The role of industry context for new venture internationalization

Evidence from the medical technology sector

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Abstract

The medical technology sector consists of numerous small niche markets. Approximately 95% are small and medium sized enterprises, many of which are start-ups that develop technological breakthroughs for the healthcare sector. The competition in this sector is highly global. In addition, firms that originate from countries with small home markets, like Sweden, are therefore often pushed to an early internationalization process while commercializing their product innovations. Although the potential demand for the medical technology innovation is global, institutions such as the regulation and financing of the healthcare sector are nation specific. Little is known about how the combination of specific industry context factors influence the internationalisation process in itself and its subsequent outcomes. The overall research purpose in this thesis is therefore to explore how and why the medical technology context influences new venture internationalization. I use a qualitative research method with two in-depth case studies from the medical technology sector to answer my purpose. My thesis contributes to the international entrepreneurship field in several ways. The overall contribution is to illustrate how our understanding of the internationalization process changes when we study a specific empirical context given certain particularities and distinctive factors. The most distinctive factor is that the medical technology sector is embedded in different socio-political systems across nations where the healthcare sector is a concern of each nation’s internal affairs. This means that each country and even regions within a country has its own distinctive regulative, normative and cultural-cognitive healthcare dimensions that affect both sales patterns and internationalization process. Operating in such a business-to-institution context leads to a complex sales process as well as a slow and focused internationalization process. The combination of industry particularities also affects the types of capabilities and networks that are critical during an international new venture’s early development. The results also show that various types of networks are needed besides business and social ones, such as scientific, institutional and opinion creating networks. In addition, the need for more specific financial, scientific and regulative capabilities is paramount to complement the technological, marketing and entrepreneurial capabilities.
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I Introduction

This thesis explores the role of the industry context for new venture internationalization when operating in the medical technology sector. This introductory chapter starts with a brief explanation to the importance of studying this empirical field, followed by how different empirical contexts have incited theory refinement and/or development within the internationalization literature, finally leading to the problem discussion. Different types of innovations are then defined in a medical technology context before the introduction of the purpose of the study. The section ends with the outline of the thesis.

1.1 Motivation for the study

Sweden is a very small country in relation to the number of inhabitants which today amount to around 9.7\(^1\) million people. This means that Sweden has a limited home market (compared with e.g. the US, which has around 314 million people). Swedish firms have traditionally engaged in international business for a substantial amount of time whereas many have grown into large multinational companies (MNCs) in both traditional manufacturing industries (e.g. Sandvik, Atlas Copco) and high technology firms (e.g. Pharmacia, Astra, Gambro, Getinge, Ericsson and Volvo). These large firms have historically contributed to Sweden’s wealth and distinctive international competitiveness. However, more and more firms have been sold to international owners or merged with international partners (e.g. Pharmacia, Astra, Gambro and Volvo). One risk with this trend is that Sweden might lose some of its critical capabilities and its competitiveness in knowledge intensive sectors, should these companies decide to move out from Sweden. One such event was when AstraZeneca in 2013 decided to close down the R&D department in Södertälje\(^2\). Although this is sad news, both on a national and regional level and, probably even more so, on a personal level for the employees losing their

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\(^1\) Counted in 31 August 2014, Statistics Sweden. http://www.scb.se/be0101/

\(^2\) One R&D department still remains in Sweden (Mölndal). The new global R&D is concentrated in one location in Cambridge, UK.
jobs, it can also imply new opportunities when knowledge based capabilities are released, liberating valuable human capital on the local market. This, could eventually, spur a region of many life sciences start-ups which commercialize innovations and, hopefully, lead to economic development and growth in the long term perspective. On a policy level, the specific industry sector of life sciences (which broadly comprises biotechnology, medical technology and pharmaceuticals) has attracted much focus as a potential growth area in Sweden. Only in the medical technology sector, has Sweden historically introduced many breakthrough innovations like the gamma knife, dental implants, the implantable pacemaker, and the dialysis machine (KTH et al., 2007). However, the competitiveness of many mature firms in the medical technology sector still relies on old innovations. This is the reason why many different reports stress the importance of creating a strong medical technology sector in Sweden including how to incite developing innovations and creating new firms in this industry sector. Hence, the life sciences in general, and the medical technology sector in particular, is a very important and vibrant field with immense opportunities for new ventures in which Sweden strives to excel in a global context. However, it is not always evident for policy-makers, entrepreneurs and academic scholars, how new ventures that internationalize from inception might encounter distinct challenges during their actual commercialization and internationalization journey. In this thesis, I will therefore use different theoretical perspectives that help me to understand this process.

I have here briefly discussed some reasons why this industry sector is an important area to study from an overall public policy perspective but also to some extent from a practitioner perspective. I will now turn to why this industry sector is also an important area to study through an academic perspective.

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1. Introduction

1.2 Emergence of international entrepreneurship as an academic field

Many companies, both small and large, face the need to internationalize their activities. However, large, established and resource-full firms operating in relatively stable industry settings (Autio, 2005; Oviatt and McDougall, 2005a) have historically dominated the internationalization research within international business. Moreover, research within this field has not given much attention to the early stages of internationalization of firms (Mathews and Zander, 2007), how the actual internationalization process starts (Andersen, 1993; Johanson and Vahlne, 2009) or how the MNCs were founded.

One of the most influential theories to explain the internationalization process is the Uppsala model, which was developed in the 1970s (Johanson and Vahlne 1977; Johanson and Wiedersheim-Paul, 1975). It is also described as the process theory of internationalization (PTI) (Autio, 2005). The PTI and the Uppsala model are used interchangeably in this thesis. The PTI was developed as a reaction to dominant, mostly static, international business theories which were anchored in the axioms of perfect competition for explaining MNCs behavior (Johanson and Wiedersheim, 1975). Through qualitative empirical studies, Johanson and Vahlne (1977) found that firms behaved in a much more bounded rational way (Cyert and March, 1963; Simon, 1991). They therefore developed their behavioural and organization learning theory where focus is on the firms’ behavior when it comes to the different establishment sequences regarding which markets to enter and in which ways (Johansson and Vahlne, 1977, 1990). The key mechanism in their dynamic state-change model is on the processes and interplay of knowledge development and increasing foreign market commitments. Both the geographic and the psychic distances (i.e. perceived differences between two countries) are important constructs for deciding which countries to enter first and how to do this (see Håkansson and Ambos, 2010; Johanson and Wiedersheim-Paul, 1975). The psychic distance concept implies that firms tend to start with the countries that are perceived most similar to their home country and where the risk is perceived as smallest, implying a constraining and reactive posture. In other words, one of the key constructs is to view each market as distinct, where risks are reduced by entering international markets that are perceived to most closely resemble the firm’s home market.
Our environment has changed considerably since then. Decreasing trade barriers and advances in information, communication as well as transportation technologies have made the world much more integrated and more easily accessible (Oviatt and McDougall, 1994). Many people have already gained experiential international knowledge, from international studies, work experiences and from travelling – all of which tend to reduce perceptions of psychic distance (Andersson et al., 2004; Madsen and Servais, 1997; Oviatt and McDougall, 2005a). Different case studies, in the 1990s, revealed that some firms were founded with an international vision of the firm and that their innovative product or service could be marketed internationally through personal networks (Oviatt and McDougall, 1994). It was also shown that some ventures leapfrog some of the prescribed stages in the Uppsala model and that they internationalize from their foundation in a both broad and speedy way. This empirical phenomenon triggered Oviatt and McDougall in 1994 to present the basis for a theory that could better explain the behavior and the context of companies that decide to internationalize from their inception. For theory building, they borrowed and combined elements from the three broad theoretical areas of entrepreneurship, international business and strategic management (Oviatt and McDougall, 1994). Hence, the international entrepreneurship field also emerged as a reaction to the existing theories that mainly explain the internationalization of multinational enterprises (MNEs), including the stage theories within the international business discipline (Oviatt and McDougall, 1994). Traditionally, most literature had focused on already established organizations, both domestically and internationally, as well as on new organizations on the domestic market, but not on international new ventures (INVs); an INV being defined as “a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” (Oviatt and McDougall, 1994, p. 49).

Although INVs have been found in different industries (including for instance low-tech sectors e.g. Evers 2010, 2011), they are especially represented and dominated in the high-technology industries (e.g. Burgel and Murray, 2000; Coviello and Munro, 1995, 1997; Coviello and Jones, 2004; Jones, 1999; Keeble et al., 1998; Peiris et al., 2012; Zahra and George, 2002). In the following, I will discuss some of the particularities that exist in two types of high-technology industry contexts and assess whether considering these would imply that we need to change some of the prevailing assumptions in the international new venture theory.
1.3 Problem setting

As a large portion of early as well as influential international entrepreneurship papers has its focus on the software/ICT high-technology sectors (Coviello, 2006; Coviello and Jones, 2004), it is relevant to ask to what extent would current theories hold if we studied another high-technology empirical context? It is easy to believe that two different high-technology contexts share the same types of opportunities and challenges, which makes it even more relevant to disclose if that is actually the case. Recent research in international business has highlighted not only the problems that occur if context is not accounted for when theorizing (Andriopoulos and Slater, 2013; Poulis et al, 2013), but also that encompassing context is helpful when developing theories (Bello and Kostova, 2012; Jones et al., 2011a). Could another type of high-technology context, like the medical technology sector with its specific particularities, imply different influencing factors, and would they affect the way we understand and interpret the internationalization process? In other words, the context in this thesis refers to the particularities of the medical technology sector (see further in section 3.1).

A recent review by Peiris et al. (2012) concludes that the focus of international entrepreneurship research seems to have narrowed down to high-technology firms and new ventures. However, the industry context is not specified in all studies (Coviello and Jones, 2004). Yet, many of the high-technology studies are comprised of single-industry studies, specifically within the software and ICT sectors (e.g. Bell, 1995; Cannone and Ughetto, 2013; Coviello, 2006; Coviello and Cox, 2006; Coviello and Munro, 1995, 1997; Kuivalainen et al., 2010; Kuivalainen et al., 2012a; Nummela et al., 2004; Sigfusson and Harris, 2012). Moreover, research in the international entrepreneurship field has examined ICT/software firms’ internationalisation processes from the very beginning in the 1995s (e.g., Bell, 1995, 1997; Coviello and Munro, 1995, 1997). This implies that theory building within the international entrepreneurship field is very much influenced by the particularities of the ICT/software sector. An important industry-specific factor that has enabled many small software producers to internationalize both early and quickly is the common ‘interfirm cooperation’ that exists between hardware or computer manufacturers and software firms, which facilitates an accelerated internationalization process (Bell, 1995; Bell et al., 2003; Coviello and Munro, 1997). The ICT/software industry context tends to have low entry barriers (Bell, 1995; Cannone and Ughetto, 2013) and "relatively few nationally
imposed legal or technical barriers” (Bell, 1997, p. 600). Some more recent single-industry studies in the life sciences with a focus on primarily biotechnology SMEs (small and medium-sized enterprises) now exist which could also include medical technology firms (e.g. Brännback et al. 2007; Gassmann and Keupp 2007; Jones et al. 2011b; Lindstrand et al. 2011; Melén and Nordman 2009; Nordman and Melén 2008; Tolstoy and Agndal 2010). These studies help to point out some of the particular opportunities and challenges that face firms which operate in this industry context, particularly in relation to types of network relationships and different knowledge bases (Gassmann and Keupp, 2007; Lindstrand et al., 2011; Nordman and Melén, 2008). However, few of them explicitly account for the role of operating in a regulatory industry context and its impact on the actual internationalization process.

While there are many similarities between the software/ICT and the medical technology industry contexts, there are also some key differences. Some of the similarities are providing niche, specialized, and innovative products (e.g. Bell, 1995; Cannone and Ughetto, 2013; Kuivalainen et al., 2012a); operating in a dynamic industry with global demand (e.g. Coviello and Munro, 1997; Kuivalainen et al., 2010; Tolstoy and Agndal, 2010); often having small domestic markets (e.g. Bell, 1995; Cannone and Ughetto, 2013); and network relationships are important for the internationalization process (e.g. Bell, 1995; Cannone and Ughetto, 2013; Coviello and Munro, 1997; Gassmann and Keupp, 2007; Lindstrand et al., 2011; Tolstoy and Agndal, 2010). The most important differentiating factor is that medical technology ventures operate in a highly regulated industry context (Gassmann and Keupp, 2007) as compared to the ICT/software industry (Bell, 1997).

The chosen empirical context in this thesis is the sub-sector of medical technology within the overall life sciences industry which is surrounded by high regulative requirements. This context therefore fits to explore the role of a highly regulated industry sector and its impact on the internationalization process. This high-technology sector is characterized by many start-ups that introduce breakthrough innovations (Altenstetter, 2003) and approximately 95 % of the firms in the medical technology sector are SMEs. This empirical context is impacted by some barriers and constraining factors that have not been

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4 www.eucomed.org
in focus in the international entrepreneurship literature. Since these firms operate in a highly regulated context, the maneuverability and the entrepreneurial creativity are probably constrained. This, in turn, affects how we understand the role of entrepreneurs and the types of capabilities and networks that are needed to handle some of the requirements that face the entrepreneur and the entrepreneurial team members during an INV’s different developmental and growth phases. The important time factor (e.g. Jones and Coviello, 2005); in relation to a rapid internationalization process as proposed in the international entrepreneurship literature, is therefore challenged (cf. Zahra, 2007). Different industry specific factors could therefore affect theory building when we study another high-technology context, like the medical technology sector. Probably the most important influencing factor for theory building is the sometimes simplified assumption to view the world as highly integrated in the international entrepreneurship field (Autio, 2005). This notion is challenged when studying a context where every nation has a different healthcare system with different regulations (cf. Scott, 2008). Therefore, some of the logics from the traditional Uppsala model can be combined with the international new venture theory. More precisely, one important element in the process theory of internationalization is to view country markets as distinctive entities that are separated by high barriers (constraining factors) whereas international new venture theory views country markets as highly integrated (e.g. Autio, 2005; Johanson and Vahlne, 1977; Johanson and Wiedersheim-Paul, 1975). Moreover, in the industry context of software and ICT, an enabling posture of perceiving an international integration between country markets have probably been possible when the most important customers are in the business-to-business sectors with low national entry barriers (Bell, 1995; Cannone and Ughetto, 2013; Hennart, 2014) which is not necessarily the case in the medical technology sector. Instead, one of the most important actors in the medical technology sector is often a public healthcare organization, which is characterized by pluralistic and sometimes conflicting goals (Denis et al., 2007). It is therefore an advantage to analyze the healthcare sector from an institutional lens (Scott, 2008). This implies understanding the differences and constraining factors across national healthcare organizations from regulatory, normative and cultural-cognitive dimensions and how they might impact on the commercialization and internationalization processes. It has to be noted that all empirical contexts are characterized to varying degrees by regulative, normative and cultural-cognitive dimensions which would affect any industry logic but presumably in different ways. However, since the medical technology sector is specifically characterized by regulative dimensions, which in turn are a
consequence of both normative and cultural-cognitive dimensions, some of the elements from an institutional theory framework could be borrowed to analyze the most important actor in this industry setting, i.e., the national healthcare organizations.

Finally, a ‘missing link’ in the international entrepreneurship literature is how different industry contexts affect the internationalization process in itself and its outcomes. The most common way to study the internationalization process in the international entrepreneurship literature is by focusing on the dimensions of speed/time, scale (extent) and scope (Jones and Coviello, 2005; Kuivalainen et al., 2012b; Zahra and George, 2002). This study refers to the internationalization as “the process of adapting firms’ operations (strategy, structure, resource, etc.) to international environments” (Calof and Beamish, 1995, p. 116) where the industry context is an important environmental factor that influences the internationalization process and its subsequent outcomes. It is also vital to understand how and why an INV initiates diverse upstream and downstream international value-chain activities (Hewerdine and Welch, 2012; Jones, 1999; Oviatt and McDougall, 1994) to strengthen its international competitive position. It is therefore useful to incorporate qualitative outcomes or different milestones to justify an INV’s early development and growth (Kuivalainen et al., 2012b). Examples of downstream international activities are foreign sales and international marketing whereas upstream international activities include purchasing, production and R&D (see Agndal, 2004; Naldi, 2008).

When developing contextualized theories, it is equally important to account for a firm’s specific conditions and boundaries (Andersen, 1993); as when ventures are new while commercializing new technologies on new international markets and being embedded in a global competitive industry facing national healthcare differences. This combination of challenges needs to be considered when developing theories. This is a context to account for that differs from other studies focusing for instance on either new international markets with existing technologies or new technologies on existing international markets (see Tolstoy and Agndal, 2010). The next section therefore covers what medical technology innovation refers to and how it relates to commercialization and internationalization.
1.4 The role of the medical technology context and innovations

The medical technology sector is fragmented. It consists of many small niche markets and SMEs, many of which are start-ups “that develop many of the technological breakthroughs of today’s healthcare environment” (Altenstetter, 2003, p. 229). It has to be noted that there is a clear distinction between breakthrough5 (radical) and incremental technologies. A breakthrough innovation in this thesis refers to “significantly different changes to products, services or processes” whereas an incremental innovation refers to “small improvements to existing products, services or processes” (Bessant and Tidd, 2007, p. 29). In this thesis, commercialization refers to how INVs bring new products, in this case medical technology breakthrough innovations, to the market, which in turn involves different value-creating and networking activities (Coviello, 2006; Jolly, 1997; Thédrin, 2014).

It is also relevant to understand what strategy is most applicable in different situations, like market pull versus technology push (see Autio, 2005). Bessant and Tidd (2007) argue that market pull is more common in a context of incremental innovations whereas technology push is more common for breakthrough innovations. An argument for this is that the customer might not even be aware of the need of a new medical technology product, which is why the INV has to educate the market and inform different network actors of the need for the new product or service (Gliga and Evers, 2010). However, it is well known within the marketing literature (see Vargo and Lusch, 2004) that customers do not buy a technology per se, but rather the value, benefits or

5 There is a rich literature on different types of innovations and definitions such as radical innovations which "produce fundamental changes in the activities of an organization or an industry and represent clear departures from existing practices" and incremental innovations are those which "merely call for marginal departure from existing practices" (Gopalakrishnan and Damanpour, 1997, p. 18). There are also other descriptions of innovations like disruptive; e.g. rules of the game are changed implying new winners and losers in the market place (Bessant and Tidd, 2007) when for instance new customers are identified by offering “cheaper, simpler, more convenient products or services aimed at the lower end of the market” (Christensen et al., 2000, p. 3) or an architectural innovation which “is the reconfiguration of an established system to link together existing components in a new way” (Henderson and Clark, 1990, p. 12). However, the most important distinction in this thesis is to differentiate between the degrees of newness and/or change when commercializing a medical technology innovation.
solutions to a need and this need can differ among different “customers” or stakeholders. It is furthermore expected that actors have distinctive characteristics across industry contexts, which both affect the speediness and swiftness of commercializing medical technology innovations.

This is also the reason why it is vital to integrate the industry context in the theoretical framework and how respectively why it would affect the internationalization process. Furthermore, it is not only the type of innovation that affects the internationalization process; the argument is that the type of customer in combination with the product’s characteristics affects the commercialization and the internationalization process. It is assumed that the commercialization process is more straight-forward in a business-to-business context, like the ICT and the software technology, as compared to when interacting with a “public customer” embedded in a regulative medical technology context. In the current international entrepreneurship literature, neither the industry context nor the type of customer has explicitly been in focus and how it might affect the commercialization and internationalization process (see Hennart, 2014). This leads me to present the overall research purpose in the following section.

1.5 Purpose of the study

Based on the reasoning so far, it is expected that different industry factors in the medical technology sector affect the new venture internationalization and commercialization processes. These assumptions lead me to present the overall purpose of this thesis which is to explore how and why the medical technology context influences new venture internationalization. I use an abductive research approach which specifically acknowledges the interplay between theory and empirical phenomenon. The thesis is based on two in-depth case studies from the medical technology sector to further refine existing theory. The five appended papers in the thesis advance different models and propositions that relate to how the industry context influences the commercialization and internationalization processes. In the last chapter, I then combine the findings from the different papers and propose a contextualized model of different factors that influence internationalization speed when operating in the medical technology sector.
1.6 Outline of the study

The remainder of the thesis is structured as follows. Chapter 2 presents the overall theoretical framework which is structured into the following main sections: international entrepreneurship; networks; capabilities (knowledge bases) and institutional theories in a medical technology context. The theoretical framework then ends with a synthesis, discussing complementarity and compatibility between the different theoretical perspectives and generation of the research questions. Chapter 3 covers the study’s research approach and ends by discussing quality criteria in a qualitative research design. Chapter 4 summarizes the five appended papers, their main results and intended contributions. Finally, Chapter 5 first synthesizes the different findings from the appended papers and then concludes the thesis’s theoretical and practical contributions, discusses limitations and suggests avenues for future research.
2 Theoretical framework

This chapter first introduces the field of international entrepreneurship with a focus on defining characteristics of INVs. The theoretical fields of networks and capabilities (knowledge bases) are then explored as they play key roles as explanatory factors for describing and understanding the existence of INVs. Thereafter, I borrow some concepts from institutional theories to describe the healthcare setting and how we can understand healthcare organizations as one of the most important actors in the medical technology context influencing the internationalization process. This section ends with a short synthesis, discussion on complementarity and compatibility between the different theoretical perspectives and generation of the research questions.

2.1 International entrepreneurship

The field of international entrepreneurship has developed during the past twenty years. In their seminal work in 1994, Oviatt and McDougall tried to integrate parts of the already three large theoretical areas of entrepreneurship ("how ventures gain influence over vital resources without owning them", p. 52), of international business ("international internalization of essential transactions, p. 52) and of strategic management ("how competitive advantage is developed and sustained", p. 52) when they advanced the basis of a theory of international new ventures. An intensive academic debate has taken place since then, both criticizing the field as being fragmented and lacking "common theoretical integration" (Keupp and Gassmann, 2009, p. 601) but also acknowledging the field’s vast opportunities in terms of its multi-disciplinary roots which "is influenced and will be informed by research from many fields" (Jones et al., 2011a, p. 642), such as strategy, sociology, marketing, finance, knowledge management and economics. One of the main critiques from Keupp and Gassman (2009) was the field’s lack of a theoretical foundation that goes beyond the size and age of small and young firms. The focus in the academic field of international entrepreneurship has, however, over time become more inclusive and has also integrated the study of the behavior of larger and/or mature firms and even corporate entrepreneurship (Keupp and Gassmann, 2009; Zahra, 2005). A broader conceptualization of the international entrepreneurship field has therefore lately been proposed as follows: "the
discovery, enactment, evaluation, and exploitation of opportunities—across national borders—to create future goods and services” (Oviatt and McDougall, 2005b, p. 540). This newer conceptualization combines a theoretical foundation of entrepreneurship and internationalization which neither delimits itself to size nor the age of venture types. In response to the critique that the international entrepreneurship lacked a robust theoretical foundation, Jones et al. (2011a) carried out a thorough and systematic review (from 1989-2009) to prove how this field has developed theoretically over time. Three areas of research types with underlying thematic areas were identified: entrepreneurial internationalization (includes venture types, internationalization patterns and processes, networks and social capital, organizational issues, entrepreneurship; international comparisons of entrepreneurship (cross-country and cross-culture research) and finally comparative entrepreneurial internationalization. Whereas most research has been done within the first research type, the latter area has only recently started to spur research interest which more explicitly combines entrepreneurship and international business theories.

Some of the defining characteristics for an INV from the early seminal paper in 1994 have lately incited many scholars to return to the early phenomenon of the venture types and what they stand for in relation to theoretical implications and operationalization (e.g. Baum et al., 2011; Kuivalainen et al., 2012a; Kuivalainen et al 2012b; Madsen, 2013; Taylor and Jack, 2011). In the following, I shall therefore start my discussion with some of the main characteristics that relate to the phenomenon of INVs as an organizational entity and what is meant by an INV in this study context.

2.1.1 Main characteristics of INVs

The definition from the seminal work (Oviatt and McDougall, 1994, p. 49) refers to an INV as “a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries”, but without really defining resources, quantifying the scale of foreign sales or specifying the scope (number of countries), within or across different continents. However, more importantly, Oviatt and McDougall (1994) do specify that the most distinguishing factor for an INV is its commitment to create value across countries, either handling a few or multiple value-chain activities. They proposed four types of INVs: (i) export/import start-ups; (ii) multinational traders; (iii) geographically-focused start-ups and finally (iv) global start-ups. The differences among these four
venture types are whether they coordinate few or many activities across few or many countries. Export/import start-ups and multinational traders are handling few activities that primarily relate to logistics which are important, but not so relevant for firms that compete within knowledge-intensive industries which are dependent on a number of value-creating activities across either a few or many countries. The geographically-focused and global start-ups are therefore more relevant in knowledge-intensive industries (Baum et al., 2011), like the medical technology sector, which often relies on some unique knowledge. Another core of Oviatt and McDougall’s early conceptualization of an INV is that it has a “proactive international strategy” which they contrast to the posture of organizations that “evolve gradually from domestic firms to MNEs” in a more reactive way (Oviatt and McDougall, 1994, p. 49). Their quite ambiguous definition of an INV has opened up for a variety of different interpretations among academic scholars on what really constitutes an INV. Before discussing some of the most common ways of defining and operationalizing the INV phenomenon as a type of organization, a subset within the broader field of international entrepreneurship, it is relevant to remind us that this field emerged because it was found that certain firms did not follow the slow and incremental internationalization process as prescribed by the traditional Uppsala model why time/speed were and are still important constructs.

Hence, it is assumed in the international new venture theory that INVs embark on a speedy internationalization journey (e.g. Kuivalainen et al., 2012a; Kuivalainen et al., 2012b). Acedo and Jones (2007, p. 236) even state that one of the characteristics that specifically defines an INV “…is the rapidity with which it enters international markets following inception”. More precisely, Jones and Coviello (2005) point at two distinguishing factors in relation to time; the time it takes to start international activities (also called precocity) and the speed of international development over time. Time is the factor that primarily distinguishes INV from SME internationalization since the former focuses on the early stages of internationalization (Jones and Coviello, 2005). Thus, many scholars have agreed that speed/pace/time (e.g. Kuivalainen et al., 2007; Kuivalainen et al., 2012a; Taylor and Jack, 2011) is one out of three main distinguishing characteristics for defining INVs (although scholars use different definitions for INVs as well, like born globals or early internationalizing firms). The operationalization of speed is very broad in the extant literature. Hence, firms that start their internationalization in between three (Andersson and Wictor, 2003; Knight et al., 2004; Kuivalainen et al., 2007; Melén and Nordman, 2009), five (Acedo and Jones, 2007; Johnson,
The second distinguishing characteristic refers to scale/degree/intensity/extent (Cesinger et al., 2012; Kuivalainen et al., 2012a). Some scholars therefore define scale (intensity, degree, extent) as the proportion of foreign sales with the most frequent ratio amounting to 25 percent (Andersson and Wictor, 2003; Knight et al., 2004; Knight and Cavusgil, 2004; Kuivalainen et al., 2012b; Nordman and Melén, 2008). Luostarinen and Gabrielsson (2006) have pointed at the cut-off ratio for foreign sales amounting to at least 50% since they argue that those firms that operate in a small open economy are more dependent of foreign sales why 25% do not really distinguish these so called “born globals” from the “ordinary” types of SMEs.

The third distinguishing characteristic refers to scope (Cesinger et al., 2012; Kuivalainen et al., 2012a). One way of interpreting the scope dimension refers to choosing a market concentration strategy (a limited or focused geographical scope) or a market diversification strategy (a broad scope) (Kuivalainen et al., 2012a). Scope can also refer to firms choosing psychological distant countries in their internationalization strategy (see e.g. Oviatt and McDougall, 2005b). In addition, it is also discussed which and/or how many continents to cover in order to be defined as a Born Global firm (Luostarinen and Gabrielson, 2006). Kuivalainen et al. (2012a, p. 375) propose a more precise definition for scope as follows: “a born-global firm must have more markets than there are neighboring countries (which implicitly shows that they are not following traditional pattern along the lines of the Uppsala model)”. The traditional pattern of the Uppsala model refers to many companies first starting through sporadic export, local agents and then later on through own sales- and manufacturing subsidiaries (Johanson and Wiedersheim-Paul, 1975). The most common pattern is to start at markets that are close to one’s own country in order to get sufficient experience before establishing in more distant countries. The psychic distance plays an important role in this line of arguing. It is measured as an index and can for example include differences in level of development, level of education, legislation, business language, everyday language and culture (Johanson and Wiedersheim-Paul, 1975). Hence, the traditional Uppsala stage model’s internationalization process is closely related to the choice of different types of entry modes, which has not necessarily been the case within the international new venture theory. Instead, they discuss the
coordination of value chain activities across countries, which also include sales and production activities. In their view, it is not necessary to “own foreign assets” (i.e. foreign direct investment). Instead, Oviatt and McDougall (1994, p. 49) propose to use strategic alliances “for the use of foreign resources such as manufacturing capacity or marketing”, whereas the most common entry mode for INVs or Born Globals is to use different distributor models (e.g. Knight and Cavusgil, 2004; Knight et al., 2004; Taylor and Jack, 2011).

Returning to the discussion that scope implies covering more markets than there are neighboring countries according to Kuivalainen et al.’s (2012a) definition can be challenged if we bring in the psychic distance paradox (O’Grady and Lane, 1996) into the discussion. The reason is that it is generally assumed that the countries nearby in one continent, like Europe, are more alike each other than compared to countries that are more distant (Cesinger et al., 2012). Although most countries in Europe belong to the European Union and have access to a single market that promotes free movement of goods, people, capital and services, there are large cultural and institutional differences (especially within the healthcare sector) across countries. Another line of arguing is if close countries have a more complex customer for the INV’s business, e.g. a healthcare organization (implying a more challenging commercialization and sales process), than is found in a psychic distant country, then it would not make sense to start internationalizing nearby. If we then contrast the UK with the US and Australia (cf. Johanson and Wiedersheim-Paul, 1975), they have probably more in common as compared to e.g. Poland, Romania and Greece, which are all members of the European Union. Finally, it is probably easier for a Finnish company to do business with the UK than with its closest neighbour Russia, which is also situated on the European continent. Therefore, to distinguish between how many different continents to cover or covering more markets than there are neighboring countries in order to be an INV, or rather a Born Global, is not without problems. These lines of reasoning lead me to conclude that choosing international markets could be highly contextual where other factors such as choosing lead markets might be more important than categorizing them as either being psychic distant or not (e.g. Bell et al., 2003; Madsen and Servais, 1997; Moen and Servais, 2002).

Apart from these three core defining characteristics of INVs (or born globals); there is still another important construct that is closely related to the speed construct, namely how to define the age of a venture. Oviatt and McDougall’s first definition in 1994 explicitly refers to new ventures from inception whereas the one proposed in 2005 is not limited for young or new ventures. Instead,
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This latter conceptualization from 2005 aims for integration of entrepreneurship research and international business research, with focus on opportunity recognition and exploitation (for a review see Mainela et al., 2014). However, since this section focuses on INVs as an organizational entity, it is more relevant to clarify what is meant by a new venture. The age construct is not as frequently used as the other three defining characteristics. Most academic scholars seem to agree that a new venture should not be older than 6 years (Arenius, 2005; Coviello and Cox, 2006; McDougall et al., 2003; Presutti et al., 2007; Shrader et al., 2000). The first six years are the most critical ones in a new venture’s life span for survival reasons (McDougall et al., 2003; Shrader et al., 2000). However, the industry context could also affect the way we understand how new a venture is. For instance, Melén and Nordman’s (2009) study within the biotechnology context indicates that a new venture is 20 years or less which is in line with recent research that has pinpointed the long development phases in the biotechnology sector (Gassmann and Keupp, 2007; Hewerdine and Welch, 2012), which is as relevant for the medical technology sector. Recent research has pinpointed the long development phases before inception in the biotechnology sector, which is why Hewerdine and Welch (2012) propose that the inception should rather be seen as a process instead of a fixed date of establishment. However, Oviatt and McDougall foresaw already in 1994 that it could be problematic to define a venture’s inception. They (McDougall, 1994, p. 49) therefore suggested that “researchers should rely on observable resource commitments to establish a point of venture inception”. In other words, having long product development periods makes it difficult to use exact definitions without considering contextual factors. Different lengthy pre-organizational activities would therefore affect how we eventually measure how young a venture is and how rapidly it internationalizes. Time can therefore have different connotations depending on a study’s context. For instance, a short time perspective has certainly a different meaning when coordinating international value-chain activities in a regulated medical technology sector as compared to for instance the fashion or software industry sectors if we assume that the latter sectors have shorter product life cycles with a swifter product adoption and sales process. In other words, what is considered as a rapid process in the medical technology sector is probably considered as a slow process in the software sector.

To conclude, the variety of definitions and operationalizations is large. In line with Cesinger et al. (2012), I can only agree that it makes sense to develop contextualized definitions. The reasons are that the conditions across countries
and industries are so different that it also becomes difficult to agree upon a singular definition. This leads me to introduce what is meant by an INV in the present study context. For defining an INV, this thesis refers to the basic assumptions that triggered the very emergence of INVs (Oviatt and McDougall, 1994). First, the domestic market is not necessarily the starting point for an INV, as compared to the process theory of internationalization which proposes that “the firm first develops in the domestic market” (Johanson and Wiedersheim-Paul, 1975, p. 306). Second, the international or global vision of the entrepreneur and/or the founding/management team is the most important characteristic for defining an INV (Oviatt and McDougall, 1994). Third, the proportion of foreign sales is only one of many activities that distinguish an INV. The whole range of international upstream and downstream value chain activities are included that an INV carries out to compete in an internationalized or global industry context. Moreover, when new ventures commercialize innovations, it can take years before they manage to attain any sales at all while they are building their international competitiveness through different value creating activities (Jones, 1999). Therefore, it is not sufficient to only focus on foreign sales (Hewerdine and Welch, 2012) since these new ventures build their international legitimacy and competitiveness through other value-enhancing activities until they manage to attain actual sales orders. These three factors together are compatible with the original definition of an INV.

The internationalization journey then also depends on a variety of antecedents, which include different elements on a managerial/entrepreneurial level (e.g. mindset, experience, entrepreneurial orientation); on a firm level (e.g. resources, networks, capabilities, liabilities) and on an environmental level (e.g. market internationalization, industry factors, environmental dynamism) (e.g. Kuivalainen et al., 2012b; Madsen and Servais, 1997). Focus on international business has traditionally been on the firm and the environmental levels, whereas the entrepreneurship theories have primarily focused on the individual levels. In other words, the agency and the strategic vision of the individuals have not been in focus within the international business field (Andersson, 2000; Hutzshenreuter et al., 2007; Mathews and Zander, 2007). By focusing on different antecedents on the individual level (e.g. individuals’ earlier international experiences and personal networks) have enriched our understanding of how and why INVs manage to internationalize from their inception (Madsen and Servais, 1997). Within the international entrepreneurship field, the industry context (Andersson et al., 2014; Andersson and Wictor, 2003; Boter and Holmquist 1996; Fernhaber et al. 2007), on the
other hand, has often been downplayed and treated in an implicit or exogenous way. In some industry contexts, it is not enough to focus on either the individual or the firm level since the environmental factors are so characteristic that they also need to be in focus to understand the new venture internationalization strategies (cf. Michailova, 2011; Welter 2011; Zahra and George, 2002). In the present study, the environmental level refers to how different industry context factors affect the internationalization process in relation to speed, scope, scale and mode when operating in a regulated industry context with high national entry barriers (e.g. the medical technology sector).

This does not mean that the elements from the individual (managerial or entrepreneurial) level or the firm level are not important. On the contrary, many previous studies emanate from these levels and have shown how personal characteristics, e.g. having a global mindset (Nummela et al., 2004) and/or individual/firm level resources (capabilities) and networks, both facilitate and accelerate the internationalization process, especially in an industry context with lower entry barriers, as in the software industry (Bell, 1995, 1997; Cannone and Ughetto, 2013). However, a higher level of distinction and specification is needed of what constitutes a network and a capability across industry contexts. This means that it is expected that different industries have various logics and prerequisites, which in turn would imply specific activities, capabilities and networks. In the following, the central premises for a speedy internationalization process will be further discussed.

### 2.1.2 The basis for assuming a speedy internationalization process

Developing a theory toward international new ventures was largely spurred when existing internationalization process theories, mainly based on the Uppsala model, were perceived as deterministic, risk-averse and reactive and that they could not explain the phenomenon of new ventures that internationalize from their inception (Autio, 2005; Oviatt and McDougall, 1994). It was in this context that Oviatt and McDougall (1994) proposed their international new venture theory since they found that the traditional Uppsala model could not sufficiently explain the behaviour of INVs. An underlying assumption in the new strand of research is that these young INVs had a much more enabling and proactive posture to internationalization. Different entrepreneurs’ own international experiences in combination with using their established personal networks for accessing critical resources, compensated in many ways for the perceived psychic distance in the Uppsala model. If the Uppsala model
perceives the internationalization process as slow since the firm needs increasingly to gain experiential knowledge, the international new venture theory instead starts from how speedy an internationalization process can manifest (Jones and Coviello, 2005). This is the reason why Oviatt and McDougall (2005b, p. 541) also proposed a model of different forces that influence the internationalization speed (see Figure 1). Their model refers to the three following vital aspects. First, it relates to opportunity internationalization, which implies how quickly a discovery or enactment of an opportunity is internationalized (borrowing concepts from the entrepreneurship literature). Second, it relates to how quickly the country scope is increased, both considering accumulation of foreign country entries and entries into psychically distant countries. Third, it relates to the speed of international commitment in relation to increasing the foreign revenue.

Figure 1 A Model of Forces Influencing Internationalization speed (Oviatt and McDougall, 2005b, p. 541)

Hence, the model starts with the entrepreneurial opportunity and how speedy that opportunity is internationalized. The focus in the model is not on how opportunities are discovered or enacted per se, but on the following four types of forces that facilitate an accelerated internationalization: enabling, motivating,
mediating and moderating. The enabling force has been in focus within international entrepreneurship since its early start as an empirical phenomenon. This refers to a new reality of today with decreasing barriers, both institutional and cultural, which was not the case for around forty years ago when Johanson and Vahlne presented their first theoretical model of internationalization. This is the reason why Oviatt and McDougall (2005b) specifically refer to technology as an enabling force for an accelerated internationalization process. The second influencing force is the motivating force of competition. It could also be seen as a necessity for a firm, which competes in an internationalized industry sector. The entrepreneurial actor is the third, the mediating force. In the model, it is only through the individual or group level lens that we can understand how opportunities are interpreted and acted upon, which then both include the enabling and motivating forces. As mentioned before, this is the individual level of analysis, which has taken an implicit role in earlier international business research, as in the Uppsala model. A shortcoming with the Uppsala model, put forward by international entrepreneurship scholars, is that the individuals or the entrepreneurs are not treated explicitly (Andersson, 2000). However, Johanson and Vahlne (2009, p. 1417) argue that “the model can easily incorporate managerial discretion and strategic intentions”. For example they write that “the relationship between market entry order and psychic distance applies at the level of the decision-maker (…), not at that of the firm” (2009, p. 1421). All the same, the explicit focus on individuals has contributed to a new way of understanding and explaining INVs, especially based on the individuals’ combined experiences, competences, capabilities and networks which lead us to the next two moderating forces in the model: the knowledge-intensity of the opportunity in combination with the knowledge base of the entrepreneurial actor and his or her international network. The moderating forces can either speed up or slow down the internationalization process. Following this, I will start discussing how knowledge intensity in relation to the product or service is expected to influence the internationalization process.

First, differences in the novelty, complexity, and sophistication of knowledge used in a firm in relation to innovative products or services explain the speed of internationalization. This factor is important to shed further light on because it both affects the internationalization process and speed. For instance, when a firm competes within a more traditional industry sector and adapts a well-understood technology to new foreign markets, the firm is predicted to internationalize in an incremental way (Bell et al., 2003). On the contrary,
when a firm competes with either a novel or a complex knowledge for developing new products, the assumption in Oviatt and McDougall’s (2005b, p. 543) model is that “this type of firm is likely to have the most accelerated internationalization because it has a unique sustainable advantage that may be in demand in a number of countries”. However, one shortcoming with this line of arguing is that it does not consider the complexity related to the process of commercializing breakthrough innovations based on some novel knowledge and how to gain early revenues in some sectors, e.g. medical technology sector.

The last influencing factor is related to international networks in the model. The role of networks for internationalization is now so established through the empirical evidence of a great number of academic studies (see Jones et al., 2011a), stretching across many strands of academic disciplines that its role cannot be underestimated or denied. Networks also play a crucial role in this thesis, which is why the next chapter is devoted to covering some of the important concepts. Moreover, networks and knowledge intensity are interrelated with each other, where further distinctions are needed on what type of networks are under scrutiny or what type of knowledge is critical on an individual and/or firm level, which in turn is a consequence of different industry-specific requirements.

In the following three sections, the two influencing factors of networks and knowledge-intensity, are explored more in depth, where the latter more specifically refers to resources, capabilities and knowledge bases in the present study. Since networks are often understood as a way of gaining and leveraging resources for a resource-constrained venture, the next section gives a short background on the early network research among international entrepreneurship scholars. This section also introduces a later strand of research where attempts are made to integrate resources and capabilities with different network perspectives. After this short introduction, the roots of different network perspectives will then be presented. I thereafter discuss the role of other types of knowledge bases besides market and internationalization ones, which have primarily been in focus in the traditional process theory of internationalization. However, market and internationalization knowledge bases do not capture how firms become competitive nor whether critical knowledge bases and capabilities differ across industries. Finally, networks, resources and capabilities are increasingly interdependent and intertwined since networks often function as a tool for getting access to resources and for developing capabilities.
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2.2 Setting the stage for networks and capabilities

Entrepreneurship and internationalization research have become closer over the latest decades thanks to a more explicit focus on opportunities, contingencies and entrepreneurial capabilities (Johanson and Vahlne, 2009; Schweizer et al., 2010). The revisited Uppsala model from 2009 has included the ‘insidership of networks’ thanks to the growing number of empirical evidence that showed how and why networks have an impact on the internationalization process. Thus Johanson and Vahlne (2009, p. 1413) recognize the “clear evidence of the importance of networks in the internationalization of firms” and also those networks that are developed before entry into a new market (Johanson and Vahlne, 2003). The phase before the founding of the firm is vital to understand in order to explain the forthcoming internationalization processes, which is an issue that international entrepreneurship scholars have argued for a while (Coviello, 2006; Ghannad and Andersson, 2012; Hewerdine and Welch, 2012).

Around the late 1980s and the beginning of the 1990s, networks started to play an important role in different internationalization studies (e.g. Johanson and Mattson, 1988; Johanson and Vahlne, 1990; Oviatt and McDougall, 1994). One early and influential article in the international entrepreneurship literature that brought in the framework of networks was Coviello and Munro’s study in 1995 in the software sector that showed how “foreign market selection and entry initiatives emanate from opportunities that were created through network contacts, rather than solely from the strategic decisions of managers in the firm” (Coviello and Munro, 1995, p. 58). In 1997, Coviello and Munro published their second study on networks in the software sector covering the impact of network relationships on the internationalization process. It is a longitudinal study (Coviello and Munro, 1997, p. 379) which shows that the internationalization process was rapid; it was characterized by only “three stages” and “by the small firms making simultaneous use of multiple and different modes of entry; mechanisms which are part of a larger firm’s international network”. By studying the internationalization process from a network lens led to a new understanding of how to perceive the internationalization process where networks were more important for which markets to enter and how to do this as compared to the psychic distance concept. Their results therefore challenged the basis of the stage model logic on many dimensions; a speedier internationalization process; leapfrogging some
stages and undertaking more complex and risky entry modes early in the process.

When the network research within the international entrepreneurship field had gained a certain maturity for concluding that networks matter for INVs (for a review see Jones et al., 2011a), many scholars pushed the questions further to not only understand how an early internationalization process manifests itself but also why this is possible. Research that combined insights from network theories and the resource-based view was introduced, which advanced the understanding of INVs’ competitiveness (e.g. Coviello and Cox, 2006; Loane and Bell, 2006; Tolstoy and Agndal, 2010). For instance, Coviello and Cox (2006) integrated the types of resources (physical, human, financial or organizational); the nature of resource flows (acquisition, mobilization or developmental) and the role of social capital during various change sequences during the internationalization process. This second strand of research direction opened up for an increasing interest in more capability and dynamic based studies.

After having concluded that both networks and resources are important for INVs, another key development in the international entrepreneurship field was therefore to introduce the dynamism that faces many INVs why a dynamic capability perspective is proposed as a suitable theoretical lens (Mort and Weerawardena, 2006; Peiris et al., 2012). One early influential definition of a dynamic capability is “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” which was developed by Teece et al. in 1997 (p. 516). This shift in focus has opened up many interesting research avenues for international entrepreneurship scholars, e.g. especially when firms operate in a knowledge-intensive or knowledge-based industry setting which is further discussed in relation to knowledge capabilities in section 2.2.2.

After this short introduction which illustrates three key phases of theoretical development in relation to ‘networks’, ‘networks and resources’ and then finally ‘networks and dynamic capabilities (knowledge bases)’, I continue with the roots and foundations of network theories and how they interrelate. The section thereafter explores different types of knowledge bases and capabilities.
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2.2.1 Different strands of network perspectives

Above, I have presented how networks have been used in the international entrepreneurship field since its early start in the 1990s and how resource-based studies have been integrated successively. Next, different network concepts, derived from various theoretical fields will be disentangled; entrepreneurial, social network and business network research (Slotte-Kock, 2009; Slotte-Kock and Coviello, 2010).

Most entrepreneurial network perspectives build on how to gain access to critical resources, and how ventures “gain influence over vital resources without owning them” (Oviatt and McDougall, 2005a, p. 33). This perspective differs to some extent from the social network and business network perspectives. While the social network theory from its beginning was interested in understanding social life by studying how groups are composed (Simmel, 1955; Slotte-Kock, 2009; Smith-Doerr and Powell, 2005), business network theories were initially interested in studying industrial dyadic relationships between buyers and sellers by borrowing concepts and ideas from social exchange and resource dependence theories (Emerson, 1976; Mattson and Johanson, 2006; Möller, 2013; Pfeffer and Salancick, 1978; Sousa, 2010), but not from a new venture perspective. Hence, social network and business network theories share some common sociological roots. The business network theory is mainly interested in understanding how to establish, build and maintain stable relationships and positions in a dynamic and adaptive network, without definite boundaries but based on interactions on firm and/or network levels (Håkansson and Snethota, 1995). On the other hand, the individual level is particularly in focus in the entrepreneurial network approach. The types of ties that are in focus in the entrepreneurial and social network approach are both related to business and social ties whereas the business network approach mainly focuses on business-to-business relationships. Moreover, social and personal relationships are important to study in the entrepreneurial network approach since new ventures are often dependent on their support in the early formation process (Johannisson, 2000).

According to the social network approach, there are certain characteristics that constitute a network such as the existence of a tie, which implies describing the content (e.g. family/friend and/or business, see Coviello, 2006) or meaning of a relationship to the individual actor (Jack, 2010). Another characteristic is the direction of the tie which refers to whether it is the focal venture which initiates the effort of networking (outward-directed) or the external networks (inward-
Inward directed effort can be indicative of whether the focal venture has managed to attract new network ties on account of its own reputation and identity (Coviello 2006). The third characteristic is the assessment of the tie durability, which means that we can understand the dynamics of relationships and how stabile the overall network is (Coviello, 2006). These concepts from the social network approach have been used and integrated in an entrepreneurial network approach. For instance, scholars within the entrepreneurial network approach are interested in relationships’ strength (weak or strong). Granovetter (1973, p. 1361) introduced the concept of tie strength as the “combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie”. Initially, Granovetter’s definition of strong ties was based on interpersonal ties (friends and family), but as research has progressed (Sharma and Blomstermo, 2003); strong ties are increasingly used to describe organizations as well (business partners and acquaintances). Thus, strong ties can involve both social and business relationships. Some researchers argue that weak ties help firms gain access to new information, ideas and opportunities outside strong network ties (e.g., Agndal and Chetty, 2007; Burt, 1992; Elfring and Hulsink, 2003; Granovetter, 1973; Hoang and Antonic, 2003; Salman and Saives, 2005); that they are not as costly to maintain; and that they push for adaptive behavior, in contrast with strong ties (Oviatt and McDougall, 2005b; Sharma and Blomstermo, 2003). Conversely, some of the advantages of strong ties are that they prompt the “exchange of fine-grained information and tacit knowledge, trust-based governance, and resource cooptation” (Elfring and Hulsink, 2003, p. 410) and that they are durable and involve “a desire to negotiate about differences in order to preserve the tie” (Oviatt and McDougall, 2005b, p. 544). However, some of the disadvantages of strong ties are that they tend to be rigid (Mort and Weerawardena, 2006) and that they can possess redundancy effects (Oviatt and McDougall, 2005b).

In contrast to having too many strong and redundant networks ties, Burt (1992) introduced the concept of structural holes and how to gain a competitive advantage through brokerage or indirect relationships. Indirect ties mean that a third party or broker establishes contacts and information between other actors who are not tied themselves (Agndal et al., 2008; Oviatt and McDougall, 2005b; Salman and Saives, 2005). It is of interest to understand how key individuals manage to create new bridges across structural holes for accessing new opportunities and information (see Burt, 1992) with actors that are not directly linked to their networks. It is often perceived in the extant
social capital literature that weak ties act as bridges to new networks as opposed to strong networks that are already embedded in a redundant network structure. It is therefore difficult to obtain new information and opportunities in so-called closed networks (Burt, 2000). The use of brokerage or indirect ties becomes specifically critical when it is expected that it is difficult to draw on existing networks whilst operating in innovative international niche segments (Loane and Bell, 2006). It is therefore not only the advantage of having established personal networks that matters; it is also the process of turning structural holes into a competitive advantage for INVs in their commercialization and internationalization process.

A specific interest in the entrepreneurial network research is to study which types of relationships and networks are most important in a venture’s different developmental and growth phases (often in relation to a life-cycle perspective) (Hite and Hesterly, 2001; Hoang and Antonic, 2003; Larson and Starr, 1993). The implication is to find out how INV networks change over time in relation to their characteristics and compositional ties (Coviello, 2006). For instance, it was shown in Coviello’s study that the range of INV networks increased over time and that network density decreased over time. In other words, the use of weak ties became more important as the ventures intended to grow through internationalization; a finding that is in line with Oviatt and McDougall’s (2005b) arguing when they developed their model of forces that influence internationalization speed.

To recapitulate, network ties are important in the entrepreneurship, social and business network research. Entrepreneurial network research has borrowed many concepts from the original social network research in order to advance the understanding of entrepreneurship through a network lens where different types of network ties have played a crucial role (in relation to strength, size and density). Business network research is more interested in how and why network relationships develop and change (Slotte-Kock and Coviello, 2010). Entrepreneurial and social network research has increasingly become intertwined when they are used in the international entrepreneurship literature.

A fruitful way forward, beyond research on different types of network ties, is how to increase the understanding of the actual value and content of networking (Sainio, 2011; Styles and Seymour, 2006; Jack, 2010). A shortcoming in the extant network studies is that focus has mainly been on social or personal relationships in the entrepreneurship studies, and primarily market-based interfirm relationships in business networks but not on other types of relationships.
that are driven by different values or goals. For instance, researchers who operate in scientific surroundings have probably a strong focus on producing publications and achieving scientific progress in contrast to business partners whose main long-term objective is creating revenues (Biemans, 1995; Lindstrand et al., 2011). However, there is a growing trend to both embrace the broader contextual setting and other non-market based actors like scientific and specifically political ones in the business network approach (e.g. Bengtson et al., 2011; Bengtson et al., 2009; Biemans, 1995; Gummesson, 2006; Hadjikhani and Sharma, 1999; Peiris et al., 2012; Welch and Wilkinson, 2004) as they can be decisive in certain industry contexts when entering new international markets, especially within the medical technology context.

Next, I turn to uncovering what different types of knowledge bases and capabilities imply when operating in a knowledge-based or knowledge intensive industry setting.

### 2.2.2 Different strands of knowledge capabilities

In the model of Oviatt and McDougall (2005b), the second influencing factor is related to knowledge and learning, a concept that is equally important in the process theory of internationalization (Johanson and Vahlne, 1977, 1990), the dynamic capability perspective (Teece et al., 1997; Teece, 2007) and the knowledge-based view of the firm (Grant, 1996). In the model of Oviatt and McDougall (2005b), as depicted in Figure 1, the knowledge block refers to both market knowledge and the intensity of knowledge in the offered product or service. Depending on the innovation height (degree of novelty), the knowledge-intensity of the product is divided into three levels; the first level refers to well-understood technologies; the second level refers to complex knowledge and the third level refers to “novel complex knowledge” which is also expected to “have the most accelerated internationalization because it has a unique sustainable advantage that may be in demand in a number of countries” (Oviatt and McDougall, 2005b, p.543). Although this statement and conclusion first seems logical, an alternative conclusion could also be drawn from this statement. The product can also be too novel that it will take time to prove the product’s ‘proof-of-concept’ and to gain international market acceptance among diverse stakeholders, i.e. the assumption of an accelerated internationalization process is challenged.
2 Theoretical Framework

The model starts from how the perceived opportunity is exploited internationally. However, this does not say so much about the actual process of gaining market acceptance for the so-called opportunity. The process of gaining market acceptance is therefore more related to the actual implementation of the opportunity (Shane and Venkataraman, 2000) than how the opportunity is identified. I would therefore like to push this reasoning further by integrating the types of knowledge bases, capabilities and micro-foundations (activities) that are required across industry settings to better elucidate the often cumbersome process of commercializing a breakthrough innovation and to achieve sales revenues. Capabilities have no real value unless they are used, developed, combined or recombined in different ways. More precisely, this thesis refers to capabilities in the following way: “Capabilities emerge via the integration of specialist knowledge across a number of individuals” (Knight and Cavusgil, 2004, p. 127) whereas the dynamic capabilities are “about developing the most adequate resource base” (Ambrosini and Bowman 2009, p. 34) in a dynamic environment. These definitions fit well in an international entrepreneurial knowledge-based context since individual competences and actions are specifically acknowledged (Grant, 1996). In addition, the types of knowledge bases that different individuals bring with them and their combined knowledge bases in an INV are equally important. Individual actors together are the carriers of resources and competences, both internal and gained through their external networks (Evers et al., 2012; Fernhaber et al., 2009; Mort and Weerawardena, 2006; Teece et al., 1997). As such, they play an important role in an INV’s competitiveness.

In a recent study from the medical technology context, it was confirmed that the most important knowledge that managers bring with them from previous working experiences at incumbent large medical technology firms was knowledge within regulations and marketing (Chatterji, 2009) and not the technology knowledge which could be expected as the most important asset. Chatterji’s study clarifies which types of competences and knowledge bases matter for entrepreneurial firms with new medical technology innovations which can help us untangling some of the requirements that exist when operating in this industry setting. The study set-up fits well into an international entrepreneurship perspective since it starts from the assumption that prior knowledge matters, which is one of the most important premises for explaining why an INV can embark on a speedy internationalization process. In addition, it is vital to understand the actual content of relevant knowledge bases.
and capabilities across industry settings and if industry-specific activities would influence a speedy internationalization process.

We have learnt the importance of experiential internationalization and market knowledge from the PTI research (Eriksson et al., 1997; Johanson and Vahlne, 1977). However, it is not enough to only focus on these constructs if we include the innovation height and the knowledge-intensity of the product or service that will be internationalized. Technology knowledge is expected to be important for INVs operating in high-technology industries (Autio et al. 2000; Nordman and Melén, 2008). However, one of the most important conclusions from Chatterji’s (2009) study was, as mentioned above, that it was not the inherited technical knowledge that was most critical for success; it was instead the work with regulatory knowledge, marketing knowledge (refers to how to market to physicians) and identifying new market opportunities (entrepreneurial knowledge) in this industry sector. In his study, the marketing knowledge and the entrepreneurial opportunity were interrelated since it was found that “prior experience marketing products to physicians provided valuable insight into what new devices might look like and who might buy them” (Chatterji, 2009, p. 200). This relationship between marketing and entrepreneurial opportunities is not as striking and distinct as the role of regulatory knowledge. Since this study referred to spawned6 firms in the US context, the regulatory knowledge then refers to understanding the US Food and Drug Administration (FDA) approval process. However, no matter which country a firm enters, it still has to cope with nation-specific regulatory approvals and reimbursement issues. An important activity that is specific to the overall life sciences industry is related to proving evidence before sales. For instance, Chatterji (2009) showed how important it is to specifically have knowledge in relation to clinical trials which are demanded by the approval authorities. For instance, the FDA can recommend a much larger clinical trial if they find that existing evidence is insufficient, which can easily amount to $20 million and it would easily take another three more years to obtain the additional evidence. The relation is that the more novel and complex a new product is, the more evidence is demanded which would then lead to a slower and more cumbersome internationalization process which contradicts the assumption in Figure 1 of an accelerated internationalization (Oviatt and McDougall, 2005b) for this product category.

6 Spawns mean ventures that are started by former employees of incumbent firms (large medical technology firms) (Chatterji, 2009).
The interesting part is that Chatterji (2009) showed how the already gained knowledge bases (working with and managing clinical trials) through earlier work at large medical technology firms resulted in that the entrepreneurs managed to speed up the approval process when they started their new spawned firms. Another important activity is related to how to get paid or obtain coverage to reimburse the use of a medical technology product which is a very complicated process for even large medical technology firms (Chatterji, 2009). The relation is that the more novel a product is when being commercialized, the more demanding it is to get paid and earn early revenues since it is expected that the need of providing different types of scientific and economic evidence takes time, which in turn would affect a rapid internationalization process. In addition, it has to be noted that the reimbursement process differs across and even within countries. The reimbursement issue is related to pricing which is normally seen as an activity for marketing. However, this issue of reimbursement is not a straightforward process since it also requires an understanding and specific knowledge of scientific evidence. It is not uncommon to have a full-employed person who only works with this task (Chatterji, 2009). In other words, this implies that it can take a long time to get paid for a new product and that the process for gaining a reimbursement decision can cost a lot of money. These two factors are related to the novelty of a product, which in the short term perspective can, instead of accelerating the internationalization process, slow it down considerably. Since these two activities are expected to take time, a financial capability (Kuivalainen et al., 2010; Park et al., 2014) is critical for being able to attract external financing. For instance, some venture capital investors may even demand a detailed “reimbursement strategy as a precondition for investment” (Chatterji, 2009, p. 2000). In other words, “providing the Centers for Medicare & Medicaid Services (CMS) with a persuasive case for reimbursement is a priority for a medical device start-up. CMS evaluates whether the medical technology improves patient outcomes over existing technologies, in contrast to the FDA, which focuses on safety” in the US context (Chatterji, 2009, p. 2000). Due to the complexity with these activities, prior experiences are important for both being able to speed up the process, but also for achieving success. Based on this reasoning, it makes sense to pursue a more constrained posture to internationalization, which in this context refers to a meticulous understanding of each country’s specificities (Johanson and Vahlne, 1977; Johanson and Wiedersheim, 1975) regarding regulative and reimbursement issues and how they would fit the breakthrough innovation. This implies that additional and very specific knowledge bases besides those which refer to internationalization and market are of importance.
when operating in a medical technology industry sector. Knowledge is often distinguished between objective knowledge and experiential knowledge (Eriksson et al., 1997; Penrose, 1959) where the former is such knowledge that can be learnt relatively easily, for example, by reading books or by interpreting market research results (Johanson et al., 2002). This knowledge can be transferred between individuals and between parts of a company. On the other hand, experiential knowledge is such knowledge that is obtained through personal experiences (learning by doing), which is the most important construct within the internationalization literature.

In Table 1, I have first defined what is meant by market and internationalization knowledge as these are the most important constructs in the process theory of internationalization (Eriksson et al., 1997; Johanson and Vahlne, 1977). Market knowledge is a broad concept that both contain foreign business knowledge and institutional knowledge (Eriksson et al., 1997; Johanson and Vahlne, 1977). In Table 1, I propose two distinct sub-categories to market knowledge, namely reimbursement and regulatory. I have defined them in relation to the specific requirements and activities that are needed when operating in a medical technology context. I have then added three other types of knowledge bases (technology, finance and entrepreneurship) that are expected to matter when commercializing a knowledge-based product. As with the market knowledge, I have also added two sub-categories for the technology knowledge base that are critical for the medical technology context, R&D and specifically science. To conclude, based on the highly specialized knowledge bases that are required when operating in a medical technology context (Chatterji, 2009), I have explicitly added reimbursement, regulatory, R&D and scientific knowledge bases and what they refer to in this specific industry context in Table 1. Financial resources are also needed for developing the different firm capabilities (Kuivalainen et al., 2010). Hence, financial capabilities are crucial for enabling commercialization and international growth. Finally, entrepreneurship knowledge relates to the very process of discovering or creating opportunities and how to exploit them which is the very essence in the entrepreneurship literature (Mejri and Umemoto, 2010; Nordman and Melén, 2008; Oviatt and McDougall, 2005b; Sarasvathy, 2008; Zahra and George, 2002).

To sum up, while the international new venture theory mainly views the entrepreneurial knowledge as the enabling factor for international growth, the process theory of internationalization mainly views the foreign experiential
knowledge as decisive for further resource commitments (i.e. implying a more risk-averse and constraining posture). I have so far included some specific knowledge types that are highly critical when operating and competing in a medical technology context.

This section has covered how the knowledge-intensity of a product or service can affect the assumption of a speedy internationalization process. The product and the industry sector itself require some distinct knowledge types that might differ across industry settings. In the next section, I will explore the medical technology industry context through an institutional lens. There are three reasons for this approach: (1) healthcare organizations, embedded in politically governed markets, are crucial actors in the medical technology sector; (2) the medical technology sector is highly regulated; and (3) different types of actors in a healthcare setting have probably different goals and incentives as compared to profit-driven market actors (business actors).
Table 1 Different types of knowledge bases in relation to the medical technology sector

<table>
<thead>
<tr>
<th>Types of knowledge bases</th>
<th>Most common contents</th>
<th>Examples of authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Foreign business knowledge of clients, the markets and competitors. Institutional knowledge of government, institutional framework, rules, norms, and values.</td>
<td>Eriksson et al. (1997); Hilmersson (2014); Mejri and Umemoto (2010); Sharma and Blomstermo (2003)</td>
</tr>
<tr>
<td>Reimbursement</td>
<td>How to secure coverage, coding and payment for new medical technologies. Highly specialized knowledge in the medical technology context.</td>
<td>Altenstetter (2003); Chatterji (2009); Hutchings (2010); Schreyögg et al. (2009); Torbica and Cappellaro (2010)</td>
</tr>
<tr>
<td>Regulatory</td>
<td>How to cope with nation-specific regulatory approvals and quality systems. Highly specialized knowledge in the medical technology context.</td>
<td>Altenstetter (2003); Chatterji (2009); Pietzsch et al. (2012); Schreyögg et al. (2009); Steg and Thumm (2001)</td>
</tr>
<tr>
<td>Internationalization</td>
<td>This knowledge type is gained by own experiences. It is about a firm’s capability and its resources to engage in international operations.</td>
<td>Eriksson et al., (1997); Eriksson et al. (2000); Hilmersson (2014); Mejri and Umemoto (2010)</td>
</tr>
<tr>
<td>Technology</td>
<td>Knowledge-intensity is focused in the international new venture theory. For instance, it reflects technological learning. Experiential knowledge refers to the technology upon which the firm’s products are built.</td>
<td>Freeman et al. (2012); Nordman and Melén (2008); Yli-Renko et al. (2002)</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Indicators are often patents, trademarks and the amount of R&amp;D spending.</td>
<td>Yli-Renko et al. (2001, 2002)</td>
</tr>
<tr>
<td>Science</td>
<td>Refers to clinical trials which should also be aligned with the reimbursement requirements to prove added value and medical benefits. Highly specialized knowledge in the medical technology context. Scientific publications are also creating legitimacy.</td>
<td>Altenstetter; (2003); Chatterji (2009); Hutchings (2010); Schreyögg et al. (2009); Torbica and Cappellaro (2010)</td>
</tr>
<tr>
<td>Finance</td>
<td>Combination of investment expertise, connections to investors and financial control systems. The capacity of the firm to deploy financial resources.</td>
<td>Gabrielson et al. (2004); Kuvlainen et al. (2010)</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>This knowledge type refers to how to discover or create opportunities and how to exploit them.</td>
<td>Nordman and Melén (2008); Mejri and Umemoto (2010); Zahra and George (2002)</td>
</tr>
</tbody>
</table>
2 Theoretical Framework

2.3 Institutional theories and international entrepreneurship

It is only recently that institutional theories have appeared in international entrepreneurship literature. They are then often used from the perspective of how different institutions across countries affect entrepreneurial capabilities, opportunities and behavior (Jones et al., 2011a; Terjesen et al., 2013). There are also a few studies that are related to differences in relation to institutions and their role for internationalization process, and then mainly in emerging economies (Kiss and Danis, 2008; Kiss et al, 2012). The latter types of studies have provided important insights into the role of institutional differences, advising firms to use, for example, different mechanisms when entering emerging countries with weaker institutional structures than when entering mature Western countries—for example, regarding use of networks (Kiss and Danis, 2008). More precisely, Kiss and Danis (2008) found that strong personal ties were critical when operating in a country with a low level of institutional development, whereas it sufficed with weak ties when operating in a country with a high level of institutional development for achieving new venture internationalization speed. There is one study that takes a somewhat different perspective which is closer to my research context, namely to study the role of regulatory differences across countries and how the choice of market entry is related to the level of protection of intellectual property rights from a regulative perspective (Coeurderoy and Murray, 2008). In other words, this refers to how institutional differences would affect the the internationalization process of INVs.

2.3.1 Institutional theories and healthcare policies

Institutional theories broadly consist of three pillars: regulative, normative and cultural-cognitive dimensions (e.g. Scott, 2001, 2008, 2014). The regulative dimension embraces the rule-setting, monitoring, and sanctioning activities for guiding behavior in a community, society or nation (Scott, 2008). Firms that operate in a regulated industry sector, e.g. the medical technology sector, need to conform to a variety of regulative rules where the key mechanism for control is coercion (DiMaggio and Powell, 1983). The regulative dimension primarily stems from the economic and political streams of research (North, 1990) which has a stronger reliance on ‘rationality’ as compared to the other two dimensions. Although the main indicators for the regulative dimension are rules, laws and
sanctions that are legally sanctioned, “many laws are sufficiently controversial or ambiguous that they do not provide clear prescriptions for conduct” (Scott, 2014, p. 62). This is also one of the reasons why the normative and cultural-cognitive dimensions, relying on normative respectively mimetic mechanisms for their effects, are suitable to complement the coercive mechanism of the regulative dimension. Scott (2014, p. 62) even puts forward that in circumstances of ambiguity and controversy, “law is better conceived as an occasion for sense-making and collective interpretation” which now leads me to introduce the normative and cultural-cognitive dimensions, stemming from the sociological and organizational streams of research (Scott, 2001, 2008). The main indicators of the normative dimension are certifications, accreditations, standards, and best practices which are established by, for instance, professional and trade associations in a given industry sector (Scott, 2014; Renko, 2011). Whereas the basis of legitimacy within the regulative dimension is legally sanctioned, the normative dimension is often morally governed (Scott, 2014). More precisely, this dimension also embraces values and norms; values answer the question of “what is preferred or considered proper,” and norms answer the question of “how things are to be done, consistent with those values” (Bruton et al., 2010, p. 423), which stretches across industrial, professional and cultural contexts, including country specificities. Finally, indicators of the cultural-cognitive dimension are “common beliefs” and “shared logics of actions” which are “culturally supported” (Scott, 2014, p. 60). Whereas the regulative dimension is mainly concerned with the “rules of the games” (North, 1990), the constitutive function of the cultural-cognitive dimension includes how different symbolic processes construct social reality (Scott, 2014). The cultural-cognitive dimension has a wide approach. Scott (2014, p. 68) describes in the following way how cultural systems can operate at multiple levels:

“from the shared definitions of local situations, to the common frames and patterns of belief that comprise an organization’s culture, to the organizing logics that structure organization fields, to the shared assumptions and ideologies that define preferred political and economic systems at national and transnational levels”.

In this thesis, the regulative and normative dimensions are in focus. Moreover, the concepts of the normative (values, norms) and the cultural-cognitive (shared logics of action, common beliefs) are to a certain extent interdependent, especially regarding how they can manifest in different industry and/or country specific practices. It needs to be clarified that regulative, normative and cultural-cognitive dimensions are expected to be relevant to any business or social
2 Theoretical Framework

context. However, they fit particularly well in a medical technology context since firms operating in this sector need to consider each country’s specificities in relation to regulations, norms and culture-cognitions. The regulative dimension is seen as a result from each country’s underlying values, norms, and common beliefs which then manifest in different normative practices among the concerned stakeholders or actors in a healthcare environment.

Moreover, healthcare policy is each country’s concern why the broader socio-political situation needs to be considered when firms operate in the medical technology context. Overall, there exist three key directions of healthcare systems (Palier, 2006). First, public healthcare systems are, for instance, found in Sweden and the UK where healthcare costs are mainly state-funded through taxes (Altenstetter, 2003; Palier, 2006; Schreyögg et al., 2009). Second, different types of public health insurance systems are found in a variety of countries, often in combination with private insurance solutions e.g. Germany and France (Altenstetter, 2003; Palier, 2006; Schreyögg et al., 2009). Third, a healthcare system that operates on a more or less free market with only a low public interference with predominantly private insurances is found in the US (Palier, 2006). The various healthcare policies reflect the different norms and values across countries. For instance, in Sweden, inhabitants expect access to an equal and free healthcare, which has not been the tradition in the US. However, in 2010, one of the largest reforms in the US has taken place when the Affordable Care Act, also called, ObamaCare became a law in order to reform the American healthcare system7. The implemented Obamacare reform now implies that the free market place has changed. For instance, it is now mandatory for individuals to have insurances.

The point in this section is not to value different countries’ policies and priorities. Instead, it is to illustrate how different healthcare policies can affect firms that operate in a medical technology context. Each overall healthcare policy in a country is consequently based on its values and norms, which in turn affect the legislation, laws and practices that are developed and enforced. This means, among other things, that each country has different priorities and budgets for adopting medical technology innovations, all major factors for a firm to consider when deciding which countries to enter, and in which ways.

7 http://obamacarefacts.com/whatis-obamacare/
2.3.2 Institutional theories and actors in a medical technology context

The institutional perspective in this study context specifically pertains to the role of various healthcare organizations as important non-market based (public) actors embedded in very complex systems across countries with specific regulations and normative practices, which are difficult for an individual entrepreneur or firm to influence, at least in the short time perspective. This type of actor is therefore denoted as an institutional customer. To understand the institutional mechanisms that exist in different healthcare settings, it is therefore useful to account for different carriers or vehicles that diffuse institutional arrangements across time and space. Scott (2008) discusses a number of these different carriers or vehicles such as symbol systems, routines and artifacts and they represent various mechanisms in order to understand for example stickiness, constraints or possible changes in a healthcare setting, and who or what transport them (Scott, 2008). These three different carriers mentioned above are now integrated in a networked healthcare perspective.

A networked healthcare perspective implies that there are some distinct groups of actors to whom the medical technology firms have to relate when operating in a medical technology context. The main five groups are illustrated in Figure 2 below and comprise healthcare providers, payers, regulators, patients and medical technology suppliers.
Due to changing demographics e.g. an ageing population, most western countries struggle with increasing costs, which is why their healthcare organizations have tried to implement different ways to address budgetary constraints and to change purchasing procedures. However, the ways of addressing these issues vary between different healthcare systems in the world. The need remains for the medical technology firms to understand the relevant actors and their roles, especially because purchasers (e.g. governments), financial intermediaries (e.g. different insurers) and providers (physicians and nurses) operate under different logics. For example, healthcare providers are mainly concerned with delivering effective healthcare, whereas payers are mainly concerned with proving healthcare efficiency costs (Burns, 2005; Sobrio and Keller, 2007). Thus, different actors operate under various logics, incentives and institutional arrangements. Sobrio and Keller (2007) propose three fundamental drivers that the firms need to consider namely health, cost and profit (see Figure, 2). Another important driver that is added in Figure 2 is the
regulative aspect (Steg and Whitelegg, 2000), which implies that firms need to comply with regulations when operating in a healthcare context. These different drivers fit well to integrate in an institutional framework, based on the regulative, normative and cultural-cognitive dimensions (Scott, 2014). The regulative dimension is added in Figure 2 to explicitly account for this important factor when operating in a regulated industry context. It relates to how different symbol systems guide behavior (Scott, 2008) in different institutional contexts. All medical technology products need to comply with different rules and regulations, some supranational, such as EU-legislation whereas others are governed by national health policies (Steg and Whitelegg, 2000) with the purpose of placing products on the market which fulfill safety measures. Before launching a product in a European country, manufacturers must ensure that the regulation on medical devices is followed by acquiring the CE mark for every product. To enter the US, the largest market in the world, every medical technology product must be approved by the FDA.

Therefore, the most important driver is to be able to prove that the products/solutions are effective and contribute to the public health, which relate to the actors who actually provide healthcare services (e.g. physicians, nurses) in Figure 2. They follow different routines, characterized by “deeply ingrained habits and procedures based on unarticulated knowledge and beliefs” (Scott, 2008, p. 82). Routines refer to the key actors’ way of working in a healthcare context and their diverse logics and incentives. Science per se is global, but how it is translated into everyday practice is country/region specific and even clinic specific. For example, although a firm might have received the European CE mark for its innovative technology, this does not imply that the product has reached clinical acceptance because the product’s clinical efficacy still must be proved and demonstrated. This means that in every individual market, local hospitals want to make their own evaluations before the product is accepted by local physicians and caregivers (SwedenBio et al., 2005). Moreover, it is easier for many people to carry on old habits and routines than to make an active change (Scott, 2008).

Cost means that the firms need to show how their solutions/products contribute to the efficiency of the healthcare system, which relates to payers in Figure 2. For example, “health-care policymakers want scientific, technological and economic evidence before classifying a new technology as reimbursable” (Torbica and Cappallaro, 2010, p. 61). Today, regional differences in relation to financial incentives in order to recognize new technologies are common and the process of recognizing the need for and the reimbursement of a new
product can in some cases take years (Sobrio and Keller, 2007; Torbica and Cappallaro, 2010). Contrary to most European countries, the US requires new technologies to provide clinical data on cost as well as on medical effectiveness. However, the situation starts to change in Europe and "in recent years most EU countries have specified additional regulation on national level for coverage in the national benefit baskets, which usually requires data on effectiveness and even cost-effectiveness" (Torbica and Cappellaro, 2010, p. 67).

This industry is characterized by the need to provide different kinds of evidence in relation to both proving healthcare efficiency and proving healthcare effectiveness. The concept of artifacts, which refer to the "material culture" (Scott, 2008, p. 83), is therefore helpful for pinpointing what type of evidence is required by the different actors in the healthcare setting in order to change healthcare behaviors and to achieve sales for the focal firm. The critical artifact in this study is achieving a reimbursement decision for an innovative medical technology. Hospitals and clinics may not want to invest in medical technology products that are not included in the reimbursement lists of third parties (e.g. insurance companies, county councils). The payments can range from public funding (national and/or local) to patient and/or employer insurance. Another important artifact is proving cost-efficiency through, for example, health economics data. Products should not only prove clinical effects (e.g. based on clinical trials) but also be cost-efficient for the payer.

The last driver in Figure 2 relates to financial performance and that these integrative processes must be profitable, at least in the long-term, for the medical technology firm to ensure its survival. Considering that the medical technology sector consists of many start-ups that commercialize innovations (Altenstetter, 2003), there are some challenges in relation to becoming profitable, at least in the short run. In general, newly created firms often suffer from both liabilities of newness and smallness (Cafferata et al., 2009; Stinchcombe, 1995) and can also lack internal resources and capabilities to ensure the successful survival of the firm (Hite and Hesterly, 2001). For instance, it is shown that "approximately 25% of all new businesses fail within two years and 62% fail within six years" (Zacharakis, 1997, p. 35). In other words, the first six years are the most critical for assuring a new venture's survival chances (McDougall et al., 2003). A recent study from 2014 on bankruptcy and how to promote a second chance for "honest bankrupt entrepreneurs" in the European context showed that "50 % of new businesses
close down or fail during their first five years in operation”⁸. This figure is expected to be even higher in this industry sector due to many formal requirements that encounter an INV during its early life cycle. In addition, liability of foreignness (Hymer, 1960) faces an INV that from its inception strives to gain international market acceptance, where gaining legitimacy for both the new venture and the new product is paramount (Mort et al., 2012).

2.4 A synthesis of the theoretical framework

To recapitulate, international business literature as represented by the Uppsala stage model has more and more incorporated entrepreneurship theories in their revised internationalization models (Johanson and Vahlne, 2009; Schweizer et al., 2010). Among other things, focus is now on the insidership in networks while the psychic distance is outdated (Johanson and Vahlne, 2009) which is in line with the way that many international entrepreneurship scholars have argued during the latest 20 years. Moreover, the incremental and slow internationalization process is also questioned since different networks can compensate for experiential learning. However, a theoretical deficiency exists since crossing national markets is not in focus any longer, neither in the revised Uppsala model nor in the international entrepreneurship literature. Many of the international entrepreneurship studies are based on the assumption that national markets are not very distinctive and that the entrepreneurs’ knowledge, networks and previous experiences can compensate for liabilities of newness, smallness and foreignness. This argument holds for many high-technology industries which are characterized by niche segments and/or where the firms offer homogenous products or services (Madsen and Servais, 1997) and when there is almost no difference between the time for attracting and serving national and international customers (Hennart, 2014). But what happens when every national market is surrounded by different regulations and public policies that are difficult to influence for an individual entrepreneur, at least in the short

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run, and when the most important actors are governed by other logics besides business-related motives and needs? In these cases, would we encounter other types of internationalization speed, scale, scope and pattern?

I have integrated different elements from the international process and international new venture theories in this thesis. The phenomenon under study, new venture internationalization, is a result from both newer insights from INV theory and from older insights from PTI. Thereafter, I have used three broad theoretical perspectives that help me to understand this phenomenon from their respective theoretical lenses; networks, capabilities (knowledge) and institutional perspectives in order to advance a holistic understanding of new venture internationalization and commercialization in the medical technology sector.

In the next section, before generating my research questions, I summarize the different theoretical perspectives and argue for their compatibility and complementarity.

2.4.1 Complementarity and compatibility between different theoretical perspectives

To sum up, my theoretical framework starts with how the international new venture theory has mainly developed as a reaction to the traditional Uppsala model. I then proceed to describe the characteristics of INVs and assumptions for a speedy internationalization process. Thereafter, I uncover different strands of network theories. These are closely related to gaining access to vital resources in a dynamic environmental context, which affect the creation, development and deployment of critical knowledge based capabilities in INV theory. The fourth area in the literature framework is related to some elements in the institutional theoretical perspective. I argue that this is a missing piece in a jigsaw puzzle for better answering the overall research purpose to explore how and why the medical technology context influences new venture internationalization. The most common way of working with institutional theory in the international entrepreneurship field is either on analyzing emerging markets from an institutional lens or studying differences in entrepreneurial set-ups across countries where focus is on how opportunities are perceived, understood and acted upon. However, less research is found on how to analyze a regulated industry setting and/or a “public customer” through an institutional lens. One of the deficiencies in the current internationalization
literature is that the actual crossing of national borders is not in focus anymore. This was one of the priorities when the psychic distance concept was introduced in the 1970s. The view was that country markets are distinctive and are separated by high barriers to enter (Autio, 2005). Thanks to both an increased globalization and many individuals’ prior international experiences, the perceived psychic distance is diminishing. Yet, there are still factors in different industry settings which are a concern for each country, like how each country governs its healthcare policy. A national socio-political system refers to a healthcare system which is governed by political systems that differ in each and every country (Palier, 2006). This diversity constitutes a quite unpredictable environment for an individual firm which could both imply an opportunity but also a hurdle if the innovativeness of the offered product does not fit a country’s socio-political priorities. This is one of the reasons why I argue that the institutional perspective not only helps in creating a suitable context for INVs operating in the medical technology sector but also in analyzing the healthcare system in different countries. This implies understanding the differences across national healthcare organizations from an institutional perspective and how they might impact on the internationalization process.

In the extant literature, both networks and resources (capabilities) have been used to analyze INVs within the international entrepreneurship field since its early start in the mid 1990s. However, further distinctions and elaborations are needed from a regulated industry perspective, where scientific and commercial logics try to fit each other (various actors have different priorities and needs) (Brännback et al. 2007; Gurdon and Samson 2010; Lindstrand et al. 2011; Nordman and Melén 2008).

Based on the reasoning from the theoretical framework, I will now discuss whether the overall theories fit each other, i.e. their compatibility or how they complement each other in this thesis.

INV theory:
The theoretical heritage of the INV theory (Oviatt and McDougall, 1994) stems from international business, strategic management, and entrepreneurship. The starting position for an INV is often that individuals are innovative, proactive and risk-taking (McDougall and Oviatt, 2000) and that they have the agency for change. However, the environmental conditions have been downplayed in the international new venture theory why the traditional PTI (e.g. considering national regulative differences), strategic management
2 Theoretical Framework

(weak environmental fit) and the institutional theory (regulative, normative and cultural-cognitive dimensions) do all complement the INV theory.

IPT:
The theoretical heritage stems from organizational theory (Cyert and March, 1963) and the theory of the growth of the firm (Penrose, 1959). Concepts of competences, knowledge bases, resources, and capabilities are all compatible with both the INV and the dynamic capability perspectives. The focus on the market and internationalization knowledge bases in the IPT is still important to understand when internationalizing. However, other knowledge bases and capabilities, which are more related to activities (micro-foundations), are added, why a dynamic capability perspective both enriches the PTI and the INV perspectives. Resources are equally important in both entrepreneurship and business network theories. The INV theory perspective proposes that knowledge intensive firms are less constrained by distance and national boundaries. However, this is a paradox if the firms offer too novel solutions which do not yet fit institutional frameworks across nations, which is why the institutional theory would also give some valuable insights on the topic.

There is a large difference between the PTI and INV when it comes to the role of the domestic market. The PTI suggests that the value creation starts in the domestic country (Johanson and Wiedersheim, 1975) whereas the INV proposes that value creation takes place across national borders (Autio, 2005). Moreover, if a company builds its competitive advantage first in its home market, there is a risk of inertia and learning impediments. This is why Autio et al. (2000) proposed the "learning advantages of newness" when firms start an early internationalization process which becomes specifically crucial when competing in a global industry context.

Networks (entrepreneurial, social, and business):
The theoretical heritage of the three different network perspectives differs (ranging from sociology, economics and marketing). The entrepreneurial network perspective has borrowed many concepts from the social network perspective (with focus on network strength, size and density). Entrepreneurial dynamics complement the dynamic capability perspective and how critical capabilities are created with network actors (Mort and Weerawardena, 2006). The role of networks for INVs has been established through the extant research since its start in the 1995s. Yet, further network distinctions and elaborations are needed when operating in a knowledge-based medical technology sector.
The assumption in many network studies is that entrepreneurs use already existing personal or social networks (Oviatt and McDougall, 1994). However, this might be difficult if the firm competes in an innovative niche segment where it is difficult to draw on existing networks (Loane and Bell, 2006). The business network perspective fits well when the ambition is to understand how networks are created and to increase the understanding beyond business and social networks. The business network approach also fits well when trying to understand how network actors try to create value with each other through various resources and activities (Håkansson and Snehota, 1995). The concept of value creation and the focus on activities are equally important in the dynamic capability perspective, although they do use different avenues for their respective research fields. Hence, the combination of network perspectives helps to understand: (1) the role of network dynamics (including the pre-founding phase for founding and developing the INV); (2) the types and functions of networks; (3) the creation, development and deployment of critical capabilities with network actors; and (4) the value creation and exchange with network actors.

**Dynamic capability:**

The theoretical heritage stems from the resource-based view (Barney, 1996), organizational learning (Cyert and March, 1963) and evolutionary economics (Nelson and Winter, 1982). The roots of the resource-based view are shared with the INV theory (Autio, 2005) whilst the roots of evolutionary economics are shared with some parts of institutional theories (Scott, 2014). The roots of organizational learning are shared with the PTI. It is critical to understand why an INV is able to compete internationally, which relates to different individuals’ competences, knowledge bases and capabilities (Gassmann and Keupp, 2007; Grant, 1996; Knight and Cavusgil, 2004). Knowledge is the most central concept in the PTI but it mainly concerns the internationalization process itself or the market knowledge. It does not look at the capabilities that are needed in order to become competitive internationally or the capabilities that are needed for commercializing innovative products or services. Hence, the dynamic capability perspective is used for understanding why an INV has the ability to internationalize, based on its critical capabilities which per se need to be in congruence with a dynamic environment. The dynamic capability perspective fits well since the phenomenon under study is in constant change. In a knowledge-based medical technology context, the critical capabilities are dynamic since they are constantly created, developed and deployed according to the INV’s international growth ambitions and activities. Dynamic capabilities
2 Theoretical Framework

are understood at the firm level but the theory acknowledges the individuals’ competences and activities (knowledge, skills, abilities, prior learning) which fits an INV perspective.

The common ground of both the dynamic capability and the PTI is that they discuss the path dependency as a function of earlier experiences, activities and knowledge. Since an INV faces constant change, especially when operating in a dynamic environment, the trap of path dependency is avoided (a legacy from both dynamic capability and PTI). Hence, the routine that an INV faces is to be in constant change. A routine is also an important concept in the institutional framework (Scott, 2014), which in this study refers to the context that the most important actor or customer; i.e. the healthcare organization has developed different “sticky” routines (which are not easily manipulated or changed from an individual entrepreneurial perspective, at least not in the short term perspective).

Institutional theories:

The theoretical heritage in institutional theories has many theoretical roots (e.g. economics, political science and sociology). The evolutionary economics perspective is shared with the dynamic capability perspective (Nelson and Winter, 1982; Teece et al., 1997). The PTI was developed as a reaction to earlier international business studies which assumed that the rational behavior of human beings is the starting position in economics studies (Johanson and Wiedersheim-Paul, 1975). Different parts in the institutional framework have also sociological roots which are shared with the business network perspective, i.e. social exchange theory (Cook and Emerson, 1978; Håkansson et al., 2009; Scott, 2014).

The influence of context through legislative actions, social values and cultural-cognitive understandings complements all the other theoretical perspectives (Scott, 2014). The nature and structure of regulations are the result of political decisions that are made by the state and then influence a wide range of actors within a country. In other words, regulations and legal systems are reflective of the socio-cultural, political and normative environment.

The regulative perspective in institutional theories mainly stems from the economics heritage (North, 1990), a heritage frequently criticized in social science studies (Scott, 2014). However, healthcare organizations are to a large extent governed by economics, for instance when health economics is increasingly used for making evidence-based decisions, especially for
reimbursement decisions. Although we ascribe a larger rationality within public organizations, the notion of the rational man can still be questioned since people make their individual interpretations and decisions within the organizations which also relates to the notion of bounded rationality (Simon, 1991). Yet, politicians and bureaucrats are dependent on much more structures and procedures for their actions while striving for transparency (which can of course differ to a large extent between countries); making the regulative-economics input from the institutional theory fit a regulated medical technology context. Apart from the regulative perspective in institutional theories, sociological dimensions, such as norms, cultures and cognitions are also embraced.

2.4.2 Generation of research questions

Networks, knowledge bases, capabilities and institutions are all important concepts in this thesis for exploring how and why the medical technology context influences new venture internationalization. Firstly, this thesis proceeds from a different perspective when using an institutional framework than has been done previously in the international entrepreneurship field. Instead of comparing how institutions affect entrepreneurial capabilities, opportunities and behavior, this thesis uses the institutional perspective to understand the role of various healthcare organizations as important non-market based actors. Moreover, as healthcare institutions differ across, and even within, countries, the role of distinctive national markets and their particularities is critical when operating in this regulated industry context (papers 1, 2). Hence, the first and the second research questions are raised:

**RQ 1:** How and why does life sciences industry context influence new venture internationalization processes?

**RQ 2:** How and why do different cross-country institutional healthcare settings affect an INV’s selling strategies and internationalization process when commercializing a medical technology innovation?

Secondly, the theoretical framework has shown how INVs gain access to vital resources and capabilities through different networks. However, there is still a lack of understanding regarding which types of capabilities are developed through networking. Also, only few studies explore how networks and capabilities change over time. This triggers a further need for understanding of how individual key actors’ competence bases and networking contribute to
create, develop and deploy different critical capabilities during different developmental phases of an INV by combining insights from a dynamic capability perspective with network theories (paper 3). Hence, the third research question is raised:

**RQ 3**: How and when do individual key actors’ competence bases and networking activities contribute to building critical capabilities during different phases of an INV’s early development?

Thirdly, the theoretical framework has also shown how internationalization takes place within networks. The main focus so far has been on business and social networks within the international entrepreneurship field, whereas I argue for the need to further study non-market based networks that are related to science and institutions (papers 1, 4, 5). There is also a need to further distinguish between actors in the healthcare organizations in different countries and how and why they might have an impact on the internationalization process and how to achieve international market acceptance (paper 2). The existence of different logics among the non-market based actors also makes it important to further understand the various incentives to collaborate and how to co-create value with different types of actors (papers 4, 5). Hence, the fourth research question is raised:

**RQ 4**: How and why does an INV co-create value with different types of network actors when commercializing a medical technology innovation?

In relation to creating other types of networks besides business and social ones, international congresses and conferences serve as a knowledge and network hub (Evers and Knight, 2008) for carrying out different activities with various types of network actors through creating and exchanging resources. Hence, the fifth research question is raised:

**RQ 5**: Which is the role of networking at an international trade fair for an INV commercializing a medical technology innovation?
3 Methodology

This chapter first introduces the overall research approach. Thereafter I discuss the abductive approach for theory building by using a case study strategy, which is followed by case selection, data generation and data analysis. I finally discuss how to assess research quality in a qualitative research design.

3.1 Research approach and context

My overall research purpose is to explore how and why the medical technology context influences new venture internationalization. For this purpose, I have chosen a research approach that is mainly interpretative in order to increase my understanding of a phenomenon in a specific context through different theoretical and empirical perspectives (Denzin and Lincoln, 2000; Gioia and Pitre, 1990; Järvensivu and Törnroos, 2010). Such an approach acknowledges that “there are multiple viewpoints to knowledge and truth” and that “truth exists as dialogue, critique, and consensus in different communities, usable knowledge, as well as empirical evidence” (Järvensivu and Törnroos, 2010, p. 101). However, the ambition is not only to increase the understanding of a phenomenon but also to try to explain it within its specific context, why a qualitative research approach is a suitable method (Welch et al., 2011). This research design fits the approach in this thesis since the study is embedded in an explicit industry context where I want to find out how and why it influences new venture internationalization.

Recent research in international business (Andriopoulos and Slater, 2013; Poulis et al., 2013), entrepreneurship (Zahra, 2007; Welter, 2011) and strategic management (Peng et al., 2009) has highlighted the problems occurring from not accounting for context when theorizing and of not pursuing understanding-driven studies. I posed a question in the problem discussion whether current theories would hold if we study another high-technology empirical context. My argument is that the empirical context, in this case a highly regulative industry sector with many specific requirements, would affect the actions of the firms when they try to build a competitive base and internationalize. The argument is therefore that the enabling focus of the many early and influential international entrepreneurship papers (Coviello, 2006; Jones and Coviello, 2005), has
3. Methodology

probably affected our view towards a very enabling internationalization process as compared to a more constraining internationalization process as suggested in the traditional Uppsala model. The early and influential model of the Uppsala model has also been criticized for being too general and for not disclosing spatial and temporal boundaries (Andersen, 1993). This shortcoming of a too general and deterministic model without boundaries incited many international entrepreneurship scholars to develop new theories and models that could better explain INVs which follow different internationalization patterns. The initial trigger was to better understand how the actual internationalization process starts - something the Uppsala model could not explain (Andersen, 1993; Johanson and Vahlne, 2009). My attempt is therefore to explore how well these newly developed theories, (e.g international new venture theory) in combination with established theories, (e.g the traditional Uppsala model) fit a medical technology context and if additional theories can be added to better understand the new venture internationalization process from a medical technology perspective (cf. Zahra, 2007). Instead of treating context as only an exogenous variable, this study refers to context in a much more encompassing way and is therefore defined as “a dynamic array of factors, features, processes or events which have an influence on a phenomenon that is examined. This influence can be exercised and expressed in multiple ways. Rather than treating context as an external clearly definable and measurable entity that impacts what one studies, context will here be understood as something that is multifaceted and that both influences and is influenced by the phenomenon under investigation” (Michailova, 2011, p. 130).

Many authors (e.g. Coviello and Munro 1995; Coviello and Jones, 2004; Hitt et. al, 2006; Poulis et al., 2013) have also called for designs that are longitudinal, real-time, case-based, and contextualized. This thesis answers to these calls. Moreover, Daft (1983) is proposing some suggestions of what interesting research might mean e.g. creating significant new knowledge. One piece of advice that Daft gives is not always to work with predictable research. Huff (2008) is also talking about the value of producing interesting/engaging and significant/enduring research. The significance of this research is developing contextualized theoretical propositions and models (cf. Michailova, 2011). My starting point is that theory can be refined (Dubois and Gadde, 2002) when studying a different empirical context, which in turn can be contrasted to existing theories that are based on other empirical contexts. For instance, many of the key articles that have shaped our view on either a slow and incremental internationalization process (Johanson and Wiedersheim-Paul, 1975; Johanson
and Vahlne, 1977, 1990) or a speedy and early internationalization process (e.g. Bell, 1985, 1997; Coviello, 2006) are embedded in either a stable manufacturing- or a dynamic high-technology context of software/ICT (Autio, 2005). It can be stated that organizations are always embedded in specific contexts which imply that they constantly “face different conditions for internationalization” (Cesinger, 2012, p. 1833). These conditions in turn affect how we understand the internationalization process. For instance, Cesinger et al. (2012) even argue that it is meaningless to agree on a single definition of the empirical phenomenon of ventures that early and rapidly embark on an internationalization journey. They say that “even if the scientific community could agree on one single definition to be used in empirical studies, applying it across different contexts would result in identifying not the same, but different phenomena in each context” (Cesinger et al., 2012, p. 1833). Hence, my research approach accounts for contextual factors when studying new venture internationalization, why some characteristics of an abductive approach fit the purpose of this thesis well. In the next section, I therefore discuss the advantages of using an abductive approach to theory building which specifically acknowledges the interplay between theory and empirical phenomenon (Dubois and Gadde, 2002; Dubois and Gibbert, 2010; Järvensivu and Törnroos, 2010).

3.2 Abductive approach to theory building by using case studies

This study aims at theory building by using case studies. Choosing a case study strategy is suitable when one's interest lies in investigating a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Miles and Huberman, 1994; Yin, 2003), which is the situation in the present study. My research contains many 'how' and 'why' questions, reinforcing the decision to use case studies as the preferred research strategy (Yin, 2003).

So what is meant by a theory? Gioia and Pitre (1990, p. 587) define “theory as any coherent description or explanation of observed or experienced phenomena”. In a recent article about theory contribution, Corley and Gioia (2011, p. 21) suggest that “theories should be problem driven” and that they should “address significant problem domains that either require or will soon require theorizing”. One explanation for this urge for a problem and practice driven research is that there is in many studies a large distance between theory
3. Methodology

building and its practical utility. I have tried to avoid this fallacy by being close to my empirical phenomenon (Dubois and Gibbert, 2010) so that I could gain a deeper insight into the studied phenomenon. Yin (2003) also argues that a match between prevailing theories and a fresh set of empirical observations can help the researcher sharpen his/her final research design.

There are three main scientific ways to approach and conduct research: deductive, inductive and abductive studies (e.g. Dubois and Gadde, 2002; Haig, 2005; Järvensivu and Törnroos, 2010). Gioia and Pitre (1990) write that interpretative theory building is more inductive in nature. This implies that the researcher starts with the empirical phenomenon and collects empirical data without having generated precise theory based hypotheses. An inductive approach is therefore more suitable when the aim is theory generating, while a deductive approach has greater advantages when used for theory testing (Järvensivu and Törnroos, 2010). An abductive approach lies in between the two, and proves its qualities when working with case research that aims at theory development or refinement (Dubois and Gadde, 2002). The present study has many characteristics of an abductive approach which refers to when “theoretical framework, empirical fieldwork and case analysis evolve simultaneously” (Dubois and Gadde, 2002, p. 554). In an abductive approach, it is not problematic if the research problem is redirected or refocused thanks to the researcher’s increased understanding of the phenomenon. This implies that the researcher searches for ‘additional theory’ and ‘new concepts’ that could better fit the new research direction or focus (Dubois and Gadde, 2002). Hence, there is an on-going search for complementary theories as the researcher collects data. Dubois and Gadde (2002, p. 554) refer to this type of research approach as ‘systematic combining’ which is characterized as a “continuous movement between an empirical world and a model world. During this process, the research issues and the analytical framework are successively reoriented when they are confronted with the empirical world”. Instead of viewing this evolutionary research process as a weakness, it has increasingly been recognized as a strength and opportunity to learn from the particularites in a specific case and its environmental context (e.g. Dubois and Gadde, 2002; Dyer and Wilkins, 1991). This approach fits well when the researcher has access to a rich case and follows it over time since this allows the researcher to be sensitive and observant to the underlying mechanisms of the observed phenomenon. This in turn allows for alternative understandings and opens up for redirecting or refocusing the research problem. In Figure 3, I illustrate my overall research process and how I have iterated between the empirical world and theory.
Figure 3 Characteristics of an abductive research approach. Adapted from Järvensivu and Törnroos (2010, p. 104).

As Figure 3 illustrates, I started my study from a theoretical perspective and used an initial analytical framework (with focus on internationalization, the entrepreneur, networks and the industry, see Andersson and Wictor, 2003), which resulted in the first paper. This, my first appended paper is more all-embracing as its findings incited new and more specific research directions to explore. However, most of them were mainly related to the role of the industry context, which later led to the redirection of the focus of the study. I went back to the empirical world and tried to better understand the role of the particularities of the medical technology sector and how they affected the internationalization process. After going back and forth between the empirical world and theory, it crystalized that specific types of activities, networks and capabilities were required when competing in the medical technology industry context. The search for complementary theories for understanding and explaining these new research directions have therefore been carried out (e.g. parts of a dynamic capability and an institutional framework). This is also the reason why different theoretical perspectives are covered in the different papers while studying the same phenomenon: new venture internationalization. When generating empirical data, however, it was found that the institutional requirements on the industry level were hard to cope with for young resource-constrained ventures, leading to the conclusion that the role of the entrepreneur is not enough for succeeding in this industry context. There are other factors (e.g. regulations and reimbursement issues) that are cumbersome for the individual entrepreneur to influence in the short time perspective, especially if the venture commercializes a breakthrough innovation, which does not yet fit current institutional frameworks across different international healthcare settings. This is also the reason why I wanted to understand and analyze the healthcare from an institutional theoretical perspective. Hence, borrowing
additional concepts from new theoretical perspectives helped me to distinguish what is meant by different customers and their underlying logics and drivers (business versus ‘institutional’) and to distinguish different types of knowledge bases and capabilities (further distinctions than market, internationalization and technological knowledge bases). This approach fits appropriately when doing a compilation thesis since different frameworks and angles can be used in the different papers while still using the same cases. It can also offer a holistic approach (Easton, 2010) where different theoretical perspectives are integrated. Different theoretical concepts have therefore been developed and refined to better fit the empirical world in a specific context. However, in order to make a theoretical contribution to an academic field, it is critical to relate the new findings to existing concepts and theories why the arrow in Figure 3 ends in the theory section. This process aims for an analytical generalization which is not dependent on the number of cases that are studied (Yin, 2003). It could even be an advantage to “go deeper into one case instead of increasing the number of cases” when the research problem is “directed towards analysis of a number of interdependent variables in complex structures” (Dubois and Gadde, 2002, p. 558). In the next section, I will discuss some of the advantages of studying a small number of cases in depth and over time and how I have chosen my cases.

3.2.1 In-depth cases and case selections

Choosing in-depth cases are as appropriate for investigating new aspects of a phenomenon as for being able to tell ‘good stories’ (Dyer and Wilkins, 1991; Yin, 2003). Dyer and Wilkins (1991) also want to reposition the use of a ‘classic’ case in order to be able to study one case in-depth within its specific context, something that, in this thesis is being done in four papers (1, 3, 4, 5). In paper 2, however, another in-depth case, facing similar challenges as the first case (in relation to internationalizing from inception while commercializing a breakthrough innovation), has been added. This additional case further reinforces the understanding of how the institutional factors influence the INV’s internationalization process. The aim of adding an additional case has thus not been to compare them directly with each other. Instead, the factors that relate to the medical technology context are reinforced by adding another case. Another argument for a single-case study is to carry out the longitudinal case (Yin, 2003): studying the same single case at two or more different points in time which is also done in the different papers. Moreover, different empirical angles and theoretical perspectives are caught in the five papers. Studying in-depth single cases is not intended to generate statistical generalizability; rather,
it can facilitate theory development or theory refinement through contextual (Järvensivu and Törnroos, 2010; Welch et al., 2011) and analytical generalization (Yin, 2003). New concepts have been developed or refined in relation to different theoretical frameworks as presented in the different papers (cf. Dubois and Gadde, 2002). I have then combined the findings from these different theoretical and empirical insights and integrated them in a final model which is adapted from Oviatt and McDougall’s (2005b) model of forces influencing internationalization speed.

I have used theoretical purposeful ‘sampling’ to identify two case companies (Redsense Medical and Airsonett) that suited my study context (Miles and Huberman, 1994; Pratt, 2009). The first criterion was to choose two cases from the medical technology sector, this being characterized as a dynamic, complex, global and knowledge-based industry sector. The second criterion was that the cases should fit the definition of an INV, which “from inception seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” (Oviatt and McDougall, 1994, p. 49). The third criterion was to choose two INVs that were in the process of commercializing a medical technology innovation whose innovativeness did not yet fit the current institutional frameworks within and across countries. This thesis differentiates between an incremental innovation (“small improvements…” – “doing what we do but better”) and a breakthrough (“significantly different changes…” – “do what we do differently”) (Bessant and Tidd, 2007, p. 29) and both the two case firms’ medical technologies belong to the latter definition.

Redsense Medical was also chosen for two additional reasons. First, it was presented in media as an example of successful internationalization at an early stage. The company was awarded with a Frost & Sullivan best practices award and the 2008 European Hemodialysis emerging company of the year award. Second, it is a member of the local network Healthcare Technology Alliance, a Halmstad-based, non-profit organization. The second case firm, Airsonett, was also chosen because it was awarded as the MedTech firm of the year 2009 by the Swedish MedTech Magazine and Stockholm School of Economics. The

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*A medical device (or technology) refers to ‘Any instrument, apparatus, appliance, software, material or other article, whether used alone or in combination, including the software intended by its manufacturer to be used specifically for diagnostic and/or therapeutic purposes and necessary for its proper application, intended by the manufacturer to be used for human beings’* (http://www.eucomed.org/medical-technology).
jury’s selection motivations were that the firm had managed to develop a unique technology for preventive treatment of allergic asthma, had developed a solid patent portfolio and had focused on clinical research with international ambitions and expansion plans. Furthermore, the jury concluded that the product competed with traditional pharmaceutical treatments within the asthma area. This case is especially noteworthy because the Swedish government has recently acknowledged the problem of introducing innovations into the healthcare sector, and Airsonett was one of four chosen products to be evaluated at a national level10.

3.2.2 Data generation

One of the strengths of conducting a case study is the possibility it gives to use a full variety of evidence, i.e. documents, interviews, and observations (Yin, 2003), which are all utilized in this thesis. The case studies are mainly based on multiple personal interviews taking place during different points in time in the company’s development, together with retrospective data (Blazejewski, 2011). The two case-studies are complemented with secondary data (mainly business-magazine reports, annual reports and internal documents). Multiple interviews have been conducted with key individuals within and outside the company that lasted approximately 90 minutes each (see Tables 2 and 3).

Semi-structured interview guides, based on the thesis’s theoretical framework, were used for the different rounds of interviews, covering the company’s internationalization process, the roles of different actors, activities, knowledge bases, capabilities, different networks and industry related factors. Especially the institutional aspects have been in focus in order to understand and detect the mechanisms (Welch et al., 2011) behind commercializing innovative medical technologies on different international markets. For the different rounds of interviews, I have had many follow-up questions and asked how different issues have proceeded since the last time the respondents and I met. Over the years, different critical questions have crystalized as specifically important such as how to “educate” the market of the need for the new product solution, how to

handle distributors and speed up the sales process (Redsense) and how to get paid for the new innovation in different countries to be able to start selling at all (Airsonett). A common denominator that emerged from both of the firms was the difficulty in influencing some of the institutional actors and requirements during the commercialization processes, specifically in relation to getting paid for their innovations and to creating structures for speeding up the sales process. Another critical question emerged, which relates to securing both of the firms’ financing. This is a critical issue that will be further explored in my subsequent research. In Appendix 1, I illustrate some of the main themes that have been covered during the interviews. When appropriate, I have used “what, who, where, why, when and how” for guiding my questions (see Coviello, 2006; Pettigrew et al., 2001). I have also adapted the questions according to the respondent.

The two tables below list the different interviews that have been carried out with various respondents representing the focal firms and some other key actors.

I also participated when Redsense exhibited their innovation at the most important annual international congress within their therapy area in the USA in November 15–21, 2010 in Denver, Colorado. During this event, I could both observe and interact with some of the firm’s key members (CEO, Product & Marketing Manager and Manager Sales & Marketing USA). Moreover, during the congress, I was given the opportunity to attend almost all of the meetings that the team members had. I also received information beforehand about the planned and forthcoming meetings during the event. This gave me the time to prepare before the actual meetings, for instance by searching additional information about the different actors in order to better understand what their roles would be as well as the purpose of meeting them.

I also participated in the congress, EACCI, in Istanbul (June 12–14, 2011), when Airsonett exhibited its innovation in a large booth, where I could both observe and interact with some of the firm’s key members (Chairman, CEO, two Sales Representatives, Member of the Board, Market Access Professional, Chief Information Officer, Director Research & Development and Production Manager). This event is one of the most important yearly congresses in the world for allergy and asthma.
### 3. Methodology

#### Table 2 Interviews with Redsense and some other key actors

<table>
<thead>
<tr>
<th>Redsense</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Chairman</td>
<td>6 March 2009</td>
</tr>
<tr>
<td>Senior Vice President Commercial Operations</td>
<td>10 March 2009</td>
</tr>
<tr>
<td>CEO</td>
<td>12 March 2009</td>
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<tr>
<td>CEO</td>
<td>5 May 2009</td>
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<tr>
<td>Senior Vice President Commercial Operations</td>
<td>13 October 2009</td>
</tr>
<tr>
<td>Product &amp; Marketing Manager and Senior Vice President Commercial Operations</td>
<td>25 January 2010</td>
</tr>
<tr>
<td>CTO</td>
<td>2 March 2010</td>
</tr>
<tr>
<td>CEO</td>
<td>2 June 2010</td>
</tr>
<tr>
<td>Senior Vice President Commercial Operations</td>
<td>2 June 2010</td>
</tr>
<tr>
<td>CTO</td>
<td>3 June 2010</td>
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<tr>
<td>Product &amp; Marketing Manager</td>
<td>3 June 2010</td>
</tr>
<tr>
<td>Manager Sales &amp; Marketing USA</td>
<td>4 June 2010</td>
</tr>
<tr>
<td>Manager Sales &amp; Marketing USA, Senior Vice President Commercial Operations, CEO</td>
<td>18 Oct 2010</td>
</tr>
<tr>
<td>Senior Vice President Commercial Operations</td>
<td>11 Nov 2010</td>
</tr>
<tr>
<td>Marketing Director B Brown The Netherlands-distributor</td>
<td>20 Nov 2010</td>
</tr>
<tr>
<td>CEO, Nordic Medcom, distributor</td>
<td>20 Nov 2010</td>
</tr>
<tr>
<td>CEO Gambro Canada-distributor</td>
<td>21 Nov 2010</td>
</tr>
<tr>
<td>Second chairman</td>
<td>13 April 2011</td>
</tr>
<tr>
<td>Manager Sales &amp; Marketing USA</td>
<td>1 July 2011</td>
</tr>
<tr>
<td>Product &amp; Marketing Manager</td>
<td>5 July 2011</td>
</tr>
<tr>
<td>CEO and Senior Vice President Commercial Operations</td>
<td>7 July 2011</td>
</tr>
<tr>
<td>CEO</td>
<td>16 Jan 2012</td>
</tr>
<tr>
<td>Senior Vice President Commercial Operations</td>
<td>16 Jan 2012</td>
</tr>
<tr>
<td>Distributor UK (skype interview)</td>
<td>31 Jan 2012</td>
</tr>
<tr>
<td>Distributor Australia (skype interview)</td>
<td>6 Feb 2012</td>
</tr>
<tr>
<td>Distributor Italy also responsible for France, Spain and Belgium (skype interview)</td>
<td>13 Feb 2012</td>
</tr>
<tr>
<td>Manager Sales &amp; Marketing USA</td>
<td>2 May 2012</td>
</tr>
<tr>
<td>Investor</td>
<td>2 May 2012</td>
</tr>
<tr>
<td>CTO</td>
<td>2 May 2012</td>
</tr>
<tr>
<td>Product &amp; Marketing Manager</td>
<td>9 May 2012</td>
</tr>
<tr>
<td>CEO</td>
<td>10 May 2012</td>
</tr>
<tr>
<td>CEO</td>
<td>22 Oct 2012</td>
</tr>
<tr>
<td>CEO</td>
<td>7 May 2013</td>
</tr>
<tr>
<td>Consultant Quality Assurance and Regulatory Affairs</td>
<td>14 June 2013</td>
</tr>
</tbody>
</table>
Table 3 Interviews with Airsonett and some other key actors

<table>
<thead>
<tr>
<th>Role</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneur, founder and the second CEO</td>
<td>27 Oct 2010</td>
</tr>
<tr>
<td>Entrepreneur, founder and the second CEO</td>
<td>8 Dec 2010</td>
</tr>
<tr>
<td>Entrepreneur, founder and the second CEO</td>
<td>15 April 2011</td>
</tr>
<tr>
<td>Third CEO</td>
<td>23 May 2011</td>
</tr>
<tr>
<td>Member of the board</td>
<td>23 May 2011</td>
</tr>
<tr>
<td>Sales Representative Sweden</td>
<td>30 May 2011</td>
</tr>
<tr>
<td>Market Access Professional</td>
<td>1 June 2011</td>
</tr>
<tr>
<td>Chief Information officer</td>
<td>1 June 2011</td>
</tr>
<tr>
<td>Director Research &amp; Development</td>
<td>1 June 2011</td>
</tr>
<tr>
<td>Area Manager UK &amp; Ireland</td>
<td>12 June 2011</td>
</tr>
<tr>
<td>Member of the Board and Venture Capitalist</td>
<td>12 June 2011</td>
</tr>
<tr>
<td>Area Manager Germany</td>
<td>13 June 2011</td>
</tr>
<tr>
<td>Clinician and Researcher Clinical Trial Denmark</td>
<td>13 June 2011</td>
</tr>
<tr>
<td>Clinician and Researcher Clinical Trial Sweden</td>
<td>14 June 2011</td>
</tr>
<tr>
<td>Clinician and Researcher Clinical Trial UK</td>
<td>13 June 2011</td>
</tr>
<tr>
<td>Media and Communication Manager UK</td>
<td>14 June 2011</td>
</tr>
<tr>
<td>Clinician and participant EACCI Congress</td>
<td>13 June 2011</td>
</tr>
<tr>
<td>Sales Representative Sweden (Stockholm area)</td>
<td>14 June 2011</td>
</tr>
<tr>
<td>Sixth Chairman</td>
<td>14 June 2011</td>
</tr>
<tr>
<td>Clinician and Researcher Clinical Trial UK</td>
<td>14 June 2011</td>
</tr>
<tr>
<td>Clinician and Researcher Clinical Trial Germany</td>
<td>14 June 2011</td>
</tr>
<tr>
<td>Member of the Board and Venture Capitalist</td>
<td>7 Sept 2011</td>
</tr>
<tr>
<td>Entrepreneur, founder and the second CEO</td>
<td>30 April 2012</td>
</tr>
<tr>
<td>Entrepreneur, founder and the second CEO</td>
<td>9 Oct 2012</td>
</tr>
<tr>
<td>Director of Quality Assurance &amp; Regulatory Affairs</td>
<td>13 June 2013</td>
</tr>
<tr>
<td>Director Research &amp; Development</td>
<td>13 June 2013</td>
</tr>
<tr>
<td>Fourth CEO (previously the CFO)</td>
<td>13 June 2013</td>
</tr>
<tr>
<td>Seventh chairman of the board</td>
<td>14 June 2013</td>
</tr>
<tr>
<td>Fourth CEO (previously the CFO)</td>
<td>25 Nov 2013</td>
</tr>
</tbody>
</table>

I have also participated in different practitioner-oriented seminars within this industry to extend and deepen my knowledge about this sector’s logic. This has helped me to deepen my understanding of the challenges but also opportunities that these kinds of firms face when they introduce medical technology innovations on the international market. In Table 4, I specify the different themes addressed in these seminars.
Table 4 Different practitioner oriented and industry specific seminars

<table>
<thead>
<tr>
<th>Topic</th>
<th>Organizer</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swedish Healthcare as a future export industry</td>
<td>Swedish Entrepreneurship Forum together with Almega, Today’s Medical Sweden, Swedish Association of Local Authorities and Regions, Swecare, Swedish Medtech, Swedish Agency for Economic and Regional Growth and Vinnova</td>
<td>12 Oct 2009</td>
</tr>
<tr>
<td>The market is large outside Sweden</td>
<td>Healthcare Technology Alliance in collaboration with Swecare</td>
<td>19 Oct 2009</td>
</tr>
<tr>
<td>Innovations for healthcare technology</td>
<td>Halmstad University</td>
<td>22 Oct 2009</td>
</tr>
<tr>
<td>Revision of the medical devices legislation</td>
<td>Centre for Health Technology Halland and Healthcare Technology Alliance</td>
<td>8 Dec 2009</td>
</tr>
<tr>
<td>Public procurement in change</td>
<td>Region Halland, Centre for Health Technology Halland and Healthcare Technology Alliance</td>
<td>28 Oct 2010</td>
</tr>
<tr>
<td>MedTech Investment Day Nordic</td>
<td>Swedish Medtech</td>
<td>10 Feb 2010</td>
</tr>
<tr>
<td>Which market to choose?</td>
<td>Swecare</td>
<td>12 Feb 2010</td>
</tr>
<tr>
<td>Export – one way of increasing growth</td>
<td>Region Halland, Centre for Health Technology Halland and Healthcare Technology Alliance</td>
<td>30 Nov 2010</td>
</tr>
<tr>
<td>How to succeed selling medtech products on the US market?</td>
<td>Swedish Medtech</td>
<td>12 April 2011</td>
</tr>
<tr>
<td>Is it worth the effort to apply for a patent?</td>
<td>Centre for Health Technology Halland and Healthcare Technology Alliance</td>
<td>1 Nov 2011</td>
</tr>
<tr>
<td>Medtech Investment Day Nordic</td>
<td>Swedish Medtech</td>
<td>13 Sep 2012</td>
</tr>
<tr>
<td>Procurements, complaints and innovation procurement</td>
<td>Region Halland, Centre for Health Technology Halland and Healthcare Technology Alliance</td>
<td>14 March 2014</td>
</tr>
</tbody>
</table>
3.2.3  Data analysis

The analysis in the different papers has included several iterations between theory and data (Dubois and Gadde, 2002; Eisenhardt, 1989). In the first paper (co-authored), we compared the empirical findings with earlier theories covering firms’ internationalization. I also searched for articles that had single-industry empirical findings from the life sciences and from the software/ICT sectors to understand their main similarities and differences. To facilitate the analysis, we empirically derived three stages, inspired by Kazanjian (1988) as well as Coviello and Cox (2006). We detected critical events for identifying boundaries between different phases, covering the pre-founding, the start-up and the commercialization and internationalization phases.

For the second paper, my focus when analysing the data was related to similarities and differences in relation to the institutional healthcare settings when the focal firm enters the US, the UK, and Germany as well as penetrating its home market Sweden. When reducing data (Miles and Huberman, 1994), and iterating between theory and data, it became evident that three main carriers in the institutional framework (Scott, 2008) were specifically useful for understanding the different healthcare settings, i.e. symbol systems (rules and laws), routines (professional roles and treatment patterns) and artifacts (clinical trials, health economics, health technology assessments, reimbursement decisions, guidelines). By analysing the chosen countries’ different healthcare settings, different international sales patterns emerged which affected the internationalization process in relation to scope and speed.

For the third paper (co-authored), we searched for patterns over time, including critical events, activities and capabilities, and how these generated different outcomes (Langley, 1999). The interviews conducted with different key individual actors helped us craft a first list of network ties and their contents during different phases of development. When interviewing the same actors again, we gave them a blank sheet of paper and asked them to draw their personal networks and to indicate how each network tie emerged and which role it has played over time. With our pre-generated lists from the previous interviews, we could then check whether the interviewees had forgotten any network ties previously mentioned and ask about the status-quo of this tie. We then aggregated these individual network maps into five sequential company network maps, one for each of the five distinct phases of development identified by the key actors in the venture. We detected critical events for identifying boundaries between different phases. Moreover, to advance beyond strong and...
weak ties (Jones et al., 2011a), we labeled network ties as ‘existing direct’, ‘new direct’ or ‘new indirect’ and noted their direction and whether they were local versus global throughout the different phases. We determined that the origins of relationships (direct vs. indirect) and their functions helped us better understand not only how the individuals make use of their existing network ties but also how they must build new networks when operating in an international and innovative niche market in which it is difficult to draw on existing networks (Loane and Bell, 2006). The direction of ties means whether it is the focal venture’s key individuals who initiate the effort of networking (outward directed) or the external networks (inward directed effort) (Coviello, 2006). Finally, we found it fruitful to uncover the situations in which the individuals make use of local versus global networks. However, we were mostly interested in the actual contents of network ties (Jack, 2010; O’Donnell et al., 2001). Different researchers (e.g. Abell et al., 2008; Ambrosini and Bowman, 2009) have acknowledged the importance of linking concrete activities to strategic outcomes; the ‘anchor’ outcome (Pettigrew 1997, p. 344) in our study being the process of gaining international market acceptance for a new medical-technology innovation. By acknowledging the key individual actors’ different capabilities and networking activities over time, we were able to obtain concrete evidence of what critical capabilities look like in organizations and how they are related to an INV’s early development (Ambrosini and Bowman, 2009). The unit of analysis was first on the key individual actors’ activities and various internal and external interactions that constitute the individual-level foundations for then analyzing firm-level outcomes (Abell et al., 2008).

For the fourth paper, I used the terminology of actors, resources, activities from the business network view and value creation from the marketing field when analyzing the data. More precisely, the analysis was guided by trying to identify and understand what kind of value is co-created for whom, and by using what kinds of resources and activities (Saarijärvi et al., 2013). The network view is helpful for increasing the understanding of why different actors, resources, and activities are valuable for the focal firm and its counterparts. Five distinct groups of actors were identified during the analysis work and they were categorized according to their main roles, logics and drivers. This means that the analysis goes beyond the more traditional market-based relationships to encompass other types of network actors which are specifically critical when operating in a science-based and socio-political environment, like the medical technology sector (Aspelund et al., 2007; Möller, 2013; Welch and Wilkinson, 2004).
For the fifth paper, I used the terminology of *activities*, *actors* and *resources* in order to structure the analysis by combining the strategy-as-practice and the network views to analyze the action (activities) as well as the actors (both within organization and extra-organizational) with the different tools/material used that can reinforce the adoption process of the innovation. The activities of the case firm as well as those of the other actors, and their interactions, are explained by the structure of the actual healthcare chain and are interpreted as how and why they are related to each other with the focus on the content. The content of network interactions is analyzed according to what value these interactions give to the different actors. Thus, this research takes an integrative approach across the healthcare value chain where the central perspective is the commercialization and internationalization of the innovation.

### 3.3 Assessing research quality for qualitative research

Suddaby (2006, p. 635) writes about how important it is to “constantly remind yourself that you are only human and that what you observe is a function of both who you are and what you hope to see”. There are many similarities with this way of reasoning with the process of producing research that is equally qualitative and ethical. It is not until you show the reader how you have done your research, how you structure your findings, that the work becomes more transparent and hopefully robust (or at least it opens up for the reader to judge if s/he will approve of the findings or not).

For studies with a qualitative research design, there exist different approaches of quality measurements. I base my evaluation on Lincoln and Gubas’s (1985) four criteria: credibility, transferability, dependability and confirmability.

- **Credibility** refers to the issue that the inquirer ensures that the respondents’ views fit with the inquirer’s reconstruction and representation. In order to increase the credibility issue, I have complemented the two case studies with secondary data (mainly business magazine reports, annual reports and internal documents). I have used data triangulation to minimize informant bias by collecting interview data from multiple informants and the data was then cross-checked with secondary data (Miles and Huberman, 1994; Yin, 2003). The majority of interviews have been recorded and transcribed and the key respondents have had the opportunity to read through and
3. Methodology

comment on empirical texts. The different papers have also been presented at academic conferences for peer feedback. I have also presented my different papers at an interdisciplinary Research School in Halmstad with both academics and representatives from the industry. Over three years, the Research School has organized different open research seminars where industry representatives are invited. I have had the opportunity to both present a poster each year at the open research seminars and to discuss my research results with practitioners. They could also confirm my findings, especially in relation to the hurdles that face new ventures which commercialize and internationalize new medical technology innovations.

- **Transferability** refers to the issue that the inquirer should provide the reader with sufficient case information so s/he could make generalizations in terms of case-to-case transfer. The ambition is not to provide categorical or statistically generalizable ‘truths’ (Silverman, 1999). The transferability of the case study rather depends on the quality of the analysis than on the size of the sample. It also depends on why empirical cases are chosen which in my case followed a theoretical ‘purposeful sampling’ (Miles and Huberman, 1994) for theory development. The ambition is to provide as accurate and multi-faceted information as possible on the selected cases. Moreover, my approach is to interview the different respondents both in real-time and on different occasions but also to recapitulate retrospectively. Another way of increasing transferability is to be as open as possible with the context of the studied phenomenon, for example by explicitly describing and explaining critical events and milestones throughout the internationalization process, the reader can herself make generalizations in terms of case-to-case transfer (see paper 3). One example could be that the internationalization mode changes because of the financial crisis (an attempt towards a contextual explanation). Moreover, the context of the medical technology industry is described to increase the understanding of different actors’ logics and incentives. The transferability is also enhanced by participating in several practitioner-oriented seminars, as many of the two cases’ challenges and constraints are likewise valid to other medical technology firms, especially resource-constrained start-ups with a global vision.

- **Dependability** refers to the issue that the inquirer should ensure that the research process is logical, traceable and documented. This thesis accounts for how data were collected and analyzed as well as providing the criteria for case selection.
Confirmability refers to the issue that data and interpretations are not fabrications of the inquirer’s imagination. This is achieved by involving many respondents and by discussing the results with them, other practitioners and academics. When I collected data for the first paper, it emerged that the role of healthcare organizations for choosing different markets was very important. Consequently, the role of institutions became an important factor in this thesis. An iterative process has been carried out which means that I have gone back and forth between theoretical literature and the empirical phenomenon. This interplay has an important role for achieving a common vocabulary between the empirical context and then to “translate” that into a theory-driven coding. The role of rules and the difficulty to get reimbursement for new medical technologies were emphasized by the European MedTech industry last year during their yearly congress in Brussels, which further increases the relevance of institutional theories with focus on regulative, normative and cultural-cognitive dimensions for the studied context. Moreover, I have a pre-understanding of the life sciences industry since I have worked for seven years at a global pharmaceutical company. This means that I beforehand understand some of the key customers’ logics and their drivers in the healthcare value chain, especially the roles of the physicians. I also know how difficult it can be to change routines and behaviours, even minor ones, in a healthcare setting.
4 Summary of the papers

There are five papers in this thesis, each contributing to its overall purpose — to explore how and why the medical technology context influences new venture internationalization. The papers broadly cover the following areas: internationalization, entrepreneurs/key individual actors, capabilities, networks and institutions. Below follow summaries of the five appended papers.

Paper 1: The importance of industry context for new venture internationalization: A case study from the life sciences


The first paper focuses on enabling and constraining factors for the internationalization of a medical technology firm. During internationalization, INVs in the life-sciences industries face a number of distinct challenges. For example, high product development costs push companies into early internationalization to increase turnover and recover investments. At the same time, they face tough hinders towards internationalization, such as financial and managerial resource limitations as well as the demand to follow local regulations. The study starts from how different industry contexts influence new venture internationalization processes. This paper presents an in-depth case study of the internationalization process of a Swedish INV from the medical-technology industry. Combining insights from the process theory of internationalization with international new venture theory, our findings advance ten different propositions in relation to the role of entrepreneurs, networks and industry factors. The paper concludes with a model of life sciences new venture internationalization. Both international and local networks are important for the internationalization process. However, two key factors differentiate ventures that operate in this industry context from most other high-technology ventures. They are related to institutional and scientific factors, which in turn, affect the kinds of internationalization activities that are carried out. This study contributes to the international entrepreneurship field.
Firstly, since this industry context is characterized by institutional and scientific factors, it affects the kinds of networks that are initiated and used. This means that it is not enough to have a proactive global and entrepreneurial mindset; it is also important to possess a ‘scientific’ and ‘regulatory’ mindset to steer new venture internationalization in this industry context. Secondly, this study illustrates that the role of national markets is important when internationalizing. Finally, this study questions whether ventures that operate in an industry context with long development phases fit into the current definitions of INVs since the long time before the venture is born is not taken into account.

Paper 2: An international new venture’s commercialization of a medical technology innovation: the role of institutional healthcare settings

An earlier version was presented at the 15th McGill International Entrepreneurship Conference, in Italy, Sep 2012. Submitted to International Marketing Review.

This study explores how different cross-country institutional healthcare settings affect an international new venture’s selling strategies and internationalization process when commercializing a medical technology innovation. The prevalent literature in the international entrepreneurship field does not explicitly account for the institutional barriers inherent in different industries and how they affect and shape INVs’ behaviors and activities. The study is based on a longitudinal in-depth case study approach which compares the four different healthcare settings in Sweden, the United Kingdom, Germany and the United States. This paper draws on insights from international new venture theory, process theory of internationalization and institutional theories. An institutional framework consisting of regulative, normative and cultural-cognitive dimensions helps to analyze the healthcare settings in different countries and to elucidate some of their constraints for an INV. National markets differ when operating in a healthcare setting and thus affect both sales patterns and the internationalization process. The four countries in this study have different institutional healthcare settings. A decentralized and regional healthcare system in both Sweden and the United Kingdom led the firm to achieve piece-wise sales, whereas the centralized and bureaucratic healthcare system in Germany made any sales difficult to achieve as long as the case firm lacked a national code in the reimbursement system. The US system has a mixture of predominantly
private healthcare options but also public care, which opens up two sales routes: approaching a more privately based competitive market and/or public-based sales process. Hence, four different sales patterns emerged from the countries’ and even regions’ distinctive institutional differences. This complexity and diversity led to a focused and slow internationalization process. The paper contributes to international entrepreneurship literature by developing a contextualized internationalization model and by advancing six propositions. Apart from the cross- and within-country diversity, the type of innovation also matters in decisions about which markets to enter, and how.

Paper 3: The changing role of network ties and critical capabilities in an international new venture’s early development

Earlier versions were presented at the 13th McGill International Entrepreneurship, in Canada, Sep 2010 and at the International iSME, in France, December 2010. The paper is co-authored with Leona Achtenhagen and Svante Andersson. Under the review process in International Entrepreneurship and Management Journal.

The importance of networks for a firm’s internationalization has been pointed out for several decades. Especially for small and new firms, networks have been found to be important tools to gain access to resources and to overcome liabilities of newness, smallness and foreignness. Despite this established knowledge, there is a lack of understanding, regarding which types of capabilities are developed through networking. Furthermore, only few studies explore how networks and capabilities change over time. The aim of this article is to explore how and when the individual key actors’ competences and networking activities create, develop and deploy critical capabilities during different phases of an INV’s early development. The article is based on a longitudinal, in-depth case study of a Swedish international new venture from the medical-technology sector. Personal network maps for different development phases are constructed with all key actors and aggregated to five sequential company network maps. We find that the development process is greatly affected by the key individual actors’ various competences, existing network ties and their leveraging of different indirect ties during the pre-founding, start-up and establishment of production phases. During the commercialization and sales growth phases, however, many new network ties are developed. The heterogeneity of the individual actors’ backgrounds plays an
important role during the different developmental phases. We conclude our discussion by advancing a number of propositions in relation to how critical capabilities are created, developed and deployed through networking during different developmental phases. This study contributes to the international entrepreneurship literature by importing a new concept - namely, an activity-based focus on critical capabilities - and by pointing out other than the more ‘traditional internationalization dimensions and outcomes (i.e., scope, extent, speed and modes) that dominate the international business literature and financial performance measures that dominate the strategic management literature. In addition, long pre-emergence and pre-organization periods change the way we look upon how new a venture really is.

Paper 4: Value co-creation in an integrative network approach: the case of an international new venture in the medical technology sector

An earlier version was presented at the 22nd Nordic Workshop on Interorganisational Research in Norway in August 2012. Submitted to *European Journal of Marketing*.

We can find many cases within the international entrepreneurship field where international new ventures simultaneously compete with new innovative products in global knowledge-intensive industries while internationalizing. However, we know less about how they in practice create and exchange value with different actors from a commercialization and selling/marketing perspective in the international entrepreneurial process. The purpose of this paper is therefore to explore how and why an international new venture co-creates value with different types of network actors when commercializing a medical technology innovation. The study is based on a longitudinal in-depth case study approach. Five different groupings of actors were identified as playing critical roles in the international new venture’s commercialization process. These groupings were related to the actors’ overall roles and drivers and the ways in which they both give and receive value to each other through different activities and resources. The five groupings are as follows: (1) actors related to improving health; (2) actors related to ensuring healthcare safety; (3) actors related to reducing healthcare costs; (4) actors related to creating opinion and enhancing legitimacy; and (5) actors related to business. This research reveals the roles of different actors in a healthcare value chain context in which institutional and scientific network actors are specifically important. Moreover,
networks that are related to creating positive opinions and legitimacy for the international new venture and its medical technology innovation are also paramount (e.g., media and different non-profit organizations. Finally, business networks are also important to achieve competitiveness and to find international distributors. This study contributes to the international entrepreneurship literature by proposing an extended network model that relates to both non-market-based and market-based networks, including scientific, institutional, opinion creating and business networks.

Paper 5: The process of commercializing a medical technology innovation for an INV through international trade fairs: combining a network with a practice view


One of the findings from the first paper was recognizing the important role of trade fairs for initiating and developing contacts when operating in an innovative niche segment. Many researchers have also acknowledged the need for studying how networks are initiated and developed. This paper combines the network and practice views in order to understand the interactions that take place among different actors when commercializing a medical-technology innovation on international congresses/trade fairs. It takes an integrative stance to identify different kinds of networks, both commercial/non-commercial and academic ones which are important in the process of gaining international market acceptance. This study has identified what different types of tools/material are used in trade fair booths with the purpose of underpinning different arguments to various actors. For example, it reveals how crucial it is for the focal firm to have an impact on treatment guidelines and to become a first-hand collaborative actor with key opinion leaders and clinicians. It subsequently becomes important to understand how this is done through the creation of mutual values for the actors and by understanding and defining the incentives for their collaboration. The main findings of this paper illustrate how the different actors, activities and tools/material reinforce each other in order to create mutual value aiming at an international market acceptance for and
adoption of the innovation. The study has also established that the focal firm has to think globally when it comes to science, but that there are many different country-specific circumstances to consider when it comes to value creation through the choice of different tools/material and activities. This study contributes to the international entrepreneurship literature by extending the view on internationalization by acknowledging tools and material that are co-created with different actors and through different activities. The study also highlights the need to extend the concept of business networks to uncover further dimensions such as academic and institutional ones in an international context.
Table 5 An overview of appended papers

<table>
<thead>
<tr>
<th>Title</th>
<th>Research question</th>
<th>Theoretical framework</th>
<th>Method</th>
<th>Main findings</th>
<th>Main contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper 1: The importance of industry context for new venture</td>
<td>How and why does life sciences industry context influence new venture internationalization processes?</td>
<td>Process theory internationalization and international new venture theory.</td>
<td>An in-depth longitudinal case study.</td>
<td>The findings outline factors in the industry context that affect the internationalization process, with specific emphasis on entrepreneurs and their networks.</td>
<td>Identification of critical institutional and scientific factors. Country markets are distinctive in the life sciences industry context and need to be considered accordingly when choosing and penetrating foreign markets. Long pre-emergence and pre-organizational periods challenge the newness of a venture.</td>
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<tr>
<td>internationalization: A case study from the life sciences</td>
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<tr>
<td>Paper 2: An international new venture’s commercialization of a medical technology innovation: the role of institutional healthcare settings</td>
<td>How and why do different cross-country institutional healthcare settings affect an INV’s selling strategies and internationalization process when commercializing a medical technology innovation?</td>
<td>Process theory internationalization, international new venture theory and institutional theories.</td>
<td>An in-depth longitudinal case study.</td>
<td>Four different sales patterns emerged from the countries’ and even regions’ distinctive institutional differences. This complexity and diversity led to a focused and slow internationalization process.</td>
<td>A contextualized internationalization model and six propositions are advanced. Identification of different types of internationalization pathways when INVs face cultural-cognitive, normative and regulative industry dimensions, which in turn affect the internationalization speed and scope.</td>
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<tr>
<td>Paper 3: The changing role of network ties and critical capabilities in an international new venture’s early development</td>
<td>How and when do individual key actors’ competence bases and networking activities contribute to building critical capabilities during different phases of an INV’s early development?</td>
<td>International new venture theory, network theories and a dynamic capability view.</td>
<td>An in-depth longitudinal case study.</td>
<td>The development process is affected by the key individual actors’ various capabilities, existing network ties and their leveraging of different indirect ties during the pre-founding, start-up and establishment of production phases. During the commercialization and sales growth phases, many new network ties are created and developed.</td>
<td>Combination of individual actors’ competences through internal and external networking activities to increase understanding of how critical capabilities are created, developed and deployed during different developmental phases. Besides technology and marketing capabilities, the industry’s characteristics also demand regulatory, scientific and financial capabilities. Time and context dependent strategic outcomes are identified.</td>
</tr>
<tr>
<td>Title</td>
<td>Research question</td>
<td>Theoretical framework</td>
<td>Method</td>
<td>Main findings</td>
<td>Main contributions</td>
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<td>Paper 4: Value co-creation in an integrative network approach: the case of an international new venture in the medical technology sector</td>
<td>How and why does an INV co-create value with different types of network actors when commercializing a medical technology innovation?</td>
<td>International new venture theory, business network theory and marketing theory.</td>
<td>An in-depth longitudinal case study.</td>
<td>Five different groupings of actors were identified as playing critical roles in the international new venture’s commercialization process: (1) actors related to improving health; (2) actors related to ensuring healthcare safety; (3) actors related to reducing healthcare costs; (4) actors related to creating opinion and enhancing legitimacy; and finally (5) actors related to business.</td>
<td>An extended network model is proposed which illustrates the roles of scientific, institutional, opinion creating and business networks for an INV commercializing a medical technology innovation. Doing business in an institutional context, business-to-institution (B2I) is ambiguous, complex and even conflicting.</td>
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<tr>
<td>Paper 5: The process of commercializing a medical technology innovation for an INV through international trade fairs: combining a network with a practice view</td>
<td>Which is the role of networking at an international trade fair for an INV commercializing a medical technology innovation?</td>
<td>International new venture theory, business network theory and strategy-as-practice perspective.</td>
<td>An in-depth longitudinal case study. A participatory approach was used.</td>
<td>Different actors, activities and tools/material reinforce each other in order to create mutual value aiming at an international market acceptance for and adoption of the innovation. The INV has to think globally when it comes to science but that there are many different country-specific circumstances to consider which affect the choice of different tools/material and activities.</td>
<td>Acknowledging tools and material which are co-created with different actors and through different activities. Exhibiting at an international trade fair accelerates creating new networks, facilitates gaining relevant therapy specific knowledge, and creating legitimacy for both the innovation and the new venture.</td>
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5 Conclusions

In this chapter I first start discussing how the findings from the different papers interrelate and are built on each other. Thereafter I present my theoretical conclusions, followed by managerial implications. Finally, I present my suggestions for further research.

5.1 Discussion

This thesis has an overall purpose – to explore how and why the medical technology context influences new venture internationalization – with five different underlying research questions. The overarching contribution of this thesis is to understand how and why the particularities of the life sciences industry, with focus on medical technology, affect and shape the internationalization process of a new venture when commercializing a medical technology innovation. This stance is studied from different theoretical perspectives and empirical angles. Due to a combination of different challenges, the concept of the ‘suicide quadrant’\(^\text{11}\) fits well in a context when a firm launches a new product (in this case a breakthrough innovation) in a new market (Sarasvathy, 2008); in addition it is an INV that internationalizes from its inception. These activities are highly entrepreneurial; they include a large portion of uncertainty, goal ambiguity and enactment (Sarasvathy, 2008; Oviatt and McDougall, 2005b). This combination of substantial challenges needs to be considered when refining or expanding existing theory why this thesis proposes two contextualized internationalization models (papers 1 and 2), one contextualized network model (paper 4) and a number of propositions (papers 1, 2 and 3).

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\(^{11}\) Sarasvathy (2008, p. 93-94) has illustrated a typology on new-venture models where she distinguishes between existing markets and existing products and new markets and new products in a matrix. She places the process of both introducing a new product in a new market in the ‘suicide quadrant’. However, the entrepreneurs would not denote this process as being in a ‘suicide quadrant’. They would rather call it as having control with the following argument: “It is only when the market is truly unpredictable that the small, lean and mean startup entrepreneur has a real chance of shaping it into something innovative and valuable.”
Paper 1 in this thesis starts off with identifying both enabling and constraining factors for the internationalization of a medical technology INV. The role of the entrepreneur, different networks and the industry context are important factors for understanding the internationalization process (Andersson and Wictor, 2003). However, the industry structure is sometimes difficult for the individual entrepreneur to change, especially in a regulated industry context like the medical technology sector where institutional structures do not yet fit breakthrough innovations (see Bruton et al., 2010). In the different papers, it is shown how difficult it is for the individual entrepreneur or the entrepreneurial team members to change existing habits, routines and regulations (standards) in a healthcare sector when new products are introduced (at least in the short time perspective), even though the need emerged from the users or the market. Paper 1 in this thesis advances ten propositions whereas those related to networks and the industry context are built on and extended in the subsequent papers.

First, I elaborate on the propositions in paper 1 that relate to the industry factors which are paramount in this thesis, specifically Proposition 6; “Internationalization processes in the life sciences industry need to address institutional differences in the healthcare sector in each country” and Proposition 8; “Internationalization in the life sciences industry requires that firms adapt the revenue model to the country-specific reimbursement practices in the healthcare sector”. Paper 2 builds on these propositions. In relation to the traditional Uppsala model, the role of distinctive national markets is revitalized since every country has its own healthcare setting and policy on how to structure and finance healthcare. These structures affect the sales and internationalization process in itself which became evident in paper 2 where four different internationalization strategies emerged based on the normative dimensions in each country (cf. Scott, 2008), especially in relation to reimbursing innovative medical technologies. For instance, a decentralized and regional healthcare system in both Sweden and the United Kingdom led the firm to achieve piece-wise sales, whereas the centralized and bureaucratic healthcare system in Germany made any sales difficult to achieve as long as the case firm lacked a national code in the reimbursement system. The US system has a mixture of predominantly private healthcare options but also public care, which opens up two sales routes: approaching a more privately based competitive market and/or a public-based sales process. The institutional theories are helpful for analyzing an institutional customer; i.e. the role of different healthcare organizations as important non-market based actors and customers, from regulative, normative and cultural-cognitive dimensions (see Scott, 2008). Proposition 1 in paper 2
5. Conclusions

states: “Both the role and the type of customer have an impact on international sales patterns. A business-to-institutional sales process slows down the internationalization speed more than a business-to-business sales process.” Hence, due to the regulative, scientific and health economics requirements that need to be proven in different ways before accelerating the sales and internationalization processes, the argument is that the speed of internationalization is generally slower than in a business-to-business context where the regulative demands are generally not as high (Bell, 1995) and where there is a clear customer with whom to make direct business.

Second, the propositions that are related to networks are especially covered in papers 3, 4, and 5. Proposition 3 in paper 1 says: “An INV’s network is the sum of all individual networks” is elaborated in paper 3 in combination with a dynamic capability perspective. When operating in a dynamic and knowledge-based industry, it is paramount to understand what types of capabilities are needed during different developmental phases, which are denoted as critical capabilities. The position in the paper is to understand how they are created, developed and deployed through the individual key actors’ networking activities. During the pre-founding, start-up and establishment of production phases, drawing on existing network ties and leveraging different indirect ties, dominate. During the commercialization and sales growth phases, however, many new network ties are created and developed. Hence, the networking activities change as the venture develops as do the outcomes. However, the paper points out other than the more ‘traditional’ internationalization dimensions and outcomes (i.e. scope, scale (extent), speed and modes) and financial performance measures since they better manage to describe how the venture successively gains legitimacy and international market acceptance for the innovation. Three types of capabilities, besides technology and marketing, are especially crucial for an INV’s early developmental phases in this industry context; regulatory (due to different certifications of quality systems), scientific (how to handle clinical trials) and financial capabilities (external capital is needed due to costly activities and long lead times before break-even). Finally, long pre-emergence and pre-organization periods change the way we look upon how new an INV really is.

Building on proposition 5 in paper 1, “Leveraging network ties to non-business actors are crucial for building legitimacy and facilitating market acceptance” is further developed in papers 4 and 5. Most network studies within the international entrepreneurship field emphasize on the roles of social and
business networks. However, due to this industry’s specificity, many other so-called non-market based networks are introduced. The most fruitful way of studying networks is to understand the different actors’ needs and how to create value with them. The ambition in paper 4 is therefore to categorize the different actors in accordance with their overall roles, logics and drivers to match their needs. This turned out to be a relevant way to capture and understand their underlying drivers and incentives to collaborate with the studied INV. Moreover, this study combines the value co-creation concept according to the marketing logic with network theories within the international entrepreneurial process (Styles and Seymore, 2006). Papers 4 and 5 illustrate that business and social networks are not enough when operating in the medical technology sector where, besides business; scientific, institutional, and opinion creating networks are paramount for the INV. Moreover, many network studies assume that networks already pre-exist. However, when operating in an innovative niche segment it is highly uncertain whether it is possible to draw on existing networks (Loane and Bell, 2006). In addition, it is not only the networks per se that are important, it is the kind of resources that are created and exchanged between the different network actors that are paramount for the commercialization and internationalization processes. If a venture operates in an innovative niche segment (Loane and Bell, 2006), one of the most crucial questions is how to create legitimacy, both for the product and for the venture (Mort et al., 2012). This means that ventures constantly have to prove their rights to exist through various value-creating activities, which do not necessarily aim for profit-making when working with scientific, institutional and opinion creating issues. Paper 5 deepens the different factors that impinge on the commercialization process when the INV exhibits its products in an international trade fair – being an ideal knowledge hub for networking with the different actors that matter in a specific industry context and even within a specific therapy area. So different networks matter – and it is vital to differentiate among the different actors’ logics and roles for understanding their needs and how to create value with them. In other words, how do the ventures incite different actors to collaborate with them?

That many single-industry papers in the international entrepreneurship field are built on a software/ICT context triggered me to ask in the introduction chapter to what extent current theories would hold for another empirical context (Bello and Kostova, 2012). This thesis indicates certain particularities in this industry context that would affect the internationalization speed, scope, scale and mode and how new a venture really is, given long pre-organization periods. It also
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indicates that other types and more fine-grained distinctions of capabilities are needed in addition to technology, entrepreneurial and marketing ones, such as scientific, regulative and financial capabilities. The thesis also indicates that other types and more fine-grained distinctions of networks are needed in addition to business and social ones, such as scientific, institutional and opinion creating networks. The following theoretical concluding model is based on the empirical findings in this thesis. The model is inspired by and built on Oviatt and McDougall’s (2005b, p. 541) model of forces influencing internationalization speed.

5.2 Theoretical conclusions

Based on the findings in this thesis and the preceding concluding discussion, I propose a refined conceptualization model that better fits an empirical context that is characterized by idiosyncratic regulative, normative and cultural-cognitive dimensions (Scott, 2008, 2014). The argument in this thesis is that international entrepreneurship theories are influenced by the large number of studies from the empirical context of the high-technology sector comprising of software/ICT. While there are many similarities between the software/ICT and the medical technology sector, there are also some fundamental differences that would affect the speediness of the internationalization processes and how new a venture really is considering long pre-organization periods before a venture is founded (see Hewerdine and Welch, 2013).

There is another factor that is characteristic for the empirical cases in this thesis that would affect the internationalization processes. The two INVs commercialize medical technology breakthrough innovations which are not necessarily ready for a swift adoption within different healthcare organizations across countries for various reasons. This is a “distinctiveness of the phenomenon” in this study which would affect the internationalization process (Bello and Kostova, 2012, p. 54). By accounting for this “distinctiveness” I can contribute to refining and expanding existing theory since there are additional factors that can slow down the commercialization and internationalization processes which have not previously been in focus in the extant literature (Bello and Kostova, 2012, p. 541). These distinctive factors are now discussed in relation to Oviatt and McDougall’s model as follows.

Based on the findings in this thesis, the enabling and constraining factors that have been identified are specifically considered when proposing an adapted
model according to Figure 4. Oviatt and McDougall (2005b, p. 541) start by discussing three vital aspects to a speedy entrepreneurial internationalization; (1) “time between the discovery or enactment of an opportunity and its first foreign market entry”; (2) “how rapidly do entries into foreign markets accumulate and how rapidly are countries entered that are psychically distant from the entrepreneur’s home country?”; and finally “how quickly does the percentage of foreign revenue increase?” The focus in their model is not on the discovering or enacting an opportunity, but on how speedy that opportunity is internationalized. In the following, I will discuss some of these constructs in relation to the empirical findings in this thesis.

Figure 4 A model of factors influencing internationalization speed: an early, slow and focused internationalization route in the medical technology sector. Adapted from Oviatt and McDougall (2005b, p. 541)

So the first part of the model has many similarities with Oviatt and McDougall’s model (2005b). The empirical context for this thesis is that the entrepreneur and/or the entrepreneurial team members create a new venture
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Based on discovering, enacting or creating opportunities. In one of the cases, the opportunity was derived from a market demand, which means that the problem formulation came from a real clinical need. The key individuals then developed a completely new way of solving an old but largely ‘unknown’ problem. In the other case, an opportunity was created since one of the founders found out by chance that employees with asthma were improved after working in an industrial clean room, and from this finding, the founders developed a completely new and innovative application based on an existing core technology in a new industry setting (Shane, 2000). The assumption that Shane (2000, p. 448) proposes in his article that “different people will discover different opportunities in a given technological change because they possess different prior knowledge” is highly convincing in this context.

In the original model from Oviatt and McDougall (2005b) they start with the entrepreneurial opportunity. First of all, although the entrepreneurial opportunity is not in focus in this thesis, it is accounted for since it is expected to affect subsequent commercialization and internationalization processes (Jones et al., 2001a). Many scholars (e.g. Coviello, 2006; Ghannad and Andersson, 2012; Söderqvist, 2011) within the international entrepreneurship field have acknowledged the importance of encompassing the time before the foundation of the INVs in the research design to improve understanding of international development. Overall, the time perspective is challenged in this thesis due to long development phases and lead times in this industry which is relevant for the first construct; how quickly an opportunity is internationalized.

In the two cases in this thesis, it was shown that the process from opportunity recognition to a legal corporation took around six years. This incites two relevant questions: are INVs really “new” considering such long pre-organizational periods? (see also Hewerdine and Welch, 2012) and how quickly does the manifestation of an opportunity in reality reach a foreign market? However, if we count from the venture’s date of incorporation, the internationalization process starts from inception. The global competition in the medical technology sector is a motivating factor (or even a necessity) for an early internationalization. In addition, an early internationalization is also necessary for firms which originate from small open economies with a too limited home market for their niche products (Hallbäck and Gabrielsson, 2013; Madsen and Servais, 1997).

The enabling factor, technology which means improved ways of transportation and communication, probably affects all industries but to varying extent. The
two types of moderating forces that Oviatt and McDougall (2005b) propose in their original model, knowledge-intensity and networks, are on the other hand industry-dependent. First of all, as for the ICT and software sector, the medical technology is also characterized by knowledge-intensity. In addition to this, the medical technology sector relies on science-based knowledge that aims to improve the quality of life (Stremersch and Van Dyck, 2009). This further implies that the ventures need to prove safety measures, both before placing the product on the market but also after. Bell et al. (2003) discuss three categories of knowledge-intensity in a firm and how this in turn affects the speed and pattern of internationalization. First, the traditional way of internationalization is characterized by slow and incremental steps with main focus on industrial manufacturing firms (Autio, 2005; Bell et al., 2003; Johansson and Vahlne, 1977). These firms adapt existing technologies to new foreign markets (Oviatt and McDougall, 2005b). The second category of firms is those that use existing knowledge to develop new products, services and production methods (Bell et al., 2003). Third, the knowledge-based firms exist because of their new technologies (Bell et al., 2003), like the cases in this thesis. This in turn demands some relevant capabilities: entrepreneurial, marketing, technology and financial. In addition, there are two relatively industry-dependent capabilities that have proven paramount in this thesis: scientific and regulative. The access to and use of both distinctive knowledge bases and capabilities would probably influence internationalization speed. The argument for this is that it is not only the market and internationalization knowledge bases that matter for a speedy internationalization process. Whereas Oviatt and McDougall (2005b, p. 543) argue that firms with “novel complex knowledge” are likely to accelerate the internationalization speed, I would instead say that commercializing breakthrough medical technology innovations slow down the internationalization speed due to time consuming and often costly compulsory evidence-proving activities, at least in the short-term perspective.

Additional critical factors to account for, when breakthrough innovations that do not yet fit existing institutional structures are commercialized, are how to get paid for the technology and how to implement the product in current treatment routines within and across healthcare systems. This is the reason why I have added another influencing factor in the adapted model which could either increase or decrease the internationalization speed depending on how well the type of product would fit different healthcare systems. For instance, because each and every healthcare setting has distinctive features across nations that either directly or indirectly influence the INVs’ commercialization and
internationalization strategies, this is a factor that needs to be explicitly accounted for in the model. This also implies that the role of distinctive national markets from the original PTI model remains important when regulations and healthcare policies differ, even though the ventures do not necessarily choose countries according to the perceived psychic distance concept (Johanson and Vahlne, 1977; Johanson and Wiedersheim-Paul, 1975). The revised Uppsala model has taken insidership in a relevant network as an important token, after being influenced by the many international entrepreneurship studies which have illustrated the importance of networks for new venture internationalization.

This leads us to the third influencing factor, network relationships. Although tie strength, network size and network density, as indicated in the original model (Oviatt and McDougall, 2005b), are important constructs for internationalization speed, the empirical findings in this thesis also show that INVs operating in innovative niche segments have to create many new network relationships (Loane and Bell, 2006) and that other types of networks, besides business and social ones are vital for commercialization and internationalization processes. I have therefore added in the adapted model new and indirect ties (could be both local and global); institutional, scientific, opinion creating and business networks. Depending on whether the firms have access to, and how they can use, different types of networks, it could probably either increase or decrease the internationalization speed. In line with Oviatt and McDougall’s (2005b) reasoning, it is expected that the internationalization speed slows down if many new networks need to be created. Creating new relationships and networks can be a time consuming process. For instance, Johanson and Vahlne (2009) indicate in their revised model that it can take up to five years to establish working relationships.

Finally, another distinctiveness of this phenomenon is that operating in an industry context with long lead times to market implies using other types of outcomes than strictly financial ones and can also challenge the assumption of rapid internationalization. The most important dimensions in the internationalization process relate to scope, scale, speed and mode (Kuivalainen et al., 2012b). The empirical findings have proven that strategic outcomes (see Jarzabkowski and Spee, 2009; Van de Ven and Engleman, 2004) need to be integrated in a model of medical technology new venture internationalization, like achieving international patenting, international regulatory approvals, creating new guidelines, changing industry standards, and obtaining prestigious
sales orders (Wheeler et al., 2011), whereas the most important is gaining international market acceptance so that sales can be initiated and accelerated (see Figure 4). My conclusion is that an early, slow and focused internationalization process is expected when INVs commercialize a breakthrough innovation in a business-to-institution context. However, the influencing factors of knowledge (critical capabilities), networks and national healthcare settings could either slow down or speed up the internationalization process depending on different idiosyncratic factors as has been discussed above.

This thesis contributes to the international entrepreneurship field in several ways. The adapted theoretical model above illustrates how the different pieces of contributions from the five papers are integrated in the model. The overall contribution is to illustrate how the internationalization process changes when we study a specific empirical context given certain particularities and distinctive factors. The most distinctive factor is that the life sciences industry with focus on the medical technology sector is embedded in different socio-political systems across nations where the healthcare sector is a concern of each nation’s internal affairs. This means that each country and even regions within a country (as in Sweden and the UK) has distinctive regulative, normative and cultural-cognitive healthcare dimensions that affect the internationalization speed, scale, scope and mode. Another distinctive factor in this thesis is that the case firms commercialize breakthrough innovations that do not yet fit existing institutional structures (healthcare systems). The combination of particularities in turn affect the roles of entrepreneurs, entrepreneurial team members, networks, knowledge bases and critical capabilities which all have been covered in different ways in the appended papers and in the concluding theoretical model above. My level of generalization is contextual since I decided to have the medical technology sector as part of my overall purpose. I am interested in understanding the particular instead of generating law-like explanations (Welch et al., 2011). I wanted to increase my understanding of how we understand theory when a new empirical context is under investigation and if that changes the way we understand theory. Some of the dominant assumptions that exist in the extant literature are questioned (see Zahra, 2007) when we study INVs which operate in a regulated industry sector. The first and most important assumption to be questioned relates to time/speed. What is a rapid internationalization in one industry context, e.g. the software sector might not be the same in the medical technology sector. The other distinction of time relates to how early an INV starts its internationalization process. The operationalization of time which relates to how many years it takes before the
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internationalization starts can be questioned if it is found that some of the key activities, primarily in relation to product development and patenting, take place many years before the actual inception or legal corporation (see also Hewerdine and Welch, 2012). Another prevailing assumption in the extant literature relates to *scale* or *extent* which presumes that INVs can achieve a high proportion of international sales. However, this is a too narrow construct when INVs commercialize innovations that require educating the market about the product and/or service or when different evidence proving activities are needed, which can dramatically postpone the actual sales. Finally, the assumption that relates to *scope* (entering both many and far distant countries early in a venture’s history) is in turn affected by the other dimensions. If it takes many years before a firm can start selling and if each country has a distinctive system for how products are reimbursed, a wide scope is barely feasible or advisable. However, the choice of strategic markets, no matter if they are psychically distant or not, is the most important decision to be made. In other words, how swiftly a product can be adopted in different country contexts should guide the choice of country to enter first. As the time processes are long in the medical technology sector, it is probably advisable to choose a combination of a few strategic countries to focus on until a viable revenue model is achieved. A somewhat contradictory finding, to both the traditional Uppsala model and the international new venture literature, is that one of my cases established its own production plant in a far distant country even before having reached break-even, whereas the other case established two subsidiaries in their two chosen strategic markets close to inception. These desisions are better understood if we analyze them through a contextual lens. Since the regulatory requirements are high in this industry context, it is utterly critical that the firms can guarantee different safety requirements, both before placing the products on the market, during production, and after they have been placed on the market. Each country has different ways of controlling both safety requirements but also marketing practices. In addition to this, firms need to report if any incidents occur to the different concerned authorities. These different demanding regulatory requirements imply that the choice of entry mode is critical, which was one of many considerations when the studied firms used more resource-intensive modes early in their process and even before they had reached break-even or positive cash flows. Moreover, when using one of the most common entry modes (distributorship) in the international venture theory, it is critical to choose distributors that have the ability and internal structure to comply with the country’s regulatory requirements. In one of my cases, one of the distributors had to be changed early on in the internationalization process when
it turned out that the distributor lacked the internal structure for coping with the necessary administrative requirements that are demanded when operating in the regulative medical technology context. Finally, taking these different factors into account makes it questionable whether it is feasible to cover many different countries simultaneously for an INV, at least in the short term perspective. Having to comply with these different requirements would also affect the internationalization speed, i.e. slow down the internationalization process.

5.3 Managerial implications

Both international business and international entrepreneurship literatures emanate from the importance of knowledge. The Uppsala model has differentiated between objective and experiential knowledge where the experiential knowledge is further divided into market (business and institutional) and internationalization knowledge. These knowledge bases are still relevant today but this thesis argues that further knowledge bases and capabilities are paramount when operating in the medical technology sector; namely scientific and regulatory knowledge bases and capabilities. Both of the case firms missed these capabilities, especially the scientific capability. The case firms were not fully prepared for how long the lead times actually are in the medical technology industry context, and how challenging it is to accelerate revenues, especially if the firms commercialize breakthrough innovations which do not have a clear place in different countries’ reimbursement policies. Moreover, the costs for young firms to carry out clinical trials and health economics studies are immense. Some investors talk about 100 – 400 million SEK for a market rollout and that it can take between 10 and 15 years to gain market acceptance, without considering the costs for the early product development phases\(^{12}\) (cf. Buch et al., 2011). This means that the financial capability is equally important, unless the firm manages to grow with its internal means, which is often not the case when launching breakthrough innovations internationally. Moreover, it is common that start-up firms launch breakthrough innovations and that they are from start dependent on only one product. This combination makes them particularly vulnerable. It is easy to underestimate the time and costs that are related until a successful commercialization takes place. One suggestion to these start-up firms is to

\(^{12}\text{Internal material SEB Venture Capital}\)
connect with other partners early on in the process to minimize possible risks. The interaction with resourceful MNCs is another way forward. Finally, some of these firms have as a strategy to be sold once they have proven their business case.

The role of creating legitimacy for the venture and for the product should not be underestimated in the commercialization and internationalization processes. One successful way for the case firms to show up their innovations and to create legitimacy among relevant actors is to participate and exhibit their products at international congresses early in their commercialization process. One of the case firms even exhibited their product at one of the most important congresses in their therapy area before they had received their FDA clearance. In their stand, they therefore wrote ‘Not for sale’. This procedure meant that the case firm could connect with some key actors early on in their process, both potential customers and distributors.

Hence, an INV which commercializes a medical technology innovation needs to create legitimacy. Media actors can also help to serve this purpose by delivering credible publicity through respected channels. Since the studied products are categorized as breakthrough innovations in their respective therapy areas, the focal firms have attracted some media attention, both during congresses but also in specialized magazines and other industry related press. This is an efficient way to create market demand and gain legitimacy. It is also vital to collaborate with different non-profit organizations which are linked to other actors where the most important one is probably patients.

A crucial question for the firms is to attract the attention from key actors. It is therefore paramount to learn about their customers and their different needs so that inciting value propositions can be offered to them. A way forward is to understand how to co-create value with the different actors and therefore it becomes especially crucial to understand their different drivers, logics and functions from a healthcare perspective.

Since healthcare systems across countries differ very much and that they have different priorities, it becomes crucial for the focal firms to understand how the healthcare sector is structured and what need there is for the specific product on different markets. Since each healthcare system has its own policies, it is also paramount to understand how new medical technology products are valued, reimbursed and purchased. The way the healthcare is structured is therefore an
important factor for market selection and how swiftly the innovation can be adopted in the system.

5.4 Suggestions for further research

This thesis is built on two in-depth longitudinal case studies which have enabled me to explore in detail the internationalization processes of two INVs from the medical technology industry sector. I have shown that different industry-specific factors are relevant for the internationalization process. The role of healthcare settings turned out to be crucial for the firms and for their subsequent commercialization and internationalization strategies. Some of the assumptions from the international entrepreneurship literature that relate to scale, scope and speed and newness are challenged in this thesis when studying an empirical context that is constrained by many regulations and norms, as in the medical technology context, especially if INVs commercialize breakthrough innovations which do not yet fit existing healthcare structures. This implies that there are some specific constraining factors that are related to the industry, which in turn affect the role of entrepreneurs, networks, needed resources and capabilities.

By choosing to include a specific industry context in my purpose and theoretical framework, I thereby limit my generalizations to similar contexts (Cesinger et al., 2012). However, there exist other industry sectors which also need to subsume high regulative demands. Below, I therefore start discussing how my results could to some extent be transferable to other industry contexts and propose suggestions for further research from an industry perspective before I discuss in more detail theoretical suggestions for future research. For instance, the financial services and school industry sectors have regulations that create impositions on the behavior of firms, which in turn are probably not easily manipulated or maneuvered by individual entrepreneurs. However, one crucial difference is probably that they have larger home markets as compared to firms which provide niched products in the medical technology sector. This may account for the motivation for an early internationalization process being lower. There are also other industry sectors which face intensive continuous research and developmental demands (e.g. the vehicle industry). Hence, the results from this thesis could therefore be contrasted and compared with other regulated and knowledge-intensive industry settings. A relevant research avenue would therefore be to compare different regulative and/or scientific demands across
industry settings and how they would affect the entrepreneurial behavior from an internationalization perspective (e.g. what is meant by speed across industry contexts). A suitable theoretical lens would for instance be to use Giddens’ structuration theory (1979) to understand this dynamic interplay between structures and human agency. For instance, the cleantech industry sector would be interesting to study since it comprises many stakeholders (e.g. lobby groups and non-profit organizations) and governmental policies with interventions that differ across countries (e.g. the level of environmental protection acts). It is also a knowledge-intensive industry sector with intensive R&D. A suitable empirical context to compare with would therefore be the clean teach or Greentech industry sector\textsuperscript{13} which, like the Medtech industry, also comprises many start-ups and SMEs with innovative solutions, and how they choose international markets based on different countries’ environmental priorities or institutional factors (regulations, norms and cognitions) (cf. Moore, 2011). It would also be relevant to compare the software/ICT and the medical technology sectors directly with each other in both a qualitative and a quantitative study in order to clarify the similarities versus differences between constraining and enabling factors and how they would affect the internationalization process. For instance, a very specific question is to deconstruct the time dimension in relation to how long time different value-creating activities generally take across industry settings and how that eventually affect the speed construct. It would also be relevant to make further distinctions between the different groupings within the overall life sciences industry; for instance, although biotechnology, medical technology and pharmaceuticals all belong to life sciences, there are also some key differences that could affect the commercialization and internationalization processes.

In the following I give some specific suggestions for future research where I start from some of the relationships that exist in the concluding model in Figure 4.

5.4.1 **Entrepreneurial opportunity – Internationalization process**

This thesis has only acknowledged but not focused on the relation between the entrepreneurial opportunity and the internationalization process (for a review see

\textsuperscript{13} http://www.swedishcleantech.se/2.4ca4de5140ab6d423c467.html
Mainela et al., 2014). Although the innovation height in relation to the product type has been integrated in the analysis and how its characteristics affect the actual internationalization process, a suggested research direction is to further elaborate on the relationship between product type and internationalization process (see Hennart, 2014). A theoretical perspective could be to start from the Actor-Network theory where the technology in itself could be the unit of analysis (cf. Latour, 2005). It would also be interesting to more systematically identify the process of opportunity development and/or how it results in a product or service which actually gains market acceptance. It was seen in this study that the revenue generation comes much later in the process, and why other time phases or categorizations are needed for understanding the whole process from opportunity identification until full scale sales revenue (opportunity exploitation). In the extant international entrepreneurship field it is often assumed that INVs can manage to accelerate early revenues which have not been the case in this thesis. However, I do not think that the ventures in this thesis differ that much from other firms commercializing breakthrough innovations and the actual process for gaining market acceptance with recurrent revenues. Instead, the actual time intervals can vary considerably between different industry settings. The problem is that many international entrepreneurship studies assume that firms generate a quick revenue base which in turn enables them to internationalize broadly, early and speedy (e.g. Oviatt and McDougall, 2005b). A theoretical perspective to enlighten different commercialization phases is to include the product-life cycle perspective (e.g. Vernon, 1966) and compare how and why different products go through these phases in an international entrepreneurial perspective. It is then important that it does not underpin another deterministic model as previous stage and innovation models have been criticized for (Andersen, 1993). Instead, the role of the entrepreneurial and behavioral agency should be included in such research directions. For instance, a fruitful research design would be to categorize the product according to its innovation height (i.e. well-known technologies, complex knowledge or completely novel knowledge (see Bell et al., 2003) and how these three categorizations of product types would affect the internationalization processes and time patterns.

Another research direction would be to integrate different customer types for internationalization process (see Hennart, 2014). The findings in this thesis suggest that different customer types affect the internationalization and commercialization processes when a breakthrough innovation is launched that is targeted to a mostly regulated industry sector where the end-consumer does
not decide on the product choice or adoption (e.g. the patient). There are instead other mechanisms that affect how to buy and pay for a new product, like required rigorous scientific evidence and health economics data in order to make a decision on reimbursement issues. This means that we need new theoretical approaches for answering these questions besides entrepreneurship and international business frameworks. For instance, economics and political science literature would fit these research directions in combination with entrepreneurship literature. Current research mostly focuses on the actions of entrepreneurs for predicting a successful commercial launch of a product. However, it is the government of each country, with its different health policies, economies and priorities, which primarily decides whether it is possible to gain a rapid product adoption or not. Some fruitful research directions would therefore be to integrate institutional entrepreneurship frameworks with international entrepreneurship literature to more fully understand the role of the product or industry type for new venture internationalization and commercialization of an innovation (see Battilana et al., 2009; Bruton et al., 2010; Szyliowicz and Galvin, 2010). For best results, the study design is suggested to have a longitudinal approach. The unit of analysis would be the actual innovation in order to follow its way from idea to international markets. An advantage with this research approach would be to understand the different actors that enter and/or exit the scene during a commercialization and internationalization process, such as entrepreneurs, the board of directors, venture capitalists and different members of a changing management team. This latter type of research is especially relevant when there are long development phases before a product is ready for a commercial launch, as in the overall life sciences industry sector.

5.4.2 Network relationships – Internationalization speed

This thesis has a network perspective as one of three overarching theoretical perspectives that describe and explain the new venture internationalization phenomenon. Networks have been studied explicitly in the INV theory from its early start, especially from the individual’s existing personal networks. However, it might be difficult to draw on existing personal networks when operating in innovative niche segments (Loane and Bell, 2006). Moreover, acting in the medical technology sector implies that INVs have to handle more than ‘traditional’ business actors whose general motives are to become competitive and making profits. These motives are most certainly not the same for many non-market based actors like governments and healthcare providers. An
interesting research avenue is therefore to better understand different network actors' drivers (logics) and how to co-create value with them. In addition, an INV which commercializes an innovation needs to create its legitimacy (cf. Turcan, 2011). An interesting question is to further understand how INVs work with lobbying and different media actors for trying to smooth and facilitate the adoption process of a breakthrough innovation but also how to create legitimacy for the new venture (Zimmerman and Zeitz, 2000). The perspective of creating legitimacy through different types of networks, which includes both new and established versus market-based and non-market based ones, to compensate for liability of newness, opens up many interesting research directions. The process of creating legitimacy, which also overlaps institutional theories (Scott, 2008; Zimmerman and Zeitz, 2000), would enrich the international new venture theory (Turcan, 2011). For instance, it would be interesting to design a study which directly compares the process of creating legitimacy for new ventures with new technologies on new international markets in the medical technology sector with the software/ICT sectors.

It is also argued that there are “learning advantages of newness” when embarking on an early internationalization journey since the organization then becomes less burdened by inertia or learning impediments (Autio et al., 2000). This is an interesting proposition which relates to the advantages of a young venture’s flexibility and agility as opposed to rigid organizational structures and routines in already old established multinational organizations. This is a research direction that could be understood to a larger extent from an industry perspective and which dominant logics exist when operating in different industry contexts. For instance, it would be interesting to compare large and small knowledge based firms, for instance in the medical technology sectors, and how certain routines are sedimented and routinized. The institutional framework (e.g. DiMaggio and Powell, 1983; Scott, 2014) could be used to look at institutionalized behavior among the firms and the dominant logics in the industry sectors. A possible research question would be: Do INVs which operate in a certain industry sector imitate the behavior from the incumbent firms and which advantages versus drawbacks would such imitative behavior lead to?

5.4.3 Knowledge – Internationalization speed

This thesis has added a dynamic capability perspective for better understanding an INV’s existence and competitiveness. There is an on-going vibrant and
interesting research effort in this area within the international entrepreneurship field. One of the elements in the INV theory (Oviatt and McDougall, 1994) from its start was to borrow some of the basic principles from the resource-based view since many of the identified high-technology firms compete on their unique knowledge-bases. The development has then been to propose a more knowledge-based view of the firm (e.g. Grant, 1991, 1996) and now lately to embrace a dynamic capability perspective (Peiris, 2012). These research streams complement and overlap each other considerably (Knight and Cavusgil, 2004). One of the reasons why the dynamic capability fits well into this research field is that internationalization is understood as a process or even an innovation act (see Jones and Coviello, 2005) where changes are frequent and necessary. Many high-technology firms compete in internationalized and dynamic industry settings as to why it is expected that firms need to create, develop and deploy different critical capabilities over time. I have pinpointed that different knowledge bases are needed across industry settings and over time. It would also be interesting to further entangle what various knowledge bases or capabilities refer to across industry settings, e.g. technology and marketing capabilities and fill them with **content** in relation to needed activities and requirements.

Consequently, this is another research area with many research avenues and directions. Specifically, the dynamic capability perspective has been criticized for being abstract in the strategic management field as to why a more practice oriented theoretical perspective has been proposed that look at strategy-making from a strategy-as-practice perspective (see Jarzabkowski and Spee, 2009). More precisely, it would be a fruitful research project to better understand the different micro-foundations for capabilities in an international entrepreneurship framework and if and how they differ across industry settings. It would also be interesting to place these activities in different time horizons or growth/developmental phases. For instance, it was found that there are long lead times in this industry due to demanding regulatory approvals and complex reimbursement decisions, which slow down the commercialization and internationalization processes. An interesting research avenue would therefore be to identify some key knowledge bases and disentangle their different components for better understanding the know-how knowledge in relation to capturing different “processes, activities, techniques, and tools one uses to get something done” (Park et al., 2014, p. 13). This implies that we hopefully gain a better understanding of other knowledge bases, except market and internationalization which have specifically been in focus in the traditional PTI and/or the technology knowledge that have dominated INV theories. Some recent research approaches (see further Mejri and Umemoto, 2010; Park et al.,
2014; Sapienza et al., 2006) cover different aspects of these questions, which would be an interesting base on which to further develop theories and/or test and verify some of the proposed propositions and models in this thesis. Finally by better understanding different activities that underpin capabilities and knowledge bases, we should place these activities in a time context (Jones and Coviello, 2005).

It has been shown in the different papers that the firms are very dependent on external capital for developing and growing their businesses. Park et al. (2014) make an interesting relationship between venture capitalist and entrepreneur knowledge types and how they in turn relate to new venture internationalization. They discuss these questions from a more enabling perspective where new ventures gain additional resources and knowledge thanks to venture capitalists. The other side of the coin of the same phenomenon could also be to study the role of venture capitalists as constraining and even perilous for the individual entrepreneur or founder who now has to deal with resource-intensive partners with a superior negotiation position. For instance, when new resource-intensive owners enter the scene, the initial investments can be considerably diluted for the individual founders or entrepreneurs when their voices become less powerful. Related research avenues would be to contrast the interests from the investors’ versus entrepreneurs’ perspectives through governance and agency theories (see e.g. Arthurs and Busenitz, 2003). It would therefore be valuable to examine the changing roles of different investors/owners over time and the subsequent internationalization processes in different knowledge-based industry settings.

### 5.4.4 The nature of INVs

INVs are heterogeneous groups of firms. This is not least understood if we consider the amount of definitions and typologies that have been presented by different scholars for describing and explaining the ‘new’ phenomenon. This is only a natural process for a field which is trying to find its boundaries (Jones et al., 2011a). My research has shown that a more fine-grained type of the international new venture process is crystalized when we look at this phenomenon through different theoretical lenses, such as network, capability and institutional ones. By not only looking at the enabling drivers, but also the constraining barriers, we come across another type of an INV which has elements of new technology, new venture and new markets. If we combine these three elements, and if we then also add more fine-grained categorizations of
what is meant by a *new* product or service (e.g. incremental or breakthrough), different internationalization strategies and routes will most certainly appear (cf. Chetty and Stangl, 2010). My study particularly illustrates how the role of environmental or industry factors affect the choice of country and the entry mode, speed, scope and scale. Both the specificities of the industry and the commercialization of breakthrough innovations imply that it is difficult to refer to internationalization scale in relation to international sales as there are other measures for describing growth and ‘success’. This reasoning leads me to conclude that it is fruitless and even ‘dysfunctional’ to suggest specific categorizations of INVs without encompassing contextual factors (Cesinger et al., 2012). Many scholars are trying to find exemplary definitions of an INV or a Born Global firm and how to strive for consistent terminologies (Knight and Cavusgil, 2005; Svensson, 2006; Svensson and Payan, 2009; Madsen, 2013). This reasoning opens up many interesting research avenues where we add more specific models and propositions which in turn consider contextual factors (see further Cesinger et al., 2012). For instance, both Hewerdine and Welch (2013) and Pettersen and Tobiassen (2012) asked the intriguing question whether we can call an INV (or born global) a new venture when we find extensive long periods of development before the venture’s ‘legal’ birth. It is also found in my research that before the ventures were founded or born, the actual product ideas were developed several years before that date, which make it even more challenging to place different INVs or Born globals into different categorizations. In other words, it is the *context* of different industry logics that are more decisive for how we categorize different types of INVs or Born globals. For instance, it is quite common to study spin-offs from Universities and from incumbent firms. However, their conditions for creating a new venture have been facilitated by their earlier experiences and activities from the incumbent firm or the University organization (Chatterji, 2009; Pettersen and Tobiassen, 2012).
Appendix – Sample of a thematic interview guide for different rounds of interviews and respondents

Below, I illustrate some of the main themes that have been covered during the interviews. When appropriate, I have used “what, who, where, why, when and how” for guiding my questions (see Coviello, 2006; Pettigrew et al., 2001). For the different rounds of interviews, I have adapted the questions according to the different respondents. Furthermore, many follow-up questions have been asked, which are not included in the interview guide.

Personal information about the respondents including the role of the entrepreneur

- Describe education, earlier work experiences and international experiences.
- Discuss the value of earlier experiences for your present work. Give examples.
- Explain the reasons for working at this firm or collaborating with the firm etc.
- Discuss the individual role for the firm’s development. Give examples.

Idea conception and the founding of the new venture

- Describe and explain the founding process of the firm
- Describe and explain critical milestones affecting the firm’s development. Give examples.
- Describe and explain different time spans for critical activities etc.
- Describe how new ideas arise and how you handle them. Give examples.

Development of different types of capabilities

- Describe and explain specific critical knowledge bases that are needed for different activities. Give examples.
- Describe if you miss any competences for different activities and why you miss them.
Appendix

- Describe and explain how you handle missing competences or knowledge bases. Give examples.

- Describe and explain the role of different types of capabilities over time (e.g. marketing, technology and financial). Give examples.

- Describe and explain the role of different key individuals within and outside the firm over time. Give examples.

- Describe and explain how you interact with different key individuals within and outside the firm over time. Give examples.

Product/customer

- Describe and explain the innovation process of the product.

- Describe specific activities in relation to this process (e.g. patenting). Give examples.

- Describe who was involved in this process and how it was developed.

- Describe and explain different critical milestones for developing the product. Give examples.

- Describe and explain the role of customers for developing the product. Give examples.

- Describe and explain how you interact with different customers. Give examples.

- Describe and explain the competition.

- Describe and explain the largest challenges for launching the new product (specify needed competences and resources for this process).

- Describe and explain the marketing and sales process.

Internationalization process

- Describe the firm’s internationalization process.

- Describe specific triggers/motives for internationalization.

- Explain why different markets and entry modes are chosen.
-Describe who are involved in these processes and why they are involved.

-Describe and explain the role of institutional differences between foreign markets and if they affect the internationalization process. Give examples.

-Discuss how you get market information about different markets. Give examples.

-Discuss and explain different types of international activities. Give examples.

-Discuss how you make decisions in relation to internationalization. Give examples.

-Explain needed resources for internationalization. In case of resource constraints, how was this handled? Give examples.

-Describe and explain the role of financing and how to handle it. Give examples.

 Networks

-Describe different types of networks. Give examples.

-Explain the role of different types of network actors, e.g. local, global, established networks, social, business.

-Describe and explain how the networks have affected the internationalization process and/or other activities. Give examples.

-Describe how you have worked with networking and the reasons for this. Give examples.

-Discuss the role of participating at trade fairs or medical conferences? (in relation to networking and/or other activities).

-Describe other relevant networks for the business, product or for other reasons.

-Discuss opportunities and/or constraints with different networks.

Industry/institutions

-Describe the medical technology sector.
Appendix

- Discuss opportunities and hurdles that you have faced during different developmental phases (from the pre-founding phase and onwards). Give examples.

- If possible, compare with earlier work experiences from other industry sectors.

- Discuss perceived differences and similarities between different industry sectors.

- Discuss the role of healthcare systems for the firm’s product, business and internationalization.

- Describe how different healthcare systems affect the product, business and internationalization.

- Describe the regulative frameworks in the industry sector.

- Discuss differences between countries in relation to regulations and healthcare practices. Give examples.

- Describe normative practices in different countries and how they affect the sales and internationalization process. Give examples.

- Describe cultural differences and how they affect the sales and internationalization process. Give examples.

- Discuss how the firm has handled possible institutional barriers over time. Give examples.
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