide to help direct our interviewees towards certain topics. Although we had written down the topics we would like to cover, we let interviewees stray from them to allow for investigation of related and other interesting topics. However, each interview was structured along the following general outline.

Firstly, we asked them to describe their company characteristics, as well as provide a brief history of their firm and themselves. We then discussed the company's

international endeavors and performance data. This included international sales intensity, asset intensity, scope and international goal attainment.

The interviewees were then asked questions on how they obtained the knowledge and information needed to internationalize, and from what sources this knowledge/information came from. Once we had a clearer idea of what kind of knowledge and knowledge sources were relevant, we probed deeper into how those sources of knowledge helped, and why certain sources of knowledge seemed to be more useful to help the company grow internationally.

Finally, we asked companies to describe their competitive advantage (in the international setting), and to try to relate their competitive advantage to the use of particular knowledge sources. Interviewees were also asked to confirm which knowledge sources were most important to their ability to internationalize.

## **Results and findings**

### *Themes developed from the interviews*

#### *Results of content analysis*

After we transcribed the interviews, we conducted a content analysis of the data. This was done in a selective way, to pick out data of interest. Interview content was coded based on the researcher's interpretation and the codes created for all eight interviews were compiled in a table. These were color-coded based on similarities, and these similarities were used to form categories that captured the meaning of the similar codes. This analysis resulted in 13 distinct categories, which are detailed in the figure below.

**Figure 2: Themes discovered through interview content analysis**

**Category 1: Performance of internationalization efforts** \*mentioned by 8/8

**Category 2: Founder background and experience** \*mentioned by 8/8

**Category 3: Focus on, learning from and adapting to customers** \*mentioned by 8/8

**Category 4: International conferences, tradeshow, and associations** \*mentioned by 4/8

**Category 5: Partnerships** \*mentioned by 6/8

**Category 6: Adaptive innovation and/or reliance on innovative technology**  
\*mentioned by 6/8

**Category 7: Presence of international strategy and/or strategic beliefs** \*mentioned  
by 8/8

**Category 8: Informal network relationships** \*mentioned by 8/8

**Category 9: Recruitment of individuals** \*mentioned by 6/8

**Category 10: Competitive advantage** \*mentioned by 8/8

**Category 11: International agents, consultants and government programs**  
\*mentioned by 5/8

**Category 12: Location-based advantage** \*mentioned by 5/8

**Category 13: Funding, financial resources to internationalize** \*mentioned by 4/8

These categories were then used to do a second round of analysis of the interview transcripts. Each interview was analyzed based on how it fit into the categories, and based on this analysis, each company was given a “performance score” for each category.

First, we created a comparative scale of 0 to 10, where 0 meant that they did not mention anything related to the category at all; and a 10 meant that the category was very important or relevant to their international performance. Each company was also given a score from 0 to 10 based on the researcher’s perception of the level of their international performance, based on the concepts of sales intensity, asset intensity, international scope, and international goal attainment. 10 was considered the highest level of performance and 0 was considered the lowest level of performance.



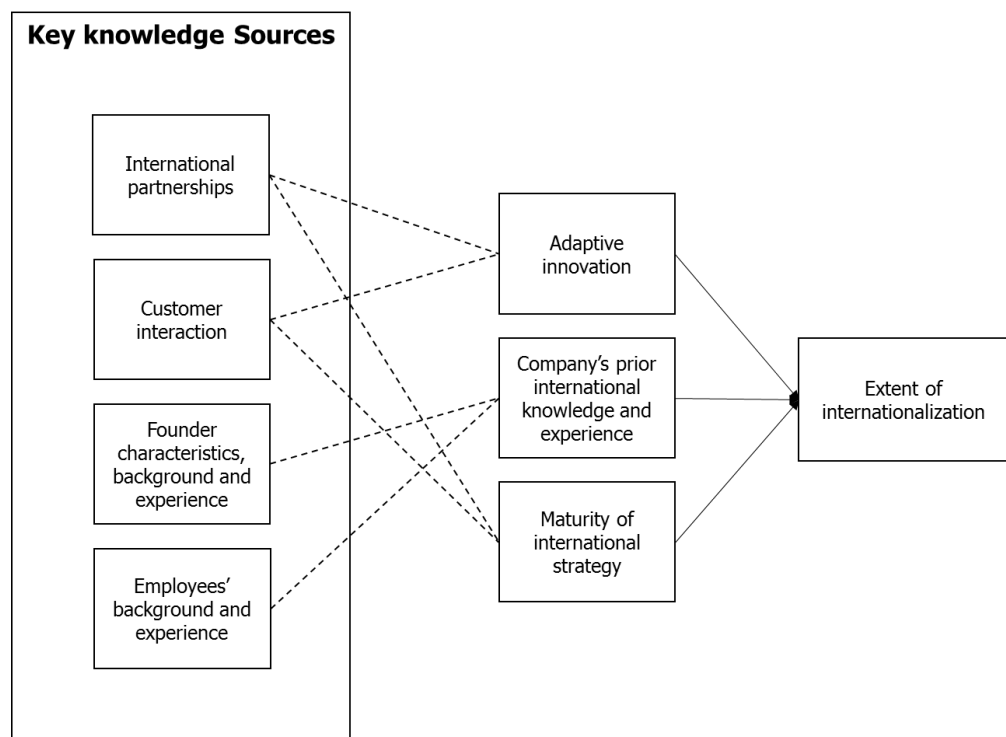
### *Insights from within and cross-case analysis*

The performance metrics above were compared side by side for all eight interviews, and this comparison was used to analyze which of the categories were most associated with the more international firms. This analysis identified seven categories, of the original thirteen, that seemed to be the most important to the success of internationalization, given their high use by the more successful firms.

1. Founder background and experience
2. Focus on learning from and adapting to customers
3. Competitive advantage
4. Presence and nature of international strategy
5. Adaptive innovation and reliance on innovative technology
6. International partnerships
7. International conferences, tradeshow, and associations

Our interview insights, and these seven key categories, were then used to derive a conceptual framework that might be able to explain the differences in international presence between these eight companies. The interviews were then analyzed based on this framework to reach our conclusions about the interview data.

**Figure 3: Conceptual framework developed from the interviews**



The conceptual framework above was developed through our grounded theory approach to help explain the differences between the companies. We found that companies that had achieved more extensive internationalization had a greater presence of three key variables; adaptive innovation, company prior international knowledge and experience, and maturity of international strategy. We also interpreted that there were connections between four key knowledge sources and these three key variables, such that knowledge from these sources could have an influence on the level of these three key variables in the companies.

If we compare this conceptual framework with our earlier preliminary framework, the framework developed from the interviews identifies individual knowledge sources that seem to have an indirect effect on extent of internationalization. We found that the key knowledge sources contain mostly prior internal knowledge and experience variables, and external formal network variables. Furthermore, we discovered that, the connection between knowledge sources and international performance (in this case degree of internationalization) is not direct. Instead, the knowledge sources influence the firm's level of adaptive innovation, prior knowledge and experience, and maturity of international strategy, which are three intangible variables that we suggest should have a positive relationship with the company's extent of internationalization.

After developing this conceptual framework, based on the themes discovered in our research, we compared the interview data based on how they fit the framework, and that analysis led us to the following insights and propositions.

#### *Adaptive innovation*

We found that companies that could gain a significant international presence had a very good understanding of their customers and could consistently adapt to the customer in ways that helped them expand. Common to those with a greater international presence was an ability to solve the problems of, and work closely with, their international customers. Furthermore, they could easily identify their international customers, and their specific needs.

We found that one of the more international companies we studied had created a unique relationship with their customers. The company approached an industry association in the target market to gain insights into best practices, and to get a better understanding of customer processes in that market. Armed with this information, the company was able to focus its' strategy on specific types of customers.

They also created a customer community that led to cross-pollination of their product innovations across customers. Constant feedback from the community through symposiums and user groups let the company develop best practices, as well as obtain information on customer challenges and needs. The knowledge developed through constant interaction with their customers has allowed them to define their roadmap and design their next initiatives with customers, so that they are constantly serving their customer community. The close partnership with their customer community has led to a culture of innovation, allowing them to absorb new technologies and ideas relatively fast.

Reviewing the more international companies, we found that they all have a strong focus on the customer coming first. They often meet with customers to get their feedback and input, and the focus is to educate customers on the technology as well as make things very easy for them. These companies are also often pulled internationally by their multinational customers who want them to implement their solutions in their international subsidiaries.

The more international companies seemed able to make up for a lack of resources by focusing on creating software products that captured exactly what the customer wanted. They can do this because of their close connection to their customer and their understanding of the customer's needs. Thus, they use ideas that are created from interacting with one customer to bring new features to all their customers. For example, one of the managers stressed the importance of the customer connection:

*“You realise that the only thing that matters is customers. It is every minute you can spend with them, instead of an advisor, that is going to tell you about customers. That is what you have to set as a priority”*

Something common to the more international companies was that they had a period of refining and developing their products locally before pushing them internationally. They spent a lot of time learning from their domestic customers and making sure that their products were easily adopted by them. For instance, to learn about how customers would use the software, one of the companies we studied had a long beta testing period. This helped them refine how to onboard customers and get them started using the product. They spent a lot of time talking to domestic companies about the problem they were trying to solve and working out the sales process.

We found that the more international companies seemed more likely to forego the help of advisors and consultants, preferring to learn from their customer base. They were very focused on opening a channel of communication with customers and creating a way to really understand the customer's needs. For instance, one manager noted some of the limitations of advisors:

*It is tempting to go to advisors, but they are already behind, their data is old. The hardest thing is having a trusted enough relationship with a wide enough group of customers in a particular market, quickly, so you can get real feedback. It all has to fit together. That what we build is easily found, that they can easily try it, and when they have questions about how something works, then they contact us, because to build up a whole system where you are going out and calling a bunch of potential customers, trying to weed down to who is actually interested, and having enough trust to actually have a conversation with them, then you are putting all your money into that. But with our model, we open it up to everybody. Let them filter themselves out. And so we only spend our time with people who care. I think that is where the insight comes from.*

All the companies we interviewed had a strong focus on the customer. However, it was those companies that understood how to approach and meet their foreign customers' needs that gained a strong international presence relatively fast.

Those companies who had a very good understanding of and close relationship with their customers were also able to consistently adapt or innovate their products and

strategies towards meeting customer needs. The presence of a culture of adaptive innovation led these companies to be more successful with their uptake of international customers.

We found that the main advantage of these small software companies lies in innovation. They believe that they understand the customer's problems and that they understand customer service. They were not worried about going international because they understood how they needed to serve their customers and what they needed to deliver. Most of them brought innovative technology into an old industry to change the game, and now are working to adapt their products to different international markets.

The competitive advantage of the more international companies appeared to be in their culture of innovation. They are focused on solving problems in a way that will excite people and they focus on being consistent in their innovation. Furthermore, their innovation was highly targeted towards specific target customer needs.

### **Catalysts for adaptive innovation**

#### *International conferences, tradeshows, and associations*

Companies that were able to develop a higher extent of internationalization had found effective ways to learn about and discover their international customers. One source of this knowledge that was common to most of the high performers was a proactivity of searching out and attending relevant industry conferences, tradeshows, and associations. These were cited by participants as being great ways to learn about what you need to do to go international, and to meet potential customers as well as partners:

*“If I had to start a new business [B2B], the first thing I would ask myself is...where are the conferences? The forums or conferences, this is where you will see the competition...you will understand the localisation you need, because maybe your product will need to be presented in different ways for different markets. This is where you will see potential customers...this is how you will start connecting with the network and partners network that you need to achieve your international goals...that is probably the most important thing”*

The successful companies mapped out which conferences they would attend and their initial strategy was to get some understanding, see what the marketplace had to offer, and see if there was any serious competition. They then pursued opportunities they found through network contacts and partners as well as finding a niche that they could be successful in.

Companies that had a lower international presence had not yet developed a strong understanding of the potential international customers. They were also uncertain about whether their product would work in foreign markets. They interacted mostly with international customers in countries close to their home country and largely were learning through their network of personal contacts.

### *International Partnerships*

The more international companies had found a way to get into partnerships with international individuals or organizations that helped them to understand how to localize and adapt to foreign customers. Partnerships largely resulted from initial connections made through participating in relevant industry tradeshows, conferences, and associations.

For instance, things happened to take off in Europe for one of the companies we studied when they got connected with very interested potential partners at a conference in Estonia. They managed to get into partnerships with these contacts, and these partners helped them to expand across Europe. The partners have been their largest source of market knowledge and have helped them get close to and adapt to end-users of their technology. They continue to work closely with their partners to adapt and innovate the technology. The president of this company found that, once they get partners to buy in, it becomes their product and that they push and sell it for him. He also emphasized that partners let you know how to adapt your technology and content to the local market. His focus on partnerships was evident in the following statement:

*“One thing is really clear to this company. Truly it is impossible to do anything on your own in isolation. You have to do it in partnership if you want to grow rapidly right across the world”*

The same company founder advised to avoid the “supplier-client” relationship. Following this, he advised that it is easier to do business internationally in partnerships, with a give and take, win-win relationship. The relationship should also be completely about providing something amazing to the customer. As the more international companies have seen, working through partnerships helps you avoid the need to hire a large sales team and to go knock on doors.

Companies that we perceived as being less international had not entered foreign partnerships and they appeared to be more focused on using the supplier-client relationship with customers. Without the knowledge developed through a partnership, it has been more difficult for these companies to figure out how to sell their products internationally. As one manager put it:

*“So far, it has not been so easy to get clients. If we try, we sometimes get them to refer us to the mother company somewhere else, but that is not always so easy. I guess it is a bit far fetched to expect them to do a perfect pitch of our application, at the perfect time, to the right person”*

We were able to identify clear differences between the more international companies and the less international companies based on our perceptions of their differing levels of adaptive innovation, and use of catalysts to develop adaptive innovation. Therefore, we propose the following:

**Proposition 1:** A higher level of adaptive innovation capability developed through international partnerships and interaction with the customer will have a positive effect on the company’s extent of internationalization.

#### *Company’s prior international knowledge and experience*

The level of the prior international knowledge and experience of a company appeared to be strongly affected by the personal knowledge and experience of the CEO/Founder and that of the company’s employees. This type of knowledge and experience appeared to depend on the human capital resources the company possessed internally. The more prior knowledge about how to internationalize held within the company, the more it seems that the company had an ability to build a strong international presence. Interestingly, it seemed that the background,

characteristics, prior knowledge and experience of the company founders and management allowed some companies to internationalize more rapidly.

### **Catalysts for prior knowledge and experience**

#### *Founder's characteristics, background and experience*

The companies in our sample had founders or top management with varying levels of experience. They also had quite different backgrounds. We found that those with higher levels of international experience, and those that had a greater knowledge of the international environment could more effectively internationalize and achieve specific international goals. Companies with a greater international presence also had founders who appeared more invested in growing and developing the international presence.

The president of one company we interviewed had prior knowledge and experience that we believe helped him to take the company international. Firstly, he was a technical expert in server technologies and had experience working for a key vendor in the software development industry. He had worked in France and had experience working on software technologies for customers in Europe, Canada and the U.S. He was also trained as a software engineer and has a master's degree in computer science. This background gave him strong knowledge of the European market, where the company had its first international customers, and it gave him a good understanding of the technology and how to deliver it. Furthermore, growing up in Africa had given him key insights regarding cultural differences, helping him learn how to adapt to international customers.

Another founder had created and run a domestic company based in Ottawa and Toronto that ran for 34 years until it was sold. He had a lot of experience in the industry the company operates in and from this experience he felt that he knew what end-users needed. His background is in engineering and he did a graduate degree in business. However, he did not have first-hand experience of doing business internationally, and this was reflected in the fact that the company was less international than some others we interviewed.



Another company was able to internationalize more easily because the founder had a lot of prior international experience that helped him know what to do. Originally from India, the founder had an undergraduate degree in engineering, and had worked for 8 years in a variety of technological spaces. He worked with multinational companies, had international clients and has an MBA. Post-MBA he worked for a very innovative company that was making software technology, which gave him some of the skills he needed, and the idea for, his company. With plenty of international experience, he felt that he had been ready to become an international manager, and he was confident in the ability of his company to build a strong international presence.

Another company that we perceived to have a high extent of internationalization had a founder who is from the U.S. He had started two companies in the U.S. before he moved to Norway, so he was quite familiar with the U.S. business environment and how people think there. He felt that this was instrumental in helping his company gain a strong presence in the U.S. Talking about the importance of experience and capabilities, this founder stressed:

*“I want to be clear, as much as what we have done, you have to dive into your own experience and own capabilities. The value of looking up and seeing how other people are reacting to it is very valuable”*

Common to all companies perceived as being high performers was the high level of prior international experience of the founder. These individuals had a background that prepared them to take their companies international, and they all had specific international goals in mind. They were vision driven and passionate about solving customer problems everywhere, not just in their home country.

We found that the founders of the less international companies, although some had plenty of experience in their industry or related industries, did not have as much international experience as the founders of the more international companies. Those with less international experience appeared to be more focused on learning through their network of trusted contacts, many of whom were geographically focused in or around the domestic market.

We also found that the founders of the more international companies had a greater desire to become an international company. They seemed more committed to growing internationally, and had spent more time considering it. They had also possessed a desire to be international from the beginning of their enterprises.

#### *Employees background and experience*

Another factor that we found to be important to the internationalization of these small firms was the nature of the background and experience of the company's employees. Those firms that had employees with more international experience found it more easy to internationalize. Also, if the founder did not have as much international experience, it appeared to help if they had employees with international experience that they could learn from.

For instance, one company we studied gained knowledge rapidly to pursue the niche opportunity that has led to their current success. The company did this through hiring experienced individuals in the industry and from the country they were targeting. They hired subject matter experts that used to be heavily involved in that industry. In the president's opinion, one of the most important things to be successful in your international efforts is to hire the right people with international experience because you want someone local to the market to do the sales.

Given the apparent importance of the prior international knowledge and experience of the members of the company to the company's internationalization, we propose the following:

**Proposition 2:** A greater amount of prior international knowledge and experience within the company will have a positive effect on the company's extent of internationalization.

#### *Maturity of international strategy*

Those companies in our sample that could be said to have an organized and planned international strategy seemed to have had an easier and more successful time internationalizing. The ability to clearly articulate the strategy, know where they

were going, and how they would get there, seemed to be strongly associated with the achievement of international goals and a greater international presence. This indicates that perhaps an international presence does not happen by accident, and that a fair bit of strategic thought and preparation is required.

### **Catalysts for developing the international strategy**

To build an effective international strategy, the companies in our sample seemed to rely heavily on knowledge developed through international partnerships, closeness to the customer, and initial knowledge gained through attending tradeshows, conferences, or being part of international associations. Advisors and consultants seem to play a lesser role, but were useful for companies that initially struggled to create an international strategy.

#### *International Partnerships*

International partnerships were found to be a powerful source of knowledge on how to develop an appropriate international strategy. Lots of the knowledge about customers, different markets, and how to do business internationally seems to have originated from partnerships. Companies that focused on learning from their partnerships were able to create more targeted international strategies.

One of the founders knew that he wanted a partnership to go international, so he was open to this, and when he met the appropriate person, he asked him to partner with them and to help them expand to Europe. Another founder knew that to go international, he would need an international partnership, since he did not have the required knowledge internally. Creating international partnerships appears to accelerate the internationalization of the company, with local partners helping to adapt the company to the local market.

#### *International tradeshows, conferences and associations*

The founders of the more international companies appeared to have gained significant knowledge from attending international conferences, tradeshows and associations that helped them create more specific international strategies.

One founder met a lot of his connections through involvement in international associations and through attending international conferences. He thought that these were a great way for him to figure out what he needed to do when he went to market and useful for getting valuable information. However, he felt that they did not give him first-hand knowledge of how to do business internationally.

Three out of the four high performers found that being part of international tradeshows, conferences and associations helped them get the initial contacts, information and knowledge that they needed to gain an international presence. Although, they did not directly give founders the knowledge they needed to complete their international strategies. This knowledge appears to have come much more from interacting with customers.

#### *Interacting with customers*

For companies that had a greater international presence, it appeared that they developed their strategies through a deep and continuous interaction with their customers. Their international strategies were not static plans but grew in maturity through increasing contact with customers. For companies that were more international, finding out where their international customer was helped them figure out what they needed to do with their strategy. As one manager put it:

*There is something about trying to find that triangulation around; what is the best place so I am able to talk to the customers, the customer is ready to buy, and the market is big enough? So, we thought about all these things, and we used to think that Sweden and Denmark were next, and we thought the UK was next (thereafter), because they are closer, but it turned out that the best thing for everybody; our ability to respond to the customers, their ability to want it, being a big enough market, was in the US.*

Another manager also discussed the importance of knowing where you are going internationally:

*If you have a product, you know where you are going, and you are able to commit the resources and the time that are needed to succeed, then it is going to work.*

We found that the less international companies had not done enough market research and learning before going international, and they had not taken an organized, structured approach, to building an international presence. Also, common to these companies was a lack of confidence in developing internationally.

For instance, for one of the founders, it seemed to be important to slowly build up the confidence to go international. Initially they did not know that their tool would work outside of Norway and they were not sure how to tailor it to foreign markets. They didn't have a solid international strategy in place and were not sure how to adapt their pricing and marketing to different markets. They had tried to sell the product in the UK a few times, but they were not sure why it didn't work out.

Another company said that they need to have more of a sales effort to expand internationally. They had not really figured out their international strategy. They wanted to eventually go abroad, but they were not sure if they had the skills to do so. They knew that finding the right people with the right skills would be important, and they were starting to focus on regional markets like Sweden and the UK. They had challenges approaching their customers using the supplier-client relationship and they found the long buying process model and decision processes of bigger customers to be difficult to deal with.

The international strategies of the less international companies were not specific, nor did they have a solid understanding of their target market and international customer. These companies seemed to rely more on their personal informal connections to explore international opportunities and learn about the international environment.

#### *Advisors and consultants*

We found that most companies thought that advisors and consultants were useful to developing an international strategy, but only to a limited extent. For instance, one company felt that outside investors and advisors helped, but only to narrow down the product to what really mattered. They took this kind of advice with a grain of salt, and tried to follow their own path. In their opinion, you should experiment

first, and only when you reach a roadblock that you can't figure out on your own, then should you use very specific expertise to help figure it out.

In one of the less international companies, the founder mainly used government agents and consultants to help gain knowledge about how to create an international strategy. He found that they helped put him in the right direction, but it was his own curiosity and learning that led him to create a better international strategy. He found the consulting help useful, but not able to do the job for him. He had to commit the organization, time, money, and resources to the effort. He stressed that a strong investment is needed, on a personal level and on a corporate level, and that you need to have a product that fits with the market. The following quote depicts the limitations of consultants in helping a company internationalize:

*“The government can provide lots of information, if you go to these government experts and consultants, searching for information, that will work, but if you go to them and you ask them to help you book meetings with people who are going to buy your products, then it won't work. You'll be disappointed”*

Given the apparent importance of having a well-developed and specific international strategy to the SME's ability to internationalize, we propose the following:

**Proposition 3:** The increasing maturity of a company's international strategy will have a positive effect on the company's extent of internationalization.

### ***Summary of interview data***

Based on the number of times it was mentioned and the way our participants talked about it, we expect that the strongest variable with an effect on the extent of internationalization is adaptive innovation based on an understanding of, and ability to, adapt to the international customer.

Furthermore, based on the interview analysis, the most important knowledge sources for internationalization are:

- Customer interaction
- Founder/CEO characteristics, background, and prior international experience
- International partnerships
- Employees' background and prior international experience

Interestingly, our analysis has shown that there are some important variables that may help explain a company's level of internationalization and that they relate to the use of particular knowledge sources. Four key knowledge sources appear to affect the levels of three key variables, which we propose should help explain the level of an SME's extent of internationalization. In summary, knowledge developed from those four sources appears to have a strong positive effect on the three variables that we propose have a positive effect on the company's extent of internationalization. This relationship was depicted above in the conceptual framework we developed from the interviews.

### ***Results of the survey analysis***

Along with our interviews, we undertook an online survey to reach a greater variety of firms and ask them about which knowledge sources they used for their internationalization process. Along with providing information about the firm and its extent of internationalization, our respondents selected from a predefined list of known knowledge and/or information sources related to the firm's ability to internationalize. The sample firms were then asked to rate the usefulness of each selected source (on a scale of 1-7) for attaining three types of knowledge that have been argued to be important to internationalization; namely, market knowledge (MK), technological knowledge (TK), and internationalization knowledge (IK) (Fletcher & Harris, 2012). The definitions of these types of knowledge, as presented in the survey are presented below:

**Market knowledge:** Knowledge related to the specific market. This includes knowledge of government, institutional frameworks, taxation, rules and norms, local conditions and opportunities, as well as the resources, capabilities and market behaviour of suppliers, competitors, local clients and their customers, but does not include technological knowledge or internationalization knowledge.

**Technological knowledge:** Knowledge related to the creation of products or services. This includes technological know-how, intellectual property, and other knowledge related to product development, but does not include market knowledge or internationalization knowledge.

**Internationalization knowledge:** Knowledge related to developing and executing an international strategy. This includes knowledge about finding and evaluating international opportunities, how to find and work with strategic partners, and how to manage international operations, but does not include market knowledge or technological knowledge.

Below, we summarize our results of descriptive and inferential analysis of the data.

### *Insights from descriptive analysis of the data*

Through a descriptive analysis of the survey data, we can visualize and describe the sources our survey respondents used to seek out the knowledge they needed to internationalize. The number of respondents that selected each knowledge source, is listed in the table below. To aid in the analysis, we group knowledge sources based on if they had been used by few (0-33%), several (34-66%) or many (67-100%) firms in our sample.

**Table 2: Number of respondents that used the knowledge source**

<b>Knowledge sources:</b>	<b>Use</b>	
<b>Formal external knowledge sources:</b>	<b>67</b>	<b>99 %</b>
- Customers	53	78 %
- Company alliances and partnerships	43	63 %
- Government agencies and public institutions	30	44 %
- Private consultants	23	34 %
- Recruitment of new employees	20	29 %
- Suppliers or supply chain collaborators	16	24 %
- Venture capital partners and investors	13	19 %
- Private institutions, programs or incubators	12	18 %
- Contractors	10	15 %
- Market research firms	6	9 %
<b>Informal external knowledge sources:</b>	<b>55</b>	<b>81 %</b>
- Informal personal network	45	66 %
- Competitors	26	38 %
- Knowledge from operating in a cluster of organisations	14	21 %
<b>Internal knowledge sources:</b>	<b>42</b>	<b>62 %</b>
- Prior experience of founder or top management team	40	59 %
- Prior experience of other company employees	16	24 %
<b>All knowledge sources</b>	<b>68</b>	<b>100 %</b>



All save one respondent used some type of formal external knowledge source to attain the knowledge they needed to internationalize. Of the formal external network knowledge sources, many firms (78%) said that customers were a source of the knowledge that they needed to internationalize. Several firms used company alliances and/or partners (63%), government agencies or public institutions (44%), and private consultants (34%). Few in our sample made use of recruiting new employees as a knowledge source (29%), supply chain collaborators (24%), venture capital partners or investors (19%), private institutions, programs or incubators (18%), contractors (15%) and market research firms (9%).

Many respondents (81%) used some type of informal external knowledge source to attain the knowledge they needed to internationalize. Of the informal knowledge sources, several managers used their informal personal network (66%) and competitors (38%), but few firms in our sample used surrounding firms from operating in a cluster (21%) as a knowledge source.

Several firms (62%) used some type of internal knowledge source to attain the knowledge they needed to internationalize. Of the internal knowledge sources, several firms indicated that the top management team's prior experience (59%) was a knowledge source for internationalization knowledge, but few firms used their employees' prior experience (24%) when seeking out the knowledge they needed to internationalize.

In our thesis, we interpret the use of a knowledge source as an indication that it was used to gain some knowledge related to the ability to internationalize. However, this does not indicate the volume of knowledge and the usefulness of the knowledge developed from interacting with that source. Thus, we asked respondents to rate the perceived usefulness of the selected knowledge sources, on three seven-point Likert scales. A score of 7 was labelled "very useful" in our survey; a score of 4 was labelled as "moderately useful" and a score of 1 was labelled "not useful." Therefore, based on this scale, we perceive scores between 5 and 7 as indications of very useful; scores between 3 and 4.9 are interpreted as moderately useful, and scores between 1 and 2.9 are considered to be only slightly useful. The first

usefulness rating was to indicate how useful that source was for the company in attaining market knowledge related to their ability to internationalize. The second and third measures were for technological knowledge and internationalization knowledge respectively. Below, we explore which knowledge sources were perceived as most useful by managers for gaining market knowledge, technological knowledge, and internationalization knowledge related to their ability to internationalize.

### Obtaining market knowledge

**Table 3: Usefulness of sources to obtain market knowledge**

Knowledge sources:	Market knowledge (MK)						Use
	Mean	StDev	Skew	Kurt	Norm	p-value	
- Prior experience of founder or top management team	5,7	1,2	-1,0	1,4	No	-	59 %
- Informal personal network	5,4	1,4	-0,5	-0,7	Yes	0,002	66 %
- Customers	5,3	1,6	-0,9	0,0	Yes	0,006	78 %
- Recruitment of new employees	5,0	1,5	-0,3	-0,8	Yes	0,008	29 %
- Company alliances and partnerships	5,0	1,3	-0,5	0,4	Yes	0,004	63 %
- Prior experience of other company employees	4,9	1,5	-0,7	0,1	Yes	0,009	24 %
- Private consultants	4,9	1,5	-0,1	-0,9	Yes	0,009	34 %
- Suppliers or supply chain collaborators	4,6	1,7	-0,8	-0,3	Yes	0,026	24 %
- Venture capital partners and investors	4,5	1,7	0,0	-0,8	Yes	0,025	19 %
- Contractors	4,4	1,8	0,2	-1,1	Yes	0,039	15 %
- Competitors	4,2	1,7	-0,1	-0,6	Yes	0,040	38 %
- Market research firms	4,2	0,8	-0,3	-0,1	Yes	0,000	9 %
- Knowledge from operating in a cluster of organisations	4,1	1,3	-0,1	-1,4	Yes	0,016	21 %
- Government agencies and public institutions	4,0	1,5	0,0	-0,5	Yes	0,033	44 %
- Private institutions, programs or incubators	4,0	1,5	-0,8	-0,1	Yes	0,034	18 %
<b>All knowledge sources</b>	<b>4,9</b>	<b>1,5</b>	<b>-0,4</b>	<b>-0,6</b>	<b>Yes</b>	<b>0,011</b>	<b>100 %</b>

For the attainment of market knowledge (table 3), prior experience of the founder or the top management team (Mean = 5.7, SD = 1.2), informal personal network (Mean = 5.4, SD = 1.4), customers (Mean = 5.3, SD = 1.6), recruitment of new employees (Mean = 5.0, SD = 1.5), and company alliances or partnerships (Mean = 5.0, SD = 1.3) were all indicated as very useful sources. Managers also found private consultants (Mean = 4.9, SD = 1.5), and the prior experience of employees (Mean = 4.9, SD = 1.5) as moderately useful knowledge sources for the attainment of market knowledge. In total, our respondents found all our selected knowledge sources to be either very, or moderately, useful for the attainment of market knowledge, with a combined mean score of 4.9.

Of the top five most useful knowledge sources, all except recruitment of new employees (29%) had been used by many or several of our sample firms, in line

with the high usefulness scores given by managers. This indicates that recruiting new employees may have been underutilized in our sample for the attainment of market knowledge.

To analyze the distributions of our data, we also included information on sample standard deviation, skewness, and excess kurtosis. This data was used to analyze whether the data variables were approximately normally distributed. This helped us to see what analytical techniques are appropriate and may help future researchers with an indication of what to expect from this type of data. We used rule of thumb values as critical values for skewness (i.e. if skewness is more than  $\pm 1$ ) and kurtosis (i.e. if kurtosis is more than  $\pm 2$ ). Managers' perceptions of the usefulness of the prior experience of the founder or top management team were found to be negatively skewed (Skew = -1), just beyond our threshold of -1, and thus probably not standard normal distributed. To see if we could identify any likely sub-groups within our data, we looked at the actual spread of usefulness responses (appendix 2) and visualized the data using histograms and QQ-plots. No clear evidence of likely sub-groups was found for this data, but we cannot rule out effects of outliers and the small sample size in our normality assessments for these variables. In any case, we recommend non-parametric tests when running regressions with ordinal independent variables, because this allows us to relax assumptions about normality in the data.

## Obtaining technological knowledge

**Table 4: Usefulness of sources to obtain technological knowledge**

Knowledge sources:	Technological knowledge (TK)							Use
	MEAN	StDev	Skew	Kurt	Norm	p-value		
- Prior experience of other company employees	6,0	1,0	-0,5	-0,7	Yes	0,000	24 %	
- Prior experience of founder or top management team	5,9	1,4	-1,5	2,4	No	-	59 %	
- Recruitment of new employees	4,6	1,6	0,0	0,0	Yes	0,020	29 %	
- Customers	4,4	1,8	-0,2	-0,8	Yes	0,037	78 %	
- Informal personal network	4,1	1,7	-0,1	-1,2	Yes	0,045	66 %	
- Contractors	4,0	1,9	-0,1	-1,1	Yes	0,062	15 %	
- Suppliers or supply chain collaborators	3,8	1,7	0,0	-1,2	Yes	0,059	24 %	
- Company alliances and partnerships	3,7	1,8	0,1	-0,8	Yes	0,072	63 %	
- Competitors	3,5	2,0	0,4	-0,8	Yes	0,090	38 %	
- Venture capital partners and investors	3,4	2,0	0,5	-0,9	Yes	0,098	19 %	
- Knowledge from operating in a cluster of organisations	3,1	1,6	0,6	-0,3	Yes	0,102	21 %	
- Government agencies and public institutions	3,0	2,0	0,8	-0,6	Yes	0,119	44 %	
- Private consultants	2,7	1,5	0,7	-0,5	Yes	0,141	34 %	
- Private institutions, programs or incubators	2,4	1,4	1,3	2,6	No	-	18 %	
- Market research firms	2,3	1,4	0,5	-1,9	Yes	0,181	9 %	
<b>All knowledge sources</b>	<b>4,0</b>	<b>2,0</b>	<b>0,0</b>	<b>-1,2</b>	<b>Yes</b>	<b>0,061</b>	<b>100 %</b>	

For the attainment of technological knowledge (table 4), the internal knowledge sources; prior experience of other company employees (Mean = 6.0, SD = 1.0) and the prior experience of the founder or top management team (Mean = 5.9, SD = 1.4) were perceived as very useful on average. Managers also perceived recruitment of new employees (Mean = 4.6, SD = 1.6) and customers (Mean = 4.4, SD = 1.8) as notable moderately useful knowledge sources for the attainment of technological knowledge. On average, the selected knowledge sources had been moderately useful for the attainment of technological knowledge, with a combined mean score of 4.0.

Of the top five most useful knowledge sources, customers (78%) had been used by many respondents, and informal personal network (66%) and the prior experience of the founder or top management team (59%) had been used by several respondents, in line with the high usefulness scores given by managers, to get technological knowledge. However, recruiting new employees (29%) and the prior experience of other company employees (24%) had been used by few respondents, and it seems that they may have been underutilized for the purposes of attaining technological knowledge.

We also assessed whether these variables were approximately normally distributed, and again manager's perceptions of usefulness of the prior experience of the founder or top management team were found to be substantially negatively skewed (Skew = -1.5). This variable was also found to be very leptokurtic (Kurt = 2.4, Mode = 7) and thus probably not normally distributed. We also found private institutions, programs or incubators to be very leptokurtic (Kurt = 2.6), possibly due to an outlier in the data, and positively skewed (Skew = 1.3). Again, we visually investigated the actual spread of respondent usefulness responses, but could not visually see any likely sub-groups within the data.

## Obtaining internationalization knowledge

**Table 5: Usefulness of sources to obtain internationalization knowledge**

Knowledge sources:	Internationalization knowledge (IK)						Use
	MEAN	StDev	Skew	Kurt	Norm	p-value	
- Prior experience of founder or top management team	5,4	1,4	-0,7	0,0	Yes	0,002	59 %
- Venture capital partners and investors	5,2	1,6	-0,2	-1,6	Yes	0,009	19 %
- Prior experience of other company employees	4,7	2,0	-0,4	-0,9	Yes	0,035	24 %
- Customers	4,7	1,8	-0,4	-0,8	Yes	0,026	78 %
- Recruitment of new employees	4,6	1,2	-0,2	0,3	Yes	0,003	29 %
- Company alliances and partnerships	4,6	1,5	-0,1	-0,7	Yes	0,016	63 %
- Contractors	4,5	1,8	0,0	-1,2	Yes	0,036	15 %
- Informal personal network	4,3	1,6	0,1	-0,8	Yes	0,026	66 %
- Government agencies and public institutions	4,1	1,6	0,0	-1,2	Yes	0,040	44 %
- Knowledge from operating in a cluster of organisations	4,0	1,0	-0,6	-0,4	Yes	0,003	21 %
- Market research firms	4,0	1,4	0,0	-0,3	Yes	0,030	9 %
- Suppliers or supply chain collaborators	3,9	1,5	0,4	-0,3	Yes	0,042	24 %
- Competitors	3,6	1,9	0,0	-1,0	Yes	0,082	38 %
- Private consultants	3,4	1,6	0,6	0,5	Yes	0,080	34 %
- Private institutions, programs or incubators	3,1	1,4	-0,4	-0,9	Yes	0,098	18 %
<b>All knowledge sources</b>	<b>4,4</b>	<b>1,7</b>	<b>-0,2</b>	<b>-0,8</b>	<b>Yes</b>	<b>0,030</b>	<b>100 %</b>

For the attainment of internationalization knowledge (table 5), our firms selected prior experience of the top management team (Mean = 5.4, SD = 1.4), and venture capital partners or investors (Mean = 5.2, SD = 1.6) as very useful sources of internationalization knowledge. In our sample, firms also found the prior experience of other company employees (Mean = 4.7, SD = 2.0), customers (Mean = 4.7, SD = 1.8), recruitment of new employees (Mean = 4.6, SD = 1.2), and company alliances or partnerships (Mean = 4.6, SD = 1.5) to be other notable moderately useful knowledge sources for the attainment of internationalization knowledge. On average, the selected knowledge sources had been moderately useful for the attainment of technological knowledge, with a combined mean score of 4.4.

Of the top five most useful knowledge sources, again customers (78%) had been used by many respondents and the prior experience of the founder or top management team (59%) had been used by several respondents, in line with the high usefulness scores given by managers. However, recruitment of new employees (29%), prior experience of other company employees (24%), as well as venture capital partners or investors (19%) had been used by few firms, and may have been underutilized for the purposes of attaining internationalization knowledge.

When assessing if these variables were approximately normally distributed we found that none of the knowledge sources substantially deviated from normality. Venture capital partners or investors was somewhat platykurtic (Kurt = -1.6), indicating sub-groups in the data, but not beyond our threshold of -2 in excess negative kurtosis, and therefore these variables were assumed to be approximately normal.

### Combined types of knowledge

**Table 6: Usefulness of sources to obtain combined knowledge types**

Knowledge sources:	All three types of knowledge (TOTK)						Use
	MEAN	StDev	Skew	Kurt	Norm	p-value	
- Prior experience of founder or top management team	5,7	1,3	-1,1	0,9	No	-	59 %
- Prior experience of other company employees	5,2	1,6	-0,8	0,1	Yes	0,008	24 %
- Customers	4,8	1,8	-0,5	-0,7	Yes	0,022	78 %
- Recruitment of new employees	4,7	1,5	-0,3	-0,6	Yes	0,013	29 %
- Informal personal network	4,6	1,6	-0,2	-0,9	Yes	0,022	66 %
- Company alliances and partnerships	4,4	1,6	-0,3	-0,5	Yes	0,028	63 %
- Venture capital partners and investors	4,4	1,9	-0,1	-1,1	Yes	0,043	19 %
- Contractors	4,3	1,8	0,0	-1,1	Yes	0,042	15 %
- Suppliers or supply chain collaborators	4,1	1,7	-0,1	-1,0	Yes	0,041	24 %
- Competitors	3,8	1,9	0,1	-0,9	Yes	0,071	38 %
- Knowledge from operating in a cluster of organisations	3,8	1,4	-0,1	-0,8	Yes	0,037	21 %
- Government agencies and public institutions	3,7	1,8	0,2	-1,0	Yes	0,070	44 %
- Private consultants	3,7	1,6	0,3	-0,6	Yes	0,063	34 %
- Market research firms	3,5	1,4	-0,3	-0,6	Yes	0,060	9 %
- Private institutions, programs or incubators	3,2	1,6	0,0	-1,0	Yes	0,097	18 %
<b>All knowledge sources</b>	<b>4,4</b>	<b>1,8</b>	<b>-0,2</b>	<b>-0,9</b>	<b>Yes</b>	<b>0,034</b>	<b>100 %</b>

We also created mean scores of the knowledge sources rated usefulness for all types of knowledge combined. Internal knowledge sources were given the highest average usefulness scores by managers. The prior experience of the top management team had the highest usefulness score on average (Mean = 5.7, SD = 1.3). This knowledge source was very useful for gaining all three types of knowledge, but was only moderately used (59%) as a knowledge source in our sample, and thus may be considered an underutilized knowledge source overall. The prior experience of other company employees (Mean = 5.2, SD = 1.6) had also been indicated as very useful on average, especially for the attainment of technological knowledge (Mean = 6.0 in table 3). However, this knowledge source was used by few of our sample firms (24%), indicating that it may have been underutilized overall. Our sample firms also found customers (Mean = 4.8, SD = 1.8), recruitment of new employees (Mean = 4.7, SD = 1.5), and informal personal network (Mean = 4.6, SD = 1.6) as notable moderately useful knowledge sources

overall. Customers had been used by many firms (78%), but recruitment of new employees (29%) is considered to have been underutilized by our sample firms.

Assessing overall normality, we found that only the most useful variable; prior experience of the founder or top management team, to be negatively skewed (Skew = -1.1) beyond our threshold, and likely non-normally distributed. Skewness was otherwise not a large issue, with most variables having little overall skew (Skew  $\pm$  0.5). Most of our variables are overall somewhat platykurtic, with kurtosis from -0.5 to -1.1, but not beyond our threshold of -2.

Finally, we assessed the total usefulness of each source for providing the three types of knowledge relevant for internationalization, and in total for all three knowledge types combined. Considering that usefulness scores are Likert scale data, all ranging from 1 to 7 on highly comparable scales, we aggregated the usefulness scores of each respondent, for each knowledge source and type of knowledge (table 7). For example, if 40 respondents indicated that customers were useful for market knowledge with an average usefulness score of 5.3, then this would result in a knowledge score (for MK) of 212 (40\*5.3). We used these measures as indicators of how much of the three types of knowledge our firms gained, and how much knowledge the different knowledge sources have contributed to our sample overall; termed as a knowledge score. Finally, we assumed knowledge to be cumulative and that manager's usefulness scores can give us an estimation of the utility of a knowledge source.

**Table 7: Knowledge scores**

Knowledge sources:	MK	TK	IK	TOTK	Use	Knowledge score			
	Mean	Mean	Mean	Mean		MK	TK	IK	TOTK
- Customers	5,3	4,4	4,7	4,8	78 %	281	235	247	763
- Prior experience of founder or top management team	5,7	5,9	5,4	5,7	59 %	228	237	217	682
- Informal personal network	5,4	4,1	4,3	4,6	66 %	241	186	195	622
- Company alliances and partnerships	4,95	3,7	4,6	4,4	63 %	213	159	197	569
- Government agencies and public institutions	4,0	3,0	4,1	3,7	44 %	120	91	123	334
- Competitors	4,2	3,5	3,6	3,8	38 %	110	91	94	295
- Recruitment of new employees	5,0	4,6	4,6	4,7	29 %	100	92	92	284
- Private consultants	4,9	2,7	3,4	3,7	34 %	112	62	79	253
- Prior experience of other company employees	4,9	6,0	4,7	5,2	24 %	78	96	75	249
- Suppliers or supply chain collaborators	4,6	3,8	3,9	4,1	24 %	74	61	62	197
- Venture capital partners and investors	4,5	3,4	5,2	4,4	19 %	59	44	67	170
- Knowledge from operating in a cluster of organisations	4,1	3,1	4,0	3,8	21 %	58	44	56	158
- Contractors	4,4	4,0	4,5	4,3	15 %	44	40	45	129
- Private institutions, programs or incubators	4,0	2,4	3,1	3,2	18 %	48	29	37	114
- Market research firms	4,2	2,3	4,0	3,5	9 %	25	14	24	63
<b>All knowledge sources</b>	<b>4,9</b>	<b>4,0</b>	<b>4,4</b>	<b>4,4</b>	<b>100 %</b>	<b>1791</b>	<b>1481</b>	<b>1610</b>	<b>4882</b>

Looking at the aggregated indexes of knowledge scores (table 7), we can assess how much knowledge each knowledge source has contributed to our sample (TOTK). Customers have contributed the most (TOTK = 763), and were used by many firms (78%), but our respondents have indicated that this knowledge source is only moderately useful for the attainment of the three types of knowledge in total (TOTK Mean = 4.8). This indicates that our sample firms may have focused too much on using customers as a knowledge source. However, customers are the third most useful knowledge source, and the most useful formal external knowledge source. In addition, customers have been very useful (MK Mean = 5.3) for the attainment of market knowledge.

The prior experience of the founder or top management team (TOTK = 682), informal personal network (TOTK = 622), and company alliances or partnerships (TOTK = 569) have contributed a lot as knowledge sources. The prior experience of the founder or top management team has been rated to be very useful on average (TOTK Mean = 5.7), especially for the attainment of technological knowledge (TK Mean = 5.9), but had only been used by several and not many firms (59%). Informal personal networks were used by several firms (66%) and were rated to be moderately useful overall (TOTK Mean = 4.6). However, the informal personal network was rated as a very useful knowledge source for the attainment of market knowledge (MK Mean = 5.4). Company alliances or partnerships have been rated as moderately useful overall (TOTK Mean = 4.4) and have been used by several firms (63%). However, their contribution of knowledge to our sample firms is still considerable (TOTK = 569), and this source was viewed as very useful for gaining market knowledge (MK Mean = 5.0), but only moderately useful for technological knowledge (TK Mean = 3.7) and internationalization knowledge (IK Mean = 4.6).

The knowledge sources that had not contributed that much to the knowledge pool of our sample firms, had not been used by more than a few firms (0 – 33%), and had only been moderately useful overall (TOTK Mean from 3-5) as knowledge sources. The most notable exception to this is prior experience of employees (not top management), who had been very useful on average (TOTK Mean = 5.2), especially for the attainment of technological knowledge (TK Mean = 6.0). This is notable, because this knowledge source was underutilized (24%) in our sample.



Another interesting finding is that, on average, usefulness ratings are higher for market knowledge (MK Mean = 4.9, SD=1.5) than for technological knowledge (TK Mean = 4.0, SD = 2.0) and for internationalization knowledge (IK Mean = 4.4, SD=1.7). This indicates one of three things; that market knowledge is more accessible to the firm, that market knowledge is more sought after by our sample firms, or that some key knowledge sources for technological knowledge and internationalization knowledge may have been left out from our study.

Some knowledge sources may, in effect, work as substitutes for other knowledge sources. By running a correlation matrix on dummy variables representing usage of different knowledge sources and looking for statistically significant negative relationships we can make suggestions of possible substitution effects that may influence the use and usefulness of knowledge sources. Also, significant positive relationships may indicate knowledge sources that support one another. This table is presented below:

**Table 8: Correlation table of dummy variables of use of knowledge sources**

		Correlations														
Spearman's rho		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	USE VENTURE CAP															
2	USE ALLIANCES PART	0,22														
3	USE GOVERN PUBL	0,17	0,06													
4	USE PRIV INST	0,36**	0,19	0,21												
5	USE CONSULTANTS	0,21	0,03	0,12	0,32**											
6	USE CUSTOMERS	0,17	0,11	-0,03	-0,03	-0,14										
7	USE SUPPLIERS	0,17	-0,01	0,14	0,02	-0,10	-0,04									
8	USE NEW EMPLOYEES	0,18	0,09	0,01	0,04	0,08	0,11	0,10								
9	USE CLUSTER	0,12	0,09	0,06	0,38**	0,10	-0,26*	0,23	0,15							
10	USE INFORM NETW	0,19	0,16	0,13	0,09	0,05	0,07	0,10	0,12	0,29*						
11	USE COMPETITORS	0,16	0,22	0,15	-0,05	0,14	-0,02	0,13	0,22	-0,03	-0,01					
12	USE TMT EXPERIENCE	0,18	-0,02	0,02	0,15	0,22	0,13	-0,03	0,08	0,20	0,35**	0,10				
13	USE EMPLOY EXPERI	0,17	0,06	-0,00	0,02	0,12	0,13	0,02	0,33**	0,15	0,32**	0,21	0,32**			
14	USE CONTRACTORS	0,33**	-0,11	0,05	0,03	0,23	0,22	-0,03	0,37**	-0,01	0,03	0,27*	0,09	0,26*		
15	USE MARKET RESEARCH	0,38**	0,24	-0,07	0,13	-0,00	0,04	0,07	0,03	0,10	0,00	0,18	-0,06	-0,17	0,02	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Looking at the correlation table, we can see three potential candidates for knowledge source substitution. Direction of substitution is based on which knowledge source received the highest average usefulness score.

- Learning from consultants when learning from customers is not available ( $r = -0.14$ )
- Knowledge from operating in a cluster of organizations when customers are not available ( $r = -0.26$ )
- Use market research to supplement low internal knowledge, especially from employees ( $r = -0.13$ )

Only one of the substitution-effects was statistically significant within our sample firms; knowledge from operating in a cluster of organizations when customers are not available ( $r = -0.26$ ,  $p < 0.05$ ).

Another noteworthy finding is that the use of the informal personal network as a knowledge source is significantly positively correlated with having experienced top managers ( $r = 0.35$ ,  $p < 0.01$ ) or employees ( $r = 0.32$ ,  $p < 0.01$ ), or operating in a cluster ( $r = 0.29$ ,  $p < 0.05$ ). Several other correlations were statistically significant, but did not have clear interpretations based on the applied theory for this thesis. Interesting statistically significant positive correlations are presented below.

- *Private institutions, programs, or incubators and venture capital partners and investors* ( $r = 0.36$ ,  $p < 0.01$ )
- *Market research firms and venture capital partners or investors* ( $r = 0.38$ ,  $p < 0.01$ )
- *Operating in a cluster of organizations with private institutions, programs, or incubators* ( $r = 0.38$ ,  $p < 0.01$ )
- *Private consultants, and private institutions, programs, or incubators* ( $r = 0.32$ ,  $p < 0.01$ )
- *Recruitment of new employees with contractors* ( $r = 0.37$ ,  $p < 0.01$ ) and *prior experience of other company employees* ( $r = 0.33$ ,  $p < 0.01$ )

- *Operating in a cluster of organizations and informal personal network* ( $r = 0.29, p < 0.05$ )
- *Prior experience of top managers and prior experience of employees* ( $r = 0.32, p < 0.01$ )

### **Summary of descriptive analysis insights:**

From the descriptive analysis of our sample data, we were able to identify particular sources that were perceived as most useful on average, similar to the results of our interview analysis. According to these results, the most useful knowledge sources, as perceived by managers are:

- Customers
- The prior experience of the founder or top management team
- The informal personal network
- The prior experience of other company employees
- Recruitment of new employees
- Company alliances and partnerships

Interestingly, these results are quite consistent with the interviews, which identified all the above knowledge sources as most useful, save for the manager's informal personal network. All the used knowledge sources were significantly useful on average (90% confidence level), but not always for the individual firms. However, we did not manage to identify any clear sub-groups in the data, and most of the variability is assumed to be normal. Of the above knowledge sources, prior experience of (other) company employees and recruitment of new employees had been underutilized by our sample firms, who instead used government agencies or public institutions. Other main insights from the survey analysis are that market knowledge appears to be the most useful knowledge type based on manager perceptions. Finally, we found some interesting positive and negative correlations between the knowledge sources, which may indicate some potentially interesting relationships.

We also asked our sample firms to indicate their extent of internationalization, by rating the level of their international sales, assets, and scope. In the section below,

we explore how the use of particular knowledge sources may have influenced the company's current international performance.

*Exploring inferential statistics within our sample*

**Exploring performance relationships:**

As a first look at the relationship between use of knowledge sources and international performance, we created a table of non-parametric correlations between the use of different knowledge sources and our performance variables; international sales intensity (no. 17), international asset intensity (no. 18), international scope (no. 19), and our internationalization index (no. 20). We also created an interval variable USE\_COUNT that counts the number of knowledge sources individual firms used to gain knowledge related to their ability to internationalize. This helped us evaluate how the use of more knowledge sources correlates with internalization. These correlations are presented in the table below.

**Table 9: Correlation table with use of knowledge sources and internationalization**

		<b>Correlations</b>			
Spearman's rho		17	18	19	20
1	USE VENTURE CAP	0,01	0,04	0,07	0,07
2	USE ALLIANCES PART	-0,01	0,14	0,08	0,09
3	USE GOVERN PUBL	0,32**	-0,05	0,41**	0,39**
4	USE PRIV INST	-0,10	-0,08	-0,11	-0,17
5	USE CONSULTANTS	-0,08	0,10	-0,13	-0,07
6	USE CUSTOMERS	0,19	0,22	0,20	0,28*
7	USE SUPPLIERS	0,04	-0,01	-0,11	-0,03
8	USE NEW EMPLOYEES	0,03	0,20	0,20	0,19
9	USE CLUSTER	-0,14	-0,11	-0,10	-0,19
10	USE INFORM NETW	-0,15	0,03	0,04	-0,03
11	USE COMPETITORS	0,12	0,08	0,15	0,17
12	USE TMT EXPERIENCE	0,05	-0,01	0,06	0,03
13	USE EMPLOY EXPERI	-0,04	0,16	0,05	0,06
14	USE CONTRACTORS	0,07	0,12	0,11	0,13
15	USE MARKET RESEARCH	0,02	0,08	-0,09	0,02
16	USE_COUNT	0,10	0,21	0,17	0,23
17	INT SALES		0,17	0,42**	0,84**
18	FOREIGN ASSETS	0,17		-0,03	0,44**
19	NOW SALES CONT	0,42**	-0,03		0,70**
20	INTERNAT INDEX	0,84**	0,44**	0,70**	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

From the correlation table, we see a statistically significant positive relationship between use of government or public institutions and international sales ( $r = 0.32$ ,  $p < 0.01$ ), international scope ( $r = 0.41$ ,  $p < 0.01$ ), and the internationalization index ( $r = 0.39$ ,  $p < 0.01$ ). The use of customers as a knowledge source also has a statistically significant positive relationship with the internationalization index ( $r = 0.28$ ,  $p < 0.05$ ). This indicates that these two knowledge sources may be positively associated with increased internationalization. The remaining knowledge sources do not show a statistically significant correlation with our internationalization variables, and the same is true for the number of knowledge sources used. This does not mean that there are not significant effects, and ordinal logistic regression was used to investigate these relationships further.

We also created a table of correlations between included control variables (see appendix 1) and our internationalization variables. An excerpt of the results is presented below and a full overview is included in the appendix (appendix 3).

**Table 10: Correlation table with control variables and internationalization**

Descriptive Statistics				Correlations			
		Mean	SD	23	24	25	26
1	INITIAL INT STRAT	0,47	0,50	-0,14	0,20	-0,04	-0,01
2	KNOWLEDGE MAN	0,44	0,50	-0,05	0,16	0,02	0,05
3	DOMESTIC RES	3,60	1,55	-0,04	0,17	0,04	0,08
4	INTERNATIONAL RES	3,81	1,82	0,02	0,18	-0,12	0,02
5	COMPANY AGE	10,53	6,41	0,40**	0,06	0,43**	0,44**
6	COMP INT EXPERIENCE	6,71	5,64	0,51**	0,15	0,46**	0,57**
7	INTERNAT DELAY	3,82	4,73	-0,09	0,02	-0,05	-0,10
8	NOW INT SALES	0,90	0,31	0,04	-0,07	-0,07	-0,08
9	NOW JV	0,25	0,44	0,01	0,12	0,00	0,06
10	NOW ALLIANCE	0,59	0,50	-0,08	-0,05	0,17	0,00
11	NOW AQUISITION	0,10	0,31	0,12	0,30*	0,18	0,26*
12	NOW GREENFIELD	0,06	0,24	0,12	0,11	0,06	0,12
13	NOW FRANCH LICE	0,13	0,34	-0,00	0,11	0,08	0,09
14	INTANGIBLE ASSETS	6,09	1,00	0,20	-0,05	0,36**	0,30*
15	R D	4,47	0,98	-0,07	0,15	-0,07	-0,01
16	EMPLOYEES	1,97	0,90	0,07	0,23	0,18	0,21
17	NOW SALES NA	0,69	0,47	0,35**	-0,10	0,63**	0,45**
18	NOW SALES ASIA	0,40	0,49	0,35**	0,02	0,74**	0,56**
19	NOW SALES SA	0,21	0,41	0,25*	0,10	0,63**	0,50**
20	NOW SALES AFRC	0,12	0,32	0,28*	0,19	0,51**	0,52**
21	NOW SALES AUST	0,26	0,44	0,28*	-0,10	0,73**	0,51**
22	NOW SALES EUR	0,85	0,36	-0,01	-0,01	0,40**	0,13
23	INT SALES	3,90	1,77		0,17	0,42**	0,84**
24	FOREIGN ASSETS	1,91	1,29	0,17		-0,03	0,44**
25	NOW SALES CONT	2,53	1,61	0,42**	-0,03		0,70**
26	INTERNAT INDEX	8,34	3,30	0,84**	0,44**	0,70**	

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

From the correlation table, we see a statistically significant positive relationship between age of the firm (in years since founding) and international sales intensity ( $r = 0.40$ ,  $p < 0.01$ ), international scope ( $r = 0.43$ ,  $p < 0.01$ ), and the internationalization index ( $r = 0.44$ ,  $p < 0.01$ ). The firm's international experience (years since first international activity) also has a significant positive relationship with international sales intensity ( $r = 0.51$ ,  $p < 0.01$ ), international scope ( $r = 0.46$ ,  $p < 0.01$ ), and the internationalization index ( $r = 0.57$ ,  $p < 0.01$ ). A firm's reliance on intangible assets for its competitive advantage is significantly correlated with international scope ( $r = 0.36$ ,  $p < 0.01$ ) and our internationalization index ( $r = 0.30$ ,  $p < 0.05$ ). The remaining correlations are due to variables being components of the constructed variables for which they are significantly correlated, except for the previously mentioned correlation between international sales intensity and international scope.

Correlation is an unconditional association and does not account for the complexities that arise from the influence of several explanatory factors on the dependent variable. In the following section, we present the results of several ordinal logistic regressions that we used to examine the conditional relationships between our independent and dependent variables.

#### **Performing exploratory regressions on the data:**

To examine how the use of these knowledge sources influences firm internationalization, we used ordinal logistic regression analysis. As previously explained, the three ordinal internationalization variables were aggregated into a performance index called INTERNAT\_INDEX, which is our ordinal performance variable representing the company's level of internationalization. In model 1, we examine the multivariate relationships between use of knowledge sources and the internationalization index, without any control variables.

In model 2, relevant control variables are included, used to represent omitted causal variables in the regression. From the correlation table (see appendix 3), we see that some of the independent variables are significantly correlated with each other, which indicates that there may be multicollinearity between the variables. However, the strongest correlation, company age and company international experience ( $r =$

0.64,  $p < 0.05$ ), is below our rule of thumb multicollinearity threshold ( $r > 0.80$ ), and therefore multicollinearity may not be a big issue. A series of VIF (Variance Inflation Factor) tests confirm this assumption, as no VIF scores above 3 were found in correlations between the control variables (see appendix 4). Therefore, we included all control variables in the second ordinal logistic regression (model 2). We note that the variables *company international experience* and *internationalization delay* are constructed using the *company age* variable. Therefore, company age would be impermissible in the regression, and is thus excluded from the VIF test.

We had a lot of available variables for our statistical model, and this may have led to overfitting the model, where the model ends up explaining random residuals instead of the relationships we are researching. In model 3, we therefore excluded the dummy variables for current continents with sales, as these variables directly contribute to the internationalization index, through the variable international scope.

For model 4, we also excluded variables about the nature of current international strategy and current R&D spending, as we can argue that these variables are relatively independent of historic events and the international performance in the firm. We can also argue that the current extent of reliance on intangible assets for the competitive advantage of the firm is the result of historic R&D investments. Since we do not have time-series data we are unable to measure if these two variables correlate with a time lag. The variable for R&D is particularly problematic because it is not approximately normally distributed (72% chose the highest available ordinal value). These factors also help explain why we should exclude R&D in the model.

The first relationship we would like to examine (regression 1) is how use of different knowledge sources affects the firms level of internationalization, measured with our internationalization index (containing measures of international sales intensity, international asset intensity, and international scope). For model 5-11, we include the changes in model 4, but in addition we ran backwards stepwise regression; thereby eliminating the most redundant control variable in the model at

each step. The stepwise approach excluded EMPLOYEES (model 5), INTERNAT\_DELAY (model 6), INITIAL INT STRAT (model 7), INTERNATIONAL RES (model 8), DOMESTIC RES (model 9), INTANGIBLE\_ASSETS (model 10), and KNOWLEDGE\_MAN (model 11). The remaining variables in model 9 are arguably the ones with the strongest relationship with the internationalization index and are the best control variables to include in our analysis.

Running relevant tests helped us assess the reliability of our regressions. For ordinal logistic regression, we ran four tests about the current model’s fit to the data and predictive power within our sample. With model fitting information, we tested whether the model improves our ability to predict the outcome. The goodness-of-fit test shows if our data fits our model well. The approximated R-Square (Nagelkerke) shows how well our model explains the behaviour of the dependent variable. The test of parallel lines shows if the odds of each explanatory variable are consistent across different thresholds of the dependent variable.

An excerpt of the log odds coefficients of the eleven models from regression 1 are presented below and a full overview is given in the appendix (appendix 5).

**Table 11: Log odds coefficients of use of knowledge sources influence on internationalization**

Independent variable	Model nr.										
	1	2	3	4	5	6	7	8	9	10	11
USE_GOVN_PUBL	1,92**	1,89	2,06	2,03*	2,02**	2,02**	2,04**	1,71**	1,28*	1,46**	1,47**
USE_NEW_EMPLOYEES	1,01	10,03**	5,83**	2,64**	1,82*	1,82*	1,80*	1,82*	1,86**	1,07	1,07
USE_CUSTOMERS	1,36*	8,72**	3,16**	1,09	1,37	1,36	1,34	1,29	1,19	0,93	0,93
USE_TMT_EXPERIENCE	0,43	4,12*	2,41*	1,63*	1,61*	1,60*	1,60*	1,34	0,74	0,53	0,53
USE_VENTURE_CAP	0,17	6,29**	4,54**	1,69	0,74	0,73	0,74	0,63	0,66	0,35	0,35
USE_MARKET_RESEARCH	0,18	-0,39	-1,84	0,50	0,37	0,38	0,36	0,65	0,56	0,79	0,80
USE_COMPETITORS	0,24	-2,27*	-0,57	0,06	0,39	0,40	0,41	0,63	0,88	0,22	0,22
USE_SUPPLIERS	-0,10	2,66*	0,41	0,31	0,00	-0,01	-0,02	-0,20	-0,12	-0,31	-0,31
USE_CONSULTANTS	-0,07	2,08	-0,15	-0,25	-0,61	-0,61	-0,64	-0,78	-0,46	-0,10	-0,10
USE_PRIV_INST	-1,48*	-4,37*	-1,65	-0,58	0,19	0,20	0,20	-0,03	-0,40	-1,06	-1,06
USE_EMPLOY_EXPERI	-0,26	-5,25**	-0,37	-0,07	-0,15	-0,16	-0,13	-0,12	-0,29	0,14	0,14
USE_ALLIANCES_PART	0,32	-4,79**	-1,39	-0,03	-0,34	-0,33	-0,34	-0,25	-0,22	0,14	0,15
USE_CLUSTER	-0,09	5,01**	0,23	-0,69	-0,39	-0,39	-0,42	-0,03	0,33	-0,05	-0,04
USE_INFORM_NETW	-0,76	-4,56**	-3,27**	-2,20**	-1,95**	-1,95**	-1,92**	-1,38*	-1,41*	-0,67	-0,67
USE_CONTRACTORS	-0,26	-14,78**	-8,01**	-3,80**	-2,74**	-2,73**	-2,70**	-2,34*	-1,83*	-0,63	-0,62
COMP_INT_EXPERIENCE		0,44**	0,61**	0,43**	0,35**	0,35**	0,35**	0,33**	0,23**	0,20**	0,20**
KNOWLEDGE_MAN		12,79**	4,51**	2,01	1,68	1,67	1,61*	1,36*	0,71	0,03	
INTANGIBLE_ASSETS=3		-32,38	-31,35	-28,77	-27,50	-27,48	-27,49	-26,69	-26,03		
INTANGIBLE_ASSETS=4		6,26**	1,88	0,23	0,07	0,07	0,03	0,40	0,14		
INTANGIBLE_ASSETS=5		-4,33*	-2,61*	-2,81	-2,79**	-2,79**	-2,76*	-2,28**	-2,45**		
INTANGIBLE_ASSETS=6		3,96**	-0,23	-1,26	-1,30	-1,30	-1,28	-1,56*	-1,47*		
INTANGIBLE_ASSETS=7		0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>		
Model fitting sign.	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Deviance Goodness-of-Fit	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Test of Parallel Lines	0,00	1,00	-	1,00	-	-	1,00	-	0,15	1,00	-
<b>Nagelkerke R-Square</b>	<b>0,356</b>	<b>1,000</b>	<b>0,93382</b>	<b>0,907</b>	<b>0,6977</b>	<b>0,698</b>	<b>0,698</b>	<b>0,675</b>	<b>0,620</b>	<b>0,496</b>	<b>0,496</b>

\*\* Significant at the 0.01 level (2-tailed).

\* Significant at the 0.05 level (2-tailed).

a. This parameter is set to zero because it is redundant.



Log odds coefficients and corresponding p-values indicate that there are five knowledge sources that are found to have a significant positive relationship with our internationalization index; government agencies or public institutions, recruitment of new employees, customers, prior experience of founder or top management team, and venture capital partners or investors. These five knowledge sources are positively associated with increased internationalization in all 11 models.

Use of government agencies or public institutions as a knowledge source ( $1.28 < b < 2.06$ ) is significantly positive ( $p < 0.05$ ) in 9 of the 11 models. Use of recruitment of new employees ( $1.01 < b < 10.03$ ) is significantly positive ( $p < 0.05$ ) in 8 of the 11 models. Use of customers ( $0.93 < b < 8.72$ ) is significantly positive ( $p < 0.05$ ) in 3 of the 11 models. Prior experience of founder or top management team as a knowledge source customers ( $0.43 < b < 4.12$ ) is significantly positive ( $p < 0.05$ ) in 6 of the 11 models. Use of venture capital partners or investors customers ( $0.17 < b < 6.29$ ) is significantly positive ( $p < 0.05$ ) in 2 of the 11 models.

Two knowledge sources also stand out with significant negative relationships with firm internationalization; contractors and informal personal network. Use of contractors as a knowledge source ( $-14.78 < b < -0.26$ ) is significantly negatively ( $p < 0.05$ ) associated with our internationalization index in 8 of the 11 models. Use of informal personal networks ( $-4.56 < b < -0.67$ ) is also significantly negative ( $p < 0.05$ ) in 8 of the 11 models. The remaining knowledge sources are inconsistent across models and usually not statistically significant.

Of the control variables, we found three control variables have significant effects on the internationalization of our sample firms; the firm's international experience, use of a knowledge or information management system, and extent of reliance on intangible assets for the firm's competitive advantage. The firm international experience (years since their first international activity) had a significant positive effect ( $p < 0.01$ ) in all 10 models where the variable was included. Use of a knowledge or information management system had a significant positive effect ( $p < 0.05$ ) in all 4 out of the 9 models where it was included. The extent of reliance on

intangible assets for the firm's competitive advantage presented a slightly mixed image, possibly due to very few respondents answering among the lower ranges of options for that variable. The overall picture seems to present a statistically positive relationship ( $p < 0.05$ ) between this control variable and our internationalization index. The remaining control variables are either inconsistent across models, between each ordinal level or not statistically significant.

The tests of the models in regression 1 show that all the models have good model fit ( $p < 0.05$ ), indicating that the models improve our ability to predict the outcome, and high goodness of fit (Deviance = 1), showing that our data fits our model well. Model 2 likely suffers from overfitting (Nagelkerke = 1.00), and is given less weight in the analysis. Models 3 and 4 also have suspiciously high model fit (Nagelkerke  $> 0.90$ ), indicating that overfitting may be a problem in these two models. The remaining models have relatively high explanatory power ( $0.36 < \text{Nagelkerke} < 0.70$ ). Parallel line test results vary a lot between models. This test indicates that we may want to use a less restrictive statistical approach, but we found these results to be satisfactory for our purposes.

The second relationship we wanted to examine (regression 2) was how use of more knowledge sources affect the firms level of internationalization, measured with our internationalization index. We investigated this by using the USE\_COUNT as the predictor variable and running ordinal logistic regression against the internationalization index. The same methodology as regression 1 was utilized, including stepwise exclusion of control variables EMPLOYEES (model 5), INITIAL INT STRAT (model 6), INTERNAT DELAY (model 7), DOMESTIC RES (model 8), INTERNATIONAL RES (model 9), INTANGIBLE ASSETS (model 10), and KNOWLEDGE MAN (model 11). An excerpt of the log odds coefficients of regression 2 are presented below and a full version is added in the appendix (appendix 6).

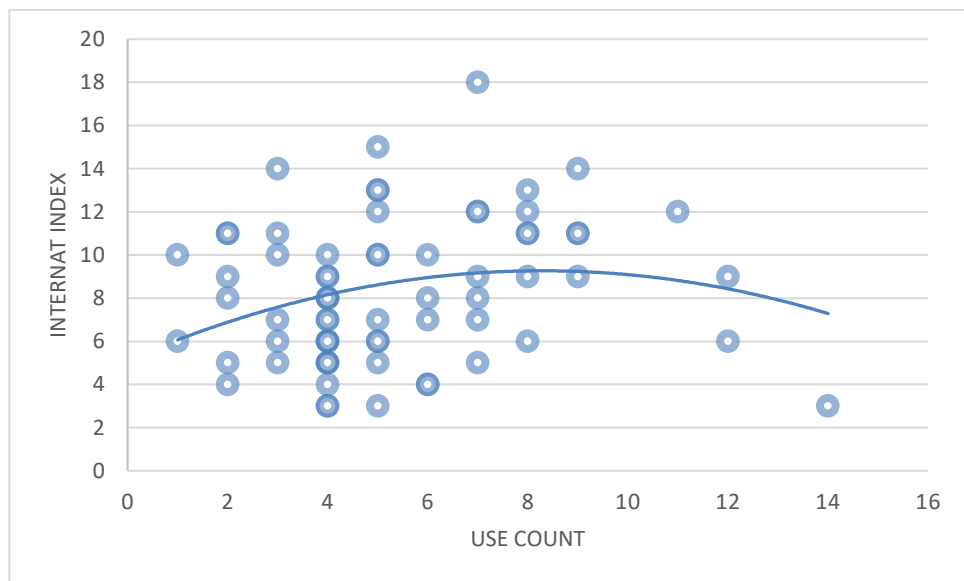
**Table 12: Log odds coefficients of number of used knowledge sources influence on internationalization**

Regression 2 Independent variable	Model nr.										
	1	2	3	4	5	6	7	8	9	10	11
USE_COUNT	0,12	0,25	0,20	0,14	0,16	0,16	0,16	0,14	0,14	0,15	0,16
COMP_INT_EXPERIENCE		0,12	0,32**	0,29**	0,29**	0,29**	0,29**	0,28**	0,22**	0,23**	0,23**
KNOWLEDGE_MAN		3,97**	1,14	0,91	0,81	0,86	0,81	1,09*	0,63	0,08	
INTANGIBLE_ASSETS=3		-22,03	-22,91	-22,82	-22,83	-22,81	-22,79	-22,97	-22,42		
INTANGIBLE_ASSETS=4		1,82	-1,39	-1,26	-1,15	-1,11	-1,11	-0,64	-0,60		
INTANGIBLE_ASSETS=5		0,97	-1,36	-1,16	-1,24	-1,24	-1,22	-0,99	-1,25		
INTANGIBLE_ASSETS=6		0,39	-1,53*	-1,35*	-1,32*	-1,33*	-1,31*	-1,41*	-1,48*		
INTANGIBLE_ASSETS=7		0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>		
Model fitting sign.	0,15	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Deviance Goodness-of-Fit	0,95	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Test of Parallel Lines	0,94	-	1,00	-	0,06	0,02	0,00	0,00	1,00	1,00	0,86
<b>Nagelkerke R-Square</b>	<b>0,031</b>	<b>0,926</b>	<b>0,840</b>	<b>0,824</b>	<b>0,537</b>	<b>0,537</b>	<b>0,536</b>	<b>0,515</b>	<b>0,470</b>	<b>0,362</b>	<b>0,362</b>

\*\* Significant at the 0.01 level (2-tailed).  
 \* Significant at the 0.05 level (2-tailed).  
 a. This parameter is set to zero because it is redundant.

Log odds coefficients and corresponding p-values indicate that there is a positive relationship ( $0.12 < b < 0.25$ ) between the number of knowledge sources used and the performance index, but the relationship is not statistically significant ( $p > 0.05$ ) for all 11 models. This shows us that the effect on internationalization from utilizing more knowledge sources is not clear, from a statistical perspective. A plot of the relationship (figure 4) indicates a non-linear relationship, where there is an initial positive relationship, but it deteriorates as you use more knowledge sources.

**Figure 4: Plot and second order polynomial regression line of impact from knowledge source use**



The chart above may indicate that the use of more knowledge sources will contribute to increased internationalization, but only up to a certain point (8 sources). It is possible that once you exceed the firm's ability to properly manage and extract knowledge from these relationships, maintaining them takes up too many resources and leads to deteriorating international performance.

Of the control variables, we again found the firm's international experience, use of a knowledge or information management system, and extent of reliance on intangible assets for the firm's competitive advantage, to be significant control variables. The firm international experience had a significant positive effect ( $p < 0.01$ ) in 9 of the 10 models where the variable was included. Use of a knowledge or information management system had a significant positive effect ( $p < 0.05$ ) in 2 out of the 9 models where it was included. As in regression 1, the extent of reliance on intangible assets for the firm's competitive advantage presented a slightly mixed image, but the overall picture seems to be that there is a positive relationship ( $p < 0.05$ ) between this control variable and our internationalization index. The remaining control variables are either inconsistent across models, between each ordinal level or not statistically significant.

The tests of the models in regression 2 show that all but model 1 have good model fit ( $p < 0.05$ ), indicating that the models improve our ability to predict the outcome, and all but model 1 have high goodness of fit (Deviance = 1), showing that our data fits our models well. Model 2 has a suspiciously high model fit (Nagelkerke  $> 0.90$ ), indicating that overfitting may be a problem in this model. Models 3-11 have relatively high explanatory power ( $0.36 < \text{Nagelkerke} < 0.84$ ). As with regression 1, the test of parallel lines varies a lot between models, indicating that we may want to use a less restrictive statistical approach. Again, we found these results to be satisfactory for our purposes.

### ***Summary of statistical analysis***

Our first exploration of how the use of knowledge sources influence internationalization identified the use of government agencies or public institutions and customers as potential key knowledge sources, based on correlations with the

internationalization index. The number of knowledge sources used was positively associated with increased internationalization, but the relationship was not found to be consistently positive.

Age of the firm (in years since founding) and the firm's international experience (years since first international activity) were identified as potential key control variables. In addition, a firm's reliance on intangible assets for its competitive advantage was also identified as a potential key control variable.

The first regression identified five key knowledge sources, based on regressions against the internationalization index; government agencies or public institutions, recruitment of new employees, customers, prior experience of founder or top management team, and venture capital partners and investors. Unlike the previous descriptive analysis, the use of informal personal network as a knowledge source was found to be one of the least useful knowledge sources, as measured by regression against the internationalization index. The use of informal personal network and contractors were found to be negatively associated with increased internationalization in several of our models.

The second regression found that the number of knowledge sources used did have a statistically positive relationship with increased internationalization, but the relationship was not consistently statistically significant across several of the models.

Regression 1 and 2 both identified three key control variables; firm's international experience, use of a knowledge or information management system, and extent of reliance on intangible assets for the firm's competitive advantage. We note that age of the firm was excluded as a control variable in regression 1 and 2.

## Discussion and Conclusion

Combining the results of our survey analysis, interview analysis, and comparing them with prior theory, we noticed several findings and patterns that we think have implications for the internationalization of SMEs. We identified a sub-set of knowledge sources from which SMEs gain knowledge related to their ability to internationalize. Of these knowledge sources, we also identified those that were considered most useful by top managers for providing knowledge used for internationalization. We then argued that the use of particular knowledge source combinations would have a positive effect on the firm's international performance. Each of these findings is explored in more detail below.

### *Knowledge sources used for SME internationalization*

The survey results and interview results supported each other as to what knowledge sources were most used by respondents. Customers, prior international knowledge and experience of employees and top managers, international partnerships, and personal networks were found to be the most used sources.

The prior international experience of the top management team appeared to moderate the approach of SMEs in seeking out knowledge from certain sources. For instance, those companies with less prior international knowledge and experience, appeared more likely to use consultants to assist them to internationalize. Hiring new employees with international knowledge and experience, especially related to the targeted market, also appeared to help companies with less prior international knowledge and experience develop an international presence.

Interestingly, the survey results suggest that those companies that didn't use customers directly to develop market knowledge, technological knowledge, and internationalization knowledge were more prone to substitute this with knowledge gained from operating in a cluster of organizations. This seems consistent with the arguments of Davenport (2005), that firms within a local cluster of related firms are more likely to internationalize jointly with the cluster organizations, whereas firms

that are more isolated, are more likely to learn from the international environment and from customers directly.

Our survey results also suggest that pooling knowledge from a greater number of sources may have a link with higher international performance, but only up to a certain point. This supports the idea the greater knowledge assets should lead to higher performance, but getting these from a sub-set of key knowledge sources appears to be the most optimal approach. This seems to be consistent with the argument of Åkerman (2015) that the more active a firm is in using the multitude of available sources of knowledge, the better the firm's ability to grow on international markets.

### ***Most useful knowledge sources for SME internationalization***

Both our surveys and our interviews identified certain knowledge sources as being most useful to internationalization for SMEs. The most mentioned and useful knowledge source was customers. It appears that having a close relationship with targeted customers and gaining international knowledge from these interactions is likely to have a positive effect on international performance. This makes sense, as international customers are the ultimate end-users of the company's products and services, and are likely to have relevant input on how those should be adapted to fit their needs. However, our interviews indicated that it is not simply by talking to customers that you gain this advantage. Instead, it appears that firms need to have a strong reciprocal, communal, relationship with customers, in which customers are very involved in the whole problem solving process, and can work together to leverage benefits.

This is also consistent with the knowledge-based view, as more frequent and in-depth connections are thought to be needed to transfer knowledge, especially that of a tacit nature. Creating a customer community can be thought of as a mechanism to reduce knowledge-sharing barriers with customers and in a sense, allow for lower transaction costs of knowledge with and between customers. This embeddedness of the firm in customer interactions should improve knowledge integration, and the competitive advantage of customer knowledge, as it becomes more path dependent, tacit, and unique.

A second source of internationalization knowledge identified as very useful by the surveys and the interviews is government agencies or public institutions. From the interview analysis, we can assume that this is an important source of knowledge for firms with less prior knowledge and experience of how to internationalize, and that government resources can serve as a strong catalyst to helping SMEs internationalize. Although government programs/consultants are probably more likely to be sources of explicit knowledge, it seems that the process of working with them, and reviewing one's own strategy helps the CEO or entrepreneur to develop greater knowledge about their business capabilities. Interestingly, the survey analysis revealed that this knowledge source was underutilized by our respondents, either indicating that they already had international knowledge and experience, or perhaps they didn't take advantage of opportunities to interact with this knowledge source. Fletcher and Harris (2012) had argued that internationalization knowledge is most likely to be sourced vicariously from government bodies and specialist consultants. Our analysis supports this, although, we argue that these sources are limited in their ability to supply tacit knowledge and knowledge that will enhance company capabilities.

The third source of knowledge identified as very useful by both the surveys and interviews was the hiring of new employees with international experience. Again, underutilized by our sample, hiring new employees is thought of as one of the best ways to get new knowledge into the firm (Grant, 1996). We argue that it is important to target certain skills and capabilities when hiring new employees. It is probable that hiring new employees who have the international experience you need to target a certain foreign market, can increase the knowledge resources of your firm; therefore, helping you to increase your international performance. This is also a way to help the firm rapidly internationalize, as it enables you to hire experience rather than gather it slowly yourself over time.

The interviews and surveys pointed to the importance of the founder's or CEO's background, prior international knowledge and experience, in explaining the international performance of the SME. The prior knowledge of employees also appeared to have a strong effect. Companies that had more internal prior



international knowledge and experience appeared to be more confident in their internationalization efforts and those companies appeared to have a better international performance as well as ability to meet their goals. This supports the notion, widely researched in Upper Echelon and INV theory, that the characteristics of the top management team have a strong effect on firm strategy and performance. We found our results consistent with this and it implies the importance of experience in the internationalization process. Furthermore, our survey results showed that firms with greater age and more experience internationally were more associated with higher international performance.

It is also argued that firms that don't have much prior international experience can overcome this by resorting to external sources, however, resorting to these external sources appears to not be as powerful as having that personal, internal experience right from inception. This helps confirm the importance of the internal composition of knowledge resources in the firm and the need to recognize, transfer, and use prior international knowledge originating within the members of the firm. This supports the view that knowledge resides in individuals, and that the firm is a mechanism for integrating the specialised knowledge of different individuals (Grant, 1996).

The interviews also revealed the importance of forming international partnerships to gain knowledge of international environments. The higher performing firms in our interview sample appeared to have a stronger ability and drive to form partnerships with international individuals or organizations. These partnerships seemed to make up for a lack of internal knowledge about the foreign operating environment, and helped firms adapt to foreign customers and ways of doing business. Furthermore, the partnership approach appeared to create better conditions for the transfer of knowledge, allowing partners to exchange more tacit forms of knowledge more efficiently. This was also supported by our survey results, as partnerships were seen as a vehicle to obtain market knowledge about foreign environments. Therefore, like Haahti et al. (2005), we recommend that SMEs form partnerships to improve export performance.

Finally, the interviews showed that participating in international tradeshows, conferences, and associations was a great way for firms to meet potential

international partners and customers, and these served as a catalyst to creating deeper and stronger international relationships that promoted the sharing of knowledge. We did not include this knowledge source in our survey, because originally, we did not think that it was a significant knowledge source for the internationalization of SMEs. Thus, it may be that this factor is underexplored in SME internationalization research, as it had greater relevance to our interviewed firms than we expected.

The manager's informal personal network was perceived by managers as a useful source of knowledge for internationalization. However, it was not clear how this knowledge source helped firms develop the competitive advantages that we have argued increase their international performance. Consistent with theory presented in the literature review (Musteen et al., 2010), we think that some managers may rely too much on learning from their informal personal network. Firstly, it is difficult for a manager to know what knowledge from which people is the most up-to-date and true, and managers can suffer from a lack of diversity of knowledge in their personal networks. Thus, managers who rely too much on getting knowledge from their personal network may be guided in wrong, or sub-optimal, directions. This was supported by our regression analysis, which indicated a negative relationship between informal personal network and international performance. We argue that more formalized connections with target international customers and international partnerships will yield better knowledge resources for international performance.

### ***Optimal combinations of knowledge sources for SME internationalization***

Our analysis has led us to believe that simply having more knowledge is not a sufficient determinant of international performance, but that perhaps by having an optimal combination of knowledge from different sources, an SME can boost its international performance.

The knowledge sources that we identified as most useful included customers, international partnerships, prior management and employee international knowledge and experience, and government resources such as export agencies/consultants. These knowledge sources seemed to be most strongly

associated with providing knowledge that promoted international performance and the achievement of international goals. Therefore, it may be possible to use this subset of knowledge sources to understand the knowledge dynamics that may lead to higher international performance. It is proposed that firms that can most efficiently gather relevant knowledge from these sources, if motivated to internationalize, will be able to improve their international performance, here measured as degree of internationalization.

We have also proposed that these key knowledge sources appear to contribute to certain intangible variables that may vary positively with international performance. These are adaptive innovation, maturity of international strategy, and prior international knowledge and experience. We argue that companies that are higher on these three dimensions can achieve superior international performance.

Adaptive innovation and maturity of international strategy seem to be closely related to an understanding of customers, and in-depth partnerships. Prior knowledge and experience of the firm, are not surprisingly, mostly influenced by the characteristics of the company's management and employees. The idea that an optimal combination of internal and external knowledge sources exists is very consistent with the arguments of Denicolai et al. (2014), and suggests that we should be concerned with the specific diversity and nature of knowledge resources. Finally, it is proposed that optimal knowledge combinations will vary across firms; most likely depending on the prior experience of employees or the management team. We predict that it is important to find ways of evaluating one's own knowledge resource combinations, and an ability to benchmark one's knowledge resources against a certain ideal combination.

We believe our research contributes to several fields of international business research. International new venture theory has emphasized the role of top manager characteristics, knowledge, and network variables in explaining international performance. We have supported these ideas but we have also delved into the specific knowledge sources and capabilities that lead to international performance. The Uppsala model is somewhat supported by our findings because we argue that firms learn from the experience of communicating with foreign partners and

customers, and that the prior experience of managers is important. In contrast with the Uppsala model, we argue that network development and learning does not have to take a long time. Through the use of particular knowledge sources, SMEs can rather rapidly bring new knowledge into the firm. This depends on the SMEs ability to recognize learning opportunities, and the ability to integrate knowledge, supporting absorptive capacity arguments. Finally, the eclectic paradigm argues that firms need firm specific advantages in order to internationalize. Since one of our main arguments is that an optimal combination of knowledge will create capabilities that allow firms to achieve superior international performance, we believe this is consistent with prior eclectic paradigm arguments.

In conclusion, we were able to achieve our main research objective of creating a deeper understanding of the knowledge sources relevant to knowledge-intensive internationalizing SMEs; and we were also able to make assumptions about the link between the use of certain knowledge sources and international performance. Optimal combinations of internal and external knowledge sources are argued to contribute to increased international performance, and the nature of these optimal knowledge sources, and the capabilities they help create was explored.

Our research question of where SMEs get the knowledge they need to internationalize was adequately answered through our survey and interview approach, as we were able to identify clear sources of knowledge relevant to internationalization; and we believe that the second part of our research question about how knowledge sources influence the extent of internationalization was adequately investigated through both research methods.

### ***Integrated conceptual framework resulting from survey and interview analysis***

Using our insights gathered from the survey results and the interview results, we created the integrated conceptual framework below. Comparing it with our preliminary framework, this conceptual framework highlights external formal network knowledge sources and prior internal knowledge and experience sources as having an indirect effect on extent of internationalization.

The interviews added a lot of depth to our understanding of how different knowledge sources relate to international performance, and the survey results largely supported the interview analysis insights. Below, we name three intangible knowledge variables that we believe are strongly associated with the SME's internationalization capabilities and international performance. We argue that *adaptive innovation capabilities* are developed through close interaction with customers and international partnerships. In this framework, we term the prior international knowledge and experience within the firm as *congenital learning capabilities*. These capabilities depend on the backgrounds and prior knowledge and experience of the company's founder and employees. Finally, *maturity of the company's international strategy* is positively affected by several external formal network knowledge sources. Industry tradeshows, conferences, and associations are proposed to have a positive effect on the development of international partnerships and customer interaction, which are argued to be key knowledge sources.

Recruitment of new employees was identified to be a useful, but underused, source of knowledge for internationalization. It is logical that SMEs could increase their knowledge stocks by simply hiring individuals who have the needed international experience. Therefore, we propose that this is a good way for firms that lack prior internal knowledge to more rapidly gain internationalization capabilities. Of course, the ability to benefit from the knowledge of new employees depends on the firm's ability to recognize and integrate this new knowledge.

This framework has several implications for theory. It suggests that SMEs rely heavily on network-related variables to internationalize, as well as prior knowledge and experience. In the absence of prior knowledge and experience, we would argue that there is an even greater reliance on network variables. As we noted in the literature review, network theory and upper echelon theory have been used to explain the SME's ability to rapidly internationalize and overcome liabilities of foreignness. This framework provides more insight into how these theories can be combined to explain an SMEs internationalization. Furthermore, the framework contains knowledge sources that are relatively easy to identify and understand.

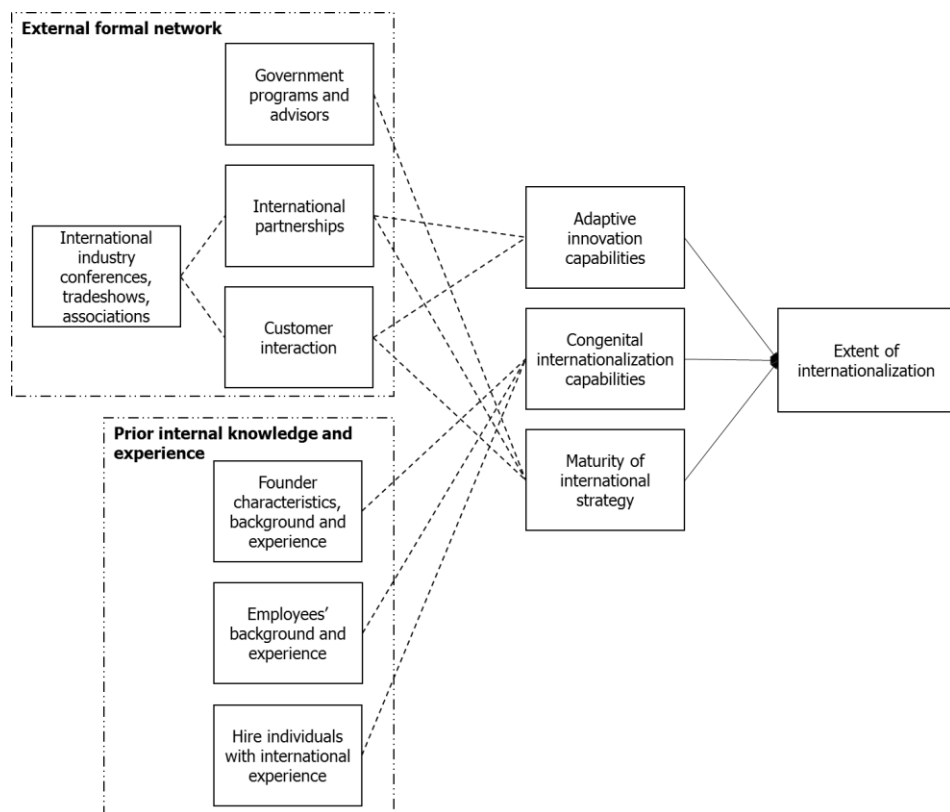
Several arguments of the knowledge-based-view appear to be applicable to our conceptual framework. Firstly, the idea that a firm's competitive advantage depends on its mechanisms of knowledge integration is evident in this framework. Having mechanisms to integrate the different knowledge from different sources is essential to the development of an SME's international competitive advantage. Furthermore, the inimitability of capabilities is argued to partly depend on the way that firms integrate knowledge from a specific set of knowledge sources. Also, the argument that a broader scope of knowledge integrated in a capability should make it less imitable is supported by our argument that a combination of internal and external network knowledge sources is required for superior international performance. Finally, it is arguable that tacit forms of knowledge, built through experience are more valuable to a firm's advantages than explicit forms of knowledge. Per this argument, we expect that *adaptive innovation capabilities*, *congenital learning capabilities*, and *maturity of international strategy* that depend on collections of tacit knowledge are the most valuable. Therefore, we argue that customer interactions and partnerships that are carefully designed to allow for the exchange and learning of tacit forms of knowledge will be most valuable to the international competitive advantage of the internationalizing SME.

This framework also has several implications for managers. If you are an SME intending to internationalize, this framework suggests that you should first take stock of your existing internal knowledge resources, and explore your own capabilities before making large investments in hiring consultants or other help. If you lack the prior international knowledge and experience, you can make up for this by finding and hiring individuals who have the international experience you need. Integrating their knowledge into the firm will increase your overall internationalization knowledge assets. Participating in relevant industry international tradeshows, conferences, or being part of associations will help you get access to potential international partnerships and customers. Government advisors can help you build your international strategy, but they cannot help you develop the actual capabilities that will enable you to succeed. These capabilities will mainly be developed through the depth of your customer-related knowledge and the knowledge you develop through partnerships. Even for those who have strong prior international knowledge and experience, we recommend using these

external network knowledge sources to build adaptive innovation capabilities, and a good international strategy.

Considering that prior knowledge and experience can be out-of-date and static, building a network with customers and partners will help keep knowledge in the company up-to-date and dynamic. Adapting to the international environment (including customers) requires you to adapt your innovation based on the knowledge you gain from your customers and partnerships. Finally, taking an ad hoc approach to internationalization is considered an unlikely path towards strong international performance. Instead, it is recommended that you invest the time, resources, and personal as well as organisational commitment to develop a clear, and well-articulated, international strategy that gives you a roadmap of where you are going, and why you are going there.

**Figure 5: Integrated conceptual framework of SME internationalization**



## **Limitations and suggestions for future research**

### ***Interview method limitations***

Readers should be aware of several limitations of our interview research method. Although we came up with a conceptual framework that we believe is generalizable, our thesis was limited in the number of firms in certain industries and countries that we could get to participate in the time we had available. Also, our sample of companies may not relate to all different types of organizations and industries, and we limited our analysis to small internationalizing firms in the ICT industry. Firms in our interviews were of different ages, sizes, and levels of internationalization, which may have limited our ability to compare across firms at identical stages of development. Although our interviews and surveys were limited to the participation of the CEO, or founder, or another high-level international strategy decision maker, we believe that these individuals are the most knowledgeable people in the company on our topic, supporting the validity of our findings.

### ***Survey method limitations***

Our survey method also has some limitations. Since the survey is exploratory, and is based on a non-probability sample, the results may not be generalizable. Also, our sampling of companies in select knowledge based industries and our geographical focus may limit generalizations outside of this context. We acknowledge that achieving accuracy in measuring knowledge factors with an email survey is a difficult task. Following this, the survey is not exhaustive and one should be mindful of the purposes and design of the survey. It was meant to be used as a part of a mixed-method approach to conduct a first study of the research field of interest, and as an exploratory tool to help build a conceptual framework as well as make suggestions for future research.

### ***Suggestions for future research***

Future research should investigate the knowledge sources that we defined as most important in greater depth, and try to measure and understand the knowledge dynamics of these internal and external variables. This research could employ quantitative methods to test some of the relationships we began to explore in this



thesis. Conversely, further qualitative methods could be used in different contexts to help confirm or generalize these ideas.

We also believe that future research could focus on solidifying our understanding of performance-enhancing knowledge combinations, and could delve into greater detail on what knowledge combinations are most useful for SMEs' internationalization. Future studies could also aim to refine, and create better measures for knowledge factors and for international performance.

Finally, we think further research that studies the effects of knowledge flows from diverse sources on international performance, combining different theoretical lenses, would be interesting. The effects of knowledge on performance are likely too complicated to be fully explained by one theory or measure, so we think that an integrated approach is necessary. Since knowledge is not easily quantifiable, we propose that further mixed-method studies are needed on this topic to combine the depth and detail of qualitative methods with the precision of quantitative methods.

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## Appendix

Appendix 1: Table of variables used for statistical analysis

<b>Independent variable</b>	<b>Acronyms</b>	<b>Operationalization</b>	<b>Measurement scale</b>	<b>Type of variable</b>
Firm home country	COUNTRY	Based on current IP-address of respondent and company website	Text entry from iplocation.net	Nominal text variable
Respondent current role in the organization	ROLE	What is your current role in the organization? (please check all of the boxes that apply)	Checkbox from list: - CEO or Founder - Chairman of the Board - Other international strategy decision maker - None of the above (text entry)	Nominal text variable
Firms current main industry	INDUSTRY	Please select the main industry your company currently operates in	Select from list: - Oil and gas - Digital Media - Maritime Marine - Health and life sciences - ICT or software technology (IT) - Energy and environment - Aerospace and defence - E-Commerce - Consulting - Other industries (text entry)	Dichotomous text variable: ICT or software technology (IT), Other industries

Early formulated initial international strategy	INITIAL_INT_STRAT	When you first decided to undertake international activities (e.g. exporting, joint ventures, production etc.), did you develop a specific strategy for internationalization (as opposed to a simple evolution of on-going activities)?	Select from list: - Yes - No	Dichotomous variable: No (0), Yes (1)
Use of a knowledge or information management system	KNOWLEDGE_MAN	Regarding the knowledge/information needed to carry out the internationalization activity, did your company have a formal approach to organizing the information (or knowledge) received? (e.g. databases or methodologies for storing and disseminating information/knowledge).	Select from list: - Yes - No	Dichotomous variable: No (0), Yes (1)
The usefulness of domestic and international external resources	DOMESTIC_RES, INTERNATIONAL_RES	To the extent that your company used external resources to develop its' internationalization capabilities, how useful were resources available domestically and internationally in building the knowledge required for your internationalization.	Two times 1-7 Likert items, from Not Useful (1) to Very Useful (7)  - Domestic resources - International resources	Two seven-point ordinal variables, ranging from 1 to 7
Age of the firm	COMPANY_AGE	2017 – Year of founding: What year was your firm founded? (Business registration)	Text entry	Interval variable
Internationalization speed	INTERNAT_DELAY	2017 – Year of first international activity: In what year did your company first undertake international activities?	Text entry	Interval variable

International experience of the firm	COMP_INT_EXPERIENCE	COMPANY_AGE – INTERNAT_DELAY	Computed new variable	Interval variable
Nature of first international activity	FIRST_INT_ACTIVITY	What was the nature of your first international activity? (eg. Exports, joint-ventures, production etc.)	Text entry, later reduced into categories	Nominal text variable
Nature of current international strategy	NOW_INT_SALES, NOW_JV, NOW_GREENFIELD, NOW_FRANCH_LICE, NOW_AQUISITION, NOW_ALLIANCE	Which of the following does your current international strategy include (please check all of the boxes that apply)	Checkbox from list: - Exporting or international sales/clients - Joint venture - Greenfield investment - Franchising/licensing - Acquisitions of foreign companies - Strategic alliance with foreign company - Other (text entry)	Six dichotomous variables: No (0), Yes (1)
Extent of reliance on intangible assets	INTANGIBLE_ASSETS	To what extent does your company rely on intangible assets for its competitive advantage (eg. intellectual capital etc.)	1-7 Likert item, from Not at all (1) to Highly (7)	Seven-point ordinal variable, ranging from 1 to 7
R&D spending	R_D	How much does your company currently spend on average on R&D (as a percentage of total expenditures)?	Select from list: - The company does not have any R&D expenditures (1) - Less than 5% (2) - Between 5% and 10% (3) - Between 10% and 15% (4) - More than 15% (5)	Five-point ordinal variable, ranging from 1 to 5



Firm size	EMPLOYEES	Approximately how many employees does your firm currently have?	Select from list: 0 – 9 (1) 10 – 49 (2) 50 – 249 (3) 250-500 (4) More than 500 (5)	Five-point ordinal variable, ranging from 1 to 5
International sales intensity	INT_SALES	Approximately, what are your international sales as a % of total sales?	Select from list: - Less than 1% (1) - Between 1% and 10% (2) - Between 10% and 25% (3) - Between 25% and 50% (4) - Between 50% and 75% (5) - More than 75% (6)	Six-point ordinal variable, ranging from 1 to 6
International asset intensity	FOREIGN_ASSETS	Approximately, what are your foreign assets as a % of your total assets?	Select from list: - Less than 1% (1) - Between 1% and 10% (2) - Between 10% and 25% (3) - Between 25% and 50% (4) - Between 50% and 75% (5) - More than 75% (6)	Six-point ordinal variable, ranging from 1 to 6
Current markets with sales	NOW_SALES_NA, NOW_SALES_ASIA, NOW_SALES_SA, NOW_SALES_AFRC,	Which continents do you currently have sales in? (please check all the boxes that apply)	Checkbox from list: - Asia - Europe - North America - South America	Dichotomous variables: No (0), Yes (1)

	NOW_SALES_AUST, NOW_SALES_EUR		- Africa - Australia/NZ/Oceania	
International scope	NOW_SALES_CONT	Count the number of continents from current markets with sales	Created new variable	Interval variable
Internationalization index	INTERNAT_INDEX	Sum of ordinal scores from; international sales intensity, international asset intensity, international scope	Created new variable	Ordinal index, ranging from 3 to 18
Sourcing of firm knowledge needed to internationalize	USE_VENTURE_CAP, USE_ALLIANCES_PART, USE_GOVERN_PUBL, USE_PRIV_INST, USE_CONSULTANTS, USE_CUSTOMERS, USE_SUPPLIERS, USE_NEW_EMPLOYEES, USE_CLUSTER, USE_INFORM_NETW, USE_COMPETITORS, USE_TMT_EXPERIENCE, USE_EMPLOY_EXPERI, USE_CONTRACTORS, USE_MARKET_RESEARCH	Which of the following sources of knowledge and/or information did your company use to gain knowledge related to your ability to internationalize? (please check all the boxes that apply)	Checkbox from list: - Venture capital partners and investors - Company alliances and partnerships - Government agencies and public institutions - Private institutions, programs or incubators - Private consultants - Customers - Suppliers or supply chain collaborators - Recruitment of new employees - Knowledge from operating in a cluster of organizations - Informal personal network - Competitors - Prior experience of founder or top management team	Fifteen dichotomous variables: No (0), Yes (1)

			<ul style="list-style-type: none"> <li>- Prior experience of other company employees</li> <li>- Contractors</li> <li>- Market research firms</li> </ul>	
Spread or concentration of knowledge sourcing	USE_COUNT	Count the number of knowledge sources selected for sourcing of firm knowledge needed to internationalize	Created new variable	Interval variable
Managers perceptions of usefulness of knowledge sources for the attainment of market knowledge	MK_VENTURE_CAP, MK_ALLIANCES_PART, MK_GOVERN_PUBL, MK_PRIV_INST, MK_CONSULTANTS, MK_CUSTOMERS, MK_SUPPLIERS, MK_NEW_EMPLOYEES, MK_CLUSTER, MK_INFORM_NETW, MK_COMPETITORS, MK_TMT_EXPERIENCE, MK_EMPLOY_EXPERI, MK_CONTRACTORS, MK_MARKET_RESEARCH	How useful have the following (previously selected) knowledge sources been in helping you develop market knowledge related to your ability to internationalize?	Likert scale, with up to fifteen 1-7 Likert items, from Not useful (1) to Very useful (7)	Fifteen seven-point ordinal variables, ranging from 1 to 7
Managers perceptions of usefulness of knowledge sources for the	TK_VENTURE_CAP, TK_ALLIANCES_PART, TK_GOVERN_PUBL,	How useful have the following (previously selected) knowledge sources been in helping you	Likert scale, with up to fifteen 1-7 Likert items, from Not useful (1) to Very useful (7)	Fifteen seven-point ordinal variables, ranging from 1 to 7

<p>attainment of technological knowledge</p>	<p>TK_PRIV_INST, TK_CONSULTANTS, TK_CUSTOMERS, TK_SUPPLIERS, TK_NEW_EMPLOYEES, TK_CLUSTER, TK_INFORM_NETW, TK_COMPETITORS, TK_TMT_EXPERIENCE, TK_EMPLOY_EXPERI, TK_CONTRACTORS, TK_MARKET_RESEARCH</p>	<p>develop technological knowledge related to your ability to internationalize?</p>		
<p>Managers perceptions of usefulness of knowledge sources for the attainment of international-ization knowledge</p>	<p>IK_VENTURE_CAP, IK_ALLIANCES_PART, IK_GOVERN_PUBL, IK_PRIV_INST, IK_CONSULTANTS, IK_CUSTOMERS, IK_SUPPLIERS, IK_NEW_EMPLOYEES, IK_CLUSTER, IK_INFORM_NETW, IK_COMPETITORS, IK_TMT_EXPERIENCE, IK_EMPLOY_EXPERI, IK_CONTRACTORS, IK_MARKET_RESEARCH</p>	<p>How useful have the following (previously selected) knowledge sources been in helping you develop internationalization knowledge related to your ability to internationalize?</p>	<p>Likert scale, with up to fifteen 1-7 Likert items, from Not useful (1) to Very useful (7)</p>	<p>Fifteen seven-point ordinal variables, ranging from 1 to 7</p>

<p>Total learned knowledge from selected knowledge sources</p>	<p>MK_INDEX TK_INDEX IK_INDEX TOTK_INDEX</p>	<p>Sum of usefulness scores from each respondent, for each type of knowledge</p>	<p>Created four new variables</p>	<p>Four interval variables</p>
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## Appendix 2: Data overview of usefulness scores of knowledge sources

Use of knowledge sources:	MK							TK							IK							TOTK						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Venture capital partners and investors	0	2	1	4	2	2	2	3	1	5	0	1	2	1	0	0	3	2	2	2	4	3	3	9	6	5	6	7
Company alliances and partnerships	1	0	4	11	11	11	5	7	4	9	8	8	4	3	1	1	12	4	13	7	5	9	5	25	23	32	22	13
Government agencies and public institutions	1	4	6	8	6	4	1	9	5	8	0	3	2	3	0	8	3	5	8	4	2	10	17	17	13	17	10	6
Private institutions, programs or incubators	1	1	2	2	5	1	0	4	2	5	0	0	1	0	3	0	4	3	2	0	0	8	3	11	5	7	2	0
Private consultants	0	1	4	4	6	4	4	6	6	5	2	3	1	0	3	3	6	7	2	0	2	9	10	15	13	11	5	6
Customers	1	3	4	7	7	18	13	4	5	5	15	8	6	10	3	4	7	10	7	14	8	8	12	16	32	22	38	31
Suppliers or supply chain collaborators	1	2	0	4	2	6	1	1	4	1	5	1	4	0	0	4	2	5	3	1	1	2	10	3	14	6	11	2
Recruitment of new employees	0	1	3	3	5	4	4	1	0	3	7	4	1	4	0	1	2	6	7	3	1	1	2	8	16	16	8	9
Knowledge from operating in a cluster of organisations	0	1	5	1	5	2	0	2	3	5	1	1	2	0	0	1	3	5	5	0	0	2	5	13	7	11	4	0
Informal personal network	0	1	5	6	10	11	12	2	9	7	4	12	8	3	1	4	9	13	5	9	4	3	14	21	23	27	28	19
Competitors	2	2	4	8	3	4	3	5	4	5	5	2	2	3	6	2	3	6	5	2	2	13	8	12	19	10	8	8
Prior experience of founder or top management team	0	1	1	3	10	14	11	1	0	2	3	6	8	20	0	2	1	7	9	10	11	1	3	4	13	25	32	42
Prior experience of other company employees	0	2	1	1	7	3	2	0	0	0	1	4	5	6	1	2	1	3	3	2	4	1	4	2	5	14	10	12
Contractors	0	2	1	3	1	1	2	1	2	1	1	3	1	1	0	2	1	2	2	1	2	1	6	3	6	6	3	5
Market research firms	0	0	1	3	2	0	0	2	2	0	2	0	0	0	0	1	1	2	1	1	0	2	3	2	7	3	1	0

Appendix 3: Correlation table of control variables and internationalization (dependent variables)

Descriptive Statistics			Correlations																										
	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
1	INITIAL INT STRAT	0,47	0,50		0,59**	0,27*	0,32**	0,10	-0,14	0,36**	-0,07	0,00	0,07	-0,13	0,01	0,07	-0,23	-0,13	0,26*	-0,01	-0,16	0,03	-0,07	-0,03	0,06	-0,14	0,20	-0,04	-0,01
2	KNOWLEDGE MAN	0,44	0,50	0,59**		0,25*	0,33**	0,07	-0,10	0,31**	-0,19	-0,03	0,38**	-0,01	-0,10	0,09	-0,14	-0,02	0,21	0,08	-0,06	0,06	-0,05	0,00	-0,05	-0,05	0,16	0,02	0,05
3	DOMESTIC RES	3,60	1,55	0,27*	0,25*		0,34**	0,15	-0,03	0,20	0,09	0,14	0,16	0,09	0,01	0,15	-0,24	-0,10	0,37**	-0,05	-0,10	0,31*	0,28*	0,12	0,02	-0,04	0,17	0,04	0,08
4	INTERNATIONAL RES	3,81	1,82	0,32**	0,33**	0,34**		0,07	-0,08	0,17	0,09	-0,02	0,27*	-0,08	0,01	-0,01	-0,14	-0,16	0,10	-0,05	-0,18	0,04	-0,01	-0,16	-0,02	0,02	0,18	-0,12	0,02
5	COMPANY AGE	10,53	6,41	0,10	0,07	0,15	0,07		0,64**	0,41**	0,05	-0,03	0,04	0,27*	0,13	0,02	0,05	-0,08	0,31*	0,42**	0,25*	0,41**	0,19	0,30*	-0,01	0,40**	0,06	0,43**	0,44**
6	COMP INT EXPERIENCE	6,71	5,64	-0,14	-0,10	-0,03	-0,08	0,64**		-0,31**	0,05	-0,19	-0,09	0,28*	0,02	0,10	0,07	-0,06	0,30*	0,30*	0,42**	0,34**	0,32**	0,41**	0,05	0,51**	0,15	0,46**	0,57**
7	INTERNAT DELAY	3,82	4,73	0,36**	0,31**	0,20	0,17	0,41**	-0,31**		-0,03	0,05	0,21	-0,06	0,00	0,01	-0,18	0,02	0,10	0,15	-0,16	0,03	-0,25*	-0,15	-0,07	-0,09	0,02	-0,05	-0,10
8	NOW INT SALES	0,90	0,31	-0,07	-0,19	0,09	0,09	0,05	0,05	-0,03		-0,14	-0,19	0,11	-0,12	-0,01	-0,09	0,02	-0,04	-0,12	-0,12	0,05	-0,03	-0,13	0,13	0,04	-0,07	-0,07	-0,08
9	NOW JV	0,25	0,44	0,00	-0,03	0,14	-0,02	-0,03	-0,19	0,05	-0,14		0,07	0,14	0,30*	-0,03	0,06	-0,07	0,14	0,17	-0,12	0,13	0,21	-0,04	-0,05	0,01	0,12	0,00	0,06
10	NOW ALLIANCE	0,59	0,50	0,07	0,38**	0,16	0,27*	0,04	-0,09	0,21	-0,19	0,07		-0,11	0,08	0,06	-0,07	0,18	0,06	0,09	0,01	0,20	0,12	0,10	0,16	-0,08	-0,05	0,17	0,00
11	NOW AQUISION	0,10	0,31	-0,13	-0,01	0,09	-0,08	0,27*	0,28*	-0,06	0,11	0,14	-0,11		0,12	0,01	0,07	0,12	0,31*	0,12	0,12	0,31*	0,33**	0,13	0,00	0,12	0,30*	0,18	0,26*
12	NOW GREENFIELD	0,06	0,24	0,01	-0,10	0,01	0,01	0,13	0,02	0,00	-0,12	0,29*	0,08	0,12		0,12	0,27*	-0,01	0,13	0,17	-0,08	0,03	0,10	0,13	-0,07	0,12	0,11	0,06	0,12
13	NOW FRANCH LICE	0,13	0,34	0,07	0,09	0,15	-0,01	0,02	0,10	0,01	-0,01	-0,03	0,06	0,01	-0,10		0,11	0,16	0,07	-0,21	0,22	0,02	0,13	0,16	0,16	-0,00	0,11	0,08	0,09
14	INTANGIBLE ASSETS	6,09	1,00	-0,23	-0,14	-0,24	-0,14	0,05	0,07	-0,18	-0,09	0,06	-0,07	0,07	0,27*	0,11		-0,00	-0,18	0,25*	0,32**	0,25*	0,28*	0,34**	-0,05	0,20	-0,05	0,36**	0,30*
15	R D	4,47	0,98	-0,13	-0,02	-0,10	-0,16	-0,08	-0,06	0,02	0,02	-0,07	0,18	0,12	-0,01	0,16	-0,00		-0,18	-0,22	-0,02	0,01	0,14	-0,09	0,07	-0,07	0,15	-0,07	-0,01
16	EMPLOYEES	1,97	0,90	0,26*	0,21	0,37**	0,10	0,31*	0,30*	0,10	-0,04	0,14	0,06	0,31*	0,13	0,07	-0,18	-0,18		0,25*	0,03	0,40**	0,30*	0,16	-0,09	0,07	0,23	0,18	0,21
17	NOW SALES NA	0,69	0,47	-0,01	0,08	-0,05	-0,05	0,42**	0,30*	0,15	-0,12	0,17	0,09	0,12	0,17	-0,21	0,25*	-0,22	0,25*		0,35**	0,26*	0,15	0,40**	-0,19	0,35**	-0,10	0,63**	0,45**
18	NOW SALES ASIA	0,40	0,49	-0,16	-0,06	-0,10	-0,18	0,25*	0,42**	-0,16	-0,12	-0,12	0,01	0,12	-0,08	0,22	0,32**	-0,02	0,03	0,35**		0,33**	0,36**	0,47**	0,17	0,35**	0,02	0,74**	0,56**
19	NOW SALES SA	0,21	0,41	0,03	0,06	0,31*	0,04	0,41**	0,34**	0,03	0,05	0,13	0,20	0,31*	0,03	0,02	0,25*	0,01	0,40**	0,26*	0,33**		0,60**	0,44**	0,21	0,25*	0,10	0,63**	0,50**
20	NOW SALES AFRC	0,12	0,32	-0,07	-0,05	0,28*	-0,01	0,19	0,32**	-0,25*	-0,03	0,21	0,12	0,33**	0,10	0,13	0,28*	0,14	0,30*	0,15	0,36**	0,60**		0,51**	0,15	0,28*	0,19	0,51**	0,52**
21	NOW SALES AUST	0,26	0,44	-0,03	0,00	0,12	-0,16	0,30*	0,41**	-0,15	-0,13	-0,04	0,10	0,13	0,13	0,16	0,34**	-0,09	0,16	0,40**	0,47**	0,44**	0,51**		0,16	0,28*	-0,10	0,73**	0,51**
22	NOW SALES EUR	0,85	0,36	0,06	-0,05	0,02	-0,02	-0,01	0,05	-0,07	0,13	-0,05	0,16	0,00	-0,07	0,16	-0,05	0,07	-0,09	-0,19	0,17	0,21	0,15	0,16		-0,01	-0,01	0,40**	0,13
23	INT SALES	3,90	1,77	-0,14	-0,05	-0,04	0,02	0,40**	0,51**	-0,09	0,04	0,01	-0,08	0,12	0,12	-0,00	0,20	-0,07	0,07	0,35**	0,35**	0,25*	0,28*	0,28*	-0,01		0,17	0,42**	0,84**
24	FOREIGN ASSETS	1,91	1,29	0,20	0,16	0,17	0,18	0,06	0,15	0,02	-0,07	0,12	-0,05	0,30*	0,11	0,11	-0,05	0,15	0,23	-0,10	0,02	0,10	0,19	-0,10	-0,01	0,17		-0,03	0,44**
25	NOW SALES CONT	2,53	1,61	-0,04	0,02	0,04	-0,12	0,43**	0,46**	-0,05	-0,07	0,00	0,17	0,18	0,06	0,08	0,36**	-0,07	0,18	0,63**	0,74**	0,63**	0,51**	0,73**	0,40**	0,42**	-0,03		0,70**
26	INTERNAT INDEX	8,34	3,30	-0,01	0,05	0,08	0,02	0,44**	0,57**	-0,10	-0,08	0,06	0,00	0,30*	0,12	0,09	0,30*	-0,01	0,21	0,45**	0,56**	0,50**	0,52**	0,51**	0,13	0,84**	0,44**	0,70**	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Appendix 4: Multicollinearity tests for control variables

<b>VIF scores</b>		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	<b>Average</b>	<b>Max</b>
1	INITIAL_INT_STRAT		1,58	2,32	2,29	2,28	2,16	2,33	2,32	2,06	2,26	2,25	2,33	2,18	2,32	2,26	2,34	2,33	2,34	2,32	2,32	2,25	<b>2,24</b>	<b>2,34</b>
2	KNOWLEDGE_MAN	1,52		2,21	2,25	2,25	2,26	2,21	2,26	1,87	2,18	2,13	2,26	2,20	2,25	2,26	2,25	2,26	2,24	2,22	2,26	2,22	<b>2,18</b>	<b>2,26</b>
3	DOMESTIC_RES	1,90	1,88		1,78	1,86	1,87	1,91	1,92	1,90	1,92	1,92	1,88	1,70	1,89	1,89	1,90	1,91	1,85	1,81	1,87	1,90	<b>1,87</b>	<b>1,92</b>
4	INTERNATIONAL_RES	1,46	1,49	1,39		1,48	1,49	1,47	1,49	1,39	1,50	1,50	1,50	1,49	1,45	1,49	1,50	1,50	1,49	1,49	1,43	1,50	<b>1,47</b>	<b>1,50</b>
5	COMP_INT_EXPERIENCE	2,06	2,10	2,04	2,09		2,10	2,11	2,03	2,05	1,99	2,07	2,10	2,06	2,10	2,06	2,08	2,07	2,08	2,07	1,98	2,11	<b>2,07</b>	<b>2,11</b>
6	INTERNAT_DELAY	1,54	1,67	1,62	1,66	1,66		1,66	1,65	1,66	1,67	1,67	1,65	1,66	1,62	1,59	1,56	1,64	1,53	1,56	1,65	1,65	<b>1,63</b>	<b>1,67</b>
7	NOW_INT_SALES	1,27	1,25	1,27	1,25	1,27	1,27		1,24	1,24	1,26	1,27	1,27	1,27	1,27	1,27	1,27	1,25	1,26	1,27	1,26	1,24	<b>1,26</b>	<b>1,27</b>
8	NOW_JV	1,44	1,45	1,45	1,44	1,39	1,44	1,41		1,45	1,44	1,36	1,43	1,43	1,43	1,45	1,37	1,41	1,45	1,33	1,40	1,44	<b>1,42</b>	<b>1,45</b>
9	NOW_ALLIANCE	1,64	1,54	1,84	1,72	1,81	1,85	1,81	1,86		1,79	1,78	1,85	1,79	1,76	1,86	1,83	1,85	1,79	1,85	1,85	1,80	<b>1,79</b>	<b>1,86</b>
10	NOW_AQUISITION	1,51	1,51	1,56	1,56	1,47	1,56	1,55	1,55	1,50		1,56	1,56	1,56	1,51	1,49	1,56	1,56	1,55	1,55	1,55	1,56	<b>1,54</b>	<b>1,56</b>
11	NOW_GREENFIELD	1,42	1,38	1,46	1,47	1,44	1,47	1,46	1,37	1,40	1,46		1,42	1,30	1,46	1,40	1,47	1,46	1,40	1,46	1,45	1,47	<b>1,43</b>	<b>1,47</b>
12	NOW_FRANCH_LICE	1,48	1,49	1,46	1,49	1,49	1,47	1,49	1,47	1,48	1,49	1,44		1,37	1,45	1,39	1,30	1,37	1,38	1,48	1,44	1,48	<b>1,44</b>	<b>1,49</b>
13	INTANGIBLE_ASSETS	1,79	1,87	1,69	1,91	1,88	1,91	1,91	1,89	1,84	1,92	1,69	1,76		1,87	1,79	1,87	1,92	1,73	1,83	1,91	1,88	<b>1,84</b>	<b>1,92</b>
14	R_D	1,45	1,46	1,44	1,41	1,46	1,42	1,46	1,44	1,38	1,42	1,46	1,42	1,43		1,45	1,44	1,46	1,46	1,35	1,43	1,46	<b>1,43</b>	<b>1,46</b>
15	EMPLOYEES	2,06	2,13	2,09	2,13	2,08	2,04	2,13	2,13	2,13	2,03	2,03	1,98	1,99	2,11		2,03	2,09	1,91	2,12	2,09	2,08	<b>2,07</b>	<b>2,13</b>
16	NOW_SALES_NA	2,09	2,09	2,06	2,09	2,06	1,96	2,08	1,97	2,05	2,09	2,09	1,82	2,04	2,06	1,99		1,86	2,08	2,05	1,89	2,00	<b>2,02</b>	<b>2,09</b>
17	NOW_SALES_ASIA	1,89	1,89	1,88	1,89	1,86	1,87	1,85	1,84	1,89	1,89	1,88	1,74	1,89	1,89	1,86	1,68		1,84	1,85	1,89	1,86	<b>1,86</b>	<b>1,89</b>
18	NOW_SALES_SA	2,64	2,63	2,55	2,64	2,61	2,42	2,62	2,64	2,54	2,63	2,52	2,45	2,39	2,65	2,37	2,64	2,58		2,45	2,62	2,52	<b>2,56</b>	<b>2,65</b>
19	NOW_SALES_AFRC	2,59	2,57	2,45	2,60	2,57	2,45	2,61	2,40	2,60	2,60	2,59	2,59	2,50	2,41	2,59	2,56	2,56	2,42		2,43	2,61	<b>2,53</b>	<b>2,61</b>
20	NOW_SALES_AUST	2,30	2,31	2,25	2,21	2,17	2,28	2,30	2,24	2,30	2,29	2,29	2,23	2,30	2,26	2,27	2,09	2,31	2,29	2,15		2,28	<b>2,26</b>	<b>2,31</b>
21	NOW_SALES_EUR	1,35	1,37	1,38	1,40	1,40	1,38	1,36	1,39	1,35	1,40	1,40	1,39	1,37	1,39	1,36	1,34	1,37	1,33	1,39	1,37		<b>1,37</b>	<b>1,40</b>



Appendix 5: Log odds coefficients of use of knowledge sources influence on internationalization

Independent variable	Model nr.											
	1	2	3	4	5	6	7	8	9	10	11	
USE_GVERN_PUBL	68	1.92**	1.89	2.06	2.03*	2.02**	2.02**	2.04**	1.71**	1.28*	1.46**	1.47**
USE_NEW_EMPLOYEES	68	1.01	10.03**	5.83**	2.64**	1.82*	1.82*	1.80*	1.82*	1.86**	1.07	1.07
USE_CUSTOMERS	68	1.36*	8.72**	3.16**	1.09	1.37	1.36	1.34	1.29	1.19	0.93	0.93
USE_TMT_EXPERIENCE	68	0.43	4.12*	2.41*	1.63*	1.61*	1.60*	1.60*	1.34	0.74	0.53	0.53
USE_VENTURE_CAP	68	0.17	6.29**	4.54**	1.69	0.74	0.73	0.74	0.63	0.66	0.35	0.35
USE_MARKET_RESEARCH	68	0.19	-0.39	-1.84	0.59	0.37	0.38	0.36	0.65	0.56	0.79	0.80
USE_COMPETITORS	68	0.24	-2.27*	-0.57	0.06	0.39	0.40	0.41	0.63	0.88	0.22	0.22
USE_SUPPLIERS	68	-0.10	2.66*	0.41	0.31	0.00	-0.01	-0.02	-0.20	-0.12	-0.31	-0.31
USE_CONSULTANTS	68	-0.07	2.08	-0.15	-0.25	-0.61	-0.61	-0.64	-0.78	-0.46	-0.10	-0.10
USE_PRIV_INST	68	-1.48*	-4.37*	-1.65	-0.58	0.19	0.20	0.20	-0.03	-0.40	-1.06	-1.06
USE_EMPLOY_EXPERI	68	-0.26	-5.25**	-0.37	-0.07	-0.15	-0.16	-0.13	-0.12	-0.29	0.14	0.14
USE_ALLIANCES_PART	68	0.32	-4.79**	-1.39	-0.03	-0.34	-0.33	-0.34	-0.25	-0.22	0.14	0.15
USE_CLUSTER	68	-0.09	5.01**	0.23	-0.69	-0.39	-0.39	-0.42	-0.03	0.33	-0.05	-0.04
USE_INFORM_NETW	68	-0.76	-4.56**	-3.27**	-2.20**	-1.95**	-1.95**	-1.92**	-1.38*	-1.41*	-0.67	-0.67
USE_CONTRACTORS	68	-0.26	-14.78**	-8.01**	-3.80**	-2.74**	-2.73**	-2.70**	-2.34*	-1.83*	-0.63	-0.62
COMP_INT_EXPERIENCE	68	0.44**	0.61**	0.43**	0.35**	0.35**	0.35**	0.33**	0.23**	0.20**	0.20**	0.20**
KNOWLEDGE_MAN	68	12.75**	4.51**	2.01	1.68	1.67	1.61*	1.36*	0.71	0.03		
INTANGIBLE_ASSETS=3	1	-32.38	-31.35	-28.77	-27.50	-27.48	-27.49	-26.69	-26.03			
INTANGIBLE_ASSETS=4	5	6.26**	1.88	0.23	0.07	0.07	0.03	0.40	0.14			
INTANGIBLE_ASSETS=5	10	-4.33*	-2.61*	-2.81	-2.79**	-2.79**	-2.76*	-2.28**	-2.45**			
INTANGIBLE_ASSETS=6	23	3.96**	-0.23	-1.26	-1.30	-1.30	-1.28	-1.56*	-1.47*			
INTANGIBLE_ASSETS=7	29	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>			
INTERNATIONAL_RES=1	10	-2.35	3.30*	3.22	2.37	2.37	2.39	2.04				
INTERNATIONAL_RES=2	10	-9.40**	-1.36	0.01	-0.28	-0.29	-0.26	-0.35				
INTERNATIONAL_RES=3	6	-5.14	1.59	2.59	2.10	2.10	2.15*	1.36				
INTERNATIONAL_RES=4	16	-2.55	1.57	2.97	2.51*	2.50*	2.53*	2.29*				
INTERNATIONAL_RES=5	15	5.57**	3.84*	3.32**	2.62*	2.61	2.58	2.02				
INTERNATIONAL_RES=6	5	-1.58	1.90	2.67	2.53	2.53	2.55	2.29				
INTERNATIONAL_RES=7	6	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>				
DOMESTIC_RES=1	10	-5.76	-5.90*	-2.51	-1.57	-1.57	-1.58					
DOMESTIC_RES=2	6	-21.30**	-10.16**	-3.55	-2.49	-2.47	-2.44					
DOMESTIC_RES=3	11	-14.88**	-7.89**	-2.97	-2.35	-2.34	-2.33					
DOMESTIC_RES=4	23	-13.53**	-6.32*	-1.10	-0.80	-0.78	-0.79					
DOMESTIC_RES=5	12	-15.09**	-6.51**	-1.21	-1.39	-1.39	-1.39					
DOMESTIC_RES=6	4	-18.14**	-5.76	0.52	-1.20	-1.18	-1.19					
DOMESTIC_RES=7	2	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>					
INITIAL_INT_STRAT	68	-7.52**	-1.20	0.24*	-0.12	-0.11						
INTERNAT_DELAY	68	0.66**	0.20	0.00	0.00							
EMPLOYEES=1	23	-25.88	-41.93**	-34.09								
EMPLOYEES=2	28	-28.02	-43.76**	-34.08								
EMPLOYEES=3	14	-26.80	-45.36**	-36.28								
EMPLOYEES=4	2	-25.97	-46.10	-37.49								
EMPLOYEES=5	1	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>								
R_D=1	1	2.24	-3.94									
R_D=2	4	-0.50	1.06									
R_D=3	6	-6.94**	-1.59									
R_D=4	8	1.27	0.75									
R_D=5	49	0 <sup>a</sup>	0 <sup>a</sup>									
NOW_INT_SALES	68	-3.50	-2.25									
NOW_IV	68	-0.35	0.33									
NOW_ALLIANCE	68	-6.80**	-1.53									
NOW_AQUISITION	68	-8.46**	-4.30**									
NOW_GREENFIELD	68	14.27**	3.00									
NOW_FRANCH_LICE	68	-0.37	2.44									
NOW_SALES_NA	68	-1.86										
NOW_SALES_ASIA	68	3.57**										
NOW_SALES_SA	68	0.70										
NOW_SALES_AFRC	68	10.20**										
NOW_SALES_AUST	68	3.83*										
NOW_SALES_EUR	68	3.020										
Model fitting sign		0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deviance Goodness-of-Fit		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Test of Parallel Lines		0.00	1.00	-	1.00	-	-	1.00	-	0.15	1.00	-
<b>Nagelkerke R-Square</b>		<b>0,356</b>	<b>1,000</b>	<b>0,93382</b>	<b>0,907</b>	<b>0,6977</b>	<b>0,698</b>	<b>0,698</b>	<b>0,675</b>	<b>0,620</b>	<b>0,496</b>	<b>0,496</b>

\*\* Significant at the 0.01 level (2-tailed).  
 \* Significant at the 0.05 level (2-tailed).  
 a. This parameter is set to zero because it is redundant.

Appendix 6: Log odds coefficients of number of used knowledge sources influence on internationalization

Independent variable	Model nr.											
	N	1	2	3	4	5	6	7	8	9	10	11
USE_COUNT	68	0,12	0,25	0,20	0,14	0,16	0,16	0,16	0,14	0,14	0,15	0,16
COMP_INT_EXPERIENCE	68	0,12	0,32**	0,29**	0,29**	0,29**	0,29**	0,29**	0,28**	0,22**	0,23**	0,23**
KNOWLEDGE_MAN	68	3,97**	1,14	0,91	0,81	0,86	0,81	1,09*	0,63	0,08		
INTANGIBLE_ASSETS=3	1	-22,03	-22,91	-22,82	-22,83	-22,81	-22,79	-22,97	-22,42			
INTANGIBLE_ASSETS=4	5	1,82	-1,39	-1,26	-1,15	-1,11	-1,11	-0,64	-0,60			
INTANGIBLE_ASSETS=5	10	0,97	-1,36	-1,16	-1,24	-1,24	-1,22	-0,99	-1,25			
INTANGIBLE_ASSETS=6	23	0,39	-1,53*	-1,35*	-1,32*	-1,33*	-1,31*	-1,41*	-1,48*			
INTANGIBLE_ASSETS=7	29	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>			
INTERNATIONAL_RES=1	10	1,18	2,44	2,41	2,23	2,22	2,18	1,67				
INTERNATIONAL_RES=2	10	-0,63	-0,06	-0,40	-0,42	-0,42	-0,36	0,13				
INTERNATIONAL_RES=3	6	2,38	2,53	2,21	2,00	2,00	1,97	1,81				
INTERNATIONAL_RES=4	16	2,22	1,51	1,44	1,54	1,55	1,57	1,66				
INTERNATIONAL_RES=5	15	3,10*	1,91	1,23	1,10	1,13	1,13	1,21				
INTERNATIONAL_RES=6	5	4,09*	3,04*	2,20	1,63	1,64	1,65	1,88				
INTERNATIONAL_RES=7	6	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>				
DOMESTIC_RES=1	10	0,56	-2,22	-2,62	-1,87	-1,84	-1,75					
DOMESTIC_RES=2	6	-4,05	-1,78	-1,17	-0,58	-0,58	-0,57					
DOMESTIC_RES=3	11	-1,86	-1,79	-1,65	-1,08	-1,07	-1,00					
DOMESTIC_RES=4	23	-0,78	-1,00	-1,24	-0,76	-0,75	-0,76					
DOMESTIC_RES=5	12	-1,13	-0,40	-0,55	-0,38	-0,37	-0,32					
DOMESTIC_RES=6	4	-2,46	-0,06	0,70	0,31	0,33	0,33					
DOMESTIC_RES=7	2	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>					
INTERNAT_DELAY	68	-0,04	-0,02	-0,03	-0,02	-0,02						
INITIAL_INT_STRAT	68	-1,49	0,06	0,20	0,10							
EMPLOYEES=1	23	-36,82	-37,73	-35,13								
EMPLOYEES=2	28	-37,09	-37,71	-34,89								
EMPLOYEES=3	14	-40,04	-38,83	-36,28								
EMPLOYEES=4	2	-36,28	-37,89	-35,39								
EMPLOYEES=5	1	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>								
R_D=1	1	3,76	-2,19									
R_D=2	4	1,02	0,13									
R_D=3	6	-2,19	-0,93									
R_D=4	8	2,83*	0,18									
R_D=5	49	0 <sup>a</sup>	0 <sup>a</sup>									
NOW_INT_SALES	68	-1,71	-1,71									
NOW_JV	68	-2,53*	-0,39									
NOW_ALLIANCE	68	-2,89**	-0,60									
NOW_ACQUISITION	68	-0,49	-0,16									
NOW_GREENFIELD	68	1,54	-1,70									
NOW_FRANCH_LICE	68	0,94	0,19									
NOW_SALES_NA	68	1,67										
NOW_SALES_ASIA	68	1,09										
NOW_SALES_SA	68	3,66**										
NOW_SALES_AFRIC	68	4,72**										
NOW_SALES_AUST	68	0,31										
NOW_SALES_EUR	68	0,02										
Model fitting sign.		0,15	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Deviance Goodness-of-Fit		0,95	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Test of Parallel Lines		0,94	-	1,00	-	0,06	0,02	0,00	0,00	1,00	1,00	0,86
<b>Nagelkerke R-Square</b>		<b>0,031</b>	<b>0,926</b>	<b>0,840</b>	<b>0,824</b>	<b>0,537</b>	<b>0,537</b>	<b>0,536</b>	<b>0,515</b>	<b>0,470</b>	<b>0,362</b>	<b>0,362</b>

\*\* . Significant at the 0.01 level (2-tailed).

\* . Significant at the 0.05 level (2-tailed).

a. This parameter is set to zero because it is redundant.

# Preliminary Thesis Report

Supervisor: Gabriel R. G. Benito

## - The usefulness of regional internationalization knowledge sources for new venture internationalization -

Hand-in date:  
01.03.2017

Campus:  
BI Oslo

Examination code and name:  
**GRA 19502** Master Thesis

Programme:  
Master of Science in Business

**Introduction to the research topic:**

There has been a lot of interest the past couple of decades in the phenomenon of early internationalization of firms at or near their founding. This concept has been referred to as “born global” (Rennie 1993; Knight and Cavusgil 2004), “international new venture (INV)” (Oviatt and McDougall 1994), or “international entrepreneurship” (Oviatt and McDougall 2005). Theory surrounding this phenomenon is a bit fragmented and various definitions have been proposed over the years, however, it mainly deals with the rapid internationalization of new and small firms, in contrast to the traditional, stage based, internationalization model (Johanson and Vahlne 1977). The literature has acknowledged that these firms typically have few tangible resources to begin with, and therefore must leverage other forms of resources in order to successfully internationalize and compete in international markets. These new ventures need to overcome constraints related to newness and smallness in order to internationalize (Knight, Madsen and Servais 2004). The international entrepreneurship literature has highlighted the importance of international knowledge as a key intangible resource leading to internationalization (Fernhaber, McDougall-Covin and Shepherd 2009). The importance of knowledge and learning in the internationalization of firms is well researched and INV research identifies knowledge accumulation and learning as key influences for the internationalization of small firms (Fletcher and Harris 2012). Gassmann and Keupp (2007) refine the definition of born globals, arguing that they can be seen as business organizations that, from or near their founding, seek superior international business performance from the application of knowledge-based resources to the sale of outputs in multiple countries. They believe that the knowledge-based view is especially suitable as a conceptual foundation for the analysis of these types of firms. Following this, we want our topic to focus on how INVs source the knowledge that they need for internationalization, since it is seen as such an important aspect for the success of these types of firms.

The resource-based view (Barney 1991) suggests that organizational knowledge is a key source of competitive advantage. Following this, the knowledge based view assumes that the critical input in production and the primary source of value is knowledge (Grant 1996). Grant suggests that firms exist as institutions for

producing goods and services because they can create conditions under which multiple individuals can integrate their specialist knowledge. Furthermore it is suggested that organizations only learn by the learning of their members, or by ingesting new members who have new knowledge. Fletcher and Harris (2012) examine what new knowledge smaller firms need as they learn to internationalize and which specific sources they acquire it from. They argue that internationalization knowledge (which they define as firm specific knowledge concerning how to manage internationally) is critical for a sustainable process of internationalization and that it is most likely to be sourced vicariously from government bodies and specialist consultants, rather than network relationships. They also argue that grafted experience, through recruitment, is more likely to be a source of technological and market knowledge than internationalization knowledge. It has been suggested that founding entrepreneurs and top management teams prior knowledge, abilities and experience supports the early internationalization of INVs (Oviatt and McDougall 1995), but these firms also accumulate knowledge from their external environment. Fernhaber, McDougall-Covin and Shepherd (2009) find that international knowledge from external sources such as a new venture's alliance partners, venture capital firms, and firms in the headquarter location was positively associated with the new venture's level of internationalization, and that these sources compensated for lower internal sources of internationalization knowledge. Decarolis and Deeds (1999) reiterate that knowledge is the most strategically important of the firm's resources, that heterogeneous knowledge bases and capabilities among firms are the main determinants of performance differences, and that firms have differential access to external knowledge. They measure knowledge inflows into the firm for biotechnology firms and suggest that knowledge flows may be captured by a firm's geographical location and through alliances.

It is important to clarify our definition of international new ventures for the purpose of our thesis. Oviatt and McDougall (1994) defined international new ventures as "business organisations that, from inception, seek to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries." Knight and Cavusgil (2004) defined born global firms as "entrepreneurial start-ups that, from or near their founding, seek to derive a substantial proportion of their revenue from the sale of products in international markets"; i.e. at least 25% foreign

sales within three years of founding. Crick (2009) differentiates between born globals and international new ventures (INVs), suggesting that the latter expand more regionally in scope whereas the former are more truly global in scope. To be truly global, Ohmae (1985) suggests that the firm needs to be present in the “Triad” markets of North America, Europe and the Pacific Rim. Finally, Oviatt and McDougall (2005) defines international entrepreneurship as “the discovery, enactment, evaluation and exploitation of opportunities—across national borders—to create future goods and services.” For the purposes of our paper, we will use the term international new ventures to describe the firms we will analyze. We will define international new ventures as small or medium enterprises less than six years old (common range in the literature for INVs) that have initiated international sales or have international business activity. This allows us to sample firms that have had and continue to need knowledge resources for internationalization. In summary, our topic lies in the research area of international new ventures and focuses on the knowledge sources that they need to internationalize successfully.

In our research, we will not look into the complex process of knowledge integration and transformation within the firm, but rather take a more macro perspective, acknowledging that this knowledge transformation process occurs and has inputs and outputs. We are more interested in the inflows of knowledge to these firms, and how the nature of those inflows affect the internationalization process of the firm. We assume that successful firms will have managed the knowledge transformation process and have created a competitive advantage with their knowledge, consistent with the theory under the knowledge based view. Our topic is more concerned with discovering what external sources of internationalization knowledge are used by firms in a particular region, and how useful those firms perceive these external knowledge sources to be. Based on the literature surrounding INVs and the knowledge-based view, we expect that external knowledge sources in the firm’s domestic, regional environment play an important part in the firm’s internationalization and that knowledge is accumulated and integrated by firm’s members. However, we want to investigate which sources of internationalization knowledge are used by firms in a particular region, and ask firm managers how important and useful particular sources have been in their internationalization process. We believe that knowledge about the way that firms use local knowledge

sources, and how useful they are, is relevant to policy makers and managers of firms that intend to internationalize. Of course, many other factors are relevant to the internationalization of small firms, but we want to focus on the importance and influence of external knowledge inflows as drivers of internationalization. It would also be interesting to ask these firms if these external knowledge sources have contributed to the creation of firm specific advantages and to the performance of these firms.

A recent OECD study found that limited firm resources and a lack of managerial knowledge about internationalization are still constraints to SME internationalization (OCED 2009). The report also argues that SMEs’ stock of knowledge resources and quest to leverage knowledge assets residing in external actors push and pull them into international markets. External environmental factors such as network, sector and region-of-origin factors seem to stimulate their internationalization. According to this report, several countries have support programs that seek to redress internationalization barriers, as well as respond to the top drivers and motivations for SME internationalization. Furthermore, the report identifies an increasing trend towards taking a sub-national approach to promoting SME internationalization in several countries. These include regional initiatives that can be sector specific. Finally, the report calls for further empirical research, employing a questionnaire survey and case study approach to provide deeper insights into the challenges facing the international SME. They propose that the main focus of this research should be on establishing how existing government provision is viewed by the intended beneficiaries, and identifying key perceived gaps and required changes from the perspective of the user SMEs. This drove us to be interested in discovering more about how firms source managerial knowledge about internationalization from their regional environment, and supports the relevance of our study.

**Research questions and objectives of the thesis:**

<b>Research question</b>	Which external sources of internationalization knowledge do international new ventures use in their
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	regional environment, and which sources do they perceive are most useful for their internationalization efforts?
<b>Sub-question 1</b>	How do they feel these sources impact their ability to internationalize successfully?
<b>Sub-question 2</b>	Which knowledge sources are most important for these early internationalizing firms?
<b>Sub-question 3</b>	How does the level of knowledge and support in the regional environment drive or constrain internationalization?

### **Objectives of the thesis:**

Our objective is to develop a greater understanding of international knowledge sources in the regions of Toronto and Oslo for international new ventures. Specifically we want to explore whether or not different external knowledge sources are perceived to aid firms in their process of internationalization; these being sources such as government programs and resources, consultants, alliances, partners, institutions and other relevant sources of internationalization knowledge. The main objective is to explore the phenomenon of early internationalization of these firms, by developing an understanding of how they are able to leverage regional knowledge sources for their internationalization goals. We also want to know which knowledge sources are seen as more important or useful, as well as those that are lacking. We aim to directly ask firm managers what their use of and benefit from the regional knowledge sources is through questionnaires and in-depth case studies. Of course, this will rely on their subjective views and this may introduce elements of bias into our research, but our method is meant to be more exploratory and explanatory, rather than to confirm or generalize theory. According to the knowledge based view, knowledge is held and integrated by firm members, which supports asking firm managers. We are basing our research on the view that regional knowledge resources are an important element of the successful internationalization of these firms. Furthermore, it is our objective to add to the



research on INVs by studying how they utilize knowledge sources in their local environment, and by investigating the usefulness of these sources. Specific research objectives are to use a questionnaire to survey managers about their use of and perceived benefit from knowledge sources in their region. Following this, in-depth case studies would help us get a deeper view of how example INVs view the knowledge resources in their area and to provide in-depth understanding of the questionnaire results. We hope that our research will have relevance to international business and strategic management research pertaining to knowledge and INVs.

**Unit of analysis:** Firms (INVs) from Toronto and Oslo regions

**Industries of special interest:** knowledge-intensive service industries

- Examples
  - Medical devices / life sciences
  - ICT and software technology (IT)
  - Clean technology
  - Renewable energy technologies
  - Professional service firms
  - Ed-tech
  - Advanced tech (micro/nano tech, media technologies)
  - Digital media

**Plan for data collection and thesis progression:**

**Research method:**

We aim to address the perceptions of internationalization knowledge sources and support among SMEs (INVs in particular) in the two regions of Toronto and Oslo. These two regions are chosen mainly for data access reasons. However, Toronto and Oslo are comparable major metropolitan areas in countries that both have smaller domestic markets and economies that rely heavily on natural resources. Our goal is to research INVs through a mixed-method approach of using a questionnaire along with in-depth case studies. The questionnaire will be sent to a sample of INVs from both regions. Two or more companies from each region will be selected for in-depth case studies.

The questionnaire will ask INVs about their use of selected knowledge sources and support programs in the region, and we plan to use likert scales to assess managers perceptions of the usefulness of the sources they have used. To help explain variation in the data we will compare the findings to the case study data and use categorical variables if needed to help clean up the data.

While conducting the survey, we will also conduct in-depth case studies with a small number of companies from each region and from particular sectors. The goal of these case studies is not to get generalizable results, but to gain deeper insight into how local INVs make use of the sources of knowledge and support programs in the region.

Our hope is that the integration of these two methods will result in a better understanding of the problem than if we used either one alone. Comparing data from multiple angles may improve the accuracy of our analysis. The utilization of a mixed method approach would increase the external validity of our findings and help us understand both what INV managers have found useful and why.

**Research plan and thesis progression plan:**

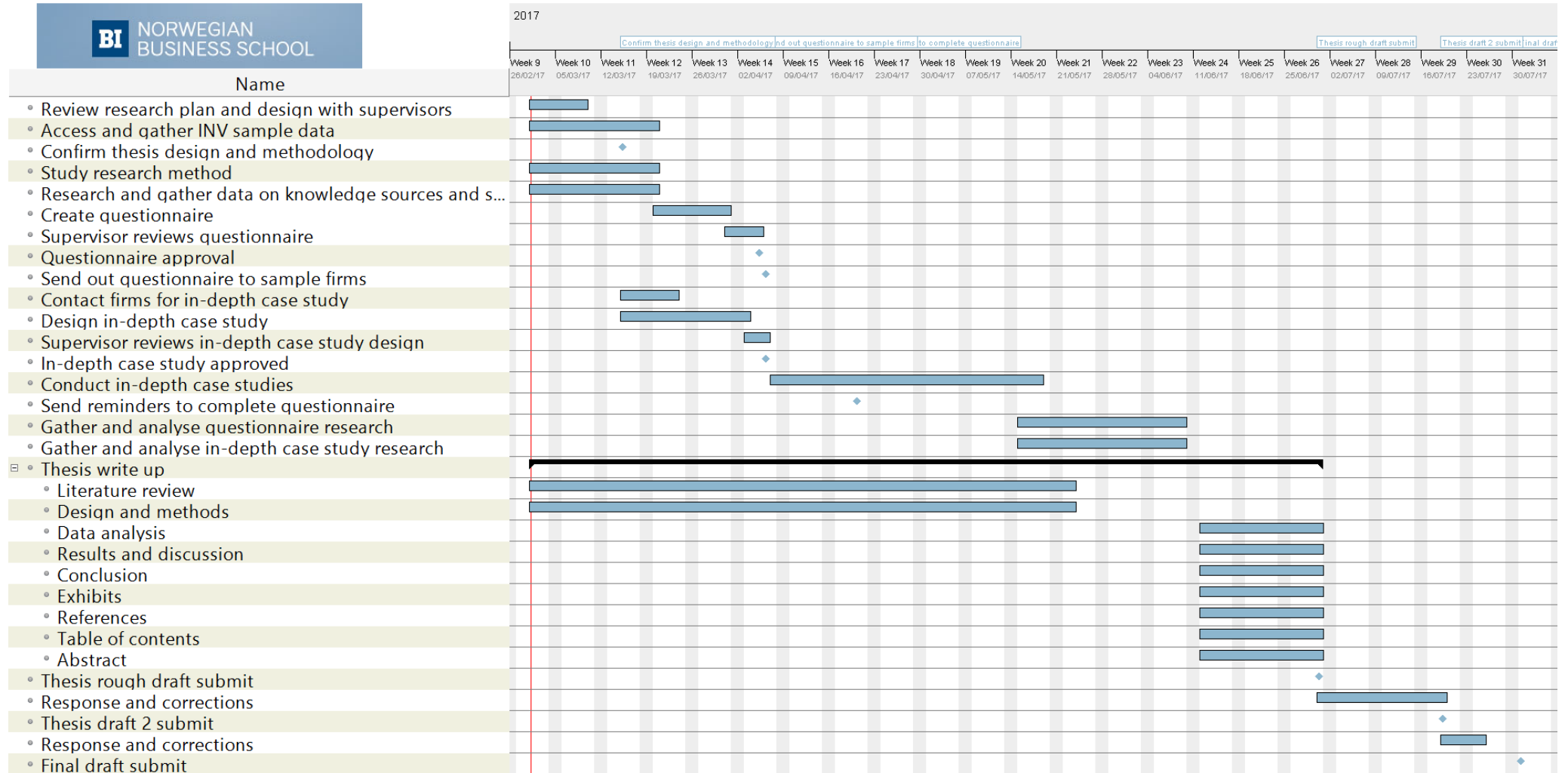
We will need to access certain data in order to carry out our questionnaire and case study design. Firstly, we need to identify INVs from each region we are analyzing and find contact information for appropriate individuals in these companies. This data can be gathered through government statistics websites such as Statistics Canada and Norwegian databases. The same or sufficiently similar data will be gathered for both countries. Companies will be classified by age based on their year of founding, and will be classified as international based on their international scale (international sales as a percentage of total sales) or scope (number of countries operated in). For our purposes, we will sample INVs that have some international activity (at least 25% of sales are international or operate in at least two foreign countries) within six years of founding, and are of a size of less than 500 employees, in addition to other relevant sampling criteria.

<b>Sampling</b>	<ul style="list-style-type: none"> <li>● New venture &lt; six years old</li> <li>● SME &lt; 500 employees</li> </ul>
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	<ul style="list-style-type: none"> <li>● Location: Toronto- or Oslo region</li> <li>● INV &gt; 25% foreign sales OR &gt; 1 foreign markets</li> <li>● Firm industry (NACE code)</li> </ul>
<b>Survey Data</b>	<ul style="list-style-type: none"> <li>● Use of internationalization knowledge source</li> <li>● Perceptions of usefulness of knowledge source</li> </ul>

For our survey, we desire to sample INVs from a range of industries, however, we will create our samples based on available data to manage the scope of our thesis project. This may involve selecting a specific subset of industries we find particularly relevant. Ideally, we want to identify a large enough sample for our research method and to improve generalizability. We will select a sample size based on the lowest estimated response rate. Secondly, we need to gather data on the nature of regional knowledge sources and support programs that are relevant to these types of firms. We will gather relevant knowledge sources from publicly available information and from the INV literature. This information will populate our questionnaire and inform our in-depth case study research. Once we have our samples and contact information, we will create and send our questionnaire to these selected companies. While we wait for questionnaire responses, we will contact and attempt to conduct in-depth case studies with a small number of firms from each region. The purpose of this will be to get a more detailed understanding of how a firm from that region views the internationalization knowledge sources and support programs, however this part of the research will be limited to particular sectors. Furthermore, we will need to learn about our research method and refine our approach/design in advance of conducting the research. A time plan and schedule is outlined in the attached Gantt chart.

### Exhibit 1: Gantt Chart



## References:

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