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INTERNATIONALIZATION OF FINNISH CLEANTECH SMALL AND MEDIUM-SIZED ENTERPRISES: PATTERNS AND ANTECEDENTS

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ABSTRACT

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The research is an exploratory study aimed at providing foundational knowledge and proper understanding on the internationalization of Finnish SMEs in the cleantech context. Although there has been extensive focus on SME internationalization, there is very little research on internationalization of the cleantech SMEs. Thus, the novelty of cleantech context in internationalization spurred the motivation for the research direction which is considered topical and timely.

The study adopted a qualitative interview based multiple case study on five Finnish cleantech SMEs. The research questions aimed to identify, *how Finnish cleantech SMEs internationalize and consequently identify their patterns as well as critical antecedents to their internationalization process*. The supplementary objective provides more clarity on "Cleantech phenomenon" as a business process of the internationalizing firms. The theoretical synthesis combined various SME internationalization theories and international entrepreneurship as an integrative theory towards understanding the internationalization of Finnish cleantech SMEs. A review on antecedents and patterns of internationalization and cleantech sectors were also taken into consideration to obtain a holistic view on the research area.

To execute the empirical research process, a dimension of internationalization mapping tool was used to identify the level of international involvement of the case companies. Then, a comparison matrix pointed out key determinants at firm, managerial, and environmental levels, thus the most prominent internationalization antecedents. Lastly, the pathways specific to SME internationalization (born global, born again global, born international, born regional, and traditional pattern) were used to identify the patterns specific to the case firms.

The concept of cleantech was observed to be ambiguous. However, cleantech incorporates sustainability, environmental consciousness and optimization in business processes. Coalitions, network ties, maturity of the domestic markets, opportunity seeking, international orientation, and profit motives were observed as principal antecedent to the internationalization of Finnish cleantech SMEs. The results also showed that Finnish cleantech SMEs typically emulate traditional internationalization and born again global patterns. Alternative pathways such as born global may be also followed depending on the location of market opportunity and available resources. Overall, Finnish cleantech SMEs adopt varying internationalization pathways due to the diversification of the industry.

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LIST OF ABBREVIATIONS

B2B	Business to Business
BAG	Born Again Global
BG	Born Global
BI	Born International
BICS	Boosting Internationalization of Cleantech SMEs
BR	Born Regional
DC	Dynamic Capabilities
DOI	Degree of Internationalization
EO	Entrepreneurial Orientation
EU	European Union
FSTS	Foreign Sales to Total Sales
ICT	Information and Communication Technology
IE	International Entrepreneurship
IEO	International Entrepreneurial Orientation
INV	International New Venture
IPR	Intellectual Property Right
KBV	Knowledge Based View
MNE	Multi-National Enterprise
OECD	Organization for Economic Cooperation and Development
R&D	Research and Development
RBV	Resource Based View
SDGs	Sustainable Development Goals
SMEs	Small and Medium-sized Enterprises
TI	Traditional Internationalization

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1 INTRODUCTION

1.1 Research Background

Globalization and global mega trends have led to a paradigm shift in the way small and medium enterprises (SMEs) internationalize (Nummela, Saarenketo & Puumalainen, 2004). Technological advances in communications, information technology, mobility of human capital, financial resources and homogeneous markets, have created a shift in business operations globally (Ruzzier et al., 2006; Hollensen, 2007). Although a lot of focus has been placed on multi-national enterprise (MNE) or large firm internationalization process (Ruzzier et al., 2006). Recently, more attention has been channeled towards SME internationalization and small companies are either pulled or pushed to compete on a global scale to guarantee survival (Mtigwe, 2006). Internationalization provides alternative means or opportunities for firms especially SMEs to be more profitable, grow beyond domestic market boundaries, intensify competitive strategies and also foster innovation efforts (Hollensen, 2007).

Given the interconnectedness in the world today, the rapidity in SME internationalization strides mounts pressure on entrepreneurs and SMEs to meet up with global standards in their business operations. Likewise, customers and market requirements have been evolving and this also reflects in general business practices as companies are required to produce and consume efficiently. These changing trends have spurred the opportunity and the emergence of “*cleantech*” (Kachan & Fugere, 2013). Thus, due to the emergence and novelty of the sector, efforts have been made to categorize cleantech based on some industrial nomenclature and standards as seen in Figure 16. The cleantech summit held in Rotterdam (2014) described “cleantech”, as an “industry” while Nick Parker and Keith Raab founders of cleantech network describe “cleantech” as a sector in “which new technology and related business models offer competitive returns for investors and customers as well as providing solutions to face global challenges” (Cleantech group, 2013). Heavy investments are also said to have been made in the cleantech sector and it is projected to continue to grow in the years to come (Kachan & Fugere, 2013; Cleantech group, 2013; SDGs, 2015).

Cleantech industry and SMEs internationalization (Finnish context) is still an emerging area of research which leads to this exploratory research. The researcher also hopes to provide

managerial, academic insight and overall, a foundational knowledge on SME internationalization in cleantech context. The growth of SMEs especially in small economies has been on the rise (Agndal & Chetty, 2006). Research attests that SMEs are the key drivers for economic growth, innovation and social integration and thus the “backbone” to the growth of the European economies (Mandl & Esser, 2015). In Finland SMEs are a major source of employment in the economy (Lindholm et al., 2013; Kuivalainen et al., 2015). Although, there is a mismatch between the entrepreneurial competences of early stage Finnish entrepreneurs in terms of international orientation (Stenholm et al., 2012). As a result, Finnish researchers have been trying to understand the internationalization process of Finnish SMEs as well as establish factors which foster their international entrepreneurial growth over time (Kuivalainen et al., 2015). This research gap has also spurred the interest of this seminal study. Thus, the thesis aims to provide a dynamic insight on how the internationalization process of Finnish cleantech SMEs occurs. Taking into consideration the antecedents and patterns of five case companies who are in different internationalization stages.

1.2 Research Objective and Research Gap

Internationalization research has been ongoing for decades and in different perspectives such as organizational theory, strategic management and international marketing (Ruzzier, Hisrich & Antončič, 2006). SME internationalization is more inclined with firm perspective or behavioral perspectives (Osei-Bonsu, 2016) and addresses theories like stage model network theories (Ruzzier et al., 2006) and studies on entrepreneurship perspectives (Cavusgil & Naor, 1987). Despite the gap between MNE and SME perspectives of internationalization, they build on the foundations of organizational theory (Ruzzier et al., 2006). However, there are arguments that the application of MNE theories to SME perspectives may lead to awkward results because they do not necessarily work in small business settings (Ruzzier et al., 2006; Ahokangas, 1998). More so, internationalization research have shown that it is not very feasible to impose specific criteria to the patterns in which SMEs internationalize. Thus, evaluating the antecedents of internationalization is of importance because it gives better understanding on the patterns followed by the case firms. This study also looks at the internationalization of SMEs through the lens of international entrepreneurship. Schweizer et al. (2010) suggest that for a better perspective on international entrepreneurship, it is essential to have a good understanding on the meaning

of internationalization. As a result, the theory also addresses SME internationalization models applicable to the study focus.

Although cleantech is described as an umbrella investment theme for a wide range of technologies and services (Kachan & Fugere 2013), the concept of cleantech is still an ambiguous and novel practice in the Finnish business environment. There has been difficulty in distinguishing cleantech from other practices like “Greentech”, “Biotech” or even sustainability and business ethics. More so, not much has been covered on cleantech internationalization in academic literature. Owing to the context of this research, recent global reforms in business practices have triggered the need for companies to revamp their business procedures to suit environmental and sustainable requirements (SDGs, 2015). The recent sustainable development summit in the USA (2015) encouraged firms to take into consideration sustainable practices (triple bottom line) and business ethics in their business and on an industrial level (SDGs, 2015). Sustainability is no longer a “good to have” process but an important corporate responsibility mandate for businesses and the world in general (Cohen, 2011). Many SMEs have taken advantage of the sustainability gap, thus creating a driving renaissance and “niche markets” for clean technology products and services (Kachan & Fugere, 2013; OECD, 2012). Hence, the objective of this thesis is to understand and analyze the patterns and antecedents of internationalization of cleantech SMEs as well as gain clarity on what cleantech is. Consequently, the outcome of the research aims not only to strictly answer the research questions but to also provide logical reasoning to the emerging internationalization antecedent and patterns as well as the connection to SME internationalization theories. Additionally, due to the limited research regarding SME internationalization of cleantech firms, this study is considered timely and hopes to contribute to SME internationalization theories.

1.3 Research Questions

The thesis was designed to identify and analyze the internationalization antecedents and patterns of Finnish cleantech SMEs. Internationalization patterns could be sporadic, after long domestic focus or from the foundation of the firm, and preceding antecedents could be on firm level, managerial level or environmental level. As a result, the study aims to identify the preceding conditions which have fostered internationalization and consequently the path considered for foreign market entry. Parallel to the research aim, the supplementary research

objective is that by virtue of this study a clearer understanding on the concept of “cleantech” will be realized. Thus, the research hopes to provide unique insights as to how the cleantech firms are linked especially as a result of the antecedents and patterns that emerge in their internationalization process as shown in Figure 1. Below is the main question and sub questions:

How does the internationalization of Finnish cleantech small and medium-sized enterprises occur?

Sub Questions:

- i. How do the different antecedents influence the internationalization of Finnish cleantech SMEs?*
- ii. How do the internationalization patterns develop?*

The first sub-question aims to understand the antecedents related to the internationalization of Finnish cleantech SMEs. To answer this question, the motivations, drivers, or triggers which influence the internationalization of the case firms are examined. To answer the second question, the researcher aims to build inferences based on the case companies’ level of internationalization involvements and methods of foreign market operations to ascertain the patterns of their internationalization. Thus, to answer the main research question, a critical evaluation of the antecedents and pathways that emerge provides interpretations and understanding on how the internationalization of Finnish cleantech SMEs occur. Overall, a hybrid approach is adopted in the study to provide concrete evaluation and holistic hypothesis based on the empirical data, archival information, as well as theoretical findings.

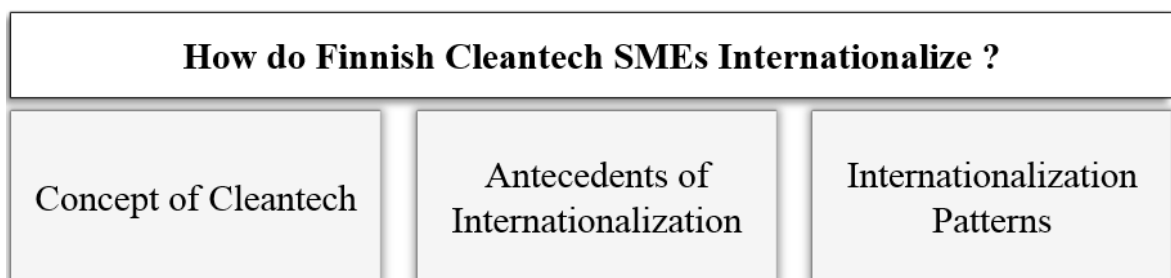


Figure 1. Overview of the research questions

1.4 Theoretical Approach

The literature delves into internationalization theories (stage model and network theories) with a strategic view on SME internationalization theories (INV, Born global and IE theory), antecedents and patterns of internationalization. Internationalization process models are addressed within the literature because of their inter-connectedness and relevance in adding more information to the context of SME internationalization in this study. However, to provide more clarity, the main focus area is the SME internationalization process. The literature review section aims to provide a primary level understanding on how SMEs internationalize. Although, there has been extensive research in other industrial contexts of SME internationalization, there is limited research in the cleantech context. Thus, this paper aims to bring more knowledge and highlight the perspective of internationalization process of Finnish cleantech SMEs.

Consequently, in order to understand the internationalization of cleantech SMEs the literature will provide content which is specific and relevant to international entrepreneurial factors and internationalization specific factors applicable to SME foreign market entry. The foundation of the literature review is built from the international marketing review by Kuivalainen et al. (2012a) on patterns and antecedents of SME internationalization. The review provides an explicit perspective in explaining the connection between the main concepts of this study. Literature on degree of Internationalization (DOI) is briefly covered to provide a basis for evaluating and measuring the relationship between the antecedents and internationalization patterns of SMEs and the varying impact of time, scale and scope on the case firm operational activities across national borders. The theoretical framework presented in Figure 2 is a representation of the literature covered relevant to the research area. It depicts the main theories and concepts covered within the study.

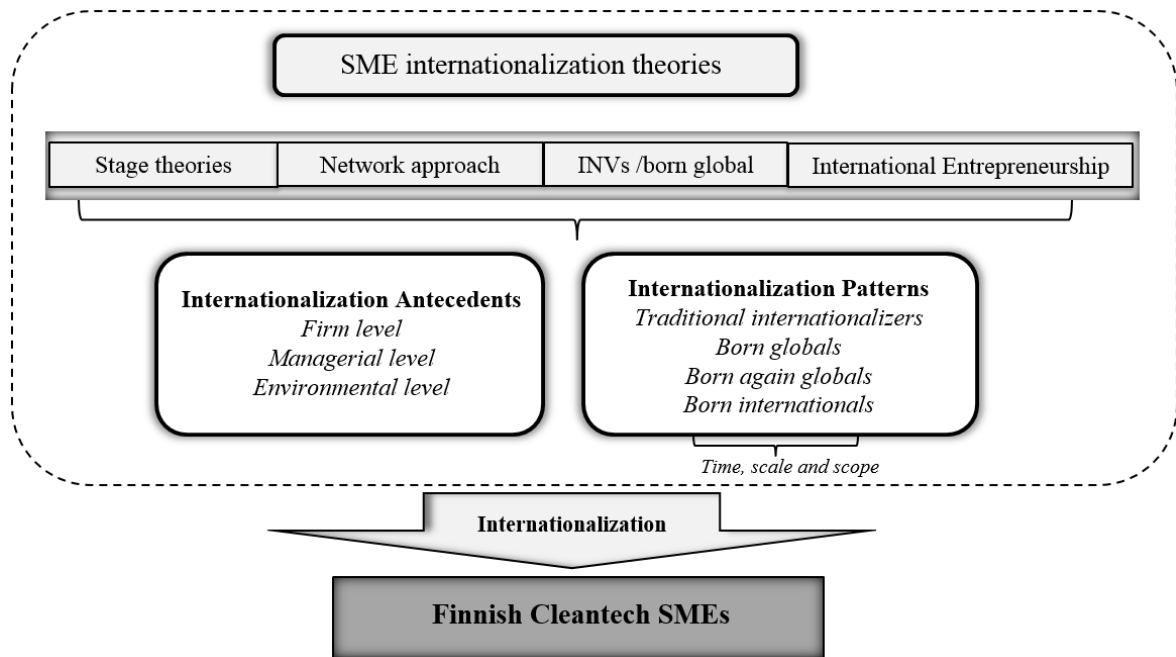


Figure 2. Theoretical framework

1.5 Definitions and Delimitations

The literature review in this study leans toward generic perspective on internationalization of SMEs. Thus, it combines internationalization perspectives from traditional internationalization (TI), born global (BG) and international entrepreneurship (IE) theories. These theories are covered because of limited research in internationalization motives of cleantech firms and due to lack of clarity on the internationalization pathways that are specific to cleantech SMEs. Finnish cleantech SMEs are also part of a cluster (cleantech Finland, 2015a). Thus, network approach is also addressed to better understand the internationalization patterns of the firms and how networks may have a role in their internationalization decision processes.

The researcher did not have access to cleantech SMEs with the similar products and services. This was due to the vast categorization of cleantech and due to the emergence of cleantech industry in Finland. As a result, companies examined in this study are from different industrial categories. However, this does not affect the validity of the results, because the researcher aims to gain a better overall perspective to the internationalization of SMEs within the industry irrespective of the cleantech category. Given the diverse categorization of the cleantech industry and the probable variations that exist in internationalization activities of

the case firms. It was essential to streamline the literature to be relevant to the empirical part. Below are some important definitions of concepts which were used in this study:

Internationalization: can be defined as the conformation of a business operation (strategies, structures and resources) to satisfy international environmental requirements of firm level activities across a country's border (Kuivalainen et al., 2012b; Calof & Beamish, 1995).

Internationalization patterns and pathway: are firm level behaviors across national borders at specific points in time (Olejnik & Swoboda, 2012). Pattern is a behavioral attribute of a firm (managers) in the face of similar situations also known as a distinct internationalization path or pathway. (Kuivalainen et al., 2012a). Pathways on the other hand is a phase in which firms exploit specific behavioral patterns. Thus, Kuivalainen et al. (2012a) defined internationalization patterns as elaborate behavioral attributes which firms exhibit to either increase or decrease their market commitment or international presence, growth or resource accumulation. In consistence with Baum et al. (2015), choosing an internationalization pathway is a strategic decision based on the resources (such as size, prior international experience, product differentiation and strength of network ties) and capabilities (such as learning orientation and international growth orientation), and a justification in line with the RBV which states that the endowment of a firms' resources and capabilities is a key antecedent to their strategy (Wernerfelt, 1984; Barney, 1991). Nonetheless, in this paper, the term patterns and pathway are used interchangeably.

Antecedents of internationalization: according to the Oxford dictionary (2016), antecedents are defined as an event or group of events which logically precede another. Thus in theory, there is no specific business definition for internationalization antecedents. According to Kuivalainen et al. (2012), the identification of internationalization antecedents involves considering numerous determinants at managerial, environmental and firm levels to the internationalization of SMEs. Ruzzier et al. (2006) includes organizational characteristics and entrepreneur's characteristics as preconditions to internationalization of SMEs.

International entrepreneurship: Oviatt and McDougall (2000) defined international entrepreneurship (IE) as "a combination of innovative, proactive, and risk-seeking behavior

that crosses national borders and is intended to create value in organizations” or it is also described as the discovery, enactment, evaluation and exploitation of opportunities internationally in order to produce future goods and services (McDougall & Oviatt, 2003). International entrepreneurship are classified into three they include; comparative entrepreneurial internationalization, international comparisons of entrepreneurship and entrepreneurial internationalization (Jones, Coviello & Tang, 2011; Baum et al., 2016). This study focuses on entrepreneurial internationalization and explains the internationalization patterns of Finnish cleantech SMEs from different industrial categories.

Small and medium enterprises: Small and medium enterprises also known as SMEs or small firms, are described by the European Commission as an “enterprise with fewer than 250 employees and a turnover of no more than €50 million or a balance sheet total of no more than €43 million” (European Commission Enterprise Publications, 2004).

International new ventures (INVs) or born global (BG): Business organizations which “from inception aim to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” are referred to as INVs (Oviatt & McDougall, 1994, p.49). Born global firms are usually characterized as firms that internationalize from onset with innovative and unique product or technology (Knight & Cavusgil, 2004). In this study, INVs and Born globals are used interchangeably.

Degree of internationalization (DOI): DOI is the measure of internationalization activities of a firm through scope, scale, and time. Where the diversification and concentration of firm activities or resources is referred to as scope, scale refers to the extent or intensity of firm operations and time functions as the dynamic embodiment of speed that is the rapidity or lateness of a firm’s general development and its process of internationalization (Kuivalainen et al., 2012; Zahra & George, 2002; Sullivan, 1994).

Cleantech: Cleantech venture network, defines “Cleantech” as “any knowledge based service or product which improves productivity, efficiency and performance optimization while minimizing cost, waste, pollution or energy consumption,” (Parker & O’Rourke, 2006). O’Rourke (2009) describes cleantech firms to be multi-sectoral and multi technology in nature. Suggesting that cleantech encompasses products, services and resources which are

created to solve both environmental problems, and deliver functions environmentally valuable to customers. As a result, cleantech companies develop products and disseminate goods and services that improve the environmental performance of the system in which they are applied. Thus, the application of “clean expertise” to other industrial technologies to make them more efficient or cleaner (O’Rourke 2009).

1.6 Structure of the Study

The introductory section encompasses the research gap, background of the study as well as an introduction to the research problem. To answer the research questions and accomplish the research objectives, Figure 3 is a description of the structure adopted in this study. The theoretical section covers main theories examined in the study as well as reviews on relevant literature regarding the patterns and antecedents of internationalization. This was followed by a review on the cleantech sector to provide background knowledge and buttress more on the research direction. The empirical part of the study provides information on the methodology, a detailed outline of the results, data analysis and interpretation implemented. To conclude, theoretical and managerial implications were discussed and areas for further research considerations were proposed.

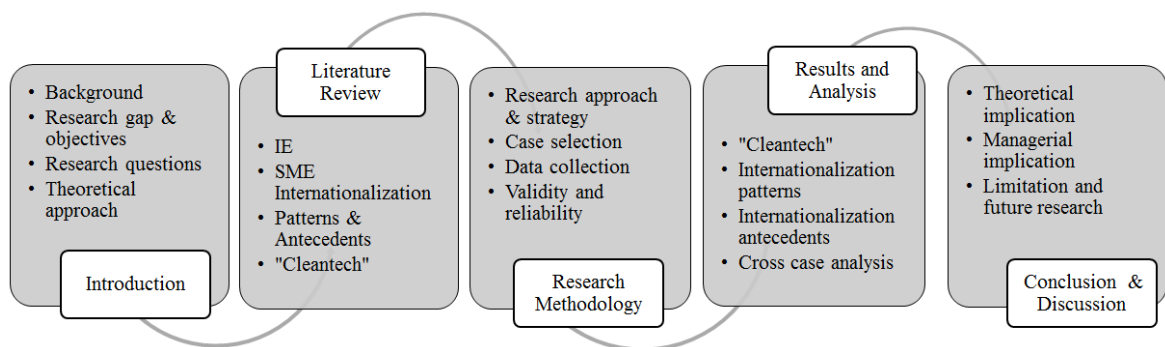


Figure 3. Structure of the study

2 INTERNATIONAL ENTREPRENEURSHIP

International entrepreneurship (IE) dates back to works of Morrow (1988) where he suggests that the establishment of new firms are attributed to technological advancements, better cultural awareness and adaptation (Zahra & George, 2002). There are different theories which integrate and guide IE research ranging from resources based view, knowledge based view, dynamic capabilities, value creation and market theory.

Resource based view (RBV) opposes the stage theory of internationalization (Peiris et al., 2012). RBV suggests that unique tangible and intangible resources of a firm are pre-determinants for superior performance (Barney, 1991). However, resources must be valuable, rare, costly to imitate and organized to capture competitive advantage (Barney, 1991). Thus, in IE perspective, RBV facilitates access to tacit knowledge, opportunity recognition (Alvarez & Busenitz, 2001) and the capability to capitalize on knowledge to benefit sustainable competitive advantage (Peng, 2001). Knowledge based view (KBV) in IE perspective is closely associated with the level of dependency on existing knowledge of the company (Peiris et al., 2012). However, studies show that the process of knowledge acquisition and generation, and the relationship between knowledge capabilities and internationalization has been under researched (Autio et al. 2000; Weerawardena et al. 2007; Freeman et al. 2010; Kuivalainen et al., 2010).

Taking into consideration the key constructs of IE, dynamic capabilities (DC) provide an interpretation of how firm level activities can be used to manage environmental change in turbulent competitive environments (Zucchella & Scabini 2007). Although, some studies mention that dynamic capabilities are largely based on a company's existing resources, knowledge acquisition from markets, internally focused learning and network capabilities (Schweizer et al., 2010; Weerawardena et al., 2007). However, studies suggest that there is a blur between dynamic capabilities and resources. They mention that attributes like network relationships, entrepreneurial orientation, marketing orientation, research and development (R&D), product diversification, customer orientation, and access to resources such as knowledge and learning are considered important firm level dynamic capabilities (Peiris et al., 2012; Kuivalainen et al., 2010). Market theory and value creation on the other hand have not gotten a lot of IE research attention. However, it has been focused on value maximization business model and value creation (Peiris et al., 2012; Sainio et al., 2011). Value creation is

also associated with innovation at product and process level especially in the aspect of internationalization process (Crick, 2009; Weerawardena, et al., 2007; Gassmann & Keupp, 2007).

IE research is said to have emerged as a response to newly internationalizing firms whose internationalization patterns are inconsistent with traditional patterns of internationalization (Peiris et al., 2012). In-depth studies on IE executed by McDougall (1989) set the premise for more research in the field. Although there has been growing research on SMEs under the IE theme, most IE research focused on manufacturing and high-tech manufacturing in ICT sectors (Peiris et al., 2012). The importance of integrating entrepreneurship and international business as illustrated in Figure 4 is to understand the motives for SME entrepreneurial internationalization activities (Ibrahim, 2004). Thus, it is essential to take into consideration the entrepreneur's background and characteristics. Peiris et al. (2012) suggest that including other IE concepts like opportunity identification, value exchange, learning, creativity and innovation may also foster the understanding of firm internationalization process.



Figure 4. Entrepreneurial motive and process framework (Ibrahim, 2004)

Notable researchers argue that although a systemic review of international entrepreneurship exists, IE is still devoid of an integrative theory. Nonetheless, IE has received a lot of attention in international business research (Zahra et al., 2005; Oviatt & McDougal, 1994; Antončić & Hisrich, 2000; Kuivalainen et al., 2012; Baum et al., 2015)

Wach and Wehrmann (2014) adapted an extended Zucchella and Scabini's (2007) model of international entrepreneurship presented in Figure 5 which describes international entrepreneurship as an amalgamation of different fields namely: international business, entrepreneurship and strategic management. Zahra and George (2002), Keupp and Gassmann (2009) and Peiris et al. (2012) agree that this amalgamation has brought about rich theoretical insights and knowledge to the field. They however are also skeptical that IE theory is still fragmented and lacks a unifying theoretical direction (Zahra & George, 2002; Peiris et al., 2012). In agreement with the findings of Zahra and George (2002), Mtigwe (2006) suggests that a cognitive approach probes the motivations for internationalization and provides an integrative theoretical perspective.



Figure 5. International entrepreneurship as an amalgamation of three fields (Wach & Wehrmann, 2014; Zucchella & Scabini, 2007).

Thus, IE is defined as “the cognitive and behavioral process associated with the creation and exchange of value through the identification and exploitation of opportunities across national borders” (Peiris et al., 2012, p.296). The inclusion of the cognitive perspective in the definition provides a more integrative approach to include diverse firms of various sizes in their various stages of internationalization. However, the fundamental aspect of the definition is based on the premise that international entrepreneurship embodies seeking competitive advantage across national borders with a proactive strategy (Peiris et al., 2012). Oviatt and McDougall (1994) define IE as a blend of proactive, risk seeking and innovative behavior across national borders aimed at creating value in organizations. The focus of the definition is on the company rather than just the individual entrepreneurial characteristics and intentions. Nonetheless, fundamental dimensions of entrepreneurship such as proactivity, risk taking and innovativeness can be developed at organizational level (Hisrich, 2009). The difference between the international and domestic entrepreneurs is based on factors considered in decisions made (Hisrich, 2009). In other words, more complex and uncontrollable factors such as economics, culture, technology, local competition, political and legal environment or reasons relating to balance of trade or payments may affect international entrepreneur’s decision making process (Hisrich, 2009). Regardless of the country of origin, Table 1 shows some important traits (characteristics) of an international entrepreneur.

Table 1. Traits of an international entrepreneur (Adapted from Hisrich, 2009)

Traits	Trait features
Ability to embrace change	Embraces diversity; seeks new challenges and receptive to change; proactive; innovative and thinks out of the box.
Visionary	Establish clear organizational vision; optimistic and value creation; clear long term and short term goals; outcome driven; resilient and high energy levels.
Achiever	Good business savvy; profit and success driven; extensive international business knowledge and expense; global mindset and orientation.
Tolerance for ambiguity	Opportunity identification and exploitation; cognitive perspective; effectuation; heuristics and learning.
High level of integrity	Good reputation; ethical organizational standards.
People management	Motivating and nurturing personality; project and team leader.

An entrepreneur or an entrepreneurial team takes tremendous risks to pursue international opportunities in new markets (Zahra, 2005). An international entrepreneurship process is driven and founded by an individual(s) who engages in discovery and exploitation of opportunities discovered by them (Oviatt & McDougall, 2005). Therefore, the role of the entrepreneur is to combine resources and capabilities, knowledge and learning to identify opportunities as well as reconfigure the firm's unique assets. However, due to the emergence of the role of the entrepreneur in IE research, there is still difficulty in establishing the key elements which have the most influence on entrepreneurial capacities and resources (Peiris et al., 2012). Nonetheless, IE literature portrays entrepreneurs as opportunity driven and they make internationalization a key element in their business and operational decision (Ibrahim, 2004).

Jones and Coviello (2004) highlight that the entrepreneur, the external business environment and entrepreneurial process are key focus areas in international entrepreneurship phenomenon. In SME internationalization, the role of the entrepreneur is recognized as an important variable (Miesenbock, 1988) due to the entrepreneur's ability to match a firm's organizational strengths, offset threats and capitalize on opportunities. Thus, internationalization is considered as a learning process which combines recognizing, seeking and taking opportunities (Zucchella & Scabini, 2007; Wach & Wehrmann, 2014). The model by Zucchella and Scabini's (2007) describes international entrepreneurship and is presented in Figure 6. The model suggests that the international entrepreneurial process begins with international opportunity and ends with cooperate performance. However, a successful international entrepreneurial process is reinforced by access to resources (international) and capabilities (dynamic). Thus, international resources and dynamic capabilities help mobilize the entrepreneur to achieve desired outcome.

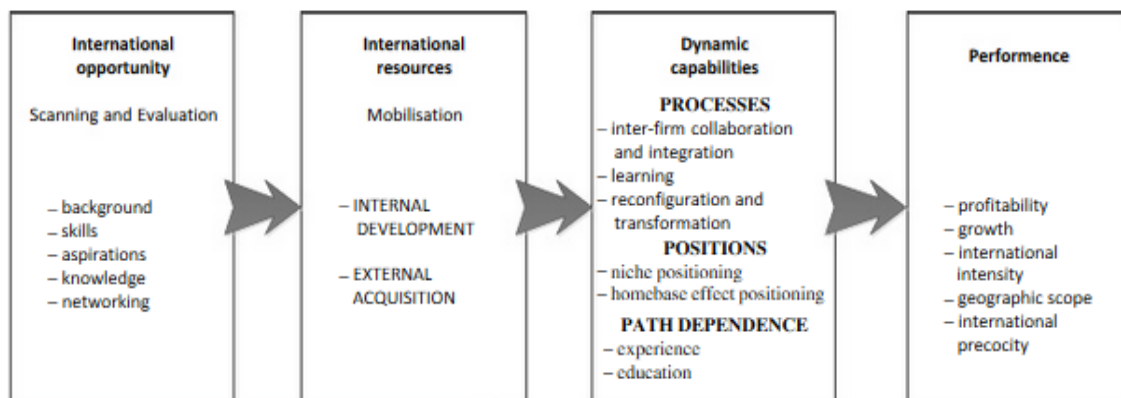


Figure 6. An interpretative model for international entrepreneurship (Zucchella & Scabini, 2007).

Opportunity identification is vital in international entrepreneurship. Krueger et al. (2000) refer to opportunity identification as an international process and a strong predictor of planned behavior. Peiris et al. (2012) found a correlation in entrepreneurial intention (vision) with firm's internationalization. Firm resources trigger opportunity discovery and exploitation of opportunities internationally (Osei-Bonsu, 2016). Exploitation of opportunities allows the entrepreneur acknowledge the resources of the firm, identify resources controlled by others, identify ways to use those resources for value creation and to create market demand. Whereas, opportunity discovery is the ability of the firm to look beyond domestic market success and seek new foreign market opportunities (Osei-Bonsu, 2016).

The factors which influence opportunity recognition include prior knowledge, networks ties and firm resources. Prior knowledge as the name implies can be gained from objective and experiential internationalization process (Zucchella & Scabini, 2007). Prior experience speeds up international market entry in SMEs (Oviatt & McDougall, 1997). Although, objective knowledge can be gained via standardized methods of transferring information for example, through market research and so on. Experiential knowledge is not easily transferable between firms and is country specific. Penrose (1959) describes international experience and orientation as a form of tacit experiential knowledge. Sources of experiential knowledge is from clients, markets or even competitors (Osei-Bonsu, 2016). Prior knowledge could also be gained from past living and working experiences and also international orientation such as language proficiency, education abroad or even employment.

Network ties are also mentioned in IE research as essential means in which entrepreneurs gain access to resources and information to develop and exploit opportunities. They enable the entrepreneur also to manage risks of entering new markets (Osei-Bonsu, 2016). Network ties are either strong or weak, and can exist on either a business or social level (Granovetter, 1973). However, the strength of a company's network ties is dependent on the extent of relationship between individuals in the network (Granovetter, 1973). Thus, the international entrepreneur's network is usually considered as an important firm resource (Johanson & Mattsson, 1988) in opportunity identification because it serves as a discovery process rather than a process which is mainly based on strategic decision, rationalization or systematic gathering of information (Osei-Bonsu, 2016).

Relevant also to SME internationalization is international orientation and international mindset. International orientation and even more recently global orientation impact the success of internationalization of SME. Global orientation is the ability to adjust to different cultures and environments while maintaining a positive attitude towards internationalization (Nummela et al., 2004). International orientation has also been referred to as the motivation towards foreign or foreign market involvement (Dichtl et al., 1984; Nummela et al., 2004). They describe international entrepreneurial orientation (IEO) as a managerial characteristic and antecedent of internationalization. IEO embodies entrepreneurial dimensions (risk taking, proactiveness and innovation) and behavioral elements of a global orientation. Entrepreneurial orientation in internationalization context is a major characteristic of managers in rapidly internationalizing firms. The characteristics of entrepreneurs with international orientation include:

- Low perception of psychic distance from foreign market;
- Highly educated and culturally diverse (language skill and foreign experience);
- Flexible and risk averse, possessing a positive attitude toward foreign market entry like export (Nummela et al, 2004; 2009; Dichtl et al., 1984).

A study on entrepreneurship mentioned intuition and being extraverted as a characteristic of entrepreneurs. Similarly, international mindset and global mindset also fosters international entrepreneurship and SME internationalization (Nummela et al., 2004). Although both concepts differ in theory, they possess similar characteristics and are interchangeable due to

their similarity and application of the concepts in practice (Nummela et al., 2004). Global mindset is the extent of internationalization activities of a firm (Harveston et al., 2000). A manager with global mindset also integrates knowledge and learning for improvement (Fletcher, 2000; Nummela et al., 2004).

3 INTERNATIONALIZATION

The concept of internationalization of firms has drawn a lot of research interest over the years, especially the “process of internationalization” (Osei-Bonsu, 2016). The term and concept of internationalization started to gain prominence in early 1920s as a replacement for imperialism which was the main organizational principle that framed market economies’ interactions (Ruzzier et al., 2006). Over the years, extant international business literature focused more on MNE or large firm internationalization. However, much recently there has been more focus on SME internationalization. Recent internationalization research also show that SMEs just like large companies face similar internationalization problems (Baum, 2015; Ruzzier et al., 2006). Economic trends in several countries such as balance of payment deficits and the need to accelerate economic growth have fostered internationalization studies of SMEs or so called “mini-MNEs” (Ruzzier et al., 2006). A firm is said to internationalize when it crosses its national borders (Schweizer, Vahlne & Johanson, 2010) and depending on the context, different definitions exist for internationalization. Nonetheless, the definitions of internationalization vary extensively based on size of the firm and research focus or approach.

The traditional perspective describes internationalization to be gradual and incremental (Johanson & Vahlne, 1977) and is been applied in both MNE and SME context (Olejnik & Swoboda, 2012). This perspective gives rise to the definition of internationalization as a process of gradual learning and self-reinforced in which knowledge and foreign market commitment is gained (Johanson & Vahlne, 1977; Olejnik & Swoboda, 2012). In the same premise, Welch and Luostarinen (1993) defined SME internationalization as the “process in which firm’s increase their involvement in internationalization operations”. This level of involvement could either be an inward or outward process and the connections between the processes (inward and outward) could either be direct or indirect (Welch & Luostarinen, 1988, 1993). The direct relationships occur based on market conditions and indirect relationships could be as a result of experiential knowledge in the foreign market. However, because inward and outward activities may occur at different time intervals their link to internationalization may not be very obvious (Hollensen, 2007). More so, research shows that the link between inward and outward internationalization may be more prevalent in small firms (Korhonen, Luostarinen & Welch, 1996) or firms in early stages of internationalization (Welch & Luostarinen, 1993). Also, entrepreneurial role in performing

both (inward and outward) activities fosters cross-learning across internationalization operations (Korhonen et al., 1996).

In network perspective, internationalization is more than just a systematic cross border involvement because networks reinforce the perception that relationships are essential to boosting the internationalization process of a firm (Johanson & Mattson, 1993). Thus, internationalization is seen as a process in which business networks are developed in other countries by virtue of extension, integration and penetration to achieve firm objectives (Johanson & Mattson, 1988; 1993). Firms can achieve their goals by adapting a firm operation through strategy, structure and resources (Ruzzier et al., 2006). The network perspective is in line with the resource based perspective which defines internationalization in terms of the resources (firm network) they possess regardless of the main content of the foreign activity itself (Ruzzier et al., 2006). Thus, internationalization is said to be the practice of taking unique and interdependent resources and processes into consideration while organizing, collecting and developing resource for cross border operations (Ahokangas, 1998; Johanson & Vahlne, 2009). Building on the network perspective to internationalization, Schweizer et al. (2010) emphasized the entrepreneurial context. Hence, re-conceptualizing internationalization as a by-product of a firm's effort to develop its network position(s) as a result of entrepreneurial action. However, this study considers the definition of internationalization according to Kuivalainen et al. (2012a) and Jones and Coviello (2005) which states that internationalization are patterns of firm-level behavior which are formed by accumulating evidence shown at specific points in time.

3.1 SME Internationalization Models and Theories

SME internationalization differs from the internationalization of larger firms due to the liability of foreignness and newness as well as the motivation of the entrepreneur (Onkelinx & Sleuwaegen, 2008). Unlike larger firms, the barriers to new market entry emanate from limited resources and financing capabilities (Onkelinx & Sleuwaegen, 2008). Furthermore, SMEs have fewer options in terms of entry mode decisions. Most studies have focused on the traditional pathways in which firms internationalize which are criticized for being very deterministic (Melin, 1992; Andersen, 1993). Rapid internationalization (INVs / born globals) on the other hand are also criticized for being fragmented due to the inconsistency

in its theoretical and methodological approach (Olejnik & Swoboda, 2012; Kuivalainen et al., 2012).

Although internationalization theories complement each other, there is no optimum SME internationalization pathway or entry mode (Zahra & George 2002; Oviatt & McDougall, 1994). This is because internationalization activities largely depend on factors such as the nature of the industry, market conditions, resources and capabilities and the product life cycle. As a result, SMEs may adopt multiple entry modes in their internationalization process (Welch & Luostarinen, 1988). Adopting multiple entry modes is possible because SMEs vary in their mode of operations. For that reason, many combine different elements of these various kinds of models in their internationalization strategy (Onkelinx & Sleuwaegen, 2008). Nonetheless, this behavior is still an emerging area in SME internationalization research and there are no comprehensive theoretical backings or frameworks to concretely characterize SME internationalization (Leonidou & Katsikeas, 1996; Olejnik & Swoboda, 2012; Welch & Luostarinen, 1988). However, rationalizations on SME internationalization results from behavioral models which explain internationalization process using perspectives from stage models, IE, network theory and more recently INV literatures (Jones & Coviello 2005; Olejnik & Swoboda, 2012).

SMEs have recorded tremendous growth and the impact of internationalization in the SME sector is very profound. As a result of these, the role of SMEs in contributing to economic growth and business operations beyond home market is increasing. Thus, internationalization is a strategic process with growth objectives, and SMEs are considered active players in the economy (Ruzzier et al., 2006) because of their increasing foreign market operations and contribution to economic growth (Gjellerup, 2000). Although researchers have tried to adapt other internationalization theories (e.g. network approach, stage process) to understand the internationalization process of SMEs. The emergence of international entrepreneurship research has brought about a profound understanding in SME internationalization. International entrepreneurship looks at internationalization from the entrepreneur's perspective. It also considers attributes that combine to enhance internationalization within the entrepreneurial perspective such as networks, resources, capabilities, proactiveness, risks, competitiveness or international orientation (Knight & Cavusgil, 2004; Kuivalainen, 2007). Lehtinen and Penttinen (1999) emphasize on

international orientation as a firm's attitude to internationalization and international entrepreneurial commitment as the requirement of the chosen operation modes and size of the business internationally. Nonetheless, performance differences in internationalization or international entrepreneurial activities emanate from the value of the opportunity, location, creativity, exploitation methods and learning from internationalization operations (Zahra, 2005).

IE studies also challenge other internationalization theories and tightly embodies the role of the entrepreneur in rapidly internationalizing SMEs such as INVs or born global firms (Oviatt & McDougall 1994; Jones & Coviello, 2005). Oviatt and McDougall (1994, 2005) describe these INVs as firms who begin internationalization from the onset of business operations. In other words, internationalization is a common denominator for firms and entrepreneurs who are seeking expansion opportunities as a result of globalization activities (Wiklund & Shepherd, 2003). Entrepreneurial orientation and globalization propel internationalization strides (Wiklund & Shepherd, 2003). Globalization in this context is a stage where firm operations are managed on a global scale rather than in few countries (Ruzzier et al., 2006). Similar to internationalization, globalization is a phenomenon which SMEs are also forced to respond to at a faster pace. Gjellerup (2000) refers to globalization as an extension of internationalization.

Taking the context of research into consideration, SMEs have an important role in the growth and development of the Finnish economy. Finland is a small open economy and entrepreneurial society (Kuivalainen et al., 2015). Finnish SMEs account for 28 percent of the country's exports. Key exports are metal and machinery, chemical, forest and other industrial products (Kuivalainen et al., 2015). Statistics holds that over 99 percent of new jobs are from Finnish SMEs. Competitive pressures and global economic recession foster the need for Finnish entrepreneurs to remain profitable. This is reflected in the growth aspiration of SMEs. Lindholm et al. (2013) suggest that "every tenth Finnish SME seeks rapid growth and more than one third seek moderate growth". IE is on the rise and Finnish SMEs get strong government support. International orientation and growth is a fundamental challenge facing early-stage Finnish entrepreneurs. There are about 322,184 Finnish enterprises of which SMEs account for 99.8 percent. However, SMEs recorded about 53 percent of the entire Finnish enterprise in 2012 which accounted for about 40 percent of the

total annual GDP. (Kuivalainen et al., 2015; Stenholm et al., 2012; Nummela et al., 2005).

Figure 7 illustrates typical characteristics of Finnish SMEs.

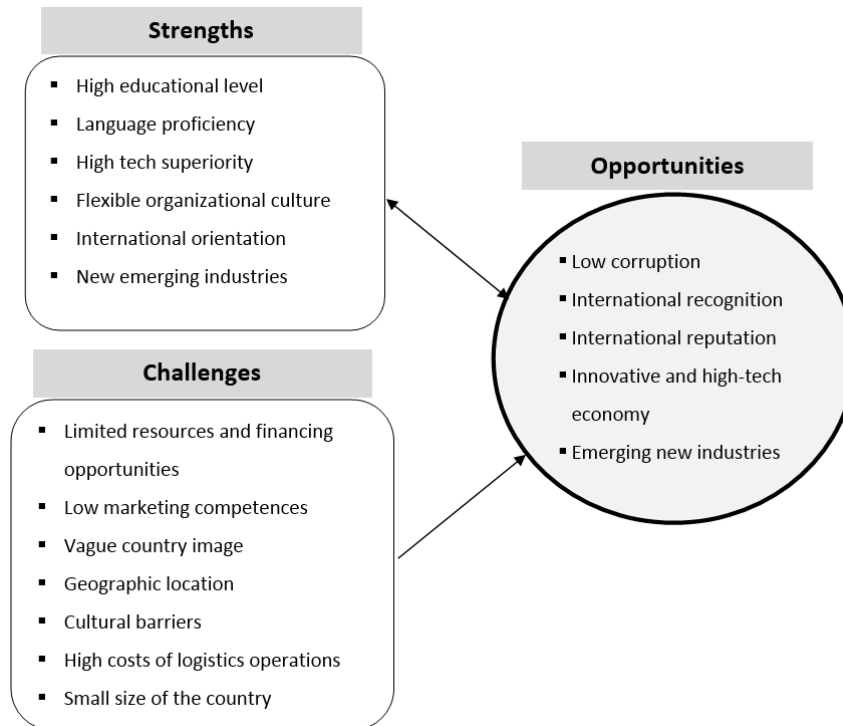


Figure 7. Outlook of Finnish SMEs as internationalizers (Adapted from: Kuivalainen et al., 2015)

3.1.1 Theoretical Approaches of SME Internationalization

Over the years, efforts have been put towards validating the application of the various internationalization theories to SME internationalization. Different internationalization theories independently or collectively provide understanding to SME internationalization processes. For example, SME internationalization process may vary and not conform to the incremental model of internationalization (Julien, Leo & Philippe, 1995). Thus, it may have to be adapted to SMEs internationalization (Gankema, Snuif & Zwart, 2000) while innovation related model (I-model) on the other hand is not very flexible and does not necessarily take into consideration the contribution of other business actors. In order to have a cohesive view on SME internationalization, network perspective, INVs and IE perspective were also addressed.

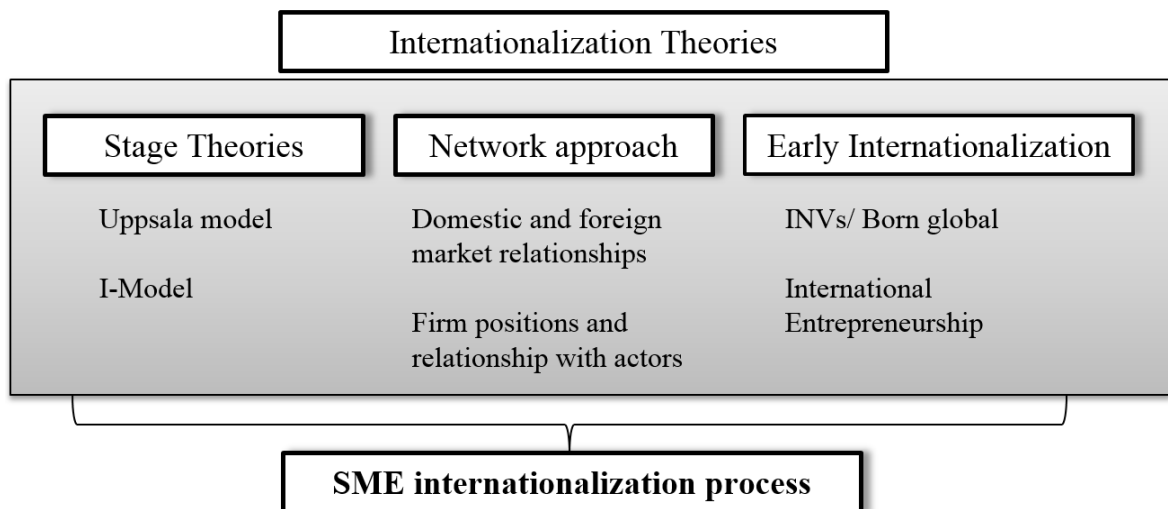


Figure 8. SME internationalization theories

Figure 8 describes the collective internationalization theories adopted in this study. Firstly, stage theory which describes internationalization based on the U-model and the innovation related model were addressed. Network approach to internationalization (Johanson & Mattsson, 1988), INVs or born global (Oviatt & McDougall, 1997; 2000) and IE perspective (Johanson & Vahlne, 1977; Zahra & George, 2002; 2005) will also be addressed in this section.

3.1.2 Stage Models of Internationalization

Stage models are based on the idea that internationalization is a sequential and linear process made up of stages (Coviello & McAuley, 1999) or an establishment chain (Johanson, Wiedersheim-Paul & Vahlne, 1975). The main stage models are the innovation related model and the Uppsala internationalization model (Ruzzier et al., 2006; Bilkey & Tesar, 1977; Czinkota, 1982; Reid, 1981; Cavusgil, 1980). Some MNE internationalization theories presented in Table 2 support the claims that some firms may follow the stage model of internationalization in terms of increasing commitment and investment while some do not follow this model.

Table 2. Proposing and opposing views on the stage model (Adapted from Buckley & Ghauri, 1999)

Authors	Views on internationalization
Calof and Viviers (1995) and Hakam et al. (1993)	Findings support the traditional perspective of incremental internationalization.
Hyvärinen (1994)	Confirms that internationalization is a gradual process and established the prevalence of inward investment preceding outward investment in internationalization activities.
Rao and Naidu (1992)	Re-conceptualization of the stages in firm and market characteristics context.
Lau (1992)	The incremental commitment process for SMEs differ considerably compared to large firms.
Chang and Grub (1992)	Identified that internationalization process involves competitive strategies and no linear relationships exists between the mechanisms and stages followed in internationalization.
Lindqvist (1988) and Bell (1995)	Questions the traditional view of incremental internationalization taking into consideration network perspective. <ul style="list-style-type: none"> - Suggesting that the pattern and pace of foreign market growth and chosen entry method is largely influenced by other factors such as network or customer relationships. - Relationships between firm actors such as clients or suppliers influence market selection and entry mode decisions.

However, empirical evidences have shown that although many firms have followed incremental internationalization patterns (Bell et al., 2003), stage theories have also been criticized as not absolutely applicable in practice (Anderson & Strandskov, 1998; Hollensen, 2007). This is because some firms who claim to have followed these patterns are believed to leapfrog the stages of internationalization due to homogenous markets and knowledge (Hollensen, 2007).

Innovation related model (I-Model)

The I-model, process of internationalization and decision making is closely linked to the adoption of new products and innovation of a company (Roger, 1962; Bilkey & Tesar, 1977). The model is based on export development process of SMEs, suggesting that each internationalization stage consideration is an innovative leap for a firm (Gankema et al., 2000; Gemser et al., 2004). Additionally, in the I-model, the motivation to internationalize is triggered by so called “push” or “pull” factors. The pull mechanism is based on internal

changes which explains incremental stages of internationalization efforts made by the firm while the push factors are due to external changes which trigger the export decision (Cavusgil, 1980; Reid, 1981). Synonymous to the Uppsala model, the I-model focuses on incremental learning corresponding with the implementation of innovation (Bilkey & Tesar, 1977; Andersen, 1993; Reid, 1981). According to Leonidou and Katsikeas (1996), the internationalization process in the Innovation related model is in three main phase namely:

- Pre-engagement phase: The phase in which the firm is only interested in the local market and embarks on information search, and analyzes the export potential. At this stage, the firm was previously engaged in exports but do not export anymore.
- Export trial stage: This is the stage in which the firm considers starting exportation irregularly when the potential to extend firm activities internationally exists.
- Advanced export stage: At this stage, the firm participates in exports regularly and extends experience abroad while considering other forms of international engagements.

Exporting activities and internationalization of SMEs usually starts in the beginning of establishment of the firm. An essential aspect of the I-model, is the role of the decision maker in the internationalization process (Collinson & Houlden, 2005). Some of the factors influencing the internationalization process of the decision maker includes attitude, experiences, motivation and expectation. Nonetheless, some researchers think that the I-model is too vague and the operationalization of the stages are problematic. Andersen (1993) and Ahokangas (1998) agree that the model does not properly describe the dimensions and approaches for the development of firm activities.

Uppsala internationalization model

The Uppsala internationalization model was developed based on the internationalization patterns observed in large Swedish manufacturing firms. The model postulates that market and resource commitments are the key variables which affect internationalization decisions and current business activities (Johanson & Vahlne, 1977; 2003). Uppsala internationalization model was initially developed by Johanson and Wiedersheim-Paul (1975) and is also known as the *establishment chain*. The principal contribution of the Uppsala model is learning and psychological distance. Thus, foreign market entry

commences in nearby countries and gradually penetrates more distant markets or countries or with successively greater psychic distance (Hollensen, 2007). Psychic distance in this context refers to the perceived extent of similarity or differences in business and cultural factors which exist between markets (Johanson & Vahlne, 1977; 1990). Factors such as cultural, political and language differences, affect the information flow between the company and the international market (Hollensen, 2007; Johanson & Wiedersheim-Paul, 1975).

In the establishment chain, the firm commences its internationalization with "ad-hoc" exporting or irregular (sporadic) export activities. Then subsequently, consider market entry through intermediaries of the focal companies in foreign markets, thus export via independent representatives (Johanson & Wiedersheim-Paul, 1975). Consequently, as sales grow, the firms may consider replacing agents and setting up a foreign sales subsidiary, after which they may eventually gain foothold through growth in the foreign market and start production to minimize trade barriers (Hollensen, 2007; Johanson & Wiedersheim-Paul, 1975). In line with the incremental school of thought, Johanson and Wiedersheim-Paul (1975) highlight that lack of knowledge and resources are obstacles to the internationalization process. However, these challenges are minimized by incremental decision making and learning about the foreign market (Johanson & Vahlne, 1977; 2003). As a result, the model is perceived as dynamic whereby the result of one cycle or decision of actions provides the input for the following cycle or decision (Ruzzier et al., 2006).

Earlier studies on incremental internationalization by Johanson and Wiedersheim-Paul (1975) was centered on export as the main characteristic of foreign market entry as opposed to other entry modes. Johanson and Vahlne (1977) considered "change" and "state" aspects as shown in Figure 9. Stating that the underlying assumptions of the Uppsala internationalization model is based on uncertainty and a bounded rationality also referred to as change and state aspects or mechanisms (Johanson & Vahlne, 2009).

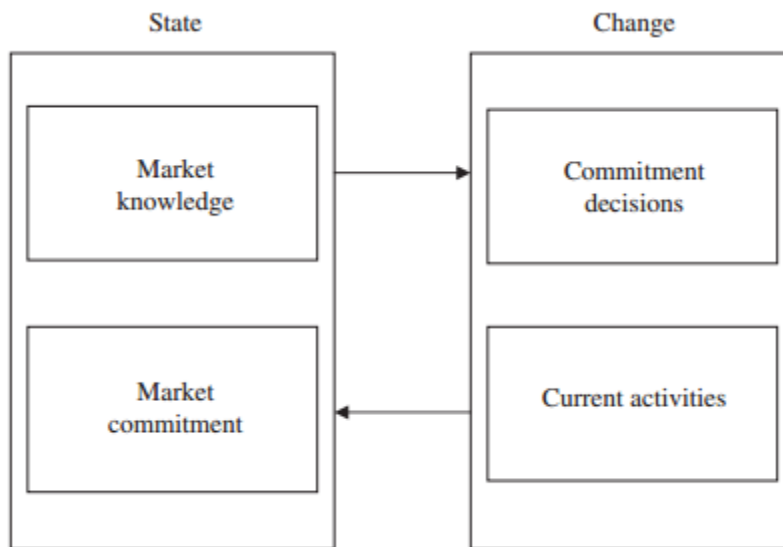


Figure 9. The basic mechanism of internationalization - state and change aspects (Johanson & Vahlne, 1977).

The state aspects are made up of resource commitment and experiential market knowledge of the firm which impact change aspects (Johanson & Vahlne, 1977). Whereas, the change aspects encourage added resource commitment and increase knowledge internationally in the subsequent cycle (Andersen, 1993; Ruzzier et al., 2006). Both change and state aspects are dependent on the construct of market commitment and knowledge. Market knowledge (general or specific) means the knowhow gained over time through market experience. Knowledge can be objective and can be transferrable across various national frontiers (Ruzzier et al., 2006) while market commitment is the amount of resource commitment and degree of involvement affecting both commitment decisions and the way current activities of the firm are managed (Andersen, 1993; Johanson & Vahlne, 1977; 2009).

There are some profound empirical and theoretical criticisms to the validity and operational application of the Uppsala model (Sullivan & Bauerschmidt 1990; Sharma & Johanson, 1987). The criticisms suggest that the U-model lacks a valid standing on the claims that an internationalizing firm follows the four successive stages of increasing commitment (Mtigwe, 2006; Anderson 1993). Lacking also in the Uppsala model is failure to specify the role of the entrepreneur or individuals with knowledge ownership. The model was said to be too deterministic and without a rationale on why companies should follow a subjective stage for internationalization (Melin, 1992; Andersen, 1993; Reid, 1981). The Uppsala model is

also said to disregard the role of actors (suppliers, customers etc.) and interdependencies between different country markets (Johanson & Mattson, 1986).

SME internationalization theories and the propensity for firms to "leapfrog" stages of internationalization without taking psychic distance into cognizance also contradict the Uppsala internationalization model (Hollensen, 2007). Nowadays, firms are able to gain access to various depths and quality of knowledge through management training, universities, and mass access to various data via information technology (Hollensen, 2007). An example of some of such firms are internet born global firms (Hollensen, 2007). As a result, if the psychic distance is low, a firm accordingly gets closer to foreign markets. Thus, the accumulation of international experience and knowledge by SMEs will reduce foreign market boundaries (Johanson & Vahlne, 1977). There is empirical and theoretical evidence that some firms may inadvertently or deliberately skip the incremental model or some stages of internationalization. These type of firms such as INV's, Global start-ups (Oviatt & McDougal, 1994; 1995), and born global firms (Madsen & Servais, 1997) adopt intermediate entry modes or even radically internationalize which is contrary to the incremental pattern. (Chetty & Campbell, 2003; Oviatt & McDougal, 1994).

Despite the various criticisms to the model, Ruzzier et al. (2006) highlight that the stage models have significantly influenced internationalization studies and efforts have been put over time to refine the ideas. In 2003, Johanson and Vahlne revisited the traditional theory of internationalization, in which they take the network perspective into consideration. The revised model takes the business environment into consideration, the implications of business networks and environment, as well as how they influence the operations of the internationalizing firm (Johanson & Vahlne, 2009). However, a summary of the incremental internationalization model is as highlighted by Anderson (1993) suggesting that internationalization approach is fostered by innovation adoption behavior where the managers' beliefs and perceptions are driven and formed by foreign market involvement. The model also highlights managerial learning as a driver of internationalization as well as the outcomes of process in terms of foreign market entry mechanisms and market selection (Ruzzier et al., 2006). Thus, internationalization takes place with decreasing psychic distance. This in turn leads to learning through cumulative involvement and increasing degree of internationalization (Christofor, 2008). In other words, the accumulated market

knowledge reduces the liability of foreignness and better prepares the firm to enter the global markets. Additionally, the degree of international commitment for some SMEs may also vary depending on the knowledge level and international experience of the entrepreneur. Thus, SMEs may skip some stages of internationalization and in extreme situations, some SMEs may even completely halt their internationalization process to reduce dependency on the market (Bilkey & Tesar, 1977; Reid, 1981; Cavusgil, 1980).

3.1.3 Network Approach to Internationalization

The network approach is based on the conceptualization of industrial markets as networks of business relationships of interdependent or interconnected firms (Håkansson & Snehota, 1995; Torkkeli, 2013). Networks are important sources of market information and knowledge and thus a bridging mechanism which fosters internationalization of a firm (Johanson & Mattson, 1988). In order to understand the dimensions of networking approach, it is important to simultaneously understand the role of the “firm’s position” and “business relationships” vice-versa (Axelsson & Easton, 1992). Madsen and Servais (1997) suggest that proper evaluation of the environmental conditions and relationships is necessary in order to understand the context of the firm’s internationalization operations. In the network approach, internationalization stems from the development and establishment of a position within the business networks. The positions can either be a micro position which is related to the given firm in the network or a macro position which is as a result of the relationship of the firm to the entire network (Ruzzier et al., 2006). Solberg and Durrieu (2006) describe networks as “interlinked relationships both at organizational and individual level”. Networks are made up of different actors which range from the immediate partners to the final consumers (Solberg & Durrieu, 2006) which is in line with Andersons et al.’s (1994) view of networks as sets of connected relationships which include firms, partners and other members of the network. Thus, the relationships that exist in a business network could be connected directly or indirectly with other business relationships or companies that are part of a wider network (Andersons et al., 1994).

The network perspective provides an analysis of internationalization within a process approach (Ruzzier et al., 2006). It does so by taking into consideration firm embedded actors within the business network (Johanson & Mattson, 1993; McAuley, 1999). The relevance of the network perspective resulted in the re-visitation of the Uppsala model of Johanson and

Vahlne (1977) as presented in Figure 10. The revisited model highlights the importance of capitalizing on opportunities and investing in new networks as well as increasing resource commitments to strengthen existing positions and international positions of the firm (Johanson & Vahlne, 2003; 2009). In the revisited model, the “state” variables were adjusted such that "recognition of opportunities" was added to the “knowledge” concept and "network position" substituted for the "market commitment" as seen in the preceding model in Figure 9. The “change” variables were also updated and the original labelling of “current activities” transformed to “learning, creating, and trust-building” to clarify the outcome of current activities and relationships was added to the “commitment decisions” variable.

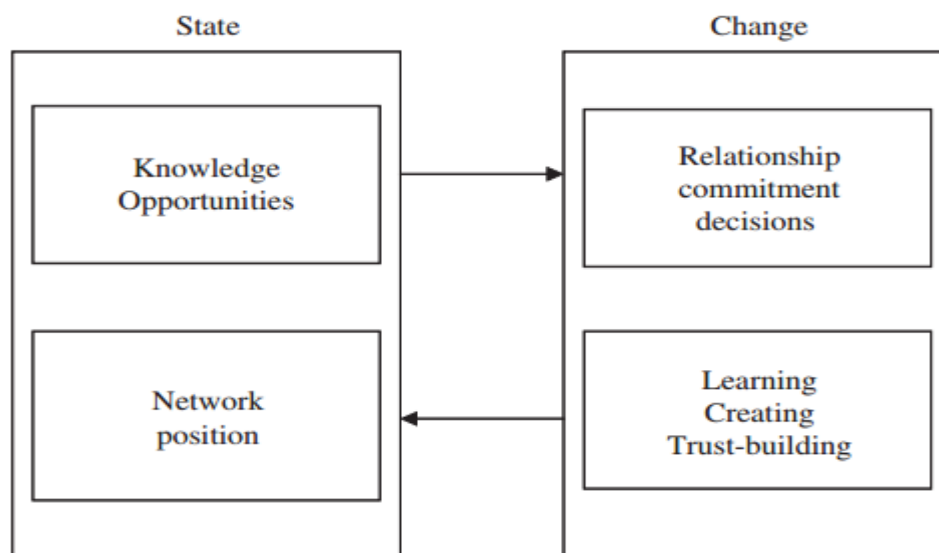


Figure 10. Business network internationalization process model (Johanson & Vahlne, 2009).

Johanson and Vahlne's (2003) business network internationalization process model of internationalization in consistence with business network view of Håkansson and Snehota (1995) who suggest that learning and commitments are related to recognition (exploitation and identification) of opportunities. The network position is also updated based on the assumption that a firm's internationalization process is pursued within a network. Essentially, Johanson and Vahlne (2009) assume that for a firm to gain better opportunities and strengthen its position, it needs to improve its relationships which are based on the level of commitment, knowledge and trust.

Management of international relationships are important in networks (Ruzzier et al., 2006). Hence, internationalization in this context is based on the premise that a firm cannot be viewed in isolation rather it is dependent on other resources it accumulates and resources controlled by other actors in the network. These resources can be accessed through the network position of the firm. Thus, the strength of the firm's position within the network influences the benefits gained (Johanson & Mattson, 1998; Hollensen, 2007). In the network perspective, internationalization tends to be initially engaged within the primary domestic network. Relationships likewise are built by a firm in the domestic network and are viewed as important links or connections to other network across national borders. (Johanson & Mattson, 1988). In line with the social exchange perspective which highlights the informal nature of business networks and how they evolve between the business firms and individuals (Granovetter, 1985). Business networks are business relationships which involves two or more firms, in which exchange relationships (which exist between the firms) are seen as collective actors such as competitors, suppliers, customers, distributors and government (Axelsson & Johanson, 1992; Chetty & Holm, 2000).

The concept of networks concentrates on actors relationships all of which are dependent on each other (Håkansson & Johanson, 1992). Networks are characterized by close collaboration and sharing information with actors (customers, suppliers, distributors and market actors) towards achieving mutual benefits (Chetty & Holm, 2000). A firm's position, actors and lasting relationships are key constituents in a business network and the focus in which internationalization evolves (Chetty & Holm, 2000). Actors exist autonomously and are interconnected via relationships. Actors are usually bonded by technical, social, cognitive, administrative, legal, economic, or even personal ties (Hammarkvist, Håkansson & Mattsson, 1982). For this reason, mutual trust and knowledge are essential for the growth of business in a network as well as the cohesiveness of a network (Hammarkvist et al., 1982). Hollensen (2007) resolved that a business network emerges in fields where there are benefits, environmental changes and coordination between specific actors. Thus, networks develop as a result of exchange between firms or group of companies rather than a specific firm.

Johanson and Mattsson (1988) used social exchange theory to provide a dynamic view on the organizational formation of network relationships of internationalizing firms. Their network based approach of internationalization extrapolates that the internationalization of

a firm is a function of the environment which is the business network and market as shown in Figure 11. The model is based on the premise that the internationalization process of a firm is embedded and influenced by their networks. Johanson and Mattsson (1988) highlight business networks as the interactions between actors in a business. Thus, in response to the Uppsala model, Johanson and Vahlne (1990) examined the internationalization process in the network perspective and emphasized internationalization as an evolutionary process which takes place in three phases namely: expansion, penetration and integration (Johanson & Mattsson, 1993). In context, as the firm internationalizes, it improves the volume and strength of its relationships and networks which can occur via formation of relationships with new counterparts in different countries (international extension), increasing commitment in already existing or established networks (penetration) or through connecting firm position with networks in other countries (international integration). In other words, the internationalization motives of firms are triggered due to the activities of other firms within the domestic or international network (Johanson & Mattsson, 1988).

		Degree of Internationalization of the Market	
		Low	High
Degree of Internationalization of the firm	Low	The early starter	The late starter
	High	Lonely international	International amongst others

Figure 11. The network approach to internationalization (Johanson & Mattsson, 1988)

A firm's position is dependent on two elements, the (high or low) degree of internationalization of the firm and the (high or low) degree of internationalization of the production of network or market (Hollensen, 2007; Hosseini & Dadfar, 2012). Johanson and Mattsson (1988) categorize the market position of the firm based on these two elementary positions namely: the early starter, the lonely international, the late starter and the international among others.

The "early starter" firms are positioned in a market where relationship between suppliers, consumers and other companies is relatively limited (Hollensen, 2007). Firms in this category have little foreign market knowledge and limited opportunity to gain knowledge

from ties within the domestic market (Chetty & Holm, 2000) thus restricting ease of entry into global markets (Johanson & Mattsson, 1988). Synonymous with the notion of the Uppsala model, the early starter usually internationalizes directly to the customer, or gradually via an agent, sales distributors or even via manufacturing subsidiary in the foreign market. In order to save costs or gain market knowledge for stronger commitments, firms in this category have low degree of internationalization and product nets (Chetty & Holm, 2000; Hollensen, 2007).

The “lonely international” on the other hand has a higher degree of internationalization but low degree of market internationalization (domestic focus). The lonely international has a more favorable knowledge compared to suppliers, customers and competitors in establishing the firm in new nets (Hollensen, 2007). In other words, the lonely international does not gain a lot from its network position, it is autonomously capable of enhancing its internationalization, due to accumulation of knowledge of foreign markets and environments (Chetty & Holm, 2000). Thus, the lonely international tends to gain competitive advantage over domestic players due to the firm’s knowledge, international experience and established position in the foreign business network (Johanson & Mattsson, 1988).

The “late starter” firms are usually already internationalized unlike the lonely international, the firms in this category tend to be at a disadvantage. This is due to the weak position compared to competitors who possess more knowledge and stronger networks (Chetty & Holm, 2000; Hollensen, 2007). In other words, the firms already function in a highly internationalized market but the degree of internationalization is still relatively low (Johanson & Mattsson, 1988; Hollensen, 2007). The late starter firm usually maintains an indirect relationships with foreign business networks through various actors, which fosters internationalization strides (Johanson & Mattsson, 1993; 1988). Contrary to the Uppsala model, where internationalization takes off in markets with relatively low psychic distance the late starters tend to begin market entry to more distant markets (Johanson & Mattsson, 1988).

Lastly, international among others as the name implies refers to highly internationalized firm operating in a highly internationalized environment. The firm and actors in this position possess and benefit from experience and knowledge about the foreign market (Johanson &

Mattsson, 1988). Since the international among others has acquired international knowledge, it is quick at setting up sales subsidiaries, as it needs to co-ordinate activities in different markets. The international among others is connected to various international networks that provide opportunities for obtaining external resources.

The network theory also faces criticisms regarding the research gap on the influence of entrepreneurs and strategic position in SME internationalization processes (Ruzzier et al., 2006). Johanson and Mattsson (1988) suggest that network perspective offers a suitable framework to understand firms as embedded actors in business networks. However, issues are raised about the inconsistencies in the kind of relationships and properties as well as matters which concern trust control and interdependencies of the firm (Ruzzier et al., 2006). More so, SME internationalization may be due to internationalization of other firms within a network, thus the integration and coordination of networks may instigate a need for a firm to internationalize (Ruzzier et al., 2006). Knowledge from relationships and embedded long term social networks (sub network within a business network) can also be imitated amongst firms within a network, this in turn speeds up market entry (Bonaccorsi, 1992). Networks however may be an important avenue through which SMEs capitalize on market knowledge, technology and capital accumulation in order to enter new markets (Jaklic, 1998).

3.1.4 International New Ventures/ Born Globals

Research on small firm internationalization patterns challenge traditional internationalization models such as the incremental model of internationalization (Johanson & Vahlne, 1977). Thus, the emergence of firms that begin internationalization from the foundation of the firms (Kuivalainen, Saarenketo & Puumalainen, 2012) are also referred to as BGs or INVs. Although, various arguments arise concerning the differences between BGs and INVs. Based on their definitions, Crick (2009) highlights that the term “global” (as in born global) refers to companies who are operating as the name implies in “at least the worlds triad regions” or have some form of commitments across these regions. Whereas INVs firms are those that may have internationalized from inception but do not necessarily have global presence (Crick, 2009). Therefore, the criteria for categorization of the terms (BGs and INVs) are somewhat interchangeable since they typically characterize firms that internationalized rapidly but not exclusively within three years of their business start-up

(Crick, 2009). Thus, both INV and Born global firms are seen as firms that consider internationalizing from foundation.

INVs and Born global literature have been receiving a lot of academic attention due to the increasing prominence and role of SMEs in internationalization trade. The increasing value of knowledge and managerial skills in the global market place have also propelled research on INVs (Oviatt & McDougall, 1994; Ruzzier et al., 2006). The prevalence of INV research is as a result of contributions of Oviatt and McDougal (1994) to international entrepreneurship research and the re-visitation of existing paradigms on internationalization processes like the U-model (Johanson & Vahlne, 1977). Oviatt and McDougal (1994, p.49) define INVs as business organizations which “from inception aim to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries”.

INVs internationalization is largely focused on small and young firms, the reasons they internationalize from inception and the role of the owners of the businesses to that effect. Oviatt and McDougal (1994) argue that INVs existed for years but extant theories from the field of international business theories overlooked them and did not cover the formation of international new ventures. This was because of the assumption that internationalization was specific to large and mature firms that internationalize mainly after a long period of domestic focus. However, owing to the emergence of BG firms is born again global (BAG) firms characterized as long established firms who after long domestic market focus embrace rapid and dedicated internationalization (Bell et al., 2001). As seen in Figure 12, INVs are grouped into four main categories which depends on the value chain activities carried out by the firm and the countries involved. Export/import and geographically focused start-ups are self-explanatory as they are start-ups driven by exports or imports and geographical location respectively. On the other hand, multinational traders and global startups are young internationalizing firms who rapidly diversify geographically. According to Kuivalainen et al. (2012a), global startups are considered similar to “true BG” due to high foreign sales to total sales (FSTS) ratio and large geographical presence.

Few Activities Coordinated Across Countries (Primarily Logistics)	New International Market Makers	
	Export/Import Start-up i	Multinational Trader ii
Coordination of Value Chain Activities	iii	iv
Many Activities Coordinated Across Countries	Geographically Focused Start-up	Global Start-up
	Few	Many
	Number of Countries Involved	

Figure 12. Types of international new ventures (Oviatt & McDougall, 1994).

The formation of INVs that rapidly internationalize is due to increase in globalization of markets, international financing opportunities, technological advances, mobility of human capital and increasing homogeneity of markets (Knight & Cavusgil, 1996; Oviatt & McDougall, 1999). Although these trend is also an important source of advantage for some MNEs, INVs do not necessarily have to go through stages of evolution before making internationalization efforts (Knight & Cavusgil, 2004; Oviatt & McDougall, 1994). The emergence of BGs also prompted new interest in the approaches to internationalization studies and international entrepreneurship research (Kuivalainen et al., 2012 and Zahra & George 2002). Researchers however questions the ubiquitous connection between IE and small firms due to the failure of the stage model in explaining the early stages of internationalization and the role of the entrepreneur in SME internationalization process (Keupp & Gassmann, 2009).

INVs / BG are as characterized to have a proactive internationalization strategy as opposed to MNEs who tend to be risk averse and internationalize after prolonged domestic focus and maturity (Hollensen, 2007). They also have the propensity to generate high revenues from the beginning of their operations (Oviatt & McDougal, 1994; Baum et al., 2015). A key characteristic of these new venture firms is the time or age in which the firms internationalize as opposed to the size of the firm. The core of INVs lie in creating value and capitalizing on strategic alliances to benefit from foreign resources (Hollensen, 2007). However, Oviatt and McDougall (1994) emphasize that researchers should pay attention to noticeable resource commitment in order to establish the point of a venture creation. They also suggest that INVs

with no sales who are still in R&D stages should also be able to demonstrate commitment to internationalize products or services upon completion or final development of the products. (Oviatt & McDougal, 1994)

Unique to BGs is the predominance of the entrepreneur and his/her role in the company. BGs are managed by entrepreneurial visionaries who see the international market space as a unique opportunity from inception of the firm. The role of the entrepreneur in the BG companies also influences the internationalization path of the firms which are represented in the inherent knowledge the entrepreneur has about international experience through living or working abroad. International experience could be about the market, personal networks and international contacts (Hollensen, 2007). INVs are formed by individuals who are “alert” to opportunities across national boundaries. Oviatt and McDougal (1994) in agreement with Kirzner (1973) suggest that an entrepreneur’s ability to spot, recognize and exploit opportunities in the external environment is an essential source for competitive advantage. The background and international experience of the business owner also serves as a basis for internationalization decisions and reduces the perception of psychic distances specific to firm product or operations. Thus, BGs tend to be highly receptive to new opportunities and collaborate extensively with networks across national borders to achieve internationalization (Madsen & Servais, 1997). In essence, the founders should possess unique competences to conveniently combine resources from various markets capitalizing on their knowledge background and networks (Hollensen, 2007). INV founders consider internationalization a strategic fit because with long domestic market focus, the growth of the firm may be stunted due to path dependency on developing domestic market competences (Ruzzier et al., 2006). For these reasons, INVs tend to adopt the use of strategic alliances or networks which Oviatt and McDougall (1994) refer to as “hybrid structures” to optimize resources in the startup of business operations.

Unlike other theories of internationalization, theories on INVs or BGs embodies network approach in promoting internationalization and compensation for limited resources. For example, a BG may carry out marketing or sales operation via specialized activities with partners or agents abroad in order to complement their own competences (Hollensen, 2007). Thus, BG pattern of internationalization strongly opposes the incremental process model. Born global firms rely on partnerships and cooperation to facilitate growth and

internationalization, unlike the incremental model where the organizational pathway or choice of internationalization is autonomous through incremental market involvement from psychically close to more distant markets (Oviatt & McDougall, 1994). A common characteristic in the models of internationalization is the need for knowledge and learning in the internationalization process irrespective of the pathways of internationalization. Knight and Cavusgil (1996) suggest that some trends lead to the emergence of born global firms including:

- Increasing importance of niche markets.
- Technological advances in communication, manufacturing and logistics etc.
- Greater flexibility and quicker response of small firms to market demands.
- Globalized or internationalized knowledge tools, homogenous markets and facilitating institutions.
- Global networks are fostered due to information technology.

Additionally, prior knowledge is essential to the current knowledge and growth of the firm (Oviatt & McDougall, 1994). For example, in sectors with rapid technological change, BG firms can gain competitive advantage by exploiting prior knowledge to gain or lock in new customers (Freeman et al., 2006; Bell et al., 2003). Although an INV may not possess all the skills necessary for internationalization, they leverage such existing knowledge and supplementary competences through rapid market entry and collaboration.

BG firms also disregard the dominant influence of psychic distance as a market selection criteria rather they consider the homogenous nature of the market or product requirements. More so, the vulnerability of born global firms to a single product or service (niche market) forces the firm to strategically focus in lead markets notwithstanding their geographical location (Oviatt & McDougall, 1994; Zahra & George, 2002; Zahra et al., 2005). Such strategic decisions on lead market focus provides better opportunities for rapid market access. For example, an INV may have made heavy R&D investments or incurred some debts before any sales are made. Such firms tend to follow BG path in order to speedily grow and reduce costs (Hollensen, 2007). The competitive landscape of BG firms is intense, in other words product may be obsolete quite rapidly due to constant innovation which may occur in the industry. For this reason, typical born global firms strive to capitalize on the

“global window” of advantage and capture major markets simultaneously (Äijö et al., 2005). Zahra and George (2002) also suggest that INVs possess and capitalize on valuable assets, unique resources and networks which provide them with sustainable advantage that is also transferable to new locations. Table 3 highlights some key factors and characteristics which lead to the emergence of born global firms.

Table 3. Characteristics of born global firms (Adapted from: Hollensen, 2007).

Trends	Reasons for internationalizing
Increasing role of niche markets	Globalization and competition by MNEs; demand (by customers and mature economies) for specialized products; supplying products or services which have a relatively narrow global niche.
Advances in process or technology production	Improvement and sophistication in production processes allows more economical production; new technologies helps to simplify complex routines and allows for collaboration with MNEs to provide sophisticated products globally; streamlining product offering to meet global market requirement; production of diverse products on small scale; increasing specialization leading to tailor made products to fit diverse preferences.
Flexibility of born global	Benefits of being a small company such as quicker response time, flexibility and adaptability to foreign standards.
Global network	Facilitation of internationalization via partnerships with various actors (distributors, customers, agents, subcontractors); capitalizing on knowledge from networks through partnerships or strategic alliances.
Advances in information technology	Information technology speeds up the flow of information; declining prices and availability of advanced information technological systems such as internet services, mobile telecommunication, electronic data exchange (EDI); enterprise resource planning (ERP) fosters cross border operations; globalization of technology through joint research development platforms; international technology transfers or cross border education and exchange of know- how has made business operations readily available to small firms.
Internet base	Revolution in the internet world provides new business opportunities especially for born global firms or start-ups. Examples of internet based companies are: service or information based companies. These types of firms tend to serve a larger number or international markets to internationalize more rapidly than firms which sell tangible product.

4 INTERNATIONALIZATION PATTERNS AND ANTECEDENTS OF SMEs

Kuivalainen et al. (2012) provide a unified framework on antecedents, patterns and possible outcomes of internationalizing SMEs (Figure 13) which is adapted in this study. The model highlights the interconnectedness of the variables. It also gives an overview of antecedents and outcomes of SME internationalization pathways taking into consideration the degree of internationalization.

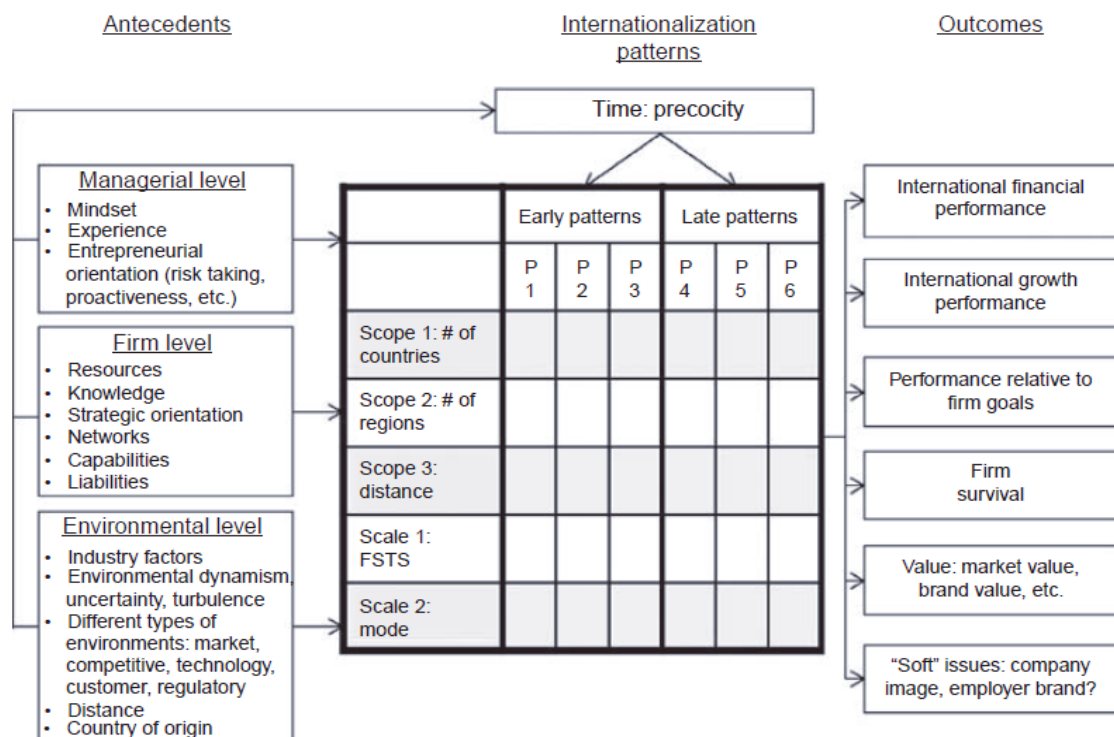


Figure 13. Model of antecedents, international patterns and outcomes (Kuivalainen et al., 2012a)

The model shows that antecedents of internationalizing SMEs could either be on firm level, managerial level or environmental level. At firm level, the variables (resources, strategies networks and knowledge) which affect internationalization decisions as well as antecedents encourage or inhibit firm internationalization process. On managerial level, the orientation (proactivity, risk extent), international experience of the entrepreneur, mindsets relevant to the path the firm takes towards internationalization of these paths are also considered. Environmental level on the other hand describes factors which pushes the firm towards international markets or factors which form entry barriers (Kuivalainen et al., 2012a).

Internationalization patterns on the other hand is described using the focal dimension of time to differentiate the pathways (early or late patterns) of internationalization. Here, timing is expressed as a measure of the beginning of internationalization activities and how swift and consistently it proceeds. Emphasis on time (precocity) as a significant measure in differentiating BGs and INVs from traditional internationalizing taking into consideration as temporal characteristic (time lag between founding and commencing internationalization activities). The last section addresses the outcomes or aftermath of the internationalization pattern adopted (Kuivalainen et al., 2012a). Although “outcomes” are highlighted in the model, it will not be tackled in this study.

4.1 Antecedents for Internationalization

According to the Oxford dictionaries (2016), the term “antecedent” can be defined as something which previously existed or a situation which logically precedes another. Thus, in this context “antecedents” are the factors preceding the internationalization of SMEs. Research in international business and SME research have discussed some of the factors preceding internationalization using terms like "motivation", "drivers", "stimulus", "factors" or “antecedents" (Hutchinson et al., 2007). The antecedents highlighted in this section are extrapolated based on SME literature and international entrepreneurship research. Extant literatures have highlighted the antecedents of internationalization based on different constructs. Luostarinen (1979) highlights internationalization motivations based on global and domestic constructs stating that generic motives (global and international) or domestic and country specific motives affect internationalization which can be on national, industrial or firm level. Hutchinson et al. (2007) adapted SME internationalization antecedents based on push and pull factors where push factors are based on the domestic saturation, industry competition, legislation or economic activities and pull factors are based on profitability and foreign market stability. They also highlight the size of the firm as a yardstick for categorization of internationalization antecedents which can be on macro-environmental or micro-firm level dimension. As a result, the term antecedent is deemed suitable for this research because it is geared towards understanding SMEs at different stages of internationalization as well as identifying common internationalization patterns.

Research suggests that internationalization motives influence scale, scope, configuration of a firm’s internationalization operations, and the allocation of tangible and intangible

resources to the international markets (Zahra et al., 2005). Other determinants for internationalizing are said to be based on the perception of foreign market growth, increase in sales, competitive pressure in the domestic market, customer's portfolio enlargement, and search for economies of scope and scale (Kubíčková, Votoupalová & Toullová, 2014). International business literature categorizes internationalization motives as either reactive or proactive. Proactive motives are based on the unique nature of the products, exclusive market information, technological advantage, economies of scale, managerial urge and tax benefits (Czinkota & Ronkainen, 2007). Reactive motives on the other hand are triggered due to competitive pressure, over production, declining sales or saturation of the domestic markets (Czinkota & Ronkainen, 2007). The decisions on the scope and scale of foreign operations are carried out as a result of the market definition, current and potential resources, collaboration and networks of alliance, market requirement and sometimes the entrepreneurs' preferences (Zahra et al., 2005). Other motivations that are said to mirror the competitive landscape of small ventures are; domestic environment and industry setting, the interaction of entrepreneur's needs and ambitions, and changes in the external market (Zahra et al., 2005).

Some other antecedents of SME internationalization include new market conditions, global sourcing activities, and cross border networks. The push for innovation or innovative products may also increase entrepreneurial efforts towards capitalizing on niche markets (Osei-Bonsu, 2016). The homogeneity of products and globalization also reinforce diversification in the internationalization of SMEs. More so, the interconnectedness and internationalization of financial markets allow for free flow of entrepreneurial activities globally (Hollensen, 2007; Osei-Bonsu, 2016). Technological advances such as communication, optimization of production processes, and competences in knowledge management systems, improve entrepreneurial knowhow for managing businesses across national borders and cultures (Osei-Bonsu, 2016). International experiences which emanate from entrepreneurial past or present international experiences and competences, and international human resource competences are also highlighted in various literatures to drive internationalization efforts.

Internal and external events may also trigger the initiation of internationalization. Internal triggers such as perceptive management, specific internal events and inward-outward

internationalization (Albaum, Strandkov & Duerr, 1998). Perceptive management is the awareness and ability to sense and gain knowledge about market opportunities abroad (Hollensen, 2007). Specific internal events such as organizational and management changes, or production and manufacturing capabilities. Thus, having an open mind, international experience, and orientation contributes to the sensitivity of management to this trigger. A study of internationalization behavior of Finnish SMEs highlight management interest, foreign market enquiries about products or services of a firm, low demand in home market as possible internal triggers (Hollensen, 2007).

External triggers such as market demand, competing firms, trade associations, external expertise and information search and translation may also trigger internationalization. Market demand may be triggered due to the effect of globalization and growth of international markets thus a push effect to meet market demand (Ruzzier et al., 2006). Internationalization actions of competing firms may also instigate internationalization efforts. Trade associations serve as change agents in that membership and association with some trade organizations may impact the decision to internationalize (Hollensen, 2007). This is due to collective experiences of members of the trade associations in which the firm belongs or collective trade group decisions (Hollensen, 2007). Information or advice from external expertise such as export agents, governments, chambers of Commerce or even financial organizations may also trigger internationalization efforts of SMEs (Hollensen, 2007; Albaum et al., 1998). Additionally, relevant information is searched and translated into knowledge which provides a basis for management internationalization efforts.

Conclusively, the motives to internationalize could either be as a result of the market (demand driven), resource seeking efficiency (economies of scale and scope), strategic resource (core competence) and more recently network (strategic alliance and social connection) seeking motive (OECD, 2009; Dunning 1993; 1995; 2000). Researchers also emphasize on opportunity seeking and inquiry as other drivers for internationalization (Karagozoglu & Lindell, 1998; Dunning, 2000; Ibrahim, 2004). Learning is also an important antecedent in SME internationalization. SMEs are believed to benefit heavily from diverse learning opportunities as a result of the changes in the international environment activities (Hollensen, 2007). Therefore, strategic objectives such as innovation, learning and adaptation, encourage firm learning via societal differences in organizational and process

systems are also important motivating factors for internationalization (Bartlett & Ghoshal, 1998). Limited resources, information and knowledge in various forms and avenues are essential, especially in SME internationalization as they provide a valuable premise to carry out internationalization (Ruzzier et al., 2006). Thus, the readiness of a firm for internationalization or internationalization trial largely relies on the credibility and value of the information search (Albaum et al., 1998; Hollensen, 2007). More so, the translation cycle and knowledge gained as a result can lead to an action that allows the firm know if they need to commence internationalization or not (Hollensen, 2007).

Zahra and George (2002) emphasize that learning thrives through proper integration and transformation of new knowledge into new products, systems and processes. Some barriers to SME internationalization include inadequate working capital for financing exports, inadequate market analysis and knowledge, lack of managerial time, skills and knowledge, lack of foreign representation and proper communication strategy for potential clients. OECD center for entrepreneurship, SMEs and local development (2009) suggest that stable economic situations, sound industrial policies, infrastructure and adequate skilled labor encourage internationalization efforts. In order to identify the antecedents of internationalization patterns, it is essential to take into consideration and itemize firm level, managerial level and environmental level factors (Korsakienė & Tvaronavičienė, 2012; Kuivalainen et al., 2012a) as shown in Figure 14.

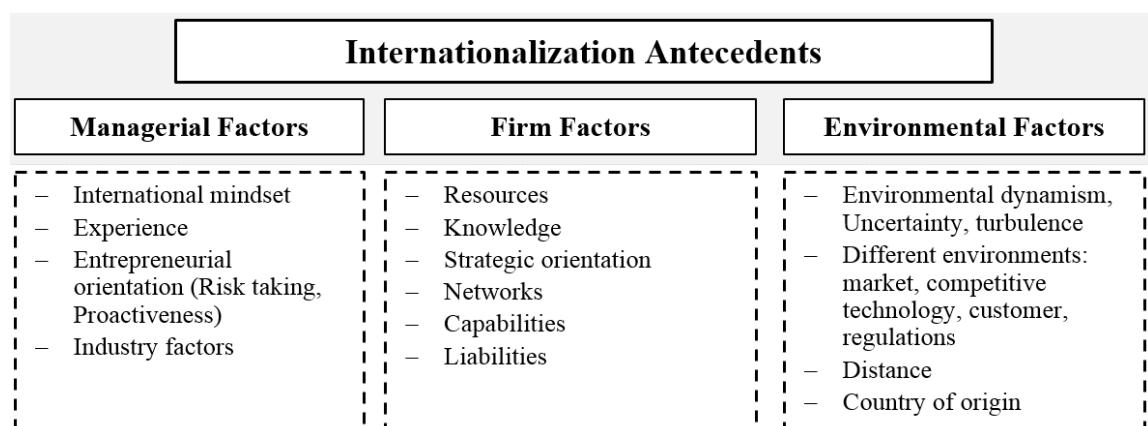


Figure 14. Antecedents of SME internationalization (Adapted from: Kuivalainen et al., 2012a).

Firm Level Antecedents

Firm characteristic such as age also affect internationalization decisions (Brush, 2013; Johanson & Vahlne, 1977). Other specific advantages such as product patent, level of technology or degree of innovation also affect internationalization decisions (Brush, 2013). Capabilities and resources of a company are important firm level antecedents of internationalization where the resources characterized as valuable, rare, non-imitable, non-substitutable and assets owned (tangible and intangible) provide sustainable competitive advantages (Barney, 1991). Unavailability and control of resources tend to be a constraint to internationalization of a firm. On the other hand, capability is the firm's ability to deploy valuable and peculiar resources with the aim of achieving a desired result (Eisenhardt & Martin, 2000; Coviello & McAuley, 1999). Resources and capabilities as a result are considered important and essential salient determinants for early internationalization (Baum et al. (2015). Strategic orientation of the firm is associated with "risk proclivity, aggressiveness and future orientation" (Johnson, Martin & Saini, 2012). Thus, strategic orientation as an antecedent of internationalization provides knowledge on the firm's performance and inclination to specific international markets. As already described in chapter 3.1.3, networks play an essential role in the early internationalization transition of SMEs. In other words, the network links of a firm is instrumental to accumulated market knowledge as well as access to relevant resources and capabilities essential for speeding up foreign market entry (Ruzzier et al., 2006).

Managerial Level Antecedents

Managerial level antecedents look closely into the role of the entrepreneur's activity and how it affects internationalization of the firms. Kuivalainen et al. (2012a; 2012b) suggest a close look at the entrepreneurial mindset, international experience and entrepreneurial orientation. Nummela et al (2004, 2009) suggest that there are positive links between the managerial level factors and mindset (global, international or traditional) of the entrepreneur. A global mindset embodies market experience and market characteristics. The market experience is international exposure such as experience and education of the manager. Whereas, the market characteristic is how the manager views the challenges and "globalness" of the international market (Nummela et al. 2004). Empirical evidence show that entrepreneurial orientation is a relevant antecedent to rapid internationalization of SMEs (Acedo & Jones, 2007). Peiris et al. (2012) define entrepreneurial orientation "as a behavior

which investigates firm level strategic orientation as having an influence on various outcome variables such as the firm performance and venture growth". However, some studies did not find strong relationships between entrepreneurial orientation and DOI (Jantunen et al., 2005). There are still arguments about using EO as a construct in determining the entrepreneurial behavior of an internationalizing firm (Kuivalainen et al., 2012a). For example, Peiris et al. (2012) suggest that opportunity recognition precedes EO and overemphasis on EO may lead to the neglect of opportunity recognition and capabilities. Kropp et al. (2006) found innovation to be a significant predictor for internationalization performance. Baum et al. (2015) suggest that international growth orientation of a firm, and the ability to operate efficiently across its national borders is an important potential antecedent relevant to internationalization of small firms. Sundqvist and Kuivalainen (2009) identify international orientation as an important determinant to growth strategy which is pursued by firms who want to internationalize.

Environmental Level Antecedents

Potential environmental antecedents could be as a result of industrial factors, country of origin, market distance, customers, regulation, level of technology, and environmental dynamism such as market structure and competition (Kuivalainen et al. 2012a). Such environmental factors may also trigger or even limit internationalization actions of SMEs (Hollensen, 2007). Luostarinen (1979) categorizes environmental factors into pull or push factors. Pull factors are typically host country conditions that foster or pull internationalization. Pull factors are usually important drivers of internationalization in larger economies. Examples of pull factors are attractiveness of foreign markets, increased sales, economies of scale, competitive advantage exploitation, excess capacity, and industry competition (Hutchinson et al., 2007; Bellak & Luostarinen, 1994). Whereas, push factors are home country conditions which foster or push internationalization. Push factors tend to be predominant in small and open economies which are mostly in the late stages of SME globalization (Bellak & Luostarinen, 1994). Some examples of push factors include market potential abroad, domestic market saturation, risk diversification, end of product lifecycle in domestic market, or even entrepreneurial ambition (Hollensen, 2007).

It is difficult to address the antecedents, motives or triggers without taking into consideration the challenges or risks to SME internationalization. Hollensen (2007) highlights barriers to

internationalization process in three categories which are general, commercial and political risks as seen in Table 4. Other factors hindering the initialization of internationalization include insufficient finance, low market knowledge, poor networks, inadequate distribution channels, domestic market focus, low export commitment, and low production capacity. Insufficient representation for cross-border distribution and offering services may also restrict international operations. All these factors individually or combined affect the commencement of firm internationalization.

Table 4. Barriers to SME internationalization (Adapted from: Hollensen, 2007)

General market risk	Comparative market distance; foreign market competition; dissimilarities in product usage in other markets; cultural and language barrier; lack of distributors in foreign market; differences in product or service specification in host market; trade barriers and INCOTERMS.
Political risks	Government restriction, policies and bureaucracy in host country; foreign exchange controls imposed by the government of host countries that limit opportunities for international customers to make transactions; stringent laws and lack of incentives in overcoming export barriers; high tariff and taxation rates; confusing foreign import and export regulations and procedures; complexity in trade documentation and certifications.
Commercial risks	Fluctuations in exchange rate when transactions are made in a foreign currency; misunderstanding due to contract dispute; bankruptcy and corruption; damages or delays in shipment and distribution process; problems in obtaining adequate finance.
Internal barriers	High cost of internationalization; quality; price; specification of product and service offering; insufficient managerial time to realize internationalization activities; lack of language skills; difficulty to identify foreign opportunities and potential target markets; difficult of find and approach customers and partners abroad.

4.2 Internationalization Patterns

Internationalization patterns have been captured in international business or international entrepreneurship literature as behavioral patterns which are developed by gathering facts which are expressed as events at a specific reference time in cross border activities of the firm (Wrights & Ricks, 1994; Jones & Coviello, 2005; Kuivalainen et al., 2012). Numerous researches cover various pathways through which SMEs operate internationally. According to Kuivalainen et al. (2012a; 2012b), to effectively conceptualize these pathways, it is essential to evaluate the degree of internationalization of various activities and

organizational structures within which they change or are implemented at different points in the lifecycle of the firm.

Internationalization patterns in SMEs vary and may emanate from the diversity in entrepreneurial behavior capabilities or internal and external situations. Patterns or pathways of SME internationalization may be as a result of entrepreneurial behavior, capabilities, networks or internal and external triggers (Kuivalainen et al., 2012a; 2012b). In order to internationalize, it is essential to identify differentiating factors of early and late internationalizing firms, the contribution of the different antecedents to the scope and scale of the internationalization process, as well as how the antecedents change over time. Thus, researchers suggest that internationalization patterns should be distinguished based on characteristics such as time, scale, scope and operation modes (Kuivalainen et al., 2007; 2012a). SME internationalization research highlights stage internationalization as an incremental learning process to geographically close countries (Olejnik & Swoboda, 2012; Johanson & Vahlne, 1977). There has also been studies on so called radically internationalizing firms such as BGs or INVs who make internationalization efforts from inception and BAGs which internationalize after long domestic focus (Oviatt & McDougall 1994; Olejnik & Swoboda, 2012; Kuivalainen et al., 2012).

Internationalization process may vary and may not always follow the Uppsala model or incremental process. Oviatt and McDougall (1994) present INVs as rapidly internationalizing firms based on the amount of countries involved and value chain activities coordinated. SMEs may also diversify geographically, or through multinational traders or global startups or in specifically selected countries. A longitudinal perspective on internationalization shows that there is no perfect stage for internationalization and firms may de-internationalize or make rapid internationalization efforts after a long period of domestic focus (Kuivalainen et al., 2012). Companies may also adopt a combination of internationalization modes in order to achieve a sustainable internationalization pathway (Jones & Coviello, 2005; Kuivalainen et al., 2012).

Research suggests that a methodological issue exists in identifying how to measure the patterns or behavior that helps differentiate between internationalization paths (Kuivalainen et al., 2012). Thus, pathways or patterns are better conceptualized based on the

understanding of degree of internationalization (DOI) of the firm. Thus, the categorization based on time, scale and scope provides a better understanding on pathways of SMEs internationalization at different stages of the firm's life cycle. Overall, based on the hypothesis of Baum et al. (2015), some distinct pathways which empirically suit the internationalization of small firms include traditional internationalizer, born global, born again global, born international and born regional patterns.

Traditional Internationalizers: Firms who follow this pathway are commonly characterized using the process model of internationalization (Baum et al., 2015). In this internationalization pattern, efforts are made incrementally to geographically close countries (Johanson & Vahlne, 1977; 2009). Although many large firms have adopted this pattern of internationalization, it also faces criticism due to of lack of measurability, limited horizons and difficulty in differentiating the relationship between market knowledge and market commitment (Olejnik & Swoboda, 2012). For traditional internationalizers, expansion logic is similar to the process model which is usually risk averse (Baum et al., 2015). In other words, the firm increases its market commitment abroad by moving from exports through agents to wholly owned subsidiaries and considering foreign operation modes. Another notion is that international expansion from closer to more geographically distant markets reduces the friction as a result of psychic distance. Traditional internationalization is based on a narrow scope strategy and internationalization begins in countries with close geographic proximity or low psychic distance (Baum et al., 2015). Empirical findings highlight that sometimes younger SMEs tend to penetrate more distant markets than older SMEs who tend to internationalize incrementally (Hollensen, 2007).

Born Global Pathway: The term born global pattern is commonly linked with the term "time-space compression phenomenon" (Harvey, 1996) because they assume a "global" geographic scope and tend to begin internationalization operations in multiple countries from inception without preceding long term domestic market operations (Oviatt & McDougall, 1994). Therefore, the geographic process is marginalized to a "here and now" concept which allows for free flow and exchange of business information between individuals globally (Törnroos, 2002). A fundamental characteristic of this pathway is strong customer orientation with global market orientation due to their unique competences (Hollensen, 2007). Thus, firms who follow this pathway are triggered due to the global nature of

customers and the need to capitalize on market niches (Bell et al., 2003). Also, due to intense competition and high amounts of debt incurred in form of high fixed R&D costs before actual sales are made, rapid market entry becomes imperative (Hollensen, 2007). Hence, firms take advantage of “the global opportunity window” (Äijö et al., 2005) to remain profitable or even gain first mover advantage. However, there are some variations of the time frames set in which researchers suggest that the firms internationalize from inception. For example, an average of 25 percent of foreign income and operation in about five countries (Kuivalainen et al., 2012) while other studies say that born global internationalization start within the two or three or even five years’ time frame (Knight & Cavusgil, 2004; Acedo & Jones, 2007).

Born Again Global Pathway: This internationalization pattern is incremental in nature and relatively consistent with the traditional internationalization but proactively exhibit a pattern similar to born global firms (Bell et al., 2001; 2003). When a firm follows a born again global pathway, it does not rapidly enter the global market terrain rather it is usually a case of long established companies who have had prolonged domestic market focus and suddenly decide to internationalize rapidly. Thus, born again global firms do not fulfill the time lag criterion of typical born global firms (Bell et al., 2001). The sudden internationalization is usually as a result of certain “critical” incidents like change in management or ownership of the firm or new clientele or new customer base or expansion in networks. Firms that follow this path tend to radically internationalize in event of possible changes in management or ownership of the firm (Baum et al, 2015).

Born Regional and Born International Pathways: The rationale of born regional has not been sufficiently explored in IE literature (Baum et al., 2015). Born regional patterns allows the internationalizing firm to benefit from firm-specific advantages in the home region and minimize liabilities of foreignness. This pathway is consistent with the findings of Rugman and Verbeke (2004) “*regionalization hypothesis*” which means intensely focusing on internationalization efforts within a specific region leads to superior performance. Although similar to born global pathway, born regionals pattern involves internationalization from the onset of the firm but internationalization operations are to countries with similar geographic regions (Rugman & Verbeke, 2004; Baum et al., 2015). The hypothesis is consistent with firms who pursue geographically focused internationalization (Kuivalainen et al 2012a; Baum et al., 2015). As the name implies, born international pathway is one in which a firm

enters the international market sporadically or traditionally and focuses on geographically close markets. This pattern of internationalization however is associated with mediocre success (Kund & Katz 2003; Kuivalainen et al., 2012a).

4.3 Degree of Internationalization

Degree of internationalization (DOI) demonstrates the extent of a firm’s position in different national nets, level of integration, and the strength of those positions (Hollensen, 2007). The firm’s position within the network which also determines the extent to which the firm has access to various resources is crucial to its internationalization process (Johanson & Mattson, 1988). According to Krist (2009), “DOI deals with the performance impact of internationalization and the way the company arrives there”. Internationalization literature highlight that while some businesses internationalize over various lengths of scope and time, some may internationalize almost immediately like the born global firms (Zahra & George, 2002; Oviatt & McDougall, 1999). Time, scale and scope are important measurement criteria in SME internationalization processes shown in Table 5. *Time* refers to the speed (swiftness or lateness) and development period in which a firm enters into new markets. *Scale* is the extent or intensity of a firm’s foreign operations and resources. *Scope* encompasses the diversification or concentration of firm operations or how a firm disburses it resources. (Kuivalainen, Sundqvist & Servais, 2007; Kuivalainen et al., 2012a).

Table 5. Measures of DOI (Adapted from Kuivalainen et al., 2012a & Sullivan, 1994).

Dimension	Possible Indicators
Scale	Extent of international operations, Export intensity or share of turnover from foreign market out of total turnover (FSTS ratios), operation modes
Time	Speed of internationalization
Scope	Market concentration, (distance) and diversification (number of markets served)

The internationalization behavior of a company can be understood by observing the degree of internationalization at different events and time intervals (Kuivalainen et al., 2007). According to Sullivan (1994), extant research conceptualizes DOI based on structural, financial or psychological dimensions. Thus, in order to properly comprehend the skew of internationalization or evolution of the different pathways in a firm’s internationalization process, analyzing the DOI is imperative (Kuivalainen et al., 2012a; Baum, 2015). The degree of internationalization can help assess the kind of pathway akin to a company. DOI

is “a snapshot of a firm’s specific situation at a particular point in time” (Sullivan, 1994). Different measurement criteria are adopted for DOI analysis such as foreign sales, entry mode, internationalization orientation, organizational structure, and development of operations. However in this study, a dimension of a company’s internationalization model is adopted to evaluate the degree of internationalization (Daniels, Radebaugh & Sullivan, 2004).

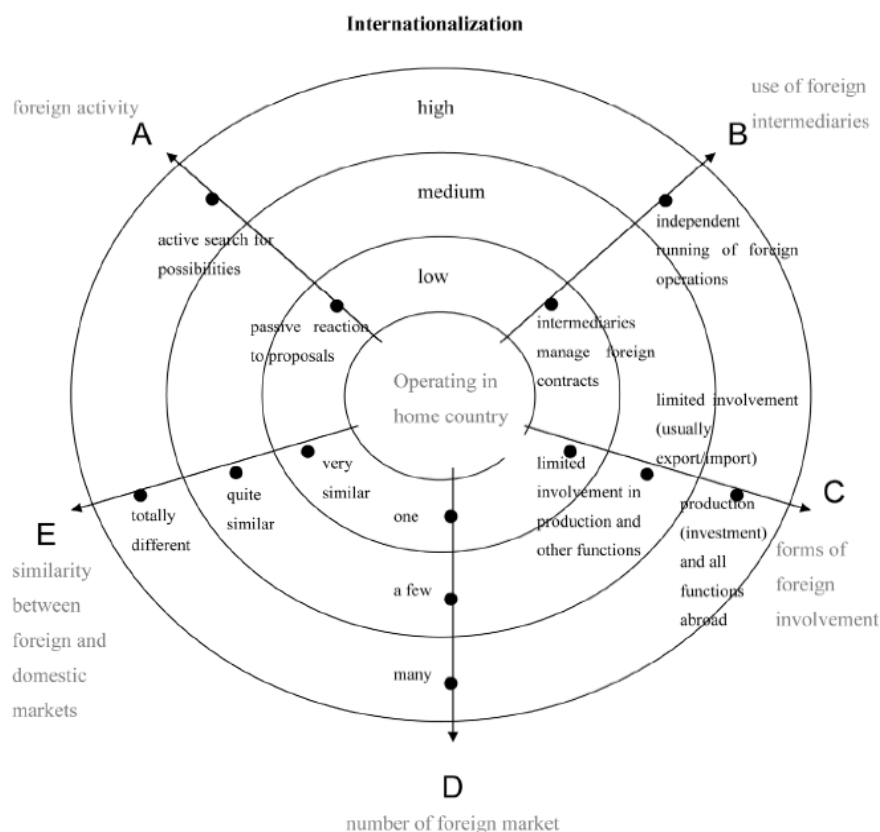


Figure 15. Dimensions of company internationalization (Daniels et al., 2004)

The model presented in Figure 15 is best described as a mapping tool used to evaluate the level of a firm’s internationalization operations. The center of the model represents the domestic market operation. Thus, the farther from the center the firm is located on the model, the higher its degree of internationalization (Jankowska, 2011). Therefore, the model allows one to determine the degree of internationalization by evaluating the firm’s activities and marking the extent of internationalization involvement on the axes. The activities marked on each axis are then taken into consideration. As a result, one can identify if a firm has either a low, medium or high level of internationalization (Jankowska, 2011). Table 6 is an explanation of the elements of the axes of the mapping tool in Figure 15.

Table 6. Explanation of dimensions of company internationalization

Axis	Indicators of the company's internationalization activities
A Foreign activity	Based on the firms foreign market operations which could be based on reactive actions caused by seeming stimuli from abroad (such as unsolicited inquiry, offers from foreign cooperation) or as a result of proactive search for market opportunities internationally or globally.
B Use of foreign intermediaries	Involves employing the assistance of intermediaries in carrying out operations in foreign markets. Thus, the degree of dependence or independence of a company is dependent on their internationalization experience, available resources and capabilities.
C Forms or scope of foreign involvement	Firms in this category advance in their internationalization based on their level of involvement. It involves the company's transition from less involving forms of foreign market operation (such as exports) to higher involvement and resource allocation (such as production and other activities connected with capital investments), advanced form of involvements also includes licensing or management systems.
D Number of foreign market	The total amount of markets in which the firm operates. Advancement in internationalization leads to increasing firm operations in more (growing) number of countries.
E Similarities between foreign and domestic markets	Firms in this category tend to start internationalization operations in similar markets or neighboring countries (low psychic distance). After accumulating international experience, they internationalize to more distant geographical markets (countries) thus larger markets with higher risks.

5 CLEANTECH

According to Hoffman (2001), a transition started to occur in the dominant logic in business operations between the early 1980 and 1990. This transition was also associated with the increase in various programs such as “clean production”, “eco efficiency” and pollution prevention initiatives to improve the environment. The emergence of cleantech industry was aimed to achieve economic savings resulting from waste minimization in business operations and in the economy at large (O'Rourke, 2009). More so, environmental responsibility became a cost burden for regulated firms. For example in the US in the early 1960s, many environmental laws and regulations were placed to control the environment and reduce pollution placing a lot of pressure on companies to reduce water and pollution of any sort (Chertow & Esty, 1997; Millennium Ecosystem Assessment, 2005). These led to increasing environmental concerns (such as disasters, sustainability and climate change) in the society and thus the emergence of cleantech firms (Millennium Ecosystem Assessment, 2005).

Kachan and Fugere (2013) refer to “clean technology”, as a novel technology which relates to business models intended to provide solutions to global climate, resource challenges, or desire for energy independence, while offering competitive returns for customers and investors. The categorization of cleantech cuts across various industries such as energy, manufacturing, environmental and resource categories as shown in Figure 16. Clean technology (or cleantech) refers to products, technologies or techniques, and services which cause less damage to the environment or less consumption of natural resources in their production process or the use of other alternatives (Kachan & Fugere, 2013). In terms of the environment, a clean technology product is a better product than an alternative product with corresponding characteristics of use (Cleantech Finland, 2015a). In the production and use of such a product, the average national level may serve as a standard of comparison (Statistics Finland, 2015a). Research claims that Cleantech embodies various products, services, and processes with a key characteristic of providing superior performance at low costs, minimizing or eradicating negative ecological impact and enforcing efficiency and more responsible use of natural resources (Kachan & Fugere, 2013).

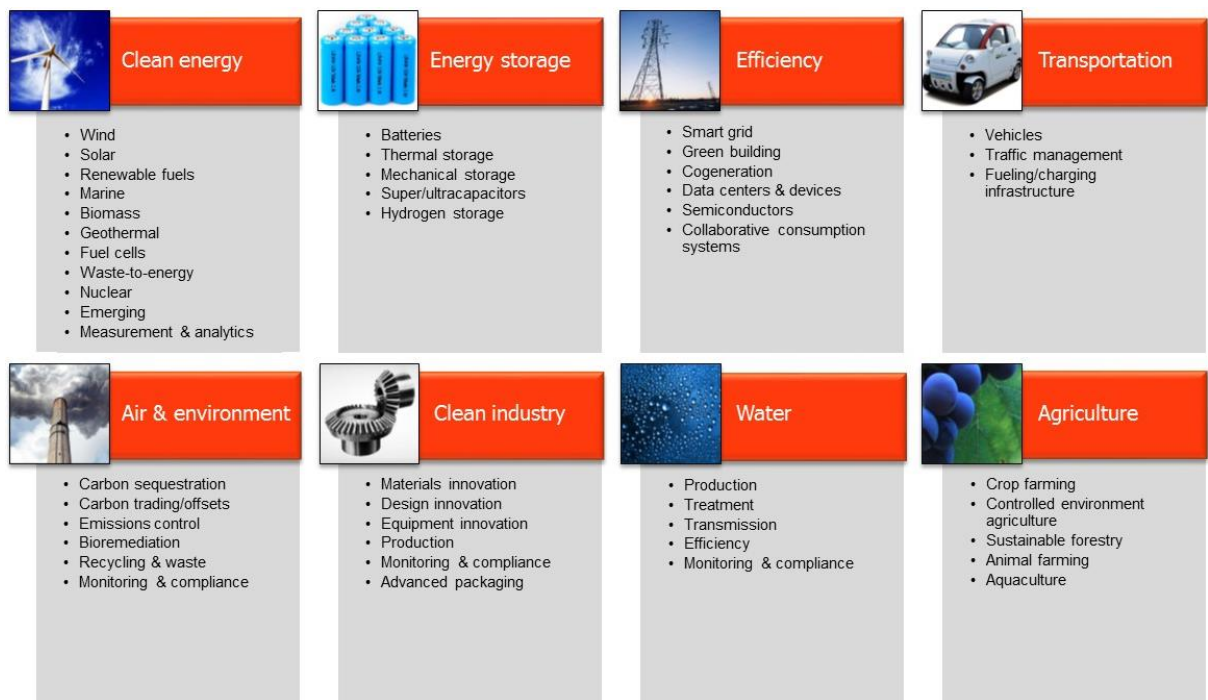


Figure 16. The categories of cleantech (Kachan & Fugere, 2012).

5.1 The Emergence of Cleantech Firms

The emergence of cleantech is as a result of sustainability initiative, thus prompting firms to be more eco-friendly (Anil, 2011). Although there are arguments that cleantech is not a new phenomenon rather it is a combination of several industries, and an evolving industry (OECD, 2012). O'Rourke (2009) suggests that cleantech symbolizes a new wave of entrepreneurial activities which fosters environmentally sustainable industrial system illustrated in Figure 17. She also mentioned that establishing cleantech as an institutional category is as a result of replication of existing venture capital norms. Adding that the emergence of cleantech has since the past decade been an important investment category and cleantech encompasses social and institutional perspective. Thus, the emergence of cleantech is as a result of institutional entrepreneurial intentional strategy aimed at competently connecting cleantech with macro events and cultural priorities. O'Rourke (2009) suggests that the emergence of cleantech is as a result of the convergence of two narratives namely "innovation driven economic growth" and "environmental degradation". These two narratives are said to have been worlds apart or contradictory and were developed in the early 21st century.

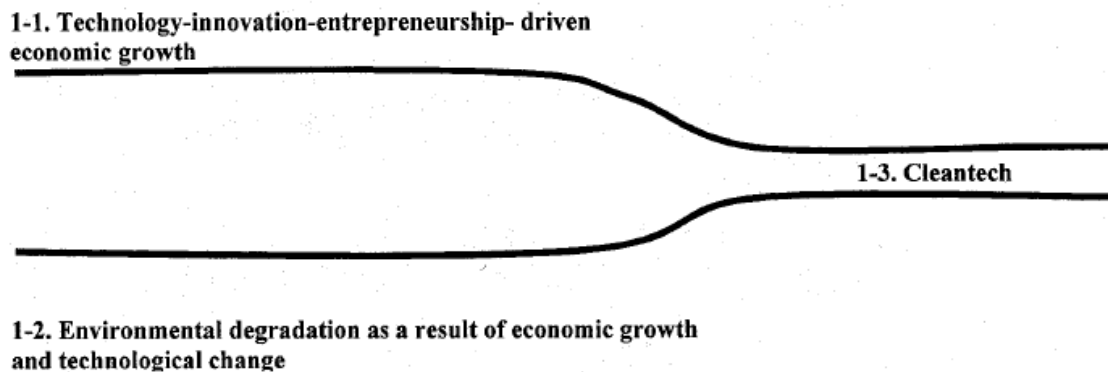


Figure 17. Conceptual schema of the antecedents of cleantech (O'Rourke, 2009).

The combination of cleantech product and service market globally is estimated to be above \$250 Billion in size and this is expected to grow exponentially up to five times bigger market in subsequent years (Anil 2011). Kachan and Fugere (2013) use the “technology hype model” to analyze the position of cleantech. In which they predict a potential rise in the cleantech industry and suggest that it is the direction for future business investments. Anil (2011) suggest that cleantech unlike similar concepts like “biotech”, “greentech” and other similar concepts, have proven to be a practical approach for companies to reduce their environmental footprints without disrupting their business models. Although there has been a speculation about the consistency of the cleantech industry where it was compared to the “dotcom” bubble. Sagar Gubbi, manager of Ecoforge, is of the opinion that cleantech firms should not be evaluated as “dotcom” companies because the industry primarily deals with improving social amenities for the society, and government and international policies support the development of the cleantech industry (Anil, 2011).

5.2 Cleantech in Finland

The national objective of Finland is to foster the growth and development of cleantech into a “new corner stone”. Figure 18 shows the most prominent Finnish cleantech categories, with energy efficiency, clean industrial process and bioenergy sectors as leaders in the global market. Finland invests heavily to encourage the growth of this sector with more than 40% Finnish public R&D funding invested in the energy and environment field, and more than a third of public R&D investments in cleantech (Cleantech Finland, 2016) as seen in Figure 18. Other important cleantech categories in Finland includes energy and resource efficiency,

renewables and smart grid, clean web and Internet of things (IoT), waste-to-value, air quality, clean water, smart transport and logistics (Cleantech Finland, 2016).

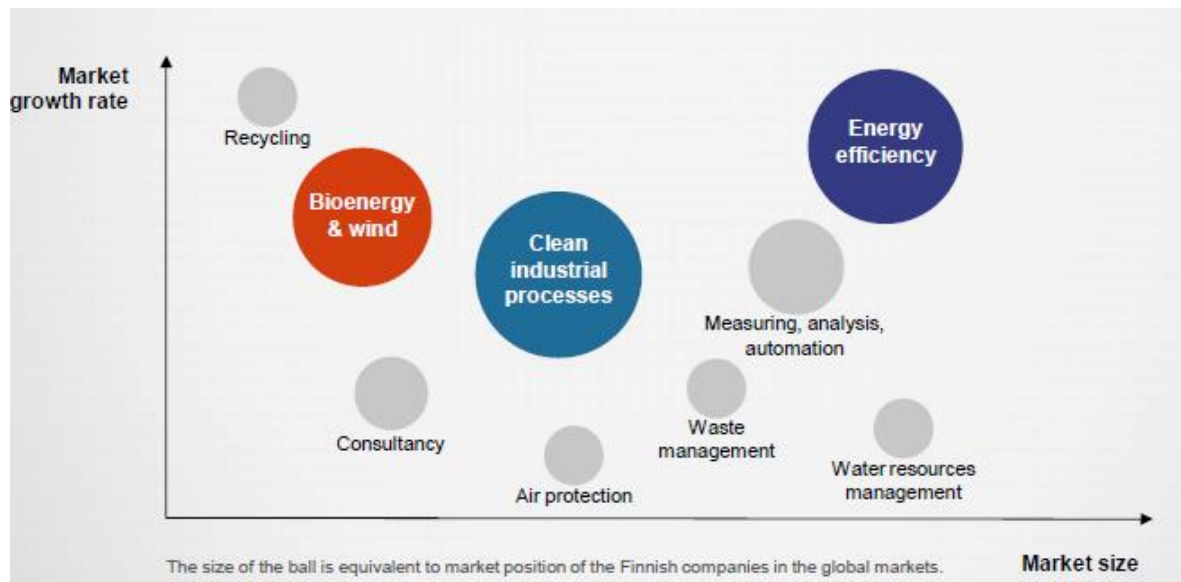


Figure 18. Finnish cleantech clusters and area of expertise (Cleantech Finland, 2016).

The Finnish cleantech sector is highly diversified with varying activities (TEKES, 2013) and comprises of about 1600 cleantech companies. The Ministry of Employment and Economy Finland highlights that “cleantech” is not an industrial sector of its own but has markets for products and services in all industrial sectors comprising of 70% SMEs and micro companies and 30% large and multinational companies (Cleantech Finland, 2016). The cleantech industry in Finland has thrived despite economic challenges with an estimated combined turnover of EUR 24 billion and 15% annual growth in 2013 (Statistics Finland, 2015b). The growth of the Finnish cleantech industry is evident with 90% of participating companies expected to increase jobs within their cleantech business segment in the next five years. Similarly, about 88% of Finnish cleantech firms are considering expansion through internationalization efforts and two thirds of Finnish firms are predicted to further invest in cleantech (Finpro, 2014). Finland has expertise in various cleantech categories.

According to the Director of cleantech Finpro, Iikka Homanen, the effect of global trends such as urbanization and industrialization pose as threats to the environment and led to enactment of global environmental regulations, which in turn has affected the global demand for Finnish Cleantech expertise (Finpro, 2014). The combined report of cleantech Finland

and TEKES mention that the key focus of cleantech as seen in Figure 19 incorporates business models, services and value proposition and digitalization and sustainability (3BL) initiatives.

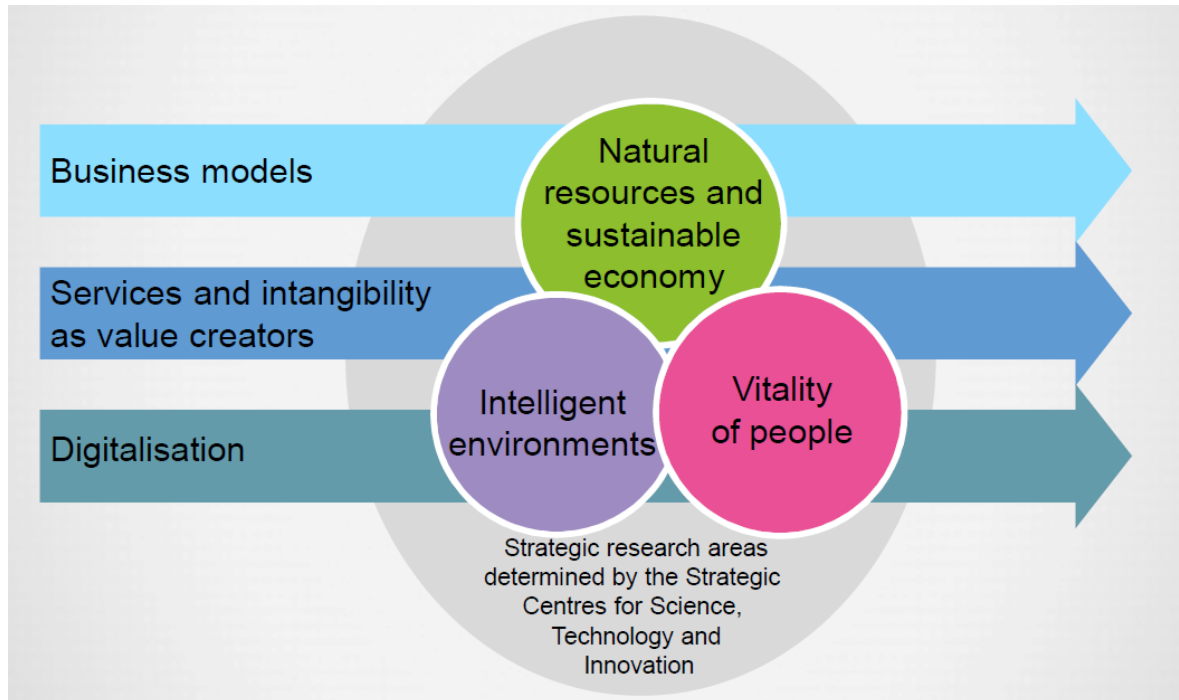


Figure 19. TEKES activities in cleantech cluster (TEKES, 2013).

Thus, cleantech aims to provide technology, service solution, process innovations or products that help reduce the environmental load caused by human activity, to save energy and natural resources and to improve the living environment (Cleantech Finland, 2015a). Immense investment efforts are being put by the Finnish government to support the growth of cleantech firms (Ministry of Employment and the economy, 2015b). Future objectives by the Finnish ministry of employment and technology strategic goals for 2020 is to raise cleantech companies' turnover to EUR 50 billion (of which exports account for over 75%). Thus, the aim is to double the cleantech home market to about EUR 20 billion, increase the number of cleantech companies from 2000 to about 3000 and create at least 40,000 jobs in clean technology in the country (Ministry of Employment and the economy, 2015a).

6 RESEARCH METHODOLOGY

This section explains the empirical approach adopted in this study. It describes the research methodology, approach, design and overall strategy adopted. The data collection method, analysis and the extent of credibility and dependability of the findings are also discussed in this section. The empirical part of this study is supported by a qualitative interview based multiple case study and an archival research approach. The study also aims to test existing SME internationalization theories and analyze the data collected to see if there are links and emerging patterns between SME internationalization theories (antecedents and patterns) and the internationalization of Finnish cleantech SMEs. Thus the decision to adopt a qualitative research method was supported by the premise that qualitative studies reinforce theory generation, especially if the research direction is exploratory (Saunders, Lewis & Thornhill, 2009). Yin (2009) suggests that the type of research question, the degree of control on behavioral activities and the extent of focus on existing events, are important conditions to consider before selecting an appropriate methodology. Thus, considering the ambiguity of the phenomena being explored, a qualitative research method was best suited, which is in line with the view of Eisner (1991) that a researcher can have a “clear understanding of a complex or enigmatic situation by adopting a good qualitative” research method.

Adopting an exploratory and qualitative study also, allowed for profound cross-cultural understanding. As a result, reducing the likely hood of cultural bias which may affect the credibility of the researcher’s findings (Marschan-Piekkari & Welch, 2004). Most importantly, opposed to quantitative inquiry, qualitative approach explores the research problem beyond measurements and observable behavior. In other words, it uncovers hidden meaning, underlying beliefs and action (Marschan-Piekkari & Welch, 2004). The adoption of the research method also allowed the researcher imbibe a naturalistic approach in understanding a phenomena in a context specific setting. (Yin, 1994; Marschan-Piekkari & Welch, 2004). In other words the research method provided a natural response to the research questions without manipulating the responses. Thus, providing a rounded view to the research area (Hancock, 2002). Overall, the objective of qualitative research is to gain “understanding, illumination and extrapolation” of the research context and phenomenon (Hoepfl, 1997). Figure 20 is an overview of the research method adopted.

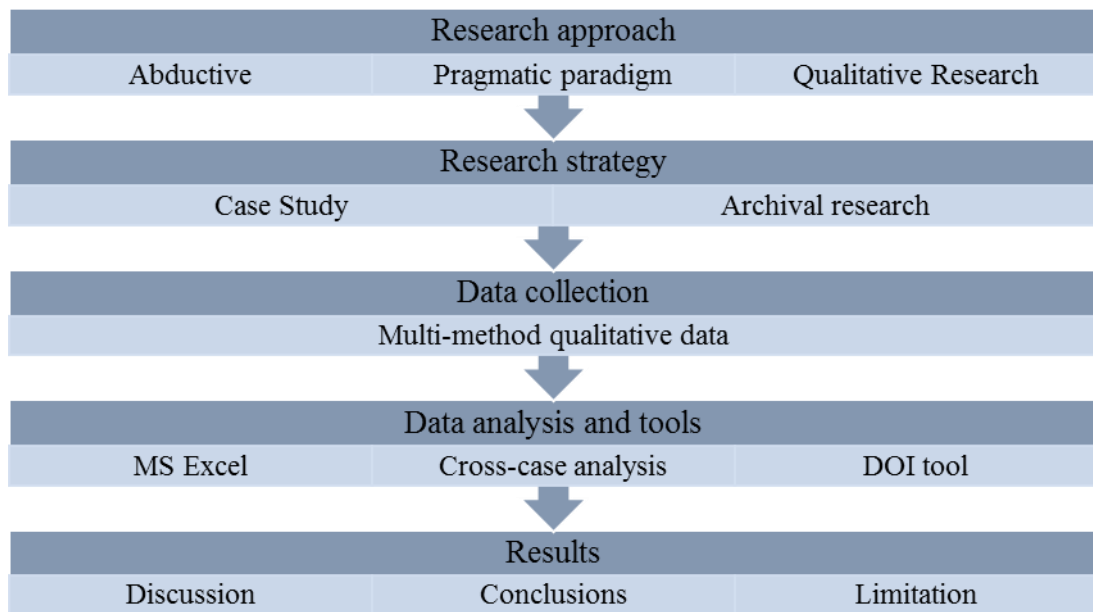


Figure 20. The research method (Adapted from: Saunders et al., 2009).

6.1 Research Design

According to Saunders et al. (2009) the research design is the plan utilized to answer research questions. Thus, it involves properly outlining the objectives based on the research questions, specification of data collected, ethicality of issues and challenges encountered. Figure 21 is a clear reflection of the approaches employed from the inception to the conclusion of the research.

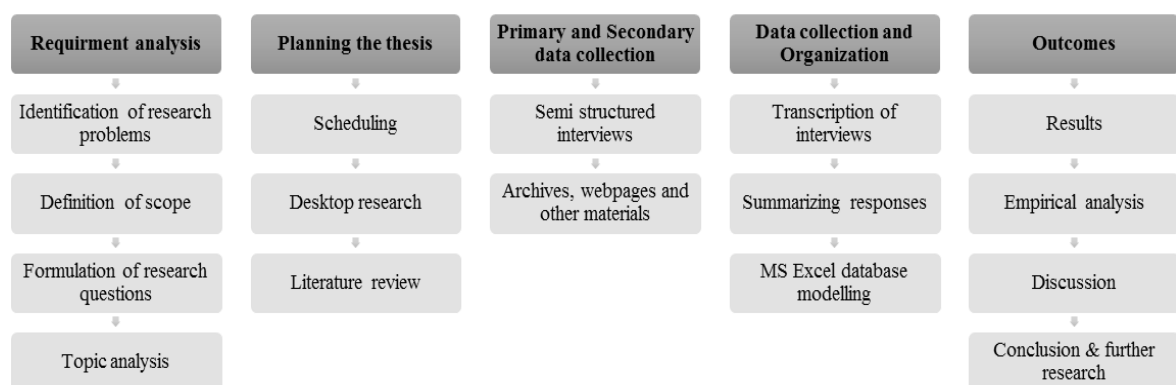


Figure 21. Phases of the research design adopted.

An exploratory research was considered suitable for the study because it is an expedient method through which a researcher gains clarification and insights on a complex and unclear phenomena (Saunders et al., 2009). The exploratory research design also spurred the data

collection method. Desk research was also employed to better understand the meaning of “cleantech”. The primary data collection was through interviewing “experts” also known as “corporate elites” (Marschan-Piekkari & Welch, 2006) to gain more knowledge on the research area. In order to gain more knowledge on the study, a multi-method qualitative research was adopted for this study. Multi-method study employs data analysis with the use of non-numerical qualitative procedures (Saunders et al., 2009). As a result, data collection was based on semi structured interviews and company archived materials. Qualitative approach is also appropriate for case studies and identification of so called “soft” factors or underlying inferences (Marschan-Piekkari & Welch, 2004; Saunders et al., 2009; Yin, 1994). Qualitative study allowed the researcher to effectively combine inductive and deductive inferences from respondents.

The case study strategy permits the use of unique themes to categorize and illustrate key inferences based on a phenomenon, rather than statistical occurrences of specific contexts. In this case, the internationalization process of the cleantech SMEs (Berg, 2001). Furthermore, to establish coherence and consistency in the data collection and organization process, the researcher adopted the use of “themes” for proper evaluation and analysis of the data. Triangulation was also adopted to provide clarity and refine the data analysis process. Triangulation is defined as an evaluation strategy used in bias control, refining the credibility (validity and reliability) and establishment of valuable propositions in research findings (Golafshani, 2003; Mathison, 1988). Critical incidence technique was also adopted in accumulation and evaluation of the data, it was considered because it allows researcher have more arguments to satisfy the research questions. Critical incidence as its name implies allows the researcher evaluate important events of a particular activity as experienced by the research participant. Consequently, critical analysis of the details of the case firm activities allows the researcher gain understanding on and make inferences on observed or emerged patterns or trend of activity (Hughes et al., 2007; Flanagan, 1954).

6.2 Research Approach and Strategy

The extent of clarification on the theoretical approach to be adopted at the beginning of a research determines the type of research approach to be implemented (Saunders et al., 2009). A research approach can either be inductive, deductive or abductive. Where the inductive approach (testing theories) involves exploration of data and forming new theories as a result,

deductive approach (building theory) relies on existing literature and theory to test empirical data (Saunders et al., 2009) and abductive research on the other hand is based in on the combination of both deductive and inductive research approaches (Saunders et al., 2009; Dubois & Gadde, 2002). An abductive research approach was adopted in this study. This was because it was difficult to select a particular approach due to ambiguity of the research phenomena. More so, the theories to be adopted to satisfy the empirical data were difficult to identify from the inception of the research, thus an abduction approach was considered more suitable. Saunders et al. (2009) are of the opinion that there are no optimum techniques for adapting research strategies in business studies. Stating that “no strategy is more superior to the other” hence allocating specific strategies to a particular approach may be considered unduly simplistic. In order to select an appropriate strategy, a researcher should be stimulated based on the degree of theoretical and practical knowledge, time, resources and philosophical inclinations (Saunders et al., 2009; Yin, 2003). In other words, the choice of the research strategy implemented should satisfy the objectives of the research and be guided by the research questions (Saunders et al., 2009). Table 7 describes relevant situations which could be considered before a research strategy selection.

Table 7. Relevant situation for a research strategy (Yin, 2009).

Research strategy	Form of research question	Requires control of behavioral events	Focuses on contemporary events?
Experiment	<i>How, why?</i>	Yes	Yes
Survey	<i>Who, what, where, how many, how much?</i>	No	Yes
Archival analysis	<i>Who, what, where, how many, how much?</i>	No	Yes/No
History	<i>How, why?</i>	No	No
Case study	<i>How, why?</i>	No	Yes

After considering the situation of the study, a mixed strategy combining a case study and archival research strategy was adopted. An appropriate research method allows the researcher gain a holistic and meaningful understanding of the research phenomena (Yin, 2009). More so, since mixed method design was considered, triangulation was used to corroborate data utilized (Bryman, 2006). In other words, the research findings were validated by adopting two or more independent sources of data. On the other hand, case studies provide an embedded design which uses multiple levels of analysis within a single

study. It is also used to test theory or provide descriptions (Eisenhardt, 1989). Thus, a case study strategy allows the researcher use an embedded design as well as adopt numerous levels of analysis at the same time (Yin, 1984).

Archival research on the other hand utilizes recent, historical and administrative data sources (Bryman, 1989; Saunders et al., 2009). Archival materials from the companies and the research projects were used to build up the results and gain more insights on the research questions. Archival research strategy was adopted because it fosters answering research questions which are based on past events (Saunders et al., 2009). Consequently, taking the scope of the study into consideration and time constraint for the data collection, a cross sectional approach was imbibed for the thesis. The basis for shaping the hypothesis and analysis will be drawn by examining cross case patterns such as similarities and differences from within the case data (Eisenhardt, 1989).

6.3 Case Sample Selection

In order to gain clear hypothesis on a research, Eisenhardt (1989) suggests that a proper case selection is crucial and should be carried out with a suitable population. As this would help minimize variations in data collection and allow the researcher properly limit and generalize findings. The companies selected in this study were “Finnish cleantech SMEs” who are at various stages in their internationalization process. The case firms were selected from a group of companies directly or indirectly involved in the BICS project. All the companies evaluated were cleantech companies with various level of involvement in internationalization activities. Thus, the case firms were not random because they were specific to the research context.

However, due to the diversification of cleantech industry and variations in the cleantech categories, the criteria for case company selection was not strict. The companies had different lines (products and services) of business and the unifying characteristic was their industrial podium or “cleantech phenomena”. Additionally, due to the varying levels of involvement in internationalization operations of the case firms, they were categorized as “best practice”, “intermediate” and “inexperience”. The categorization allowed for ease in handling data as well as answering the research question, the cross analysis further enabled the researcher observe the relationships or inconsistencies in the responses (Fisher, 2010).

The "best practice" firms had extensive knowledge and experience in internationalizing; "intermediate" firms had intermediate knowledge and experience in internationalizing; and "inexperienced" firms although were knowledgeable about internationalization, they did not have actual international sales. Thus, the sample selection was mainly concerned with gathering information specific to the respondents for analysis.

6.4 Data Collection and Organization Method

Data collection involves collection of information from various sources such as archives and drawing qualitative evidence from interviews (Eisenhardt, 1989; Saunders et al., 2009). Primary data and secondary data were used in the study. The main source of the primary data were interviews from the company respondents and the data was retrieved through personal interviews, telephone and skype calls. Secondary data was via other sources like archives and webpages. Table 8 shows a summary of the sources of data utilized.

Table 8. Summary of sources of data collection.

Data used	Sources of data gathered
Primary data	<i>Interview with key actors: CEO, Marketing and Sales representatives</i>
Secondary data	<i>Cleantech Finland, Finpro, Company webpages</i>
Archival materials	<i>Reports, Interview transcripts, Presentations, Pamphlets, company annual reports</i>
Other material	<i>Voitto database, Statistics Finland</i>

Data analysis and processing

Eisenhardt (1989) describes data analysis as the core through which theories are built in case study evaluations. Thus, given the importance of data analysis in a research process, it was essential that the data collection was carried out in an organized and systematic way to ensure that meanings were not lost, and data validity and credibility was retained. The interview questions were systematically and purposefully set to answer the research questions. The questions were interwoven such that inferences were made both directly and indirectly from the interviewees' responses and underlying meaning to subliminal questions were recognized. The approach is in line with Ghauri's (2004) suggestion that efficiency is achieved if data collation and analysis are interconnected from the inception of the interview. As already mentioned semi structured interviews for primary data collection was used. The summary of the responses are presented in Appendix II.

The selection of participants for the interviews were made by taking into account the research questions and objectives which is to understand the internationalization of cleantech SMEs taking IE perspective into consideration. For this reason, it was important for the researcher to carry out the interview with the experts or corporate elites. Welch et al. (2002) defines corporate elites as *“top management specialists or middle age managers who occupy elite positions due to their long tenure in the organization, broad internal or external personal networks or functional responsibility”* Five interviews were carried out involving the CEO of Biosoln, CEO and sales director of IoTech, sales director of Lumtech, CFO of Newaves, and marketing representative of Converttech. The interviews alongside archives were very informative and satisfied the research purpose. As the respondents had extensive knowledge of the business and experience in the case companies. All the interviews were recorded and transcribed after which all the interview responses were individually summarized. The interview questions were also arranged based on key themes relevant to the elements of analysis. Figure 22 is a representation of the set up.

The interview style was semi-structured and the questions were clear and simple. The questions were structured such that the theoretical concepts were kept to a minimum. The respondents were also knowledgeable about the research context and had extensive work, educational and international experience. However, the respondents were intimated beforehand and sent preliminary themes on the line of questioning to be implemented. This was done to give the participants an overview on the line of questioning. Fortunately, the respondents seemed to be considerably acquainted with the interview questions which embodied some theoretical concepts. In order to properly explore and gain a full account of the research topic, the researcher employed an open line of questioning. Some of the interview questions were also modified based on direction and reaction of the responses received. In other words, depending on the skew of the responses, the researcher asked more specific and probing questions. Thereby, allowing the respondents build trust, confidence and ease to spontaneously communicate their opinions without any underlying prejudice (Saunders et al., 2009; Golafshani, 2003). Critical incident technique was also adopted in the interview questions and inquiry process because the approach allows the respondents describe in detail one or more incidents significant to the research questions (Saunders et al., 2009). The technique was adopted to minimize the scope of bias and reinforce the reliability of the accumulated responses.

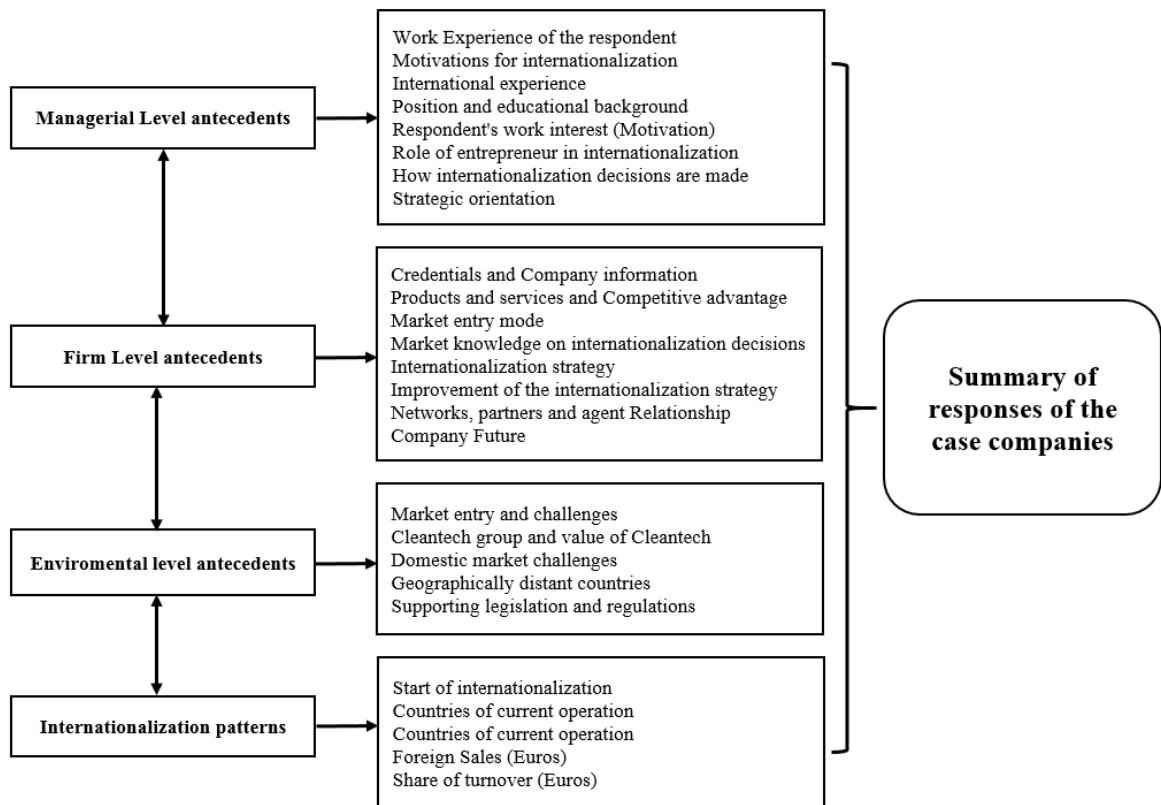


Figure 22. Key themes and elements of analysis used for data collections.

After collecting the data, in order to rationally extract relevant responses for the analysis, the researcher matched the “questions” (themes) against the summarized responses from the case companies. MS-Excel was utilized in order to build a data model for the analysis. For the data model, a database was developed based on the summary of the responses from the various case companies. The researcher considered the case companies and interview questions as the key variables for the model which provides the responses as the output. The features “define names” and “data validation” were used to sort the data in order of relevance for the cross case analysis. Additionally, to compare the responses, “offset” and “match” functions were used to call up the responses based on selected variables. Thus, the data model is considered dynamic due to the fact that additional data for example, interview questions or case companies can be added to the data model for further research. Figure 23 is the data model employed in the data analysis. The areas labelled 1, 2 and 3 represent the first variable (themes or questions), the second variable (case companies) and outcomes (responses) respectively. Figure 23 shows an example of how the responses are displayed from the data model.

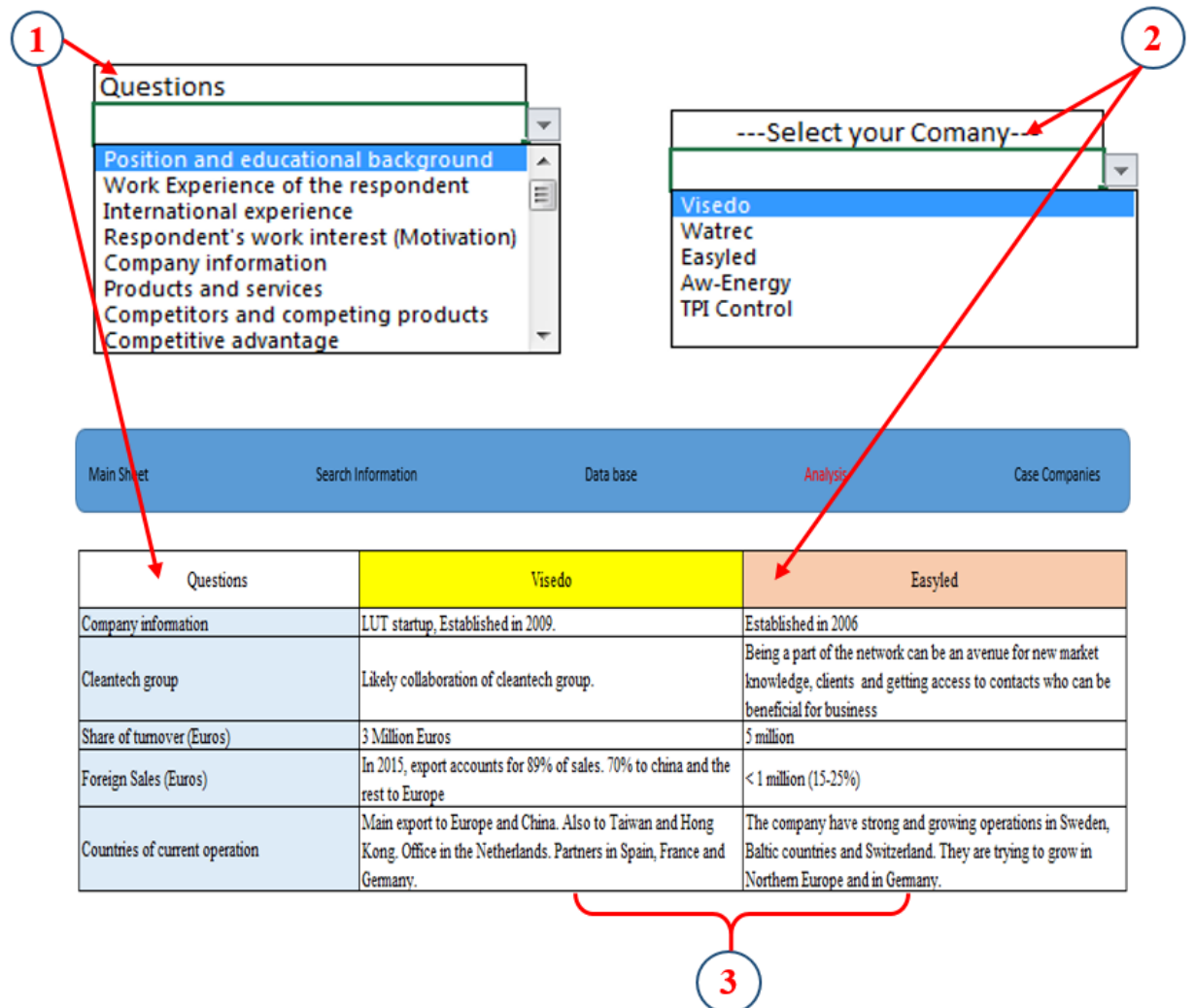


Figure 23. Data model illustration showing variables and outcomes.

To conclude this section, the setup of the interview questions and data model were targeted towards the actualization of the research questions which is aimed at understanding “How the internationalization of Finnish cleantech firms occur?”. A hybrid approach aided the data interpretation because it involves using proven theoretical constructs and paradigms to make sense of the research findings (Saunders et al. 2009). Thus, data collected was used to make inferences on the antecedents and pathway of internationalizing cleantech SMEs. The data interpretation techniques adopted were essential for generating the themes for the data collection processes and logical generalizations on significant patterns that emerge based on the findings. Lastly, to buttress on the data interpretation process, the researcher adopted a collaborative assessment of the key findings in order to have a holistic view for answering the research questions.

6.5 Validity and Reliability

In academic research, be it qualitative or quantitative, it is imperative to evaluate the credibility of the research. To do so, the researcher is expected to avoid subjective intuitions which are developed as a result of the connection between the researcher and his or her material (Saunders et al., 2009). Reliability and validity are considered in qualitative research paradigm as a data collection technique for ensuring the credibility of research findings. Although, Stenbacka (2001) contends that reliability and validity is best suited for measurement related studies and is irrelevant to qualitative studies. Lincoln and Guba (1985) maintain that validity and reliability can co-exist because a demonstrating the validity is sufficient to establish the reliability of the study.

In both qualitative and quantitative perspectives, reliability is the extent in which data collection methods and analysis methods lead to consistent findings (Golafshani, 2003). Thus, to access the reliability of research findings, validity is associated with the consideration that the findings satisfy the measurement criteria and the candor of the results. Validity is usually determined by asking series of questions and seeking for causal relationships (Golafshani, 2003; Saunders et al., 2009). Although reliability and validity are essential criteria for the quality of quantitative paradigms (Golafshani, 2003). In qualitative studies, credibility, conformability, dependability and applicability are essential criteria for quality assurance (Lincoln & Guba, 1985). Thus, the terminology of dependability is perceived as best suited to qualitative paradigm (Lincoln & Guba, 1985).

Researchers argue that validity and reliability are treated independently in quantitative studies. However in qualitative studies, they are viewed collectively and characterized by their credibility, transferability, or trustworthiness (Golafshani, 2003). In this study, the interview questions were set such that they do not discredit any of the respondents. The questions were also set without unnecessary ambiguity to ensure reliability and reduction of bias in the interview responses. Non-disclosure agreements and anonymity of the respondents was ensured to foster mutual trust between respondents and researcher, thus more credible responses (Saunders et al., 2009).

To strengthen the rigor of the research and ensure that the data analysis was in line with the research setting, as earlier mentioned, hybrid approach and triangulation were considered.

Hybrid approach was adopted to reinforce the suitability of theoretical approaches adopted, assumptions, recommendations and conclusions made in the analysis. Triangulation on the other hand was adopted to ensure the trustworthiness, quality and credibility of the results. Most importantly, employing hybrid approach and triangulation served as the yardstick for generalizing the results. Lastly, intermittent evaluation of research questions, inputs and discussion of the results with (BICS) team members involved in the study also added towards reduction of researcher's bias on interviews, evaluating responses, and reporting results of the study as a whole.

7 RESULTS AND ANALYSIS

In this section, the research findings and analysis are discussed and interpreted. The chapter starts off by introducing the case companies and their demographics presented in Table 10. In the case descriptions, the researcher also responds to questions regarding the internationalization pathway of the case companies using the DOI mapping tool in Figure 15, observed firm internationalization activities described in Table 11 and connected the findings to pathway theories. The antecedents of case firms on firm level, managerial level and environmental level are also discussed and analyzed. The responses were evaluated based on the researcher's categorization of case firms (as best practice, intermediate and inexperience) and on a generic level. A lot of data was processed to answer the research questions. Thus, the cross case analysis illuminates how the data was managed, the validity of the data analysis, and it provides a condensed and visual explanation of the findings.

7.1 Internationalization Patterns and Description of Case Companies

This section combines an overview of the case companies and their internationalization patterns. Also, the demographics of the case firms and an outline of the internationalization activities were extrapolated in Table 10 and Table 11 respectively. The criteria and determinants used to evaluate the internationalization patterns are highlighted in Table 9 and Table 13.

Table 9. Evaluation criteria for internationalization patterns (Adapted from Kuivalainen et al., 2012a; Baum et al., 2015)

Pathway	Criteria for evaluation
Traditional internationalizers (TI)	Risk averse and incremental internationalization outside established domestic market. Starts internationalizing later than three years after the inception of the firm. Companies who follow this pathway have operations in less than five countries including country of origin.
Born global (BG)	Internationalization occurs usually within three years after inception with operations in five or more countries including country of origin.
Born again global (BAG)	Foreign market entry begins later than three years after the inception of the firm with operations in five or more countries including country of origin.
Born international (BI)	Typically sporadic pattern of internationalization. Foreign market operations occurs within three years of the inception of the firm, but operates in less than five countries including country of origin.
Born regional (BR)	Similar to born-global firms, born regionals firms internationalize shortly after inception but focus operations on countries from similar geographical region.

Convertech is a technology company which specializes in manufacturing of high efficiency hybrid and full electric vehicle solutions (Convertech, 2015). The company is also a rapidly growing cleantech firm which applies cutting edge technology in providing hybrid solutions that lower power and fuel consumption and meets emission standards of various countries (Greenenergyshowroom.fi, 2015). Their main focus *“is on the system selling”* (Interviewee, Convertech). The company was a university (Lappeenranta University of Technology) start-up founded in 2009. The respondent mentioned that the company was founded by engineers from different industries of which some of the owners had connections with the local university. Additionally, as a core, their competitive advantages lie in *“...their possession of own in-house software knowledge in system building and very strong engineering background and specialized R&D Professionals”*.

Although Convertech considers itself a born global company, this is also reflected in its internationalization efforts which commenced from the inception of the company in 2009 with about 90 percent of sales coming from international trade. Convertech owns manufacturing facilities in Finland and Germany. They also have various other business to business (B2B) customer segments spread across different parts of Europe, China, Taiwan and Hong Kong. In 2015, their export accounted for about 89% of sales. About 70% to china and the rest to Europe. They also have offices in the Netherlands, partners in Spain, France and Germany.

Biosoln is a technology company with background in industrial waste water treatment. However the company through R&D refocused towards organic waste processing and providing bio-waste treatment. The company was founded in 2003 and had been a one-man consulting company. It has grown organically and attracted important domestic investors who have been instrumental in product and technology development. According to the CEO, the company's main competences are in biological systems and providing close loops in bio-gas systems. Biosoln does not have a “one gadget product” rather they specialize in constructing so called “bio refineries” and providing customized product and technology solutions to suit their client needs and specification. Biosoln claims to have started exploring project business as an internationalization strategy since 2006 due to the declining attractiveness of the domestic market. As stated by the CEO, *“we have been looking for*

different markets in, environmental sector abroad. We started from the US and then we had, tried Russia, and sometimes we've been in China, (more or less) all around the world". But the problem is the product line, the nature (intangibility) of the product and long-time taken to develop the product. We have now in a final stage of starting one project in Greece, and we started to develop that project together with the client six years ago".

The competitive advantage of the firm is in the simplicity of their business processes and operation. *"The physical equipment's we are using, we can buy them anywhere. So there's nothing special and we are trying to avoid all kinds of let's say gadgets that would make your process unique, because it doesn't really work".* In other words, they have extensive experience in the plant operation, functionality, technical and educational knowhow on how the systems work. According to the respondent, the combination of the aforementioned qualities are quite rare. The company has also explored different projects in Poland, Estonia, Iraq, Greece, Mexico and parts of Asia. The CEO mentioned that location (distance of the countries) does not affect the market which they enter. However, due to limited firm resources it seemed more logical to focus on locations closer to the domestic market. The company recorded less than one percent in foreign sales in 2012 which is due to the longevity of the projects and also because the revenue comes per project. The company aims to be more systematic in terms of sales and gain up to 50% revenue from foreign sales in the next two years. They aim to achieve this by amplifying financial and human capital efforts. More so, the company mentioned developing an alternative revenue model which is their plant management service. This service was recently developed and they plan to launch it as an international service offering. In other words, Biosoln plans to provide international consultation to augment development projects and manage client relationships.

Lumtech was founded in 2006. They manufacture and design LED luminaires for street, sports, retail and industrial lighting. Lumtech's vision is to gain international recognition through its innovative and reliable high-quality LED lighting solution. The company's mission is to design, manufacture and deliver safe, high-quality, improved life cycle and costs-optimized products. The company has major competitive advantage in thermal management of the product, the slim design of the product and the optical performance of the product. According to the interviewee *"Everybody can put LED on the printed circuit board, and call it luminaire. Because it's giving light, for sure. Yes, that's true. But it is the*

magic that, what we do and it is our sweet spot that we can steer the light where you need it”. Lumtech operates internationally via foreign distributors who handle sales and operate in close contacts with customers, local contacts and partners. Their distributors are mainly in Sweden, Estonia, Lithuania, Benelux-countries, Spain, Switzerland and the United Arab Emirates (Lumtech.fi, 2016). According to top managers of the company, Lumtech provides training and support in technical aspects but the marketing is pretty much outsourced to distributors. In 2015, the company recorded less than 1 million euros (15-25%) in foreign sales. The company has strong and growing operations in Sweden, Baltic countries and Switzerland. They are trying to grow in Northern Europe and in Germany. The main driver to enter the German market is the market size and the high cost of electricity since LED offers less power consumption.

Newaves is a Finnish clean technology company operating in the wave energy industry. The company was founded in 2002. Newaves’s core competence is in its patented *Wavers* concept and product design. The *Wavers* is the first device to use ocean energy also known as the surge phenomenon to generate electricity. According to the interviewee, Newaves’s competitive advantage is in their breakthrough product which is the *wavers*, power take off and their rare accreditation certified by “Lloyds”. The power take off is a patented component of the company’s product which gives the *wavers* the potential to generate electricity which is also considered as a key competitive advantage. The respondent mentioned that they *“have a very strong operational team, so people who have actually worked in the ocean and, have been diving in the sea, so they actually understand the practical side.... So I see that our team has quite unique setup for capabilities and in this way we are able to progress fast and deliver good quality products”*. Although the *wavers* has not been fully commercialized, it is still in development and testing phase. The company has undertaken some successful demonstration projects in Portugal, Ireland, United Kingdom, France and more recently in Mexico. The current business model is based on collaboration with integrators due to inadequate finances and resources to push through major demonstration projects. The company obtained financial backing of about three million euros in 2009 from the EU and in 2012 received a grant from stakeholders of about 9 million US dollars to show the proof of concept of the technology. Some of the financiers of the project include Aurora Capital, Fortum Oyj, John Nurminen Oyj, Sitra and TEKES (Newaves, 2016). Besides their successful demonstration projects, the company also seeks

for projects in the United Kingdom and Spain. The company also has some activities outside of Europe, in the United States, Mexico, Chile, India, Sri Lanka and Indonesia.

IoTech is a service company which studies and analyses the state of heat transfer processes and provides optimized solutions based on their findings. The company was founded in 1999 and the owner owns about 85% of the company and four individuals own the other 15% of the company stock. 15% of their annual revenue is allocated to research and development. The company has a peculiar process, they collaborate with their partners to carry out renovations and standardized maintenance of heating and cooling systems in buildings. According to the respondent, it takes a few years for them to get the buildings renovated. They are interested in big buildings, shopping malls, hospitals and offices. They start by analyzing the situation concerning heating and cooling in a building. The company carries out process design calculations, service process consultation, maintenance, economic analysis and budget preparation for clients. The competitive advantage of IoTech is that they have theoretical and practical knowledge and R&D competences concerning heat transfer and other related phenomena. The company's business method is also considered a competitive advantage as it involves constant reporting, feedback and future recommendations. Trust building is also integral in service delivery. IoTech is interested in operating in Sweden. Additionally, because some of the company's domestic customers are also operating in Sweden, the CEO was of the opinion that *"it is logical to enter the Swedish market "that's natural step that we can utilize the contacts within customer"*. The respondent also suggested that Swedish market is also a potential market area because the economy is growing and because they are carrying out a lot of building projects. Also, the market similarity and market proximity to Finland is an enabling factor. *"It takes only 45 minutes flight from Helsinki to Stockholm. Then, another countries where we have similar climate than in Finland and similar structure"*. Potential countries for future market entry includes Russia and Canada due to the similarity in weather conditions as the domestic market.

Table 10. Case company demographics

Company	Convertech	Biosoln	Lumtech	IoTech	Newaves
Established	2009	2003	2006	1990	2002
Products/Services and Technology	Hybrid and full electric vehicle solutions	Bio-gas construction, customization and consultancy	Energy efficient LED luminaire	Heat transfer management	Wave Technology
	Product: Electric and power train systems	Product: Bio refinery	Product: Industrial, street, sport and retail lighting	Product: Detergents and anti-freeze	Product: Wavers and power take off
Cleantech category	Energy storage / transportation / efficiency	Renewable energy / energy storage efficiency	Energy storage / Efficiency	Clean Industry / energy storage / efficiency	Clean / renewable energy / Efficiency
Credentials	ISO Certified	ISO 9001	ISO 9001 and 14001, SGS-GS certificate for PRO Wave	-	Fitness for purpose certification
Competitive advantage	Research and development, In-house software and system building	Experience, educational competences, and innovative waste treatment solutions	Thermal management, design and optical performance	Holistic product and service offerings	Effective team work and cutting edge technology
Turnover in euros (2015)	3,000,000	8,000,000	5,000,000	4,000,000	200,000
Number of employees	30- 40	20	25	30	20

Table 11. Case firm international activities and pathways

Company	Convertech	Biosoln	Lumtech	IoTech	Newaves
Foundation of company	2009	2003	2006	1990	2002
Start of internationalization	2009	2006	2011	-	2002
Method of foreign market operation	<i>Licensing, exports, cooperation with value added distributors or resellers</i>	<i>Personal contacts, collaboration with partners and agents</i>	<i>Exporting and via international distributors</i>	<i>Intended operations via international partners</i>	<i>Own projects or via Integrators</i>
International markets served	<i>Europe and China</i>	<i>Poland, Greece, Indonesia, Mexico, South East Asia</i>	<i>Sweden, Baltics, Germany, Benelux countries, South America, Spain, Switzerland, UAE</i>	<i>Sweden</i>	<i>Projects in Portugal,, Ireland, United Kingdom, France and Mexico</i>
Countries of interest	<i>Flexible to global market opportunities</i>	<i>South east Asia, South Africa.</i>	<i>Germany, Norway, Denmark, Baltic countries</i>	<i>Sweden, Scandinavia and Baltic countries</i>	<i>Western coastline, Japan Chile, South Africa, Australia</i>
Level of internationalization involvement (actual sales)	<i>Best practice</i>	<i>Intermediate</i>	<i>Intermediate</i>	<i>Inexperienced</i>	<i>Inexperienced</i>
Dimension of internationalization	<i>High</i>	<i>Medium</i>	<i>Medium</i>	<i>Low</i>	<i>High</i>
Foreign sales percentage	89% (High)	<1 % (low)	15-20% (low)	-	200,000 EUR
	<i>High</i>	<i>Low</i>	<i>Medium</i>	<i>Low</i>	<i>Low</i>
Internationalization pathway	<i>Born global</i>	<i>Born again global</i>	<i>Born again global</i>	<i>Traditional internationalizers</i>	<i>Born global</i>

7.2 Internationalization Antecedents

The internationalization antecedents are discussed in this section and they are further described based on the individual antecedent's determinants in Figure 14 and Appendix I.

Convertech is considered as the best practice case company because of their extensive internationalization experience. The respondent mentioned that the internationalization of the firm has been speedy and that they have doubled their turnover yearly since inception. For them to have achieved such growth, it was essential to begin internationalization from the day the firm was established. Thus to Convertech, internationalization *“is not something that we consider would be nice and would have potential but it's just something we have no other options than do as best as we can”*. The top management makes internationalization decisions on where and what to focus on and how to run internationalization operations. Firm decisions are further reinforced from information which comes from face to face discussion with client or during exhibitions. According to the respondent, *“information flow for internationalization comes from basically everywhere”* mentioning that some of the important sources of information for internationalization comes from the market, competitors' products, customer requests and information regarding changes in policies and regulations especially those centered around environmental issues.

Biosoln has had extensive internationalization experience. The respondent mentioned that some of the key motivations for the internationalization of the firm was to make profits, seek new market opportunity and react to declining potential of the domestic markets. The respondent stated that over the years, they had carried out extensive market research and made effort to exploit different markets using several means. To achieve this, Biosoln used various avenues such as student studies, participation in various fairs in different countries like France, Germany and South-East Asia. However, in order to internationalize, Biosoln adopts various operational approaches to suit the specific market of intended internationalization, *“we have different approaches also to different places”*. The respondent enumerated that when they have a project opportunity, first and foremost the management primarily tries to evaluate if it is a country of interest and if they have any opportunities to work in those countries. Afterwards, they evaluate the size of the plant in order to identify the feasibility *“of the project in terms of technical and economic sense”*. This step is essential because the company's main focus is on large scale projects or

construction of big plants. After these initial steps have been assessed, the final step involves sending emails on budgetary offering and enlightening the customer on the application and specification of the product. In summary, the respondent stated that internationalization decisions are made after the company is contacted by customers or clients. Their firm pays attention and responds to questions regarding the products and projects. Also, decisions are easier when the customer already has interest and some background in waste treatment.

Lumtech started making internationalization efforts via distributors not long after the foundation of the firm. One of the core motives for the company's internationalization is to increase business opportunities, gain first mover advantage, and capitalize on the innovativeness and novelty of their technology. Additionally, the small size of the domestic market and growth potential from the international market is a key driver for internationalization decisions *"In Finland you have certain size of the market and certain group of players and, if you want to grow, you need to go somewhere"*. The respondent indicated that the main competence of Lumtech in their internationalization strides is their knowledge of the LED business. However, the company is aware that in order to make internationalization decisions, it is imperative to gain local knowledge, such as local habits, local market procedures as well as language competences to effectively penetrate new markets. The respondents cited that *"For example in Germany, business is much more formal than we are doing in Finland. You need to do some steps and some jumps before the even discussion starts"*.

Newaves viewed internationalization as an imperative from the inception of the firm. The reason is as a result of their unique product and technology which is best suited to specific locations and terrains internationally. According to the respondent, the core motivation for internationalization is the market opportunity. The company does not see a lot of feasible business potential in the domestic markets, thus internationalization was an imperative from the inception of the firm. No specific person or group of people influence foreign market selection decision. More so, the respondent stated that *"from the very beginning and inception of the company we thought that we have to go abroad so we have always been in foreign markets"*. According to the respondent, the internationalization decisions of the company are made based on the analysis of countries where there is perceived positive market potential in terms of resources and business opportunities. One of the key aspects for

internationalization is entering markets where their product and technology is relevance that is areas where there is an abundance of ocean waves. As a result, the company seeks for customers or make internationalization decisions to enter markets where the resource potential (waves) is high. However, they are considered inexperienced because in the interim they are working with demonstration projects and do not have actual sales.

IoTech has mostly focused their business operation on the domestic market. However, the company has recently been making efforts to intensify its internationalization efforts. The main countries of immediate interest for IoTech is the Swedish market and subsequently Baltic countries and other European markets. According to the CEO, *“because the biggest strength is that we company owners have to save Finland we know we need exports because the Finnish market is small”*. Taking this statement into consideration, the company’s internationalization motive is largely as a result of a collective effort of Finnish entrepreneurs to provide support to the declining Finnish economy by fostering international trade. In the case of IoTech, they aim to do so through exportation of their services to new markets. The respondents were of the opinion that they can gain enormous market opportunities in small areas like in Stockholm and even the domestic market. They plan to achieve success in foreign markets through collaboration with local partners who have interest in their business line. The CEO also affirmed that there is a big potential in modernizing their product and service offerings by capitalizing on the “internet of things and digitalization” in the near future. Regarding internationalization decisions *“We have four departments, and each one has the manager of the department, there’s five of us that are making decisions”*. However, the CEO stated that *“. . . When there’s big decisions concerning what will be the future and so on, then it will be me who will decide”*. In other words, each department is allowed the autonomy to make decisions that best suits the individual departments however the CEO makes major decisions and oversees the running of the entire company. The respondent emphasized that decisions made are in line with the company’s value. They are also considered as inexperienced because in the interim, their scope of operation is still mainly within the

7.2.1 Managerial Antecedents

Attributes	Case companies	
Mindset	Convertech	
	Possess a global mindset, and interested in learning about new markets and getting involved in business operations internationally internationalization decisions show high receptiveness of market opportunities globally.	
Experience	The respondent interviewed was a marketing employee of Convertech, with a Master’s degree in international marketing from Lappeenranta University of Technology. Work experience in export coordination and as a summer trainee. International experience accumulated though involvements in export coordination to china, international education and language proficiency. However, overall the company has highly educated professionals on managerial and various departmental level who are in charge of various firm operations locally and internationally.	
Entrepreneurial orientation	The education and experience of the business owners is important in the founding of the firm. However the role of capital investors is pivotal towards proving leadership for the firm “they decide which, segments we are moving towards, and also, the internationalization process “ market selection process is done through market research, information sharing and via international and personal networks. Distance is not a constraint for international market entry. <i>“We target markets that are providing the biggest growth potential for us... location is, not relevant for us but the market potential and what we can offer customers”</i>	
Mindset	Biosoln	Lumtech
	International mindset due to experiences in business operations. Personal contacts and networks are essential in internationalization decisions. They adopt a critical approach in market selection process. Distant geographical markets are less preferred due to limited resource and extreme location.	International mindset, due to long work experience and international market. Interested in working with new technologies, in new environments with new people. Stereotypical and stiff viewpoint towards distant markets. Developing solid international foothold or networks is an antecedents to internationalizing.
Experience	The respondent for the interview CEO of the company. Has high level education up to PhD level. Extensive work experience in consulting and in the environmental sector. His International experience arises from business operations in foreign countries. For example. US, Russia, China, and Europe. Overall, Biosoln employs highly educated experts who have multi professional competences in variety of tasks and running firm operations.	
Entrepreneurial orientation	The business owner capitalizes on his experience in the field and plausible business savvy in internationalization decisions. Internationalization decisions are based on the feasibility of client requirements or specifications. The company exploits various means to enter new markets. E.g. student studies and fairs in foreign countries. Perception towards geographically distant market is low because the Management team makes internationalization decisions. It was also reflected that the company management is proactive towards new market information and particularly keen towards opportunities within the European market because product range is best suited for the European market. The respondent mentioned that they had Strong and growing operations in Sweden, Baltic countries and	

	markets are far away. The firm is not limiting itself to regions, but the capacity of their team, the small size of the firm and insufficient of resource is a hindrance to optimal internationalization.	Switzerland. More so, specific locations of interest is Northern Europe and in Germany. The company did not seem receptive to more distant markets due to competitive challenges from Asian competitors as well as legislative and bureaucratic challenges.
	IoTech	Newaves
Mindset	International mindset (Regional). Interested in learning through R&D, domestic market focus and internationalization effort is low. Showed keen interest in Swedish market.	Global mindset, Interested in learning through R&D and exploring new opportunities and receptive to new market opportunities regardless of location.
Experience	The first respondent for the interview is the CEO of the firm and a graduate of Tampere University and 19 years work experience in sales, marketing career in Finland and Russia he also co-owned a company specializing in water treatment before the foundation of IoTech. His longest international experience is in exporting to Russia and central Europe and Business travels to abroad to Russia, and Beijing in china. The second respondent is the sales executive of the company, graduated from business school in Sweden. He has extensive work and international experience working in Sweden, Nordic and Baltic area various positions in in sales, marketing ICT and IT security. Overall the company has highly skilled and strategic oriented departmental staff who are competent to make autonomous decisions regarding firm operation.	The interviewee is the company's CFO and heads the business development team, manages projects and negotiations within the company. He has an educational background in finance and previous work experiences in banking sectors as well as various SMEs and multinational firms. His international experience was accumulated through his work experience, birth place, travels, education, and foreign language competence. Overall the company employs highly educated experts who possess multi professional skill to tackle multiple operations internally and externally and internationally. Employees are also strategically oriented and acquainted with various level of theoretical and practical level information regarding to internationalization of the firm.
Entrepreneurial orientation	The CEO makes the major decisions for the company. Key focus is on the domestic market with specific interest in the Swedish market. Subsequent interest in markets with similar characteristics Scandinavia, Baltic countries the company intend to expand achieve high profits from in the next four years by exporting outside the domestic markets.	Multiple ownership evolving around the life of the business. The impact of inventor of the wavers is also important in securing of projects and harnessing opportunities for the company internationally in South America Ecuador and Chile, due to his ties to the region and his understanding of their culture. The CEO of the company has vast experience and network of business contacts, which is vital in their expansion in Europe. Some shareholders also financially support and influence the operation of the globally. Distance is not a constraint for internationalization. However business operations may be handled different from normal practice e.g. specific signing contract and agreements.

Summary of Managerial Antecedents

The best practice firm had a global mindset and proactive managerial attitude regardless of location. Learning orientation was also a predominant mindset in the firm's internationalization activities. Internationalization accomplishment seems to be attributed to international orientation and proactive attitude through seeking for customers and new market opportunities regardless of location as well as efforts toward product development. The educational competences of the founding team and access to leadership support of capital investors also seemed to have had positive effect on product development and fosters international business operations globally.

On intermediate level, the companies showed that they had considerable international experience dealing with multiple countries. Thus, the nature of the product and service delivery affects the extent of experiential knowledge and international involvement. Team leadership in multiple locations internationally impacted the manager's orientation on handling internationalization processes. However, both companies seem to have an obtuse view point to distant markets. The reason for lack of interest in distant geographical markets differed extensively between both firms. Possible reason for the lack of interest was due to limited resources and risk averseness of the companies. Market selection decisions and managerial attitude for both companies seem to be largely reactive as market entry is based on saturation of the domestic market and internationalization dependent on network or distributor's activities and recommendations. For example, Biosoln based market selection and internationalization on the feasibility of the project and local contact.

Inexperienced internationalizing firms seemed to be interested in learning through R&D. However, the companies' international orientation differed significantly from each other. This was mainly because of the differences in target market segment and also internationalization decision making process. In IoTech, the CEO makes major decisions while internationalization decisions in Newaves were based on market opportunities and collaborative team decisions.

7.2.2 Firm Antecedents

Converttech	
Resources and Capabilities	<p>Converttech employs about 30- 40 people they specialize in converting power train systems into fully electric or hybrid systems. The business is divided in three sectors: heavy duty machines, transportation and marine and provides services in system selling. Converttech products and services are ISO certified. The company's key capabilities is in their In-house software and design works, knowledge on system building, strong engineering background with professionals in their R&D department. <i>"We're not just selling others' products, we are actually doing design in here for example motors design, we are doing it in-house in here in Lappeenranta"</i>. Thus the company provide high efficiency products and services to customers which are cost-saving, decreases fuel consumption and emission levels. Although the company provides clean technologies competition is not specific to clean tech companies. They have so far received positive feedback from customers who have used their system in comparison to previous systems used.</p>
Knowledge	<p>Generally, information gathered from the market serves as a guide in firm operation and internationalization decisions. More so, the company benefits from its relatively large R&D department, thus they focus mainly at keeping up with innovation. Which is an imperative in high-tech industry. The company gets information flow and top management makes the decisions where to focus. Access to relevant market and customer and information from management is instrumental to the internationalization decisions and operations. Converttech also gains from the access and connections of capital investors and managers globally.</p>
Strategic Orientation	<p>The main idea of their strategy is to research on the most promising potential market for them. They also collaborate with local partners and agents to get first references from the markets. <i>"In our field it is really important to show good references because there are many companies that are maybe starting or planning to use something that when you have actual sales and you have actual customer testimonials that is the one of the biggest driver for the sales... So, getting inside the market with the right partner that can provide support to foster a win-win situation is the core of our internationalization."</i> Foreign market entry is challenging thus company collaborates with partners and agents. <i>"We are using partners and agents, generally, so that we can, have better entry to the market"</i> collaboration with these local specialists aids them in running international sales and operation in those countries. Additionally, the company is still in exports stage <i>"we are (in export stage) so we are exporting, we will see what the future brings because we are relatively new...and have been operating for only seven years. The first years are always kind of slow when you're establishing something totally new that has never been seen before"</i>. Reinforcing research efforts could be an avenue to gain more market information. The respondent was optimistic about the potential growth of the company as well as all the company's segments in the near future. The respondent is also positive that <i>"the change in the market for example in heavy-duty has come and, the situation for us is very, interesting altogether"</i>. Furthermore, there is also hope that the company will gain first mover advantage because they believe they have the position advantage in the interim. According to the respondent, internationalization-wise, Converttech has expanded, and become more structured in their decision making and processes altogether.</p>
Networks	<p>As already mentioned, networking and personal contacts are essential for the company's internationalization strategy. The respondent cited the connections of management as an important link for international market entry. <i>"They know people. They know whom we should discuss with they provide recommendations... they bring the connections, real names and contact information"</i>. The respondent mentioned that the contacts with which the company works also have technical background. The close ties and relationship between them is an important avenue through which the company generates information. It also allows them better serve their customers and include them in value co creation <i>"...in that way they are involved with the product development"</i>. Although the respondent also mentioned that depending on partners for market information is not typical of Converttech's operations sometimes enthusiastic partner networks or agents want to get more involved and help promote internationalization activities. Citing that for example <i>"There can be some people that want to understand and be involved more, In Asia actually we have some partners who are even excited to help us to do some R&D. But that's a little bit more exceptional. It's not a general way how we operate."</i></p>

	Biosoln	Lumtech
Resources and Capabilities	<p>Biosoln is a small sized company and employs 25 people. providing who construct bio gas refinery's and provide feasibility studies, consultancy services people with competitive advantage in thermal management, design and optical performance. The company specializes in building and customizing factories for treating waste, which are usually long term projects internationally. <i>"For example we are in a final stage of one project in Greece, and we started to develop that project together with the client six years ago.</i> They are responsible for the project until the plant is handed over the client. for example in Finland the company handles turnkey projects and are responsible for the development of the project, consultancy part, engineering part, construction and taking the plant into operation. The respondent stated that adhering to international standards like ISO-9001 influences their reputation internationally and makes their working culture more efficient. According to the respondent given the immense global competition, maintaining a stiff IPR is not imperative for the company. Rather their unique construction method, professional expertise, the feasibility of the project and in house know-how is considered a competitive advantage. The key expertise of the company is in the simplicity of their business process and operation. Extensive experience in the plant operation, functionality, and technical and educational knowhow on how the systems works <i>"the physical equipment we are using, we can buy them anywhere. So there's nothing special and we are trying to avoid all kinds of let's say gadgets that would make your process unique, because it doesn't really work"</i> According to the respondent, the combination of the aforementioned qualities is quite rare.</p>	<p>Lumtech is a product company, they also carry out installation work and maintenance services. <i>"We are 25 people company so there is no much muscle to do everything"</i>. Street lights, was the company's base and background, the company has since evolved to industrial lighting, warehouses, ice halls and sport arenas. With current share of business covering 20%, 40% and 40% for street and industry respectively. Competences in thermal management of the product, the slim design of the product, and the optical performance of the product. <i>"Everybody can put LED on the printed circuit board, and call it luminaire. Because it's giving light, for sure. Yes, that's true. But it is the magic that, what we do and it is our sweet spot that we can steer the light where you need it."</i> Additionally. Given the intense competition in the lighting industry, Lumtech ensures that all their products abide by international standards. For example ISO 9001 and ISO 14001, SGS-GS certificate for PRO Wave which is important for maintaining their reputation internationally. Although the company benefits from its wide network of distributors who carryout sales internationally, the company also has limited human resources to effectively carryout internationalization operations independently. However, the company mentioned active efforts towards improving potential resources and capabilities to amplify to strengthen internationalization undertakings.</p>
Knowledge	<p>The respondent mentioned that company does not have a systematic way of finding customers or internationalizing. They rely on alliances abroad to carry out and complete projects, the company may also access new markets information via fairs, networks and personal contacts. Which is very helpful for them in accessing potentially new customers and new markets. Internationally, the firm does not have sufficient resources to handle all aspects of large scale projects in various locations simultaneously. Thus they seek for projects which require only specific technology supplies that the firm has the capacity to adequately deliver.</p>	<p>The company's efforts towards internationalization and sources of information has mainly been through market studies, tours to find new clients, trade shows, networking and with the help of the chambers of commerce. The company is also a fast-follower for some of its product categories such example for street lighting. Lumtech, however has unique specifications on their individual product categories, and product technology. For example the with the sport lights, the company is more innovative and takes discretionary actions in product development to suit market needs.</p>
Strategic Orientation	<p>Due to the small size of the company and limited revenue the internationalization strategy of the company in the interim is to focus on project development and optimize firm resources and capabilities for market entry and to meet international market demands. Although the company</p>	<p>The company aims to <i>"Grow, step by step on the focused markets and areas. Meaning, go there where your products still has some leading edge"</i>. Lumtech considers big manufactures their competitors as well as technical companies and mainly luminaire manufacturing firms not just</p>

	<p>believes improvements can be made on their internationalization plan. They have adopted a realistic approach based on their available internal resources and capabilities to manage projects at hand. They also think that if they persevere and team up with big players they will have the opportunity to conveniently penetrate international markets in the long run. In the next 5 to 10 years the company hopes to be in some selected countries where there would be working on similar projects and if possible established a daughter company in Poland. The company has plenty of competition which are companies who build biogas plants globally. For example, German competitors produce biogas from renewable sources like agriculture while Biosoln for example builds waste treatment facilities using a different approach. Thus given the immense competition, the CEO mentioned that maintaining a stiff IPR is not imperative for the company rather the company's expertise, feasibility of the project and in house know-how is considered a competitive advantage.</p>	<p>cleantech companies. The respondent is of the opinion that growth can be improved by observing competitors, adopting reactive strategies and redefining their international business operations. The company makes R&D investments towards product and service improvements with a vision to be <i>“a well-known brand, in the areas of big light. Meaning the higher premises, bigger arenas”</i> in the next 5 years.</p> <p>More so, the ability to handle business cultural differences is a challenge for the company. The company considers networks as an important avenue for building knowledge and learning. The respondent highlighted that networking is or reaching customers through distributors helps in breaching the knowledge gap <i>“you need distributors due to your size and their knowledge of the market and their knowledge of local habits and contacts”</i>.</p>
<p>Networks</p>	<p>Networks and partners are key to internationalization decisions. International alliances via personal contacts and collaboration with agents and consultants are the main drivers for international market entry and penetration. The company has personal contacts with partners who are also client representatives. These contacts are the key medium through which the firm enters new market. For example Biosoln has a consultant hired in Mexico and an agent in Poland The nature of the partnership is based on mutual trust and agreement. The company either signs a non-disclosure agreement or have a joint strategy on how to handle business mutually. Additionally, depending on the country, both parties also clarify the milestones on business obligations. Biosoln does not have a specific criteria for partner selection. Sometimes <i>“We have been introduced or, we are approached by them, or we are approaching them so you never know. The partners also assist in looking for projects and deals in nearby locations”</i>. After which the negotiations can begin. In terms of international partnerships, the respondent states that they mainly liaise with partners or indigenous companies located in foreign markets who need the technology offered by the Biosoln. Usually these indigenous companies have their own capabilities and infrastructure to develop the plants, in other words the foreign partners compliment the technology provided by the respondent's firm.</p>	<p>Networking with partners and distributors are essential in their internationalization process however, according to the respondent, it is an ongoing and evolving process for them. The respondent also stated that depending on the market situation and demand from the products and services. The distributors were also mentioned to be the main link between the company and clients. The respondent views this link as an important means of <i>“information flow between the end client and international sales”</i>. This information they gather is important in product development and customization to suit specific client needs. <i>“We also review our processes every now and then. And all the time collect data and, the lessons learned in good and bad”</i> Being a part of the network is also considered an avenue for new market knowledge, clients and getting access to contacts who can be beneficial for business.</p> <p>The respondent also mentioned that the company considers solid networks with mobile tech companies like Nokia is essential for internationalization efforts <i>“when it goes to the level of everyday business and having real contracts for the real projects. You need somebody locally”</i>. However, a major challenge for Lumtech is keeping up with competitors' activities and maintaining high quality while keeping favorable cost to meet client needs</p>
<p>Resources and Capabilities</p>	<p>IoTech</p> <p>The company employs about 30 personnel with competences in carrying out research and development with competent professionals in the field who</p>	<p>Newaves</p> <p>The company's key activities revolve around the core idea of their technology development and demonstration projects which is executed</p>

	<p>help to ensure optimum product and service delivery to customers. In collaboration with their partners, they also ensure renovation of buildings of interest in which they ensure standard heating control and continuous maintenance of the building. According to the CEO, they have a unique process in their product and service delivery because they combine theoretical and practical knowledge on heat transfer and related problems. They also possess capabilities in R&D concerning heat transfer and other related phenomena. They carry out process design calculations, service process advices and definition for maintenance, economic analysis of the heating and cooling process, budget preparation and so on. Provision of measurements based on facts and reports for clients is also considered a competitive advantage because it involves constant reporting, feedback and value added services. Thus trust building is integral in their service delivery. The company claims no one else provides this type of holistic process and that they do not have any major competitors in Finland. Nonetheless according to the CEO, where competition exists, it is siloed. In other words competing companies are those who can carry out daily maintenance, cleaning and those that sell washing and cleaning agents needed with the pipes. These competitors are unable provide dynamic solutions like IoTech.</p>	<p>in-house and sometimes with local partners. The company in the past three years have opened up to more partners from abroad due to the need for more resources, and increase in scale and professionalization of technology and its certification. This has also resulted in increased volume of work, prompting the inevitable need to rely on external resources. A key resource of the company lies in their certified technology as a result certain certifications are important to their international reputation. The respondent mentioned that one of the key influences of the certifications in the company's internationalization development includes adhering to standardized practice to as proposed by DNVGL, and the Lloyd's Register certification. However the respondent pointed out that for example the DNVGL certification is not a standard but an approach through which the company can showcase its qualification for offshore environment. Other key resources and capabilities includes having quality team of people having vast and broad range of experiences from various professional fields, and comprehensive understanding as well as capabilities on all aspects of the business. Newaves also Additionally, capabilities in providing support services and training for customers to identify and evaluate project locations for Wavers power plants. Conclusively, the respondent describes the company team as a unique setup for capabilities which guarantees the progress speed and delivery for good quality services and products.</p>
<p>Knowledge</p>	<p>An important source of knowledge for the company is access to customers via personal contacts, customer's network and through industrial network. The company believes identifying appropriate partners globally is an important avenue for finding relevant client base. The company stated that their vision is to provide technical expertise, and experience to help the local service companies to provide better quality. The company is also heavily involved in R&D, market studies and fairs as well as depend on competent employees for operational advice. However, the CEO mentioned that identifying the appropriate partners and decision making and trust building in the host country is a challenge for the company at the moment"</p>	<p>The company makes weekly reviews of their project so that they can dynamically evolve depending on the situation. "we might put more focus on one opportunity instead of another just because of changes in the situation" in other words changes made by the firm according to the respondent are not necessarily made to be in a particular country rather, they are made as a reactive strategy to evaluate current situations and identify quick ways to commercialize their products. "We are not, fixing ourselves that we have to be in a country A but not in country B. We just follow what we see currently is the quickest way to (commercialize) our products"</p>
<p>Strategic Orientation</p>	<p>The company's "strategy is to go first to the closest place, and after that, to maybe to find some other roadmaps with those other partners and international partners". The company intends to use networks that would serve as references to enter into international markets while Finland would still remain business coordination hub. Thus the company aims to strengthen its domestic foothold while making efforts to boost their service and maintenance operations in order to provide better solutions internationally.</p>	<p>Essential in their strategic decision is market opportunity (locations with high wave energy potential) and collaborating with companies who specialize in energy and power utilities business. Additionally, networks which the respondent describe as "<i>commercial links like through political organizations country administrative organizations</i>" are also important. Newaves also makes active efforts towards proposing the feasibility of the project to energy companies. The company is also sometimes clients</p>

“I think in five years we have four times bigger turnover than now, and we have local organization at least in Stockholm, and I think some kind of activities also in Baltic areas. I think that we are servicing our expertise, somewhere else in Europe, too, through some partner that has contacts into other countries”. The company does not have any major competitors in Finland. Nonetheless according to the CEO the competition is siloed in other words there are companies who can carry out daily maintenance, cleaning and those that sell washing and cleaning agents needed with the pipes. However the company claims no one else provides this type of holistic process.

who are interested in the products and technology contact them directly or clients via embassies. Thus market where there is customer interest and funding are of potential interest to the company. However the respondent stated that “We are not trying to push to new markets where we would have to build the market from scratch, let's say establish a new, push to get the new legislation or attract customers that are reluctant. We go to countries where we see there is already interest”. The company adopts the “sales funnel principle” to identify project which are evolve into actual commercial projects. The company makes weekly reviews of their project so that they can dynamically improve firm operation base on accumulated feedback. Thus according to the respondent they “*might put more focus on one opportunity instead of another just because of changes in the situation*”. However, modifications made as a result are not necessarily made to be in a particular country rather, they are made as a reactive strategy to evaluate current situations and identify quick ways to commercialize their products. “We are not, fixing ourselves that we have to be in a country A but not in country B. We just follow what we see currently is the quickest way to (commercialize) our products”. The company aims that in the five to ten years their technology would have reached maturity and commercialization stage. As a result, increase in sales revenue, larger projects, staff capacity and growth of the organization at large.

Networks

The respondents stressed the need for strategic partnership in fostering market entry. They mentioned that the company is seeking for international networks through strategic alliances or collaboration with potential partners with customers, companies or sales organizations in the host country. Thus presently, resources are being invested towards investigating for companies with mutual interest who are interested in such collaborations or partnerships. The company mentioned specific partnership interest with innovative companies or cleantech companies in both the domestic and international market. Thereafter, the company aims that when those partnerships are established, they operate remotely “...we can control what is happening there and we can help the local company to provide the maintenance wherever in the world”. In other words the company hopes to capitalize on digitalization, to control more process not just heat transfer processes but other supporting services. Additionally the respondents mentioned that just like many innovative companies in Finland, the company also derive support from partner organizations for example, TEKES is assisting the company on three projects. These venture capitalist firms are

Strategic partnership is key in the business model of the company. The respondent mentioned that “integrators” are key partners of the firm. These integrators are an essential channel (key channel) through which Newaves enters the market and delivers projects. Direct contacts sometimes in an initiative which they use for building partner relationships. This is done by contacting foreign potential partner firms in other countries directly. Connections with customers are also established via agency. For example through Finpro who are specialist in reaching out to companies in other countries and assisting in setting up project or business avenue meetings. Newaves also benefit from the knowledge of other companies or existing partners to carry out specific designs of some elements and answer certain questions related to the business. Partnership with Lloyds or The Lloyds’s register has also been a major influence, as it validates that the company’s process and products meet minimum standard conditions, thus increasing the firm’s public credibility. The company also gains from information sharing from different stakeholder around the world and other companies and organizations and countries

also considered important partners for the company due to intense R&D investments. Interviewees mentioned that Finpro partly finances and gave a lot of support towards the company's project in Sweden.

are approaching them to get contacts to Finnish cleantech sector. Marketing benefits are also derived from being part of a larger network. Thus making it easier to be identified and accessed by potential customers and suppliers locally and internationally.

Summary of Firm Antecedents

For best practice firms, resources and capabilities lie in unique in-house competences, R&D and information gathering. This was enabled by virtue of the access and connections of capital investors and managers globally. Firm knowledge is also gained as a result of international business operations and knowhow was gathered from R&D and market research. Strategic orientation of the firm is largely proactive. The company collaborates with partners, and referencing is essential for foreign market entry and operation. Networking is essential to expansion of business activities, and top management connections is an important avenue for building firm networks. Market information and feedback are also gained as a result of network activities.

On intermediate level, the firms had relatively small size and insufficient human capital or work force. Thus, size is a factor which affect the companies' activities both locally and internationally. Additionally, most of their activities are in-house and the companies capitalize on international partnerships for foreign market entry. However, their unique competitive advantage was a key capability and resource for the firms. Both firms also seemed to have robust affinity to innovate and the respondents stated that adhering to international standards like ISO-9001 influences their reputation internationally and makes their working culture more efficient. For example, Biosoln mentioned that maintaining stiff intellectual property right (IPR) was not imperative for the company rather the delivery method of their product and service offering was a competitive advantage. Whereas, for Lumtech their cutting edge technology was a key performance indicator for international market success.

Market knowledge acquisition for both firms is fostered via in-house R&D, external market studies as well as thorough information for strategic alliances and networks. Observing market and competitive trends was also a common characteristic of the companies. Both firms also clarified network to be a key driver for international market entry. Similarly, they also confirm that networking is both a strategic and progressively challenging process for them. In other words, finding the right partners, managing information and communication flow as well as negotiating the extent of their relationships with their networks was difficult due to cultural differences and geographical boundaries. The strategic orientation of the companies also seemed traditionally focused. Hence, growth orientation is largely

incremental through learning and accumulated experiences from market and competitors activities. Networks and partner relationships were a key strategic antecedent for the firms. Thus, the companies were also challenged by finding the right partners to ally with to foster their internationalization activities.

Inexperienced internationalizing firms also have small work force. However, it was observed that for both firms, R&D and proof of concept were the core of their business and internationalization strategy. The method of product and service delivery is also a key capability for both firms. For example, for IoTech they have a unique process in their product and service delivery because they combine theoretical and practical knowledge on heat transfer and related problems. They also provide “ballpark estimates” for clients like design calculations, service process advices, maintenance, budget preparation and so on. For Newaves on the other hand, proof of concept to potential customers through technology development and demonstration projects were crucial for their internationalization efforts. More so, a strategic combination of Newaves’s unique team competences and support services to potential clients guarantees quality and speed in their product and service delivery.

Strategic partnerships, networking and references are essential for information gathering and international market entry for both firms. The information gathered can either come from the industry, venture capitalist firms or consulting firms. Information from different stakeholders, networks and personal contacts was also an important avenue for knowledge acquisition for both firms. Both firms also mentioned learning and constant review of firm operation as a yardstick in their knowledge generation process. However, the strategic orientation for the firms vary. For example, IoTech has a more traditional orientation towards new markets as they want to maintain foothold in the domestic market and incrementally internationalize to nearby markets. Whereas for Newaves, market opportunity was a driving force and they possessed a global mindset in terms of internationalization decisions.

7.2.3 Environmental Antecedents

Converttech	
Domestic market situation	<p>According to the respondent, the company is increasingly gaining recognition and reputation in the domestic market and “<i>the domestic market has future growth potential but it's, still a bit slow for the change</i>”. However, the company aims to be the leader in the domestic market space with their three product categories when the change happens. “<i>For example if we think about heavy-duty these work machines, for example wood harvester or, stone crusher or something else, the market in Finland has been quite slow. But, for marine market...our market potential is mainly abroad. For busses I think the Finnish market domestic market is opening quite nicely because we have had, deliveries (electric) power train, busses that for example, cities (are now) public transportation to full electric.</i>” The company also has insufficient customers in the domestic market “<i>we don't have that many customers, for example in marine sector, and the customers are located abroad</i>” the company also faces challenges with their supplier, as there aren't sufficient Finnish suppliers, thus the some components need to be purchased from abroad.</p>
Host country and distance	<p>The company operates globally with some of the main countries of operation includes export to Europe and China. Also to Taiwan and Hong Kong. The company also has offices in the Netherlands, partners in Spain, France and Germany and other parts of the world. According to the respondent, distance is not a constraint for the company as they can sell any where there is market potential. “<i>We target markets that are providing the biggest growth potential for us. So actually, where the location is, not relevant for us but the market potential and what can we offer customers, because if we can provide better efficiency then we can provide more benefits, we are providing something that is really helpful and, providing more benefits for our customers</i>”</p>
Regulations and policies	<p>The interviewee is not familiar with non-supporting regulations to the firm. However supporting regulations however for the company for example in Finland those are geared towards an emission free future in public transportation or tighter emission regulations in Paris.</p>
<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;">Biosoln</div> <div style="width: 48%;">Lumtech</div> </div>	
Domestic market situation	<p>The respondent is of the opinion that Finnish market has reached maturity stage in terms of the need for product. “<i>In Finland... there will be in the waste treatment sector room for maybe five more, and then it will be full. Because we are a small country</i>” thus the saturation and small size of the domestic market is a major reason which forces the company to internationalize. “<i>Because the country is so small, so there's no room for new plants anymore</i>” the respondent mentioned that they work alongside or compete with other cleantech firms. They also cooperates with various companies who supply numerous component parts for their project. However challenges faced with suppliers include costs and time. For example cost of purchasing a product or the guarantee that the purchased product reaches quality requirement</p>
Host country and distance	<p>The company operates in Mexico, Vietnam and Indonesia and Poland. However the respondents shows a more profound interest in Poland due to the proximity of the country “<i>Poland is a nice market in that respect that it's close and the target is to establish another company there within</i></p> <p>The company has strong and growing operations in Sweden, Baltic countries and Switzerland. They are trying to grow in Northern Europe and in Germany. The German markets however was mentioned as a specific market of interest. The main driver to enter</p>

	<p><i>three years' time, which is not the plan for let's say the countries that are much more faraway</i>” However, the respondent believes because waste management is a global phenomenon, they have unlimited market opportunity. <i>“...the whole world is the market because you have anywhere we have people we have waste”</i>. Perception towards geographically distant market is low because the company’s immediate interest is to companies which are more geographically closer to the domestic market. The respondent stated however that despite the need to focus on market with close proximity, the company is not limiting itself to specific regions. Limited resources and capacity of their team was also mentioned as a hindrance, thus <i>“...they are currently skipping out after first stage in some countries, and just focusing on Indonesia, Vietnam and Mexico, due to the small size of the firm and its lack of resources, as there is no team left to even handle project in South African Market”</i>.</p>	<p>the German market is the market size and the high cost of electricity. Thus Lumtech believes they can be profitable in the German market since LED offers less power consumption. According to respondent, Europe is mentioned as a key market for internationalization because their product specification is 220volts rating and it is best suited for the European market. Furthermore, geographical markets such as Africa or US are not of immediate interest for the company for example in the US, the product liability and legislation governing the country pose a challenge for smooth market entry. More so, from the respondents experience and as sales director, distant markets such as Africa may be difficult to penetrate due to heavy bureaucracy and competing product from Asia</p>
<p>Regulations and policies</p>	<p>Key regulations which impact the internationalization process of the firm concerns waste and how to utilize it. There are also directives set by the European Union regarding proper waste disposal called “End Waste”. The EU “End waste” programme categorizes some wastes that can be treated or untreated or waste that can be used or unused. Supporting legislations and policies however are environmental legislations set towards reduction of pollution.</p>	<p>The respondent is of the opinion that green policies, power consumption reduction and agreement decisions and legislations are targeted at increasing product lifetime. The respondent mention that the cost saving nature of their products is in line with legislative policies and regulations on energy saving and consumption. More so, the combination of the policies showcases the relevance of Lumtech’s products internationally and domestically. This is because their manufacturing operation take these policies into cognizance.</p>
<p>Domestic market situation</p>	<p>IoTech</p> <p>Although the respondent’s acknowledged penetrating the domestic market could be challenging, He mentioned that there is still a potential for growth. Some domestic market challenges emanate as a result of insufficient investment capital in energy saving reforms <i>“In Finland, people are not ready to spend on energy saving processes due to the cost factor and the decline Finnish economy at the moment”</i>. Lack of funds in the domestic market were attributed to effects of the economic recession in the country; thus financial resources are allocated to more pressing domestic issues. The respondent is also of the opinion that key customers (Facility owners) tend to make spontaneous decisions which are not based on facts. For example <i>“decisions based on market trends (for example trending structures like roof top solar panels) rather than decision based on market need”</i> The respondent also added that their product innovation is not really supported by the old fashioned structures</p>	<p>Newaves</p> <p>The company does not have to make many domestic market decisions because most of the company's project opportunities are related to project opportunities and technology development abroad. However, <i>“some of the Finnish government, policies, in a way have influenced, in a sense that there can be a funding scheme that supports technology development or some project activities, but then they might have preference to where the money is actually spent so that the money is spent in Finland”</i>. In other words, the factors that could be related to domestic market challenges include the influence of the Finnish government policies which in some instances suggest working with or giving priority to local subcontractors.</p>

	<p>and processes which are still in use in the domestic market. <i>“When we have some innovation, we are very innovative and find always, something new. It’s very difficult to get ...our innovations in those old-fashioned processes. That is one of the problems because we are only small companies and most of the others are very big ones. They are very old-fashioned processes and how we get there. That is one of the challenges”</i>. This case seems to be different internationally <i>“for instance in Stockholm is very different. They are interested in new innovations, they are, and right away they are very interested.”</i></p>	
<p>Host country and distance</p>	<p>The company is presently operating in Sweden and has already accomplished some projects. although they respondent mentioned that they had attempted in solving district heating Beijing China, Scandinavia and Baltic counties are the markets of immediate interest. Additionally because some of the company’s domestic customers are also operating in Sweden, <i>“that’s natural step that we can utilize the contacts”</i> the respondent also suggests that Swedish market is also a potential market area because the economy is growing and because they are carrying out a lot of building projects. Also the market similarity and market proximity is an enabling factor. <i>“It’s only 45 minute’s flight from Helsinki to Stockholm. Then, another countries where we have similar climate than in Finland and similar structure”</i> Potential countries for future market entry include Russia or Canada due to the similarity in weather conditions as the domestic market. <i>The company intends to focus on the domestic market and Swedish market in the interim. “After that...then we might go to Germany also but I don’t think that we first go to Canada or Beijing or Africa. I think we stay locally first”</i>. However the company’s vision is to double their turn over in four years. To achieve this, the company aims to expand by exporting outside the domestic markets.</p>	<p>They have own active development projects operating in Europe, US, Chile, Mexico, India, Sri Lanka and Indonesia. Countries of interest, but with no active operation are South Africa, Australia and other markets with resource potential (waves) globally. When entering distant market however, the company makes contracts or use <i>“success fee type of arrangement”</i> with agents in order to reach clients in distant geographical locations. Although work via agents is not a normal practice for the company. In cases when agents are used, contracts have been made with customers who have interest in the firm’s technology and the company does not make any payments to the clients until the contract with the ultimate customer has been signed.</p>
<p>Regulations and policies</p>	<p>There were no clear specifications to the regulations or legislations affecting the firm. However it was mentioned that TEKES, Finpro, local ELY-keskukset and universities supports the company’s internationalization activities. According to the respondent, the legislations and regulations that supports internationalization in the countries of their interest are quite similar.</p>	<p>The respondent mentioned that one of the regulations affecting the firm includes is the funding policies of TEKES. Another policy mentioned was the EU non-competition or support policies where countries are not allowed to provide extreme support to competing companies that would give them competitive advantages against other companies within EU also apply to the company. However internationally, the respondent mentioned that legislations and places may vary due to the different support schemes for renewable energy in different counties. For example tariffs on electricity price or grant schemes (example the horizon 2020) may differ from country to country.</p>

Summary of Environmental Antecedents

For the best practice firm, their innovative product and service offering is still relevant in the domestic market and has future growth potential. However, the slow growth and readiness of the domestic market affects firm expansion. Opportunity seeking and profit motive were key drivers for internationalization decisions. Geographic distance was not a constraint for international market operations. The company aims to maintain brand identity as a Cleantech company thus abiding by sustainable policies which is core to their service offering and business operations in the domestic and international market.

On intermediate level, small size of the country increases domestic market saturation and competition is mentioned as a key challenge for both firms which affects the expansion of the companies. Domestic market maturity pushes them to internationalize. Proximity to certain geographic market affects the choice of market entry. For example, European markets were the preferred market of entry. Geographic distance is a constraint to internationalization. Both firms prefer to enter market which are closer to the domestic market due to limited resources and capabilities. Sustainability and green related policies such as power saving, efficiency and waste reduction impact firm activities. Thus, adhering to aforementioned policies in their business process is essential to their identity and brand as cleantech firms.

On the inexperienced level, both firms had contrasting orientation to the domestic market because of their internationalization pattern and location of client base. For example, international market strategy for IoTech is to enter nearby markets incrementally while for Newaves, opportunity is the driving force for market entry decisions thus the company has wide spread operations globally. Additionally, funding regulations seemed to be an important policy to be adhered to by both firms. More so, location of operation affects the kind of policies the firms are likely to conform to. For example, Newaves is faced with varying policies and regulations due to the different markets they operate in while for IoTech domestic and international market policies are similar.

7.2.4 Cross-case Analysis

Yin (2003) defines cross case analysis as the act of matching logic and building a basis for reasonable explanation. Thus, pattern matching was adopted in gathering the data across relevant theoretical constructs. It also provided a proper basis for the interviews and also credible information to strengthen the validity of the study. To begin with, the categorization of the firms as “best practice”, “intermediate” and “inexperienced” was set in order to properly evaluate and understand the internationalization patterns and antecedents of the case firms. The reason for dividing and evaluating the case companies based on their level of international experience, was to have a concise and condensed sample size to work with. Thus, the collective analysis of the case companies were evaluated in batches in order to have a critical interpretation and generalization of the results. The comparison matrix used in the cross case analysis allowed the researcher to examine and evaluate common response patterns based on the accumulated data. As a result regardless of the grouping, the findings related to the patterns and antecedents highlighted various similarities and differences across the case companies within and outside the set category. Thus, generalizing the findings was considered reasonably appropriate for answering the research questions. The evaluation methods adapted are expressed below.

Evaluating the patterns of internationalization

The DOI model (mapping tool) was used to analyze the level of internationalization involvement and activities. The mapping tool had different points starting from the center to the outward axis as shown in Figure 15. In other words, the farther from the center the marked point is, the higher the level of international involvement. This is because the maximum level of domestic market involvement is concentrated toward the center. To use the model, the researcher examined the level of internationalization involvement of the case firms, thus various points were marked based on the criteria in Table 12 and the explanation of the criteria used is shown in Table 6. The outcome allowed the researcher determine dimension of internationalization of case firms as presented in Table 13 and further elaborately expressed in Table 11.

Table 12. Internationalization patterns using the DOI model.

Axis	International business environment and operations	Internationalization
A	Passive reaction to proposals Active search for possibilities	Low: X Medium: XX
B	Independent running of foreign operations Intermediaries manage foreign contracts	Low: X Medium: XX
C	Limited involvement in production and other function Limited involves (usually export /import) Production (investment) and all functions abroad	Low: X Medium: XX High: XXX
D	One A few Many	Low: X Medium: XX High: XXX
E	Totally different Quite similar Very Similar	Low: X Medium: XX High: XXX

Table 13. Dimension of internationalization of case firms.

	Converttech	Lumtech	Biosoln	IoTech	Newaves
A: Foreign activity	xx	x	x	x	xxx
B: Use of Foreign intermediaries	x	x	x	x	xx
C: Forms of foreign involvement	xx	x	xx	x	xx
D: Number of foreign market	xxx	xx	xx	x	xxx
E: Similarities between foreign and domestic markets	xxx	xx	xx	x	xxx
TOTAL	High	Intermediate	Intermediate	Low	High

Evaluating the Internationalization Antecedents

A comparison matrix was adopted to evaluate the antecedents of internationalization. The features of the antecedents were compared against the case companies. For each level, specific features (determinants of antecedents) were selected and were accorded specific points (numbers). However, it is considered that each feature on each level attributes equally to the effect of that level on the internationalization of the case companies. Firm level is considered as the most important level of antecedent amongst the three. Hence, the reason firm level features possess more points.

Table 14. Comparison matrix used for evaluating the antecedents.

Antecedents	Maximum value	Visedo	Watrec	Easy LED	TPI Control	AW-Energy	Total
<i>Managerial level</i>							
Global Mindset	4	4	3	2	1	4	14
Experience	4	4	3	3	2	3	15
Entrepreneurial Orientation	4	3	2	2	2	3	12
Risk Taking	4	4	3	2	1	4	14
Proactive	4	3	2	2	1	3	11
Total		18	13	11	7	17	
<i>Firm level</i>							
Resources and capability	5	3	2	2	3	3	13
Strategic orientation	5	5	3	2	1	5	16
Knowledge	5	4	3	3	2	4	16
Networks	5	5	5	5	5	5	25
Total		17	13	12	11	17	
<i>Environmental level</i>							
Industry factors	4	2	2	2	2	2	10
Domestic market	4	4	2	3	4	1	14
Regulation policies	4	2	3	2	2	3	12
Distance	4	4	2	1	1	4	12
Host country	4	3	2	1	-	3	9
Market competition (High)	4	2	4	3	1	2	12
Total		17	15	12	10	15	
Sum total	64	52	41	35	28	49	

The least point attainable by a company based on a particular feature is zero. The specific points attached to each feature is the point attainable by a company based on the influence of the antecedent (determinant) under consideration. Points were given to each company based on how the feature affects the company's internationalization. The researcher set these points for each company based on the interview responses related to the antecedent being considered. The points attached to each firm was summed up to know the impact of the antecedents on case firms as shown in Table 14 and Figure 24. The points attributed to the determinants for the case firms were summed up to examine the main internationalization drivers for each level of antecedent as presented in Figure 25, Figure 26 and Figure 27. From Table 14, it shows that the maximum points attainable by any of the case companies is 64. Therefore according to the rating, Converttech internationalizes better than other companies followed by Newaves, Biosoln, Lumtech and IoTech respectively. More so, deducing from Table 14, experience, networks and domestic markets are the key drivers for the managerial, firm and environmental level of antecedents respectively.

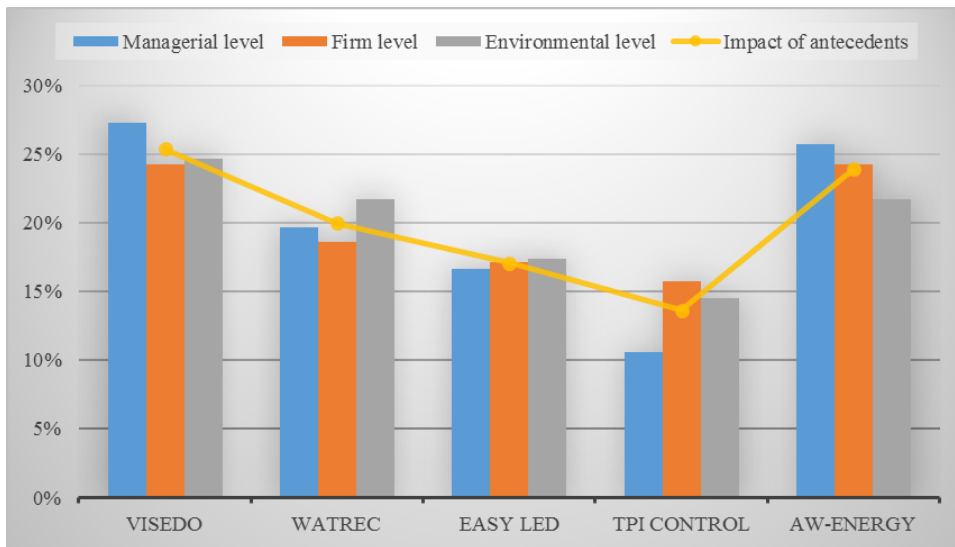


Figure 24. Assessment of antecedent levels on case firms

The most prominent group of antecedents that impact the internationalization of the case firms based on the average outcome of the comparison matrix is presented in Figure 24. Converttech and Newaves showed higher influence of antecedents. Thus, they possess the most propensity to internationalize in a shorter time. Biosoln and Lumtech followed with intermediate facilitating motives to internationalize compared to Converttech and Newaves. However, the impact of antecedents was lowest in the internationalization activities of IoTech. Below is an evaluation of the influence of individual antecedents on all case firms.

Managerial Level: Experience seemed to be the most prominent factor associated with cleantech SMEs as represented in Figure 25. The entrepreneurs seemed to have extensive prior work and international experience. However, as seen in the preceding prominent determinant, the entrepreneurs exhibited an open mindset towards internationalization. For example, Newaves and Converttech showed a proactive attitude towards internationalization efforts and possessed more global mindset. This was reflected in their countries of operation and interest. Whereas, other case firms (Lumtech, Biosoln and IoTech) portrayed a more emergent (reactive) response to internationalization. As a result, the average risk propensity seemed to be low.

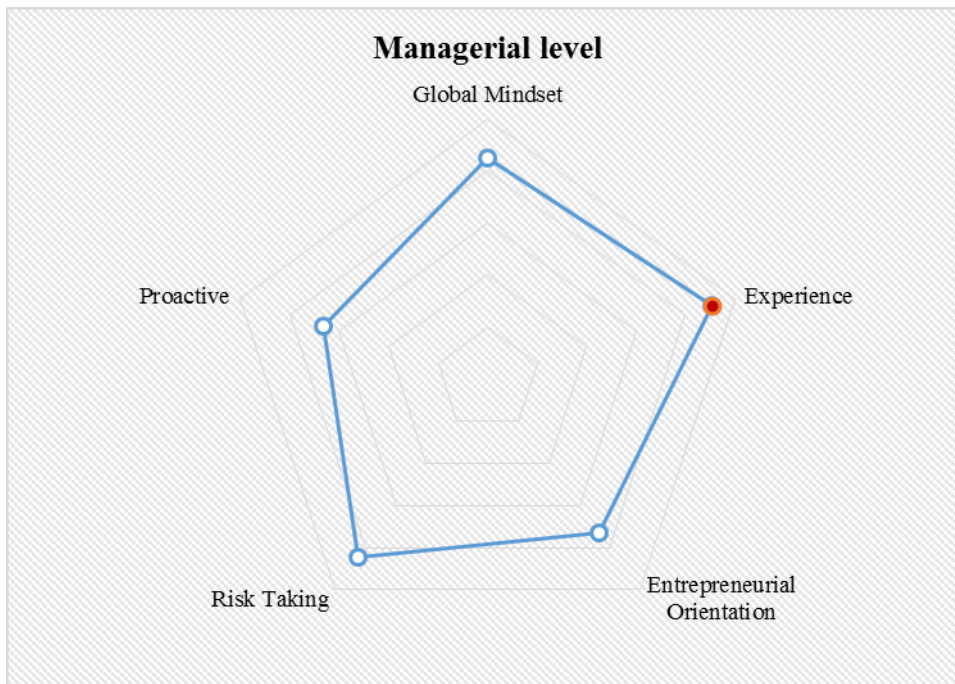


Figure 25. Prominent antecedents on managerial level for case firms.

Firm Level: Networks seemed to be the most important antecedent to internationalization across the case firms as presented in Figure 26. The relevance of partnership relationships and network ties seemed very important to their internationalization decision and operations. Knowledge and strategic orientation were the next prominent determinants as they were essential in the entrepreneurial decision making of the companies. Lastly all the firms possessed limited resources which were unique, rare and superior. However, the small size of the companies and employees seemed to be a limiting factor to the efficient exploitation of resources and capabilities in internationalization efforts.

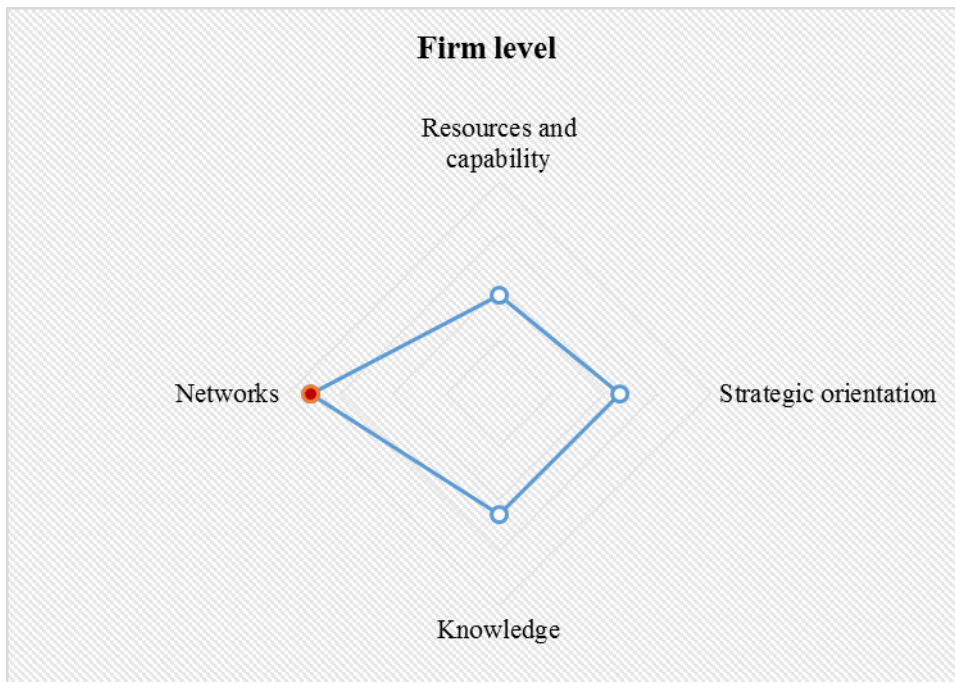


Figure 26. Prominent antecedents on firm level for case firms.

Environmental Level: Domestic market situation seemed to be the key antecedent to internationalization across the case firms as shown in Figure 27. Slow response to the product technology (IoTech and Converttech), market maturity (Biosoln and Lumtech) and, market opportunity and profitability (all firms) seemed to have uniformly pushed the firm’s internationalization efforts. Distance was the next prominent determinant which seemed to affect foreign market entry decision. On the average, the internationalization to nearby geographical countries (low psychic distance) seemed to be high. In the case of Converttech and Newaves they were not constrained by geographic location. On the average, market competition both locally and internationally seemed to be low due to unique and innovative product offerings compared to other SMEs. The policies guiding the internationalization of these firms seemed to support the growth and internationalization of the companies. The regulation and policies were not clearly defined.

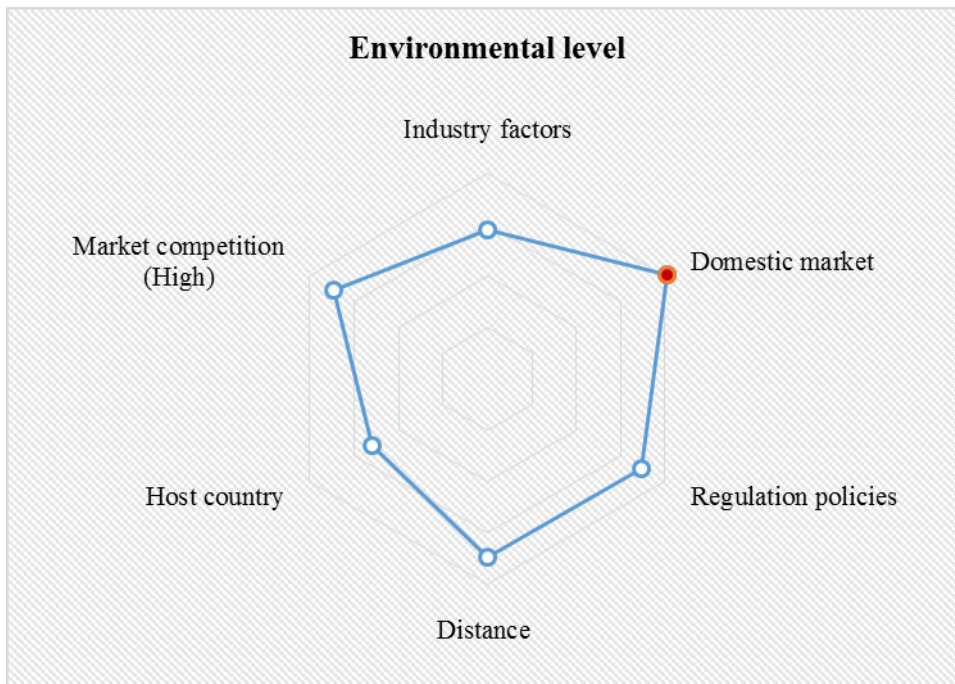


Figure 27. Prominent antecedents on environmental level for case firms.

In summary, Figure 24 shows the impact of the antecedents on internationalization operation. It was noticed that despite the fact that Newaves had not started full commercialization, the firm operations and decisions were already international before the actual sales or profits. This also demonstrates that the company followed a born global pathway where internationalization activities of the company started from inception. The activities of Biosoln and Lumtech also seemed to be on the same level as also supported in their internationalization pathway. TPI clearly followed a traditional pathway and thus internationalization activities seemed to be closer to the activities of Lumtech and Biosoln which seemed to be more traditionally oriented as opposed to the activities of Converttech and Newaves which clearly followed a born global pathway. Overall, these deductions do not strictly suggest the level of internationalization of the case firms rather they just highlight the most prominent level of antecedent peculiar to the case companies.

8 CONCLUSION AND DISCUSSION

In this section, the results are discussed, evaluated and compared with literature. Thus based on empirical findings, the researcher discusses insights on cleantech, antecedents and patterns of internationalization of case firms. This chapter is concluded by addressing the theoretical and managerial implications. Limitation and areas for further research are also outlined.

8.1 “Cleantech”

Based on the interwoven responses from this study, desktop research and archival results, the emergence of cleantech is been said to emanate due to the rise of sustainable practices like lean production and waste elimination. O’Rourke (2009) mentioned that the emergence of cleantech category was targeted towards beginning a transition in the dominant logic of business environments and achieving win-win outcomes in business operations. Concepts like “biotech”, “eco-efficiency”, “greentech”, and “cleaner production”, started becoming prominent as an industrial setup. Thereby making companies more conscious about sustainability related issues, the need to save cost and developing optimized business processes. However, taking into cognizance the findings about “cleantech” and the “value of cleantech”, the researcher concludes that there is a link between the phenomenon of “cleantech”, sustainability and environmentally conscious behavior or technologies. In other words, cleantech seems to be closely linked with providing environmentally friendly products and services, and optimization in product manufacturing and service offerings. Thus, cleantech SME operations are geared towards achieving the highest level of productivity and efficiency as opposed to regular operations. Table 15 shows some of the comments of respondents when asked about the value of cleantech and what it means to them.

Table 15. Definition and value of cleantech by case companies.

Case Companies	Cleantech
Converttech	<i>“With our systems and our products that we sell, we can give our customers really high efficiency, and if you think of cleantech, we can decrease the emission level, really highly”.</i>
Lumtech	<i>“It is about pollution minimization, “but always it is about being as efficient in your use of any substance, as possible It is absolutely marketing. For example in ice halls we are up to 70 to75 percent in power savings when you change from the mercury light to LED. With our luminaires”.</i>
Newaves	<i>“Generating clean electricity is one of the cores for the company for being a categorized a cleantech firm”.</i>
Biosoln	<i>“Cleantech focuses on waste treatment. We basically receive and treat waste in the way that renewable energy is generated simultaneously, also recycling the nutrients back to the agricultural fields, from where the agricultural waste originally originated”.</i>
IoTech	<i>“Cleantech means Green tech and Sustainability. The key value of being a cleantech company is the energy costs savings”. . . “any company can be the member of Cleantech. There’s no rules for what kind of company can join that Cleantech (organization) as you know there’s many different kinds of companies”.</i>

As seen from the results, Finnish cleantech firms have high level of technology and innovative products and services. The growth of Finnish cleantech companies makes it an attractive investment category. Thus, Finnish cleantech SMEs seem to get substantial funding for their business operation from TEKES, ELY and other venture capital firms. The results seem to be in agreement with O’Rourke (2009) which suggests that cleantech is a viable venture capitalist investment category, due to the expectation that cleantech industries can revolutionize the way in which business is being carried out. Some revolutionary attributes mentioned include; long-term improvement in environmental conditions, cost reduction and optimization (Kachan & Fugere, 2013; O’Rourke, 2009). The findings also show that environmental factors such as regulations, which support environmentally conscious and sustainable behavior also projects the development of cleantech as an industrial category. An extension of these supporting regulations and policies globally opens up market opportunities to facilitate internationalization of Finnish cleantech SMEs. Hence, in agreement with the findings on cleantech (Cleantech group Finland, 2015a; Kachan & Fugere, 2013; O’Rourke, 2009). Cleantech is proposed to be an industrial category which emerged as a result of the shift from “regular” business practices to more “conscious” and sustainable business practices which support environmentally conscious behavior.

8.2 Internationalization Pathway

Jankowska (2011) suggests that a firm is said to undergo internationalization when it transforms from a domestically focused firm to an internationally focused firm. Thus, the

degree of internationalization (scope, time or scale) depends on the firm's international development strategy. Based on the observation of the antecedents of the case companies, it is clear that the internationalization pathway adopted by Finnish cleantech SMEs vary. This is because of the diversified nature of the cleantech industry and different categories of cleantech firms. As seen in this study, different companies from different categories under the cleantech umbrella were examined. The case firms were from different cleantech categories thus they were subject to juxtaposing environmental or market conditions which affect their international market potential. For example; direction of wind (Newaves), duration of project (Biosoln) and nature of buildings (IoTech).

Additionally, the internationalization path followed by Finnish cleantech companies is not necessarily by design but based on an emergent strategy or a reactive response to the domestic market situation. Thus, internationalization of cleantech SMEs seem to be more of an emergent reaction to raise profitability and tackle impeding declining domestic customers and sales. However, some firms showed an exception to this line of reasoning as seen in the case of Converttech who began their internationalization from inception, thus satisfying the attributes of a "true born global company". Newaves on the other hand had considered international markets from inception due to the prominence of "waves across various coast lines in specific geographical locations". Corresponding with the notion that the internationalization pathways adopted by Finnish cleantech SMEs are developed in accordance to factors relevant to foreign market entry (Jankowska, 2011).

Furthermore, classifying the internationalization pathways of Cleantech SMEs may take more than just evaluation of the counties of entry and foreign sales to total sales (FSTS) ratio. This is because the companies evaluated are in different cleantech and industrial categories, have different product categories, exhibit varying levels of internationalization involvement. As a result, these varying market conditions affects their pattern of internationalization. Thus, the internationalization of cleantech SMEs aligns with the perception of internationalization as a process which applies to the scale of a company's operation as well as their differentiated foreign operations (Jankowska, 2011).

In summary, central to the internationalization process of case firms is the "cleantech" phenomenon. The concept of cleantech across the case companies seemed to be ambiguous

with respect to their operating standards. Though the case firms possessed an international orientation in markets of operation and prior operation, their preferred target market is within Europe and gradually to more distant countries (Johanson & Vahlne, 1977). Thus, following an internationalization pattern typical to EU SMEs where internationalization paths evolve incrementally with increasing commitment from one geographical and culturally close market to the other, and from developed to less developed countries (Eurofound, 2013; Mandl & Esser, 2015). Another unique feature observed was that due to industrial diversity of Finnish cleantech SMEs, their product categories, customers segments, and target markets differed. As a result, the market requirement and conditions are different in terms of internationalization process and pathway. However, a common aspect in the internationalization choices of case firms is the novelty of the industry, market opportunity and need to maintain profits. Based on the empirical findings, Figure 28 is the researcher's interpretation of the internationalization pathways typical to Finnish cleantech SMEs.

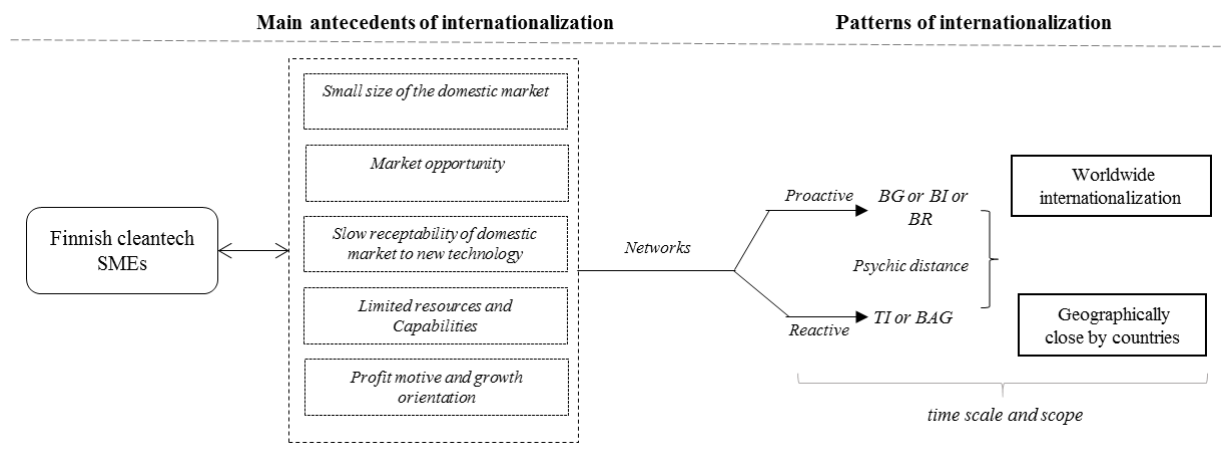


Figure 28. Proposition on the internationalization pattern of Finnish cleantech SMEs

8.3 Internationalization Antecedents

In this section, the researcher discusses the antecedents of internationalization of case firms based on research findings. The case companies are evaluated and discussed on managerial level, firm level and environmental level.

8.3.1 Antecedents at Managerial level

Based on the evaluation of the managerial antecedent that emerged, positive relationships exist between SMEs, early internationalization operations and entrepreneurial characteristics

such as open mindedness, international orientation, global mindset, networking and risk tolerance (Crespo, Simões & Fontes, 2015; Madsen & Servais 1997; Kuemmerle, 2002; Nummela et al., 2005). The results show that although the companies carry out operations in the domestic market, the vision of the company and the operation over time points towards facilitating visibility and operations in the international markets. Thus, in consistence with these findings, Finnish cleantech entrepreneurs seem to possess high international orientation and have extensive international experience. Additionally, the entrepreneurs have very high level of tertiary education which is in line with the perception of Peiris et al. (2012) and Zucchella et al. (2007) that the level of education of the entrepreneur impacts their internationalization orientation. More so, as reflected in the personal experiences of the respondents, high level of international development of the firm is reflected in entrepreneurial characteristics such as foreign language competences, work experience, or international travels or studies (Osei-Bonsu, 2016; Bloodgood, 1996; Acedo & Jones, 2007).

The entrepreneurs also had extensive work experience in various positions internationally. This is in accordance with the managerial characteristic on internationalizing new ventures which suggests that the extent of international orientation and entrepreneurial experiences determines the level of international experience, knowledge and linkages essential for new internationalizing firms to succeed abroad (McDougall et al., 2003; Simões 2012; Nummela et al., 2005; Kuivalainen et al., 2007). Networking was also a very prominent feature amongst firms as the value of firm networks both internally and externally were highly instrumental in the firm's potential to enter new markets and develop strong bonds internationally. Studies also concur that international entrepreneurial characteristics (such as: prior international experience, international knowledge and networks) is a huge facilitator to specific international partners or networks (Oviatt & McDougall, 1994).

The case companies' international involvement and the entrepreneurial orientation towards internationalization were largely proactive. The case firms were internationally oriented which fostered their intention to go into new markets. However, as in the case of Lumtech and IoTech, the firms showed a more reactive approach to foreign market entry and deliberately chose to enter markets close to their home country. This action in theory can be attributed to the notion of psychic distance where internationalization activities and decisions are made based on proximity and perceived similarities in characteristics of the domestic

market and that of foreign country (Johansson & Vahlne, 1977). However for Biosoln, this was not completely the case, rather market selection was as a result of optimizing market choices in relation to firm capabilities and resources.

Surprisingly, the researcher also noticed that the novelty of the industry and perceptions of the entrepreneurs about specific markets limited their interest in market selection processes. Additionally, the novelty of the industry seemed to affect the choice of markets the case companies were interested in. The entrepreneurs' interest in entering markets with close proximity was associated with learning about customer's reaction to products which can be replicated across other markets. For example, IoTech benefits from location advantage and customer relationships in entering Sweden; Newaves used demonstration projects to test market potential and attract potential investors to preferred markets of entry; and for Lumtech the product did not need to be modified thus entering homogenous markets seemed to be a reason for internationalizing incrementally before considering more distant markets. Thus, the reason for entering markets of close proximity was aimed at managing resources and observing if the products thrive in the domestic markets and nearby countries before venturing into more distant or risky geographical markets. This raises deliberations which are subject to future research on the notion of psychic distance. Thus, questioning if the novelty of the industry makes the entrepreneurs take precautionary measures regarding target market selection hence entering into similar markets and avoiding less risky markets.

Overall, based on the responses, the degree of internationalization of Cleantech SMEs in relation to management characteristics is relatively high. Although, the management of the individual case firms show both proactive and reactive managerial efforts to push their product and services into new foreign markets. Internationalization decisions also seem to be largely as a result of a combination of international experiences and recommendations by social networks (partners, distributors and agents). This corresponds with theoretical assumptions that the managerial characteristics of a company determines the extent of strategic decision making. In other words, the extent of international managerial experiences is proportionate to the extent of receptiveness to international markets (Madsen & Servais, 1997; Reuber & Fisher, 1997).

8.3.2 Antecedents at Firm Level

Based on the evaluation of the findings, networks seemed to be the most important antecedent for internationalization at firm level. As all the respondents mentioned the significant role that various strategic partnerships and alliances played in their international market selection, operation and decision process. International entrepreneurship literature supports that networks facilitate the speed of internationalization process by providing the firm access to critical external resources, capabilities, relevant information, knowledge and opportunities (Oviatt & McDougall, 1994; Madsen & Servais, 1997; Freeman et al., 2006). SME internationalization research support that there is a positive relationship between the time, scale and scope of internationalization with network relationship factors (Weerawardena et al., 2007; Zucchella et al., 2007). Thus, all the case companies also seemed to be dependent on their network ties in making market entry decisions. For example, as seen in the case of the intermediate firms, their personal network connections were instrumental to their decision to enter foreign markets. *“Being a part of the network is also considered an avenue for new market knowledge, clients and getting access to contacts who can be beneficial for business”* (Interviewee, Lumtech). More so, the reaction to opportunities seemed to be reinforced by network recommendations for market entry and through products development efforts. These contacts are the key medium through which the firm enters new market . . . *“We have been introduced or, we are approached by them, or we are approaching them so you never know. The partners also assist in looking for projects and deals in nearby locations”* (Interviewee, Biosoln). Thus, the findings confirm that networking relationships support the explanation of early and accelerated internationalization processes (Zucchella et al., 2007).

Consequently, supporting research on network ties is an important avenue through which internationalizing firms overcome the “liability of smallness and newness” as well as related resource knowledge constraints (Freeman et al., 2006; Tang, 2009). Case firms showed that lack of familiarity with the international market, limited resources and knowledge seemed to be a profound reason behind using networks to internationalize. The IoTech respondents mentioned that *“how we can enlarge and grow our business in foreign markets, depends on how we can find the partners over there”* which corresponds to the proposition that network relationships provide access to resources, knowledge and capabilities required by a firm to compete internationally or enter markets of interest (Chetty & Wilson, 2003). Thus,

partnering with local agents seem to be an avenue for Finnish cleantech SMEs to augment their limited knowledge about new markets. This is in line with the notion that internationalization challenges emanate as a result of limited financial resources, lack of market knowledge, market risk and economies of scale. Hence, Finnish cleantech SMEs tend to adopt partnerships and strategic alliances to foster foreign market entry (Freeman et al., 2006; Crespo et al., 2015).

The results also show that the impact of resources and capabilities is an important antecedent to Finnish cleantech SME internationalization process. The case companies all have unique products and services as well as high level of educated professionals and innovative technology which is coherent with the RBV on internationalization antecedents that resources should be rare, non-imitable and non-substitutable, and have advantage over competitors in the domestic and international market. Such firms with unique combination of these resources tend to possess high international orientation (Barney, 1991; Wernerfelt, 1984). Resource and capability constraints seemed to be a moderating factor in the internationalization process of the case companies. The case firms had relatively small size and insufficient human capital or work force as a key characteristic. Thus, size as a factor mounts pressure on the firms both locally and internationally. As a result, marginalizing the internationalization efforts of the case companies. For example, Biosoln CEO mentioned that *“What is the problem is that we have 20 people in the company, so we don't have that much personnel or human resources, and these things they take a lot of time”*. Thus, the finding aligned with the notion that the differential level of resources is a key determinant of a company's capabilities and performance (Barney, 1991; Teece et al., 1997).

Additionally, the search for knowledge, international market opportunities, potential customers, and methods of operation in foreign markets is inherent to the entrepreneurial nature of the internationalizing SME (Crespo et al., 2015). The case firms seemed to have searched for knowledge which is needed internally and externally. For example, knowledge gained from market studies, R&D or feedback from partners was said to be used in product and service development. Knowledge and the level of technological capabilities of the firm has a positive relationship with firm internationalization and performance (Autio et al., 2000; Zou et al., 2010). Similarly, Crespo et al. (2015) suggested that learning is path dependent and has evolutionary features. As a result, firm capabilities developed in the past tend to

shape future learning patterns. For example, the respondent from Lumtech stated that “*We are learning and of course we pretty much in all, either long lighting business background or long Nokia business background because we are in Salo. So it's obvious that the Nokia guys are packed here. We have already of course the long experience in international business. That helps. But still, when it goes to the, on the level of everyday business and having real contacts for the real projects. You need somebody locally*”. In other words, Finnish cleantech SMEs tend to recognize the importance of new information from external sources which is being used and applied in firm internationalizations. Thus, pointing out the relevance of exploiting new knowledge, recognizing the value of new information from external sources and applying the knowledge gained to commercial ends (Zahra & George, 2002; Cohen & Levinthal, 1990; Zahra et al., 2005; Crespo et al., 2015). This leads to the proposition that knowledge is an important firm level antecedents of Finnish cleantech SMEs and knowledge as an antecedent concurrently impacts with networks, learning and location advantage.

The strategic orientation of the case firms was an important antecedent. Freeman and Cavusgil (2007) mentioned that different strategic orientation affects the internationalization pattern adopted by a firm. Finnish cleantech SMEs seem to be strategically oriented. For example, the strategic inclination of Newaves is based on resource (high wave energy) potential as well as companies which specialize in energy and power utilities business. More so, strategic decision adopted by a firm significantly impacts the degree and speed of internationalization as well as the performance and survival of the SME (Bloodgood et al., 1996; Knight, 2000). For example, the strategic decisions for Lumtech were made based on the nature of their product (220v) suitable for European countries and . . . “*growth is step by step on the focused markets and areas. Meaning, go there where your products still has some leading edge*”. In other words, available resources and knowledge capacity of a firm determines their strategic decisions and actions (Cohen & Levinthal, 1990; Wiklund & Shephard, 2003). There is a positive relationship between the entrepreneurial and international orientation to the strategy adopted by the company which in turn impacts the level of innovation and flexibility of the firm (Knight & Cavusgil, 2004; Knight, 2001) as seen in Biosoln “*Due to the small size of the company and limited revenue the internationalization strategy of the company in the interim is to focus on project development*

and optimizing their resources and capabilities for market entry and to meet international market demands”.

As suggested by Crespo et al. (2015), another interesting finding was based on the notion that there is a positive relationship between strategic decision of a company and their international and entrepreneurial orientation. The results supported this notion because all the case firms had different products thus different business strategies and target markets. In other words, the companies did not compete against each other and the only complementing factor between the case firms was the industrial podium i.e. cleantech.

Lastly on firm level, the case companies also adopt niche strategies as an important avenue through which firms can speed up their internationalization processes and reduce the impact of global competitors (Bloodgood et al., 1996; Madsen & Servais, 1997; Knight & Cavusgil, 2004; Zucchella et al., 2007). For example; Biosoln mentioned that due to the level of immense competition globally sustaining a strict IPR is not imperative to them rather their professional expertise, the feasibility of their product and in house know-how is considered a competitive advantage. Thus, their approach to the international market is a strategic antecedent to improve the performance of the company in the international frontiers (Knight & Cavusgil, 2004).

8.3.3 Antecedents at Environmental Level

As extrapolated in the literature review, numerous environmental forces impact internationalization. According to Cavusgil (1980) and Reid (1981), external related factors also called push and pull factors are mentioned to impact home and host countries respectively. Covin and Slevin (1991) mentioned socio-cultural, political, legal and technological factors as external forces which affect the internationalization efforts of an organization. Based on responses that emerged, the main environmental factors considered were domestic market, distance, location, regulations and policies.

However, due to the scope of this study and to analyze this section, the environmental antecedents considered were mainly on home market perspectives. The environmental factors taken into consideration were domestic market, geographical location, distance and regulatory policies. Environmental factors related to an industry and the domestic market in

which the firm operates influence the company's internationalization process (Kuivalainen et al., 2012a; Crespo et al., 2015). This seem to apply to Finnish Cleantech SMEs. Besides the profitability motive, the small size of the country and maturity of the domestic market seemed to have a huge impact on the internationalization of Finnish cleantech companies. The responses showed that the small market size affects the ability of the companies to continually remain profitable. For example; Biosoln and Lumtech seemed to be pushed into foreign markets due to the declining sales and limited market opportunity in the domestic market. Responses also lean towards the long-term feasibility of the product and service offerings of the cleantech companies. Thus, internationalization is triggered because the case firms have satisfied the domestic market demands extensively. More so, diminishing demand for products seem to force the case firms to find alternative ways to make profits. Some other factors mentioned centered on situations where the product category was not properly suited for the domestic market, therefore internationalization was a natural step from the inception of the firm. As seen in Newaves, the company does not make many domestic market decisions because most of the company's projects are related to available opportunities and technology development abroad.

Another surprising driver was based on the statement of the CEO of IoTech. He mentioned that following the decline in economic situation, Finnish companies are obligated to support the economic growth and developments of their country by intensifying internationalization efforts. This led to the proposition that internationalization goes beyond mere profitability and opportunity and it is based on patriotism and support for the economic viability of the country. Hence, this findings tend to be in line with some studies which associated environmental dynamism or turbulence to propel the decisions to internationalize (Shrader et al., 2000).

Some other challenging factors seemed to also push internationalization such as; insufficient investment capital in energy saving reforms and lack of funds due to decline in the economic situation the country. More so, the domestic market response to some of the product and service offerings were slightly negative compared to the receptiveness of target countries. For example, one of the CEOs mentioned that their innovation is not really supported by the *“old fashioned structures and processes which are still in use. While the Swedish market seems to be more welcoming and interested in new innovations”*. Also, internationalization

was triggered due to the slow growth or readiness of the domestic market to their product or service (Interviewee, Converttech). Nonetheless, the entrepreneurial orientation, access to financial resources and funding from the domestic markets also influence the level of proactivity or reactivity to internationalization of a company (Hitt et al., 1997). For example, Newaves's respondent mentioned a unique case of the impact of government policies on domestic environment such as giving priority to local subcontractors or preferential funding schemes regarding allocation of funds for specific project initiatives.

Case firms had varying orientation in their perception of distance, geographic location of target market, and preferred internationalization destinations. This may have been due to the accumulation of past international entrepreneurial experience which affects how external environments are perceived by the firm and provides a foundation for recognizing and capitalizing on new opportunities (Weerawardena et al., 2007). Other factors such as psychic distance, nature of the product and suitability for specific market opportunity and market demand impact on their motivation to internationalize. As seen with IoTech and Lumtech, international market entry decisions seemed to be traditionally oriented in strategy. Thus, their internationalization interest were largely incrementally focused, and targeted toward nearby countries or customers within Europe. In other cases, the company made quick leaps into foreign markets. As in the case of Newaves, opportunity and demand potential were the driving force for market entry and intended entry decisions, thus the company had widespread operations globally. Converttech on the other hand regardless of location seemed to be pulled towards markets where demand and demand potential were high. Likewise, Biosoln was attracted to international markets with promising potential, however the perception towards geographically distant market was low due to insufficient resources and human capital.

Various research findings support that internationalization of SMEs are propagated by general global changes, legislative demands, public policies, economic situations and changing trends in technology (e.g. Kuivalainen et al., 2015; Mandl & Esser, 2015). Although most of the regulations addressed were based on supportive regulations. Overall, respondents agreed that different regulation and policies tend to impact their foreign market decisions in both the home and host countries. Thus given the nature of the industry, sustainability and green related policies such as power saving, efficiency and waste reduction

are essential to their identity and brand as cleantech firms. However, the regulations vary due to the varying categories of the firms within the cleantech industry. For example, Newaves mentioned being faced with varying policies and regulations due to the different markets they operate in while IoTech mentioned that their domestic markets and markets of interest had similar regulations and policies.

8.4 Theoretical Implication

In this section, the researcher attempts to evaluate the appropriability and implications of the adopted theories and literature to answer the research questions. Most importantly, considering that cleantech is still an emerging phenomenon and the internationalization of Finnish cleantech SMEs are still under-researched, this thesis fills a clear research gap, and the main contributions are illuminated in this section.

Firstly, due to the novelty and ambiguity of the research context, it was difficult to decipher the appropriate literature that would be suitable for the research topic. Thus, the research combined SME internationalization theories and IE as an integrative theory towards understanding the internationalization of Finnish cleantech SMEs. The main theories taken into consideration were stage models of internationalization, networks perspective and INV/born global. Literature on internationalization patterns, antecedents and cleantech were also covered. The combination of the theories provided a rounded understanding of the study. Furthermore, taking a deductive view of the study into consideration, resource based theories, dynamic capabilities and other IE constructs were also reflected on due to their importance in investigating the research questions. Nonetheless, due to the scope of the study, these perspectives (such as RBV, DC) were only delved into peripherally in the theoretical section. Thus, as mentioned in the methodology section, an abduction approach was imbibed. Overall, the study is a unique attempt aimed towards understanding the “cleantech” phenomenon and the internationalization of cleantech SMEs in the Finnish context. The selected theories and literature used provided a holistic view on the research topic and gives direction to answering the research questions.

i. How do the internationalization pattern develop?

There are limited researches explaining the patterns in which SMEs internationalize. However, to understand the internationalization pattern of Finnish cleantech SMEs, the

researcher used traditional internationalizers, born global, born again global, born regionals and born international pathways as criteria to evaluate the behavioral pattern of the case firms. The DOI mapping tool presented in Figure 15 was also incorporated in the study to evaluate the internationalization pathways and categorize the level of international involvement of the case firms. Enquiry regarding the foundation of the firm, start of internationalization, countries of current operation and interest, geographic range and foreign sales percentage were taken into consideration to evaluate their internationalization behavior. Thus, in line with Jones and Coviello (2005, p.292) “internationalization patterns are a description of firm behavior formed by accumulation of different events manifested at various points in time”.

The findings also highlighted in Figure 28 shows that a combination of internationalization antecedents also impact the internationalization pathway chosen by the case firms. As a result, Finnish cleantech SMEs may follow varying trajectories depending on factors such as the nature of the product, their internationalization strategies, orientation of the entrepreneur, and market opportunities. Limited resources and capabilities, insufficient access to funds and network ties also impact the pattern adopted for foreign market entry. However, based on the synthesis of the responses, the predominant preference of internationalization of the case firms was to grow incrementally to nearby countries. On the other hand, some firms were an exception to this internationalization pattern as they were internationalized from inception and not constrained by location.

Based on the empirical findings, the dominant internationalization patterns that emerged support that Finnish cleantech SMEs gradually internationalize after long domestic market focus. This pattern seems to follow the generic internationalization patterns of European SMEs known as “waterfall” internationalization strategy which is referred to in this study as “traditional internationalizers” and even similar with “born again global pathway” (Eurofound, 2013; Kuivalainen et al., 2012a; 2015; Johanson & Vahlne, 1977). This internationalization behavioural pattern corresponds to that of Biosoln, Lumtech and IoTech who preferred to internationalize incrementally to closer markets. Thus, Finnish cleantech SMEs are likely to enter foreign markets with increasing commitment from one geographically and culturally close market to the other and from developed to less developed countries. Thereby, following a traditional internationalization or born again global pattern.

However, Finnish SMEs may also follow more rapid internationalization patterns. As mentioned in the empirical findings, Converttech revealed that slow growth of the domestic market fostered their internationalization effort. Newaves mentioned that wave currents were not high in Finland thus making them seek locations with higher wave potential. Therefore, depending on the dominant location of target market opportunity and, availability of resources and capabilities, Finnish cleantech SMEs will adopt alternative pathways such as born global pathway. These observations reinforces the proposition made in Figure 28 and also support that market opportunity and the need to remain profitable influences the pattern which Finnish Cleantech SMEs follow.

In summary, the findings suggest that Finnish cleantech SMEs follow patterns typical to SME internationalization patterns as seen in Mandl and Esser (2015) and Kuivalainen et al. (2015). However, the pathway adopted by a Finnish cleantech SME is largely dependent on the dominant antecedent (determinant) influencing firm operations both domestically and internationally. Nonetheless, further research may incorporate more cleantech SMEs to provide more valid and generalized deductions for this hypothesis.

ii. How different antecedents influence the internationalization of Finnish cleantech SMEs?

A broad range of managerial level, firm level and environmental level factors seem to impact the internationalization of Finnish cleantech firms. On managerial level, the prominent antecedent was experience. On firm level, networks were observed as the key driver while on environmental level, domestic market situation was accentuated as a key antecedent (See Figure 25, Figure 26 and Figure 27). However, based on an overall assessment of the findings, the central drivers of the internationalization of Finnish cleantech SMEs combine pull and push factors. The researcher observed that the principal motivation to internationalization of the case companies were opportunity seeking, maturity of the domestic markets, profit motive and growth orientation. The findings are consistent with the opinion that SMEs internationalize to make profit, overcome size constraints and capitalize on foreign market potential (Onkelinx & Sleuwaegen, 2008; Ruzzier et al., 2006; Kuivalainen et al., 2012a; 2015).

Typical to all case firms was their small size and newness of the industry. Thus, the small size and the novelty of the industry directly and indirectly impacts the extent in which the firms allocate available resources and capabilities which in turn influences their internationalization decisions. This outcome is consistent with the findings of Kuivalainen et al. (2015) who describe that the disadvantages associated with internationalizing Finnish SMEs include scarce resources, small size of the domestic market and scarcity of financing opportunities. However, regardless of the small size of the case companies, they possessed unique resources and capabilities. Based on the findings, expert human capital, highly educated professionals, innovative product and services, high level of technology and flexible organizational management are examples of the capabilities possessed. These patterns also seem to be associated with the aforementioned strengths of Finnish SMEs, as seen in Figure 7, that internationalization efforts are fostered by high level of education, international language competences, superior technological competences and non-hierarchical organizational culture (Kuivalainen et al., 2015).

More so, the strategic orientation of the case firms seemed to depend on the entrepreneurial orientation of the decision maker. The results showed that management decisions seemed to lean towards emergent or reactive motivation rather than proactive motivation from the inception of the firm. However, case firms like Converttech and Newaves were an exception to this trend as internationalization decisions were less stereotypical and largely proactive due to the global mindset of the organizational management. Thus, the responses revealed that the internationalization of Finnish cleantech SMEs seem to be driven by the entrepreneurial vision and orientation of the company which also determines the internationalization patterns employed as seen in Figure 28. The findings also demonstrate that market entry decisions were based on the foreign market potential of their product and services internationally. R&D was mentioned to be a fundamental prerogative towards monitoring performance and product development. Correspondingly, all the firms showed the need to constantly gain knowledge and improve the level of innovation in their products and technology. However, Lamotte and Colovic (2013) argue that it is unclear if high level of innovation fosters internationalization of SMEs. Hence, this calls for further research.

The research findings also highlight the role of network relationships as an important avenue through which Finnish Cleantech SMEs enter foreign markets. Findings also deduce that the

strength of the relationships within the individual networks not only improves the international sales but also an important source of feedback. The feedback may be used and adapted towards further product and service development. All the case firms were a part of some coalition with various actors and had strong ties through which they shared knowledge and resources in order to compensate for their size, resource and capability constraints. More so, irrespective of the cleantech category, the case firms were interested in expanding their networks and were in active search for appropriate partners, suppliers or agents internationally. It was also noticeable that the role of these case firm networks (agents, distributors or partnerships) had directly or indirectly affected the pathway and pace of internationalization. Thus, buttressing the notion that the strength of a network is based on trust which is time dependent (Mandl & Esser, 2015) and essential to the successful internationalization of Finnish cleantech SMEs.

Another interesting observation was that Finnish cleantech firms seem to be more interested in knowledge gathering and improving the product and services through R&D, market research and from information gathered from networks. Considering heavy investments in R&D and corresponding limited resources and capabilities of the firm, it was difficult to decipher how the company measured the potential sales and success of their current products and services. Thus, the researcher pondered if the aforementioned actions were reinforced due to the changing global trends such as sustainability, effect of MNE activities or to gain competitive advantage. This deliberation was supported from the theoretical standpoint that changing industry structures and trends in global businesses may affect both small and larger firms. Thus, the need to save costs and provide more sustainable products and services are on the rise (O'Rourke, 2009). Overall, changing global trends may push cleantech companies especially from small economies to internationalize.

Some challenges were also considered as antecedents to internationalization. For example, Lumtech mentioned language and cultural barrier to be a contending force in their efforts towards entering the German market. IoTech also mentioned difficulties in identifying appropriate clients and partners in the Swedish market. The CEO of Biosoln, being largely in charge of majority of the internationalization activities appeared to have had a huge work load to efficiently realize internationalization in many locations. These findings reinforce

that the challenges to SME internationalization may determine internationalization or “de-internationalization” decisions (Kuivalainen et al., 2012a).

Finally, to answer the main research question: *How does the internationalization of Finnish cleantech small and medium enterprises occur?* The researcher provides insights on cleantech based on the study, and a corresponding evaluation of the antecedents and internationalization pattern of the case firms. Table 16 is an overall perspective on the findings based on this study. The study illuminates that although Finnish cleantech SMEs may imbibe internationalization behaviour similar to SME theories, there are some peculiar attributes typical to Finnish cleantech SMEs which influences their internationalization. These points are extrapolated below:

- The principal antecedent to internationalization of Finnish cleantech SMEs include opportunity seeking, maturity of the domestic markets, profit motive and growth orientation.
- The internationalization patterns adopted by internationalizing Finnish SMEs are dependent on the dominant antecedent(s) influencing their business operations.
- The role of coalition or network relationship is an important driver which provides access to dynamic capabilities and resources that are limited and required in the internationalization process of Finnish cleantech SMEs.
- Knowledge and international orientation are important firm level antecedents which impact innovation, learning, network activities, and market selection decisions.
- The internationalization of Finnish SMEs encompasses profitability and opportunity, and may be reinforced due to entrepreneurial patriotism and support toward the economic growth of the country.
- Psychic distance was considered in their internationalization decisions largely due to the novelty of the industry. Thus, learning and minimizing the risk of going to more distant countries that may not be ready for the new products or technology.

Insights on cleantech

Based on the empirical findings cleantech phenomenon is still ambiguous and Finnish cleantech SMEs operate in a highly diversified industry. The researcher considers that the designation of “cleantech” is exploited for the following reasons: as a platform and avenue

to keep up with changing global business trends; to create brand identity and recognition; to boost profitability; as a collaborative tactic adopted by SMEs to develop a new market niche to thrive with competition between global market players. However, based on the findings, Finnish cleantech SME operations appear to support optimized business processes, sustainability and environmentally conscious approaches in business. As a result, the study confirms that there is a connection between Finnish cleantech firms and sustainability, environmentally conscious behaviour and optimized business processes. Additionally, based on the findings, the commercialization of Finnish cleantech SMEs seem to involve adopting business models which combine innovation and technology driven solutions to solve general environmental problems (Figure 19). This is in line with O'Rourke (2009) who mentions that cleantech embodies a new wave of entrepreneurial activity and innovation which aims to create a more sustainable industrial economic system. Nonetheless, based on the evaluation of the responses and the literature review, it can be seen that there is link between SME internationalization theory and the internationalization of Finnish cleantech SMEs. Table 16 is an extrapolation of the researcher's view on the internationalization of Finnish cleantech SMEs.

Table 16. Findings on internationalization process of Finnish cleantech SMEs

Cleantech in Finland	Antecedents	Internationalization Patterns
	Managerial Level Antecedents	
	Mindset (International and global)	
	High level of education	
	Entrepreneurial spirit and orientation	
	International experience and orientation	
	International competences (Language competences)	
– High level of innovation in product and service technology	Firm Level Antecedents	– Varying internationalization patterns due to the diversification of cleantech SMEs
	Nature of the product and services	
	Innovativeness	
– Diversified industrial category	High Technology and Innovation	– Stereotypical perceptions of certain countries
	Networks: partners, agents, distributors venture capitalists	
– Link between cleantech, sustainability and environmental responsibility.	Small size of the firm	– Internationalization begins in the early stages of firm foundation.
	Limited resources	
	Dynamic capabilities	
	Knowledge and learning: R&D, market studies, networks	
– The concept of “Cleantech” is ambiguous.	Strategic orientation: reactive or proactive	– Psychic distance: following traditional internationalization strategy for market entry
	Environmental Antecedents	
	Novelty of the industry	
	Environmental dynamism	
– Role of Finnish Cleantech Association to SMEs?	Varying market situations: target market, competitors, resource potential	
	Domestic market: size, maturity, location advantage	
	Slow domestic market response	
	Environmental policies and regulations	
	Distance	

Conclusively, reflections on the findings show that the main unifying characteristic of the case firms studied is their industrial podium which is “cleantech”. In other words, although a firm may be cleantech, market competition may be outside the cleantech sector. Thus, cleantech firms tend to have different customer segments, products and services. As a result, Finnish cleantech companies have varying target markets, competitors, and strategies both domestically and internationally. As mentioned earlier, Finnish cleantech SMEs have unique internationalization processes peculiar to their business operation, customers segments, and product and service category. However, Finnish cleantech SMEs may extricate themselves based on their unique and innovative products and services, or even due to their hybrid and optimized business processes.

8.5 Managerial Implication

The research was aimed towards understanding how Finnish cleantech SMEs internationalize. The research findings brought to fore important managerial implications which could be taken into consideration in strategic development and international related operations. Thus, the managerial recommendation emanate from a theoretical standpoint, and based on the research inferences. The findings show that the small size and declining economic situation of the country as well as the adaptation and receptability of Finland to some clean technologies is still slow. The research findings highlight the role of network relationships as an important avenue through which Finnish cleantech SMEs enter foreign markets. Therefore, given the limited market potential of the domestic market, the need for internationalization of Finnish cleantech SMEs is considered imminent.

It was also noticed that the role of agents, distributors or partnerships had directly or indirectly affected the pace of internationalization and the cleantech firms did not have sufficient links for acquiring the right partners. Finnish cleantech managers should seek and invest in new ways to finding strategic partners as it will be instrumental to their international market expansion and strategic development. This is because collaborating with the right partners is instrumental to broadening foothold in international markets. Therefore, the recommendation also reinforces the evidence on SME internationalization literature which suggests that it is important to make deliberate and swift efforts that focuses on establishing foothold in foreign markets. These efforts can be through collaborative governance structures like licensing or better still investing in the right networks (Mandal & Esser, 2015; Crespo et al., 2015).

Deductions were also made based on the findings that the strength of the relationships within the individual networks is an important source of feedback and improves the international sales. The feedback from networks may be adapted towards better value proposition to customers and further product and service development. Thus, managers should capitalize on network ties and make deliberate efforts towards strengthening existing relationships within their individual networks. To capitalize on networks, managers should consider devising concrete plans towards expanding strategic partnerships to countries of interest.

Although embarking on such initiative may be cost intensive in the short run, in the long run, it would be a foundational platform for long lasting and trustworthy partnerships.

A research on the internationalization of Finnish SMEs mentioned that market information, operational information, support services are some of the benefits Finnish firms can gain from public support institutions which foster internationalization (Kuivalainen et al., 2015). Extant studies also strengthens the fact that these support services are helpful to Finnish firms who are in their early stages of internationalization (Kuivalainen et al., 2008). For that reason, managers can capitalize on their various coalitions and devise collaborative strategies with supporting organization such as, chambers of commerce, consulting firms, government organization, venture capitalist or funding institutions to foster internationalization efforts. Further collaboration can be between Finnish cleantech companies or via network ties in the Finnish cleantech group. Clear policies should also be set within the Finnish cleantech networks to foster non-competitive collaborations which provide mutual benefits for participating member firms. Examples of such benefit may include: contacts in the foreign markets and information on foreign countries or provision of guidance towards establishing international networks.

Results show that the entrepreneurial attitude towards distant countries was extensively complacent not because these markets were devoid of market opportunities but due to stereotypical perceptions of those markets. More so, the case firms seemed to emulate behaviour which involves having a risk averse attitude, market entry to countries with less demand on firm resources and increasing internationalization commitment from one geographical and culturally close market or from developed to less developed countries (Mandal & Esser, 2015; Crespo et al., 2015). Therefore, managers should consider being more receptive to market opportunities regardless of location for example internationalizing to developing countries. Furthermore, respondents seemed to have extensive international experience which shows that Finnish managers may be benefiting from their accumulated knowledge.

8.6 Limitation and Future Research

This study is considered dynamic because it contains large amount of valuable and condensed information. Although the scope of this study is considered broad, it clearly fills a research gap because it provides foundational knowledge on internationalization context of cleantech. This study however, calls for further exploration of this research context. Below are some future research areas that can be considered.

Firstly, the empirical analysis was based on a data set of five cleantech companies and data collection was in short space of time of less than three (3) months. More so, given the sample size considered compared to the total number of cleantech companies (approximately 1600), additional research could incorporate a larger sample in a quantitative study. Additionally, manipulating some of the interview questions due to the diversification of the case firms and level of involvement in internationalization activities created a few skews in the responses. Further studies could be considered within a single cleantech category as this might provide a more unified sample and better ease of data interpretation.

Future research can also focus on only the internationalization patterns of Finnish cleantech SMEs and incorporate more statistical measurements to identify their pattern of internationalization. As highlighted in Appendix 1, many determinants of the antecedents (managerial, firm and environmental factors) were taken into consideration in the thesis. Hence, further research could focus on a single antecedent determinant and how it impacts the internationalization of Finnish cleantech SMEs.

The findings illuminated the role of sustainability and environmentally conscious behavior as attributes of Finnish cleantech SMEs as shown in Figure 19. Sustainability related theories were not taken into consideration because the researcher did not want to impose the “cleantech phenomenon” into a perceived category. As a result, future research should incorporate more established theoretical constructs such as sustainability and institutional theory to better understand the cleantech as a “phenomenon” and as an “industry”. Questions could also be raised regarding the criteria for judging if a company is cleantech or not, or as well as clarifying that cleantech is not just a trend as seen with “dotcom hype”. Thus, further studies should try to understand the role of sustainability in cleantech firms and in their

internationalization process. More investigations can also compare Finnish cleantech SMEs with SMEs from other industrial categories since they may compete with each other directly or indirectly.

Deliberations were raised regarding the role of psychic distance to the internationalization of Finnish cleantech SMEs, because overall, the *novelty* of the industry was projected to motivate less risky internationalization efforts by case firms. However, this perception of the industrial novelty with regard to psychic distance is subject to further research.

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APPENDICES

Appendix I: Internationalization Antecedents

The antecedents are marked based on the responses and the common themes which emerged from the interview questions

Table I - 1. Determinants of the antecedents evaluated

Features	Converttech	Biosoln	Lumtech	IoTech	Newaves
International experience	X	X	X	X	X
Entrepreneurial orientation					
- Risk taking	X	X	X	X	X
- Proactivity	X	X	X	X	X
Commitment					
Global mindset	X	X	X	X	X
Educational background	X	X	X	X	X
Networks	X	X	X	X	X
Strategic orientation	X	X	X	X	X
Resources and capabilities	X	X	X	X	X
- Human capital	X	X	X	X	X
- Technology	X	X	X	X	X
- Financial	-	-	-	X	X
Size	X	X	X	X	X
Age	X	X	X	X	X
Liability	-	-	-	-	-
Company characteristics	X	X	X	X	X
Home country	-	-	-	-	-
- Domestic market	X	X	X	X	X
- Country location	X	X	X	X	X
Industry factors					
- Demand	-	-	-	-	-
- Structure	-	-	-	-	-
- Description	X	X	X	X	X
Host country factors					
- Geographic proximity	X	X	X	X	X
- Psychic distance	X	X	X	X	X
Environmental conditions					
- Competitive advantage	X	X	X	X	X
- Regulation and policies	X	X	X	X	X
Environmental dynamism					
- Turbulence	-	-	-	X	X
- Uncertainty	-	-	-	-	-

Appendix II: Summary of Interview Responses

Themes	Convertech
Position and educational background	The respondent works in the international marketing department. She has a master's degree in international marketing from Lappeenranta University of Technology
Work Experience of the respondent	Worked as summer trainee in UPM and (-) Development Oy focusing on export and coordination.
International experience	Have been involved in exports to China and Europe. As well as, international education and background in LUT a total of five and a half years for undergraduate studies.
Respondent's work interest (Motivation)	Motivation is based on learning about marketing and the practicalities involving business operations in the international environment.
Company information	LUT start-up and established in 2009.
Products and services	Three sectors which focuses on heavy duty machines, transportation and buses; and marine. Mainly into conversion of existing power train systems into fully electric or hybrid system and services in system selling.
Competitive advantage	In-house software and design works, knowledge on system building, strong engineering background with professionals in the R&D department. <i>"We're not just selling others' products, we are actually doing design in here for example motors design we are doing it in-house in here in Lappeenranta"</i> .
Cleantech group	Likely collaboration of cleantech group.
Value of Cleantech	Provide high efficiency products and services to customers which are cost-saving, decreases fuel consumption and emission levels. Good feedback from customers who have used their system in comparison to previous systems used.
Networks	Uncertain: <i>"I know we are following (other organizations) but I'm not sure (if we compare to competitors) are we in some, specific cleantech, part of some organizations that others are not"</i> .
Credentials	ISO Certifications
Countries of current operation	Main export to Europe and China. Also to Taiwan and Hong Kong. Office in the Netherlands. Partners in Spain, France and Germany.
Foreign Sales (Euros)	In 2015, export accounts for 89% of sales. 70% to china and the rest to Europe
Share of turnover (Euros)	3 Million Euros
The role of the business owner in your company	About seven (7) engineers founded the business and currently hold different significant roles in the company. <i>"From the very beginning, because of this kind of high tech company we needed a lot of capital investor's here . . . their role is really important, which was their original idea of founding the company"</i> .
Role of entrepreneur on the internationalization process	Entrepreneurial role is important but presently the capital investors have high importance and they guide and lead the company. <i>"They are actually deciding which, segments we are moving towards, and also, this internationalization process I think they are also this kind of a, the bigger line (towards) there" . . .</i> For market selection process, <i>"it comes through also by experienced market research, what information we get from markets and how the markets are responding to us and what are our managers' connections, who they know abroad internationally"</i> .
How internationalization decisions are made?	The company gets information flow and top management makes the decisions where to focus. Decisions are mainly made from outcomes of face to face discussion with customers and exhibitions. <i>"The most crucial is the information, the market information from competitors, products, out there, customer needs and requests, changes in laws and regulations especially considering environmental issues . . . Internationalization and that information flow comes from basically everywhere"</i> .
Start of internationalization	Internationalization started right after the company was established. <i>"I would actually call Convertech as a born global company . . . the market is really specified where we're aiming, the market (share) the domestic market is not, enough for us. We need to go abroad so we can reach, more customers"</i> .
Motivations for internationalization	The internationalization had been fast and the firm had doubled turnover every year. In order to grow, and achieve such growth internationalization for Convertech was an imperative from the day the firm was established. <i>"It's not something that we are considering would be nice and would have potential but it's just something we have no other options than do that as best as we can"</i> .
Domestic market situation	In the domestic market, the company is gaining recognition and reputation. The company believes in the potential of their products, <i>"the Domestic market has future growth potential but it's, still a bit slow for the change"</i> considering their three product categories, the company aims to be the leader in the market space when the change happens. <i>"For example if we think about heavy-duty these work machines, for example wood harvester or, stone crusher or something else. The market in Finland has been quite slow but for marine market we</i>

Appendix II, 2

	<i>have mainly abroad the market potential. For busses, I think the Finnish market domestic market is opening quite nicely because we have had, deliveries (electric) power train, busses that for example, cities (are now) public transportation to full electric”.</i>
Domestic market challenges	Insufficient customers in the domestic market customers. <i>“We don't have that many customers, for example in marine sector, and the customers are located abroad”.</i> The company also faces challenges with their supplier, as there aren't sufficient Finnish suppliers, thus the some components need to be purchased from abroad.
Supporting legislation and regulations	The interviewee is not familiar with non-supporting regulations to the firm. Supporting regulations however for example in Finland are those geared towards an emission free future in public transportation or tighter emission regulations in Paris.
Market entry and challenges	<i>“As an example entering the Asian markets. It is challenging, (to enter), and therefore we are using partners and agents, generally, so that we can, have better entry to the market than without these local specialists who can help us to sell our products there and know how we should operate there”.</i> Additionally, the company is still in exports stage <i>“we are (in export stage) so we are exporting and, we'll see what the future brings because I still think that we are relatively new, because we have been operating seven years and the first years are always kind of slow when you're establishing something totally new that has never been seen before”.</i>
Partners and agent Relationship	The company's connections are important to their internationalization strategy. <i>“They know people. They know whom we should discuss with recommendations... input they bring, they bring the connections, real names and contact information”.</i> These connections the company works with have technical background. The close relationship between the helps them better serve their customers and is also an important source of generating information to better serve their customers. <i>“They understand better...in that way they are involved with the product development”.</i> Although this is not typical of Converttech's operations sometimes enthusiastic partner networks or agents want to get more involved and help promote internationalization activities. <i>“In Asia actually we have some are even excited to help us to do some R&D. But that's a little bit more exceptional. It's not a general way how we operate. There can be some people that want to understand and be involved more”.</i>
Market entry mode	Mainly through agents and partners. In some cases licensing direct selling because agents are not everywhere
Geographically distant countries	Distance is not a constraint for the company as they can sell any where there is market potential. <i>“We target markets that are providing the biggest growth potential for us. So actually, where the location is, not relevant for us but the market potential and what can we offer customers, because if we can provide better efficiency then we can provide more benefits, we are providing something that is really helpful and, providing more benefits for our customers”.</i>
Internationalization strategy	The main idea of their strategy is to research on the most promising potential market for them. Converttech also uses local partners and agents to get first references from the markets. <i>“In our field it is really important to show good references because there are many companies that are maybe starting or planning to use something that when you have actual sales and you have actual customer testimonials that is the one of the biggest driver for the sales... So, getting inside the market with the right partner that can support you and both should have a win-win situation is the core of our internationalization”.</i>
Improvement of the internationalization strategy	More Research could be an avenue to gain more market information.
Market knowledge on internationalization decisions	Generally, Information gathered from the market serves as a guide in firm operation and internationalization decisions. More so, the company benefits from its relatively large R&D department, thus they focus mainly at keeping up with innovation which is an imperative in high-tech industry.
Company Future	The Respondent was optimistic about the potential growth of the company as well as all the company's segments in the near future. The respondent is also positive that <i>“the change in the market for example in heavy-duty has come and, the situation for us is very, interesting altogether”.</i> Furthermore, there are also hopes that the company will gain first mover advantage because they believe they have the position advantage in the interim. Internationalization-wise, Converttech has expanded, and become more structured in their decision making and processes altogether.

Themes	Lumtech
Position and educational background	The respondent is the director of international sales. He is in charge of building the distribution network and sales for the international clients like sports halls, municipalities in different countries, bigger enterprises. Has education in Commerce (BSc. Commerce) and Mobile technology engineer.
Work Experience of the respondent	Worked for 11 years in Nokia as Mechanical designer, Project management and R&D team roles. Then worked 8years in Jabil in technology management, technology sales, purchasing and KAM before current position in Lumtech
International experience	The respondent has had extensive international experience <i>“for example at the same time three teams. One team with four locations. One was in Dallas, one was in Helsinki, one was in Salo and one was in Hong Kong. So 24/7”.</i>
Respondent's work interest (Motivation)	Interested in working with new technologies, new projects and new people

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Company information	Established in 2006
Products and services	Street lights, which is the company's base and background. The company has since evolved to industrial lighting, warehouses, ice halls and sport arenas. With current share of business covering 20%, 40% and 40% for sport, street and industry lighting respectively. Lumtech is a product company, they also carry out installation work and maintenance services. <i>"We are 25 people company so there is no much muscle to do everything"</i> .
Competitors and competing products	Lumtech considers the big makers their competitors as well as technical companies and mainly luminaire manufacturing firms. Not necessarily cleantech companies.
Competitive advantage	Competences in thermal management of the product, the slim design of the product, and the optical performance of the product. <i>"Everybody can put LED on the printed circuit board, and call it luminaire. Because it's giving light, for sure. Yes, that's true. But it is the magic that, what we do and it is our sweet spot that we can steer the light where you need it"</i> .
Cleantech group	Being a part of the network can be an avenue for new market knowledge, clients and getting access to contacts who can be beneficial for business.
Value of Cleantech	According to the Respondent, in their company's perspective, cleantech means <i>"the efficiency to use all the power we are taking from the network. Meaning that with every volt, every ampere we are creating as much light as we ever can. And leading, steering that to the right position. So that we are in lighting the right place"</i> . It is particularly about pollution minimization, <i>"but always it is about being as efficient in your use of any substance, as possible"</i> .
Networks	Networking with partners and distributors is an ongoing and evolving process. Depending on the market situation and demand from the products and services (See row on partners and agent relationship)
Credentials	
Countries of current operation	The company have strong and growing operations in Sweden, Baltic countries and Switzerland. They are trying to grow in Northern Europe and in Germany.
Countries of immediate interest	German markets. The main driver to enter the German market is the market size and the high cost of electricity since LED offers less power consumption.
Foreign Sales (Euros)	< 1 million (15-25%)
Share of turnover (Euros)	5 million
The role of the business owner in your company	Lumtech was acquired by the Finfoam group, an insulation material company, in Salo. Lumtech and partner firm (Finfoam) have the same vision or goal which is energy saving, <i>"so there is some kind of symbiotic situation because they are saving power by isolation and we are saving power by LED"</i> .
Role of entrepreneur on the internationalization process	Management team is in charge of the internationalization decisions.
How internationalization decisions are made?	The size of the market and growth potential is a key driver for internationalization decision <i>"In Finland you have certain size of the market and certain group of players and, if you want to grow, you need to go somewhere"</i> . The main competences of the firm in their internationalization strides is through knowledge of the business. However the company is aware that it is imperative to gain local knowledge, such as local habits, local market procedures as well as language competences to effectively penetrate new markets. The respondents cites that <i>"For example in Germany it's much more formal than we are doing in Finland. You need to do some steps and some jumps before the even discussion starts"</i> .
Start of internationalization	The company started internationalizing five (5) years ago.
Motivations for internationalization	The motivation for internationalization is to increase business opportunities and capitalizing on first mover advantage and the novelty of the technology.
Domestic market situation	Although the respondent considers that the domestic market is saturated with competing products especially in home, industrial and office lighting space. However, he still believes there is still some market potential and the company can offer value in areas with high clings such as warehouses and sport arenas.
Domestic market challenges	<i>"To be honest, business as usual. Every day is a school day"</i> .
Supporting legislation and regulations	The respondent is of the opinion that green policies, power consumption reduction and agreement decisions and legislations are targeted at increasing product lifetime. The cost saving nature of their products is in line with legislative policies and regulations on energy saving and consumption.
Market entry and challenges	Competences in dealing with cultural differences is a challenge for the company. So they reach customers through distributors who assist in breaching the gap. <i>"You need distributors due to your size and their knowledge of the market and their knowledge of local habits and contacts"</i> . Although Long experience in the lighting business, international business background had been added to their learning and international business activities. However, their solid networks with mobile tech companies like Nokia is essential for

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	internationalization efforts. <i>“When it goes to the, on the level of everyday business and having real contracts for the real projects. You need somebody locally”</i> . A major challenge for Lumtech is keeping up with competitors’ activities and maintaining high quality while keeping favorable cost to meet client needs.
Partners and agent Relationship	The distributors are the main link between the company and clients. The respondent views this link as an important means of <i>“information flow between the end client and international sales”</i> . This information they gather is important in product development and customization to suit specific client needs. <i>“We also review our processes every now and then. And all the time collect data and, the lessons learned in good and bad”</i> .
Market entry mode	It had taken the company about 8 to 14 months to get the first deal. The company’s strategy is to move incrementally in areas where the product has a leading edge and areas where Asian product domination is low. For example Eastern Europe. Lumtech internationalizes via Direct selling (Business to business) or via local dealers or distributors who buy luminaires from the company and sells to customers.
Geographically distant countries	Europe is a key market for Lumtech because their product which have 220 volts rating are best suited for the European market. Further geographical markets such as Africa or US are not an immediate interest for the company for example in the US, the product liability and legislation governing the country pose a challenge for smooth market entry. More so from the respondents experience distant markets such as Africa may be difficult to penetrate due to heavy bureaucracy and competing product from Asia.
Internationalization strategy	Internationalization for Lumtech is in incremental steps to psychic distant countries. <i>“Growth, step by step on the focused markets and areas. Meaning, go there where your products still has some leading edge”</i> .
Improvement of the internationalization strategy	However, the company believes it can improve by observing competitors, adopting reactive strategies and redefining their international business operations.
Market knowledge on internationalization decisions	The company’s efforts towards internationalization has mainly being through market studies, tours to find new clients, trade shows, Networking and with the help of the chambers of commerce. The company is a fast-follower for some product for example, for street lighting, the company provides similar requirements to the general product specification and in other cases, for example; sport lighting, the company is more innovative and takes discretionary actions in product development to suit market needs.
Company Future	The company makes R&D investments towards product and service improvements and has an entrepreneurial vision of the company to be <i>“in five years the well-known brand, in the areas of big light. Meaning the higher premises, bigger arenas”</i> .

Themes	Biosoln
Position and educational background	The respondent is the managing director of Biosoln. Located and headquartered in Forssa and side office in Jyväskylä. Has a Bachelor of Science in environmental technology, Master’s education and PhD from Jyväskylä University.
Work Experience of the respondent	Worked in the environmental sector carrying out teaching projects, in some contaminated soil projects. He was also a startup engineer and commissioning engineer, for catalytic burner system to clean up the soil. Also worked for Valmet, doing pilot studies at the same time together with PhD. Worked also as a startup engineer for a big wastewater treatment plant and factory. He started his first company in 2001. At the same time was also a consultant in this regional development office.
International experience	By seeking for different markets in the environmental sector is part of the international experiences garnered. Some of the markets entered include US, Russia and China and within Europe.
Respondent’s work interest (Motivation)	Search for alternatives and personal interest.
Company information	Established in 2003.
Products and services	The company does not have a physical product. They specialize in building factories for treating waste, and usually the projects are usually long term projects. <i>“For example we have now in a final stage of starting one project in Greece, and we started to develop that project together with the client six years ago”</i> . They also provide customized business solutions for their clients and are responsible for every part of the plant until the plant is handed over to the client for example in Finland the company handles turnkey projects and are responsible for the development of the project, consultancy part, engineering part, construction and taking the plant into operation. Besides the plants, the company has some international clients like rail and cruise lines. Biosoln carries out consultancy services for them and sell safety equipment for waste water treatment like bottom deck of the cruise ships. Example of some of the projects are some consultancy works for Estonia for doing feasibility studies for biogas plant projects or design works for international company who had a project in Iraq as well as, biogas plant engineering plant project in Greece.
Competitors and competing products	The company has a lot of competition who build biogas plants globally. For example German competitors produce biogas from renewable sources like agriculture while Biosoln for example builds waste treatment facilities with a different approach. Thus, given the immense competition, maintaining a stiff IPR is not imperative for the company rather their expertise, the feasibility of the product and in house know-how is considered a competitive advantage.

Appendix II, 5

Competitive advantage	The competitive advantage of the firm is in the simplicity of their business processes and operation. <i>"The physical equipment we are using, we can buy them anywhere. So there's nothing special and we are trying to avoid all kinds of let's say gadgets that would make your process unique, because it doesn't really work"</i> . In other words, their extensive experience in the plant operation, functionality, and technical and educational knowhow on how the systems works. According to the respondent, the combination of the aforementioned qualities are quite rare.
Cleantech group	According to the respondent, Cleantech focuses on waste treatment. They basically receive and treat waste in the way that renewable energy is generated simultaneously, as a result of recycling the nutrients back to the agricultural fields, from where the agricultural waste originally originated.
Value of Cleantech	Cleantech, according to the respondent, is the ability to make environmentally sustainable systems that are feasible in technical and economic sense. "For example we are educating people to reduce the amount of waste", thus, the driving force is to make production more efficient.
Credentials	Certifications do impact the activities of the firm abroad. The respondent stated that they do not need any reputations for operational issues, but adhering to standards and procedure like ISO-9001, has some influence, and helps in making their working culture more efficient.
Countries of current operation	The present countries of interest Mexico, Vietnam and Indonesia and Poland. However, the respondents shows a more profound interest in Poland due to the proximity of the country <i>"Poland a nice market in that respect that it's close and the target is to establish another company there within three years' time, which is not the plan for let's say the countries that are much more far away"</i> .
Countries of immediate interest	However, the respondent believes because waste management is a global phenomenon, they have unlimited market opportunity. <i>"...the whole world is the market because you have anywhere we have people we have waste"</i> .
Foreign Sales (Euros)	< 1% in foreign sales due to the longevity of the projects and, revenue comes per project. The company aims that more than 50% in the next two years will come from foreign sales thus they have focused to be more systematic in terms of sales and have also put financial and human capital efforts to achieve that. More so, an alternative revenue model for the company is their plant management service which was recently developed which will be launched to their international service offerings. Also, providing consultancy services to augment development projects and manage client relationships.
Share of turnover (Euros)	8million euros in turn over (2015)
Role of entrepreneur on the internationalization process	Because of the challenge of a resources and human capital, the business owner capitalizes on his experience in the field and plausible business savvy in internationalization decisions.
How internationalization decisions are made?	According to the respondent, internationalization decisions are made after the company is contacted by customers or clients. Their firm pays attention and responds to questions regarding the product and project. The respondent stated that decisions are easier when the customer or partner country already have some background and interest in waste treatment.
Start of internationalization	The company started in 2003 and since 2006, they have been seeking different markets in environmental sector abroad. Internationalization started from the US and then Russia, and China, (more or less) all around the world. However a constraint to Biosoln's line of business is the intangibility of their product. The company builds factories for treating waste, and usually the project usually take very long time. <i>"We have now in a final stage of starting one project in Greece, and we started to develop that project together with the client six years ago"</i> .
Motivations for internationalization	The respondent states that their firm has researched and tried to exploit different markets using different means. They have used student studies, attended fairs in France, Germany and South-East Asia. They have been trying to secure project contracts in Poland for some years now using the help of agents. They are currently in advanced stage of securing wastewater treatment contracts from municipal operators in Poland via public tenders. He stated that they adopt different approaches in different places. When they have a project opportunity, they first of all evaluate if it is a country of interest and identify if they have any opportunities to work there. <i>"The next step is to evaluate the size of the plant to identify the feasibility of the project in terms of technical and economical sense"</i> . Since the core competence of the firm is in manufacturing of big plants, the next step involves sending emails on budgetary, offering and enlightening the customer on the application and specification of the product.
Domestic market situation	The respondent is of the opinion that Finnish market has reached maturity stage in terms of Biosoln's product. <i>"In Finland and there will be in the waste treatment sector room for maybe five more, and then it will be full. Because we are a small country"</i> thus, the saturation and small size of the domestic market is the major reason which forces the company to internationalize. <i>"Because the country is so small, so there's no room for new plants anymore"</i> . Biosoln also works alongside other cleantech firms or compete with them. However, in Finland, Biosoln cooperates with various companies who supply various component parts for the project.
Domestic market challenges	However, challenges faced with suppliers include costs and time. For example cost of purchasing a product or the guarantee that the purchased product reaches quality requirement.
Supporting legislation and regulations	Key regulations which impact the internationalization process of the firm concerns waste and how to utilize it. There are also directives set by the European Union regarding proper waste disposal called "End Waste". The EU End waste programme categorizes some wastes that can be treated or untreated or waste that can be used or unused. Supporting legislations and policies however are environmental legislations set towards reduction of pollution.

Appendix II, 6

Partners and agent Relationship	The company has personal contacts with partners who are also client representatives. These contacts are the key medium through which the firm enters new market for example, Biosoln has a consultant hired in Mexico and an agent in Poland. The nature of the partnership is based on mutual trust and agreement. The company either signs a non-disclosure agreement with the partners or have a joint strategy on how to handle business mutually. Depending on the country which they are going into business with both parties also clarify the milestones on business obligations. They do not have a specific criteria for partner selection. <i>“We have been introduced or, we are approached by them, or we are approaching them so you never know”</i> . The partners also assist in looking for projects and deals in nearby locations, after which the negotiations can begin. In terms of international partnerships, the respondent states that they mainly liaise with partners or indigenous companies located in foreign markets who need the technology offered by Biosoln. Usually, these indigenous companies have their own capabilities and infrastructure to develop the plants. In other words, the foreign partners complement the technology provided by the respondent’s firm.
Market entry mode	Biosoln has mainly approached markets using personal contacts, market studies to identify potential clients and appropriate customers to select. The company has adopted such methods in Poland and in South Asia for example, they are aided by consultants who carry out the market studies and assist in seeking potential clients. <i>“Totally different players in different countries”</i> . Overall, depending on the country they might approach on market entry may vary. More so, Regarding other approaches to securing projects, the respondent stated that they are currently conducting a market research in different developing countries. The research is funded by partners who are government agencies, whose objective is to support the goals of cleantech projects in developing countries. The firm is currently focused on Thailand, Vietnam, Indonesia, South Africa and Mexico.
Geographically distant countries	Perception towards geographically distant market is low because the markets are far away constraints. Nonetheless, The firm is not limiting itself to regions, but the capacity of their team is a hindrance, as they are currently skipping out after first stage in some countries, and just focusing on Indonesia, Vietnam and Mexico, due to the small size of the firm and its lack of resources, as there is no team left to even handle project in South African market.
Internationalization strategy	The firm perceives themselves as considerably small in size and not with enough revenue, their internationalization strategy in the interim is to focus on product development and optimizing their resources and capabilities for market entry and to meet international market demands.
Improvement of the internationalization strategy	Although the company believes improvements can be made on their internationalization plan. They have adopted a realistic approach based on their available internal resources and capabilities to manage projects at hand. They also think that if they persevere and team up with big players they will have the opportunity to conveniently penetrate international markets in the long run.
Market knowledge on internationalization decisions	The company does not have a systematic way of finding customers or internationalizing. However, the company may access new markets via fairs, networks and personal contacts which is very helpful for them in accessing potently new customers and new markets. Internationally, the firm does not have sufficient resources to handle all aspects of comprehensive or large scale projects in various locations simultaneously, so they seek for projects which require only specific technology supply that the firm has the capacity to adequately supply. Overall, the company is interested in having alliances abroad with partners to complete the projects.
Company Future	In the next 5 to 10 years the company hopes to be in some selected countries where there would be working with projects and if possible establish a daughter company in Poland.

Themes	Newaves
Position and educational background	He heads the business development team and is the CFO who is responsible for finance roles in the company. Besides other financial and international business functions, he is responsible for initiating and following up on potential customers. He also has a track record of 5 years in the company. Partners and some key stakeholders. He also manages various business negotiations and projects from their early stages to maturity.
Work Experience of the respondent	Has a Finance study background, worked in banking, corporate banking, with large multinational corporations & SMEs, though only in operations, and not technology related. Also worked with telecomm companies dealing with company suppliers, as well mobile device distributors and retailers, and internal business venture team. Later decided to work with start-up companies. After one year of small startup company experience, decided to experience slightly advanced company which already has venture capital finance.
International experience	The interviewee is a Polish national. His international experience ranges from experience of over a decade away from home country and prior to that has been working, living and studying abroad with brief experience in Canada, and majorly in Scandinavia. Has experience on dealing with American, Middle-East and Africa markets and culture. The respondent via these international experiences has been exposed to business environment and cultures.
Respondent's work interest (Motivation)	According to the respondent, he made a list of interesting firms in Finland and Newaves ranked first. Also, his work interest is triggered by the huge “international” potential of the business. As well as the viability of the business which transcends beyond just an idea but a product which already gained tremendous amount of funding even before commercialization.
Company information	Company’s key activities revolve around its core idea of technology development and demonstration. It used to be done in-house and then sometimes with local partners, but in the past three years have opened up to more partners from abroad due to the need for more resources, and increase in scale and professionalization of technology and its certification, which results in increased volume of work, prompting the inevitable need to rely on external resources.
Products and services	The key product is the “wavers”. They also provide support service for customers to identify and evaluate project locations for Wavers power plants. The company has not undertaken a customer project. In other words, the company has “own” research projects under development but has not delivered any units outside their own demonstration project. The demonstration projects were financed by the EU and other investors. The company is presently working on their demonstration and a commercial unit which will be installed in Portugal.

Appendix II, 7

	The project is not delivered directly to the customer rather is developed as a reference plant which can be shown to project developer, investors and customers and thus build credibility based on that.
Competitive advantage	Their main competitive advantage is their certified advanced technology used on wavers (wave energy) for near shore environment certified by Lloyds Register. Other competitive advantage include having quality teams of people having vast and broad range of experiences from various professional fields, and comprehensive understanding as well as capabilities on all aspects of the business. The respondent describes the company team as a unique setup for capabilities which guarantees the progress speed and delivery for good quality services and products.
Cleantech group	The company gains from information sharing from different stakeholder around the world and other companies and organizations and countries are approaching them to get contacts to Finnish cleantech sector. Marketing benefits are also derived from being part of a larger network. Thus, making it easier to be identified and accessed by potential customers and suppliers locally and internationally.
Value of Cleantech	Generating clean electricity is one of the cores for the company for being a categorized a cleantech firm
Credentials	Important certifications that influence the firm's internationalization course include the standard practice to be upheld as proposed by DNVGL, and the Lloyd's Register certification. The certification; for example, the DNVGL is not a standards but an approach through which the company can showcase its qualification for offshore environment.
Countries of current operation	They have own active development projects operating in Europe, US, Chile, Mexico, India, Sri Lanka and Indonesia.
Countries of immediate interest	Countries of interest but with no active operation are South Africa and Australia.
Foreign Sales (Euros)	100%, 200,000 euros was mentioned as the primary revenue model for the company is selling technology product for the projects. The customer buys the plant and the company also offers maintenance services (which is going to be the recurring revenue).
The role of the business owner in your company	The company has multiple ownership and has undergone multiple funding rounds. Thus, the ownership of the company has been evolving over the life of the business.
Role of entrepreneur on the internationalization process	The influence of the company owners on its internationalization include impact of inventor of the Wavers who established the company in securing of projects and harnessing opportunities for the company in South America (Ecuador and Chile), due to his ties to the region and his understanding of their culture. Another influence is that of the current CEO who has vast experience and network of business contacts, which has been vital in their expansion in Europe. Some shareholders who have supported the financially have also influenced the operation of the company in other countries around the world too.
How internationalization decisions are made?	No specific person or group of people influence foreign market selection decision. More so, "from the very beginning and inception of the company the thought that we have to go abroad so we have always been (-) foreign markets. Internationalization decisions are made based on the analysis of countries that have potential in terms of resources and business opportunities. More so, because the market potential is in areas where there is abundant wave resource, the company seeks customers in where the resource potential (waves) is high
Start of internationalization	The company is in the initiation phase of commercialization thus the cash flow is negative as most of the cash influx is mostly via investors. The company has received multiple funding rounds which have largely been allocated to product development. Since the inception of the firm major investments have been channeled towards technology development for example the power take off. However resources have also been allocated to other activities like employee salaries, and other minor expenses
Motivations for internationalization	The motivation for internationalization is the market opportunity. The company does not see a lot of feasible business potential in the domestic markets, thus internationalization was an imperative from the foundation of the firm.
Domestic market situation	The company does not have to make many domestic market decisions as most of the company's project opportunities are related to project opportunities and technology development abroad. "Some of the Finnish government policies, in a way have influenced, in a sense that there can be a funding scheme that supports technology development or some project activities, but then they might have preference to where the money is actually spent so that the money is spent in Finland". In other words, the factors that could be related to domestic market challenges include the influence of the Finnish government policies which in some instances suggest working with or giving priority to local subcontractors.
Supporting legislation and regulations	One of the key regulations affecting the firm is the funding policies of TEKES. Also EU non-competition or support policies where countries are not allowed to provide extreme support to competing companies that would give them competitive advantages against other companies within EU also apply to the company. Given the different support schemes for renewable energy in different countries. However, the legislations vary depending on the country. For example tariffs on electricity price or grant schemes (example the horizon 2020) may differ from country to country.
Market entry and challenges	To go into international markets, the company has adopted approaches which involves identifying a country with high wave energy potential, then identification of companies that are into energy and power utilities business, the company also puts emphasis on proposing the feasibility of the project to energy companies. Market entry is also being carried out through "commercial links like through political organizations country administrative organizations". The company also tries to provide training to potential customers on the best locations for the project, contacts are also being made via embassies of various countries. Newaves is also approached by contacts from various embassies who are interested in innovative and renewable technologies. Request are thus made for introduction of the firm's products to the national and local authorities in the various countries.

Appendix II, 8

Partners and agent Relationship	The integrators are key partners of the firm. They are an essential channel (key channel) through which Newaves enters the market and delivers projects. The firm contacts foreign potential partner firms in other countries directly, and they also contact them via agency for example through Finpro who are specialist in reaching out to companies in other countries and also assist in setting up project or business avenue meetings. They use other companies/partners to do specific designs of some elements and answer certain questions. The Lloyds's register has also been a major influence, as it validates that the company's process and products meet minimum standard conditions, thus increasing the firm's public credibility.
Geographically distant countries	Newaves makes contracts or use "success fee type of arrangement" with agents in order to reach clients in distant geographical locations. Although work via agents is not a normal practice for the company. In cases when agents are used, contracts have been made with customers who have interest in the firm's technology and the company does not make any payments to the clients until the contract with the ultimate customer has been signed.
Internationalization strategy	The deriving element of the company's internationalization strategy is the market opportunity. Thus, markets where there is customer interest and funding are potential customers for the company. "We are not trying to push to new markets where we would have to build the market from scratch, let's say establish a new, push to get the new legislation or attract customers that are reluctant. We go to countries where we see there is already interest". However, using the sales funnel principle they identify project opportunities and then advance the opportunities toward actual commercial projects.
Improvement of the internationalization strategy	The company makes weekly reviews of their project so that they can dynamically evolve depending on the situation. "We might put more focus on one opportunity instead of another just because of changes in the situation". In other words, changes made by the firm according to the respondent are not necessarily made to be in a particular country rather, they are made as a reactive strategy to evaluate current situations and identify quick ways to commercialize their products. "We are not fixing ourselves that we have to be in a country A but not in country B. We just follow what we see currently is the quickest way to (commercialize) our products".
Company Future	In the next five to ten years the company hopes that the technology has reached maturity and commercialized stage, increase in sales revenue, larger projects, staff capacity and growth of the organization at large.

Themes	IoTech
Position and educational background	The respondent is an engineer and the owner of the company. Graduated in Tampere and owns majority of the stock with four stock holders owning 15% of the company stocks. The second respondent is a sales executive assisting with different type of development projects and issues. Graduated from Business School of Umeå, Sweden.
Work Experience of the respondent	The CEO started work as a sales engineer for three to four years concerning printing inks in printing houses in Finland. Thereafter, was promoted to sales manager in the same company also responsible for marketing in the Soviet union, Russia in the 1990. He co-owned a company specializing in the water treatment industry in boiler chemical in bio- steam industry. The Sales executive has 18 years of work experience in different positions in mainly sales and marketing and 17 years in ICT business, IT security and different types of communication companies. However Cleantech is a novel business area for him.
International experience	The CEO had his longest experience in exporting from different cities in Russia. Also, made some contacts during career in the printing business in central Europe, mostly Germany. As well as business travels to Beijing in China. Sales executive's, international experience in Swedish companies with experience in selling and developing different type sales channels in different countries; Nordic and Baltic area. Work experience in the Nordic and Baltic area is also a key reason for doing various businesses in Nordic and Baltic area.
Respondent's work interest (Motivation)	Jorma's work interest is due to interest in making business and flare for success, love for work, developing strategies, as well as possession managerial and strategic orientation. Sales executive work interest to benefit from the learning curve of a small company in a growing market. "I am very fond of seeing this type of processes happening when something small can grow something big . . . that's fun".
Company information	The company was founded in 1999 and started by selling various kinds of chemicals concerning heat transfer, heat transfer liquids and washing aids meant for washing pipelines and so. The company then began to find some service around the products, in order to provide maintenance services of heat transfer liquids. Through Research and development ventured into providing energy efficiency, and enlarged their services concerning expertise in energy savings and energy efficiency. The company aims to combine process control, heat transfer processes and service process models at the same time. In the future, the company's road map is to seek new ways to control both heat transfer processes and service processes with the internet of things and digitization. In other word, the company has undergone gradual product development and services over time and eventually hope to integrate other appliance and provide services remotely worldwide.
Products and services	The company has a peculiar process. They are interested in structures such as big buildings, shopping malls and hospitals and offices. They start by analyzing the situation regarding the concerning heating and cooling in a building. They carry out process design calculations, service process advices and definition for maintenance, economic analysis of the heating and cooling process, budget preparation and so on. In collaboration with their partners, they also ensure renovation of buildings of interest in which they ensure standard heating control and continuous maintenance of the building. Overall, it takes a few years for them to get the buildings renovated.
Competitors and competing products	The company does not have any major competitors in Finland. Nonetheless, according to the CEO, the competition is siloed. In other words there are companies who can carry out daily maintenance, cleaning and those that sell washing and cleaning agents needed with the pipes. However, the company claims no one else provides this type of holistic process.

Competitive advantage	They have theoretical and practical knowledge about heat transfer and related problems. They also possess competencies in research and development concerning heat transfer and physical phenomena. They provide measurements based on facts and reports for clients. The company's business method is also considered a competitive advantage as it involves constant reporting, feedback and future recommendations. Trust building is also integral in service delivery.
Cleantech group	<i>"Cleantech in Finland: anybody, any company can be the member of Cleantech. There's no rules for what kind of company can join that Cleantech (organization) As you know there's many different kinds of companies"</i> .
Value of Cleantech	In the CEO's opinion, Cleantech means <i>"green tech and sustainability"</i> . The key value of being a cleantech company is the energy costs savings. However, being a part of the cleantech Finland does not add much value in being a part of the network.
Networks	Collaborates with companies for example, cooperates with Oilon in maintenance of their heating pumps
Countries of current operation	The company is presently operating in Sweden and has already accomplished some projects. Additionally, because some of the company's domestic customers are also operating in Sweden, the respondent is of the opinion that the company thinks it's logical to enter the Swedish market. <i>"That's natural step that we can utilize the contacts within customer"</i> . The respondent also suggests that Swedish market is also a potential market area because the economy is growing and because they are carrying out a lot of building projects. Also, the market similarity and market proximity is an enabling factor. <i>"It's only 45 minute's flight from Helsinki to Stockholm. Then, another countries where we have similar climate than in Finland and similar structure"</i> . Potential countries for future market entry include Russia or Canada due to the similarity in weather conditions as the domestic market.
Countries of immediate interest	Sweden and other countries in the Scandinavia
Foreign Sales (Euros)	None but the company sees prospects in Sweden and has budgeted about 200,000 euros for investment in Sweden. The company targets enlarging their foreign sales through internationalization in the next four years to 50%. They aim to achieve that by finding appropriate partners in the international market.
Share of turnover (Euros)	> 4 million euros (expected for 2016).
How internationalization decisions are made?	The CEO/Managing director and the departmental managers make the major decisions for the company. The decisions made are in line with the company's value. The company is strategic and values all her staff. Different departments in the company are permitted to make decisions that would suit the company. <i>"... But when there's big decisions concerning what will be the future and so on then it will be me who will decide it. But I have four people, we have four departments, and each one as the manager of the department and me, there's five of us that are making decisions"</i> .
Start of internationalization	not started
Motivations for internationalization	The company's motivation is to save the Finnish economy by exportation of services. They see there are big market opportunities in small areas like in Stockholm and even the domestic market and would also benefit from the local partners in those areas. They also believe there is big potential in capitalizing and in digitization in the nearest future
Domestic market situation	The respondents see high potential that has not been looked into in Finland though challenging. <i>"In Finland, they don't really provide those energy savings, really. That is why the markets are very young in Finland even now"</i> .
Domestic market challenges	In Finland, people are not ready to spend on energy saving processes due to the cost factor and the declining nature of the Finnish economy. Additionally, facility owners make spontaneous decisions which are not based on fact. For example, they are more interested in trending structures like roof top solar panels. The company believes that their innovation is not really supported by the old fashioned processes which are still in use. <i>"When we have some innovation, we are very innovative and find always something, something new. It's very difficult to get those innovations in those old-fashioned processes. That is one of the problems because we are only small companies and most of the others are very big ones. They are very old-fashioned processes and how we get there. That is one of the challenges"</i> .
Supporting legislation and regulations	There were no specifications to the regulations or legislations affecting the firm. However, it was mentioned that TEKES, Finpro, local ELY-keskukset and universities supports the company's internationalization activities. According to the respondent, the legislations and regulations that supports internationalization in the countries of their interest are quite similar.
Partners and agent Relationship	The company is seeking international networks through partnerships with customers, companies or sales organizations. Thus, in the interim they are investigating for companies with mutual interest who are interested in cooperating with them IoTech tries to find partnerships with innovative companies or cleantech companies in both the domestic and international market. When those partnerships are established, <i>"We can control what is happening there and we can help the local company to provide the maintenance wherever in the world"</i> . Thus using digitalization, the company is able to control more processes not just heat transfer processes but other supporting services. TEKES is assisting the company on three projects. Finpro partly financed and gave a lot of support towards the company's project in Sweden.
Market entry mode	Efforts to enter the market has been handled in-house by the company's personnel. The challenge for seeking partnership is the amount of time required, managing communications and investigating potential customers and partner. In order to find potential customers, the company uses search engines, facility owners and members of building associations in Sweden

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Geographically distant countries	The company intends to focus on the domestic market and Swedish market in the interim. <i>“After that, these are, okay, then we might go to Germany also but I don’t think that we first go to Canada or Beijing or Africa. I think we stay locally first”</i> However, the company's vision is to double their turn over in four years. To achieve this, the company aims to expand by exporting outside the domestic markets. The company has had an attempt in solving district heating pipeline corrosion issues in Beijing, China. <i>“. . . But we visited and we investigated what is the situation and we told that everything’s so bad condition already that there’s no question of only corrosion but something else”</i> .
Internationalization strategy	<i>“Our strategy is to go first to the closest place, and after that, to maybe to find some other roadmaps with those other partners and international partners”</i> . The company intends to use networks that would serve as references to enter into international markets though Finland would still remain its coordination hub. Thus, the company aims to boost their service and maintenance processes in order to provide better solutions internationally.
Market knowledge on internationalization decisions	The company’s vision is to provide technical expertise, and experience to help the local service companies to provide better quality. Identifying the appropriate partners and decision making and trust building in the host country is also a challenge for the company
Company Future	<i>“I think in five years we have four times bigger turnover than now, and we have local organization at least in Stockholm, and I think some kind of activities also in Baltic areas. I think that we are servicing our expertise, somewhere else in Europe, too, through some partner that has contacts into other countries”</i> .

Appendix III: Interview Template

Basic information and brief introduction

- Can you kindly introduce yourself (name, current position in the company and educational background)?
- Briefly tell about your work history (previously and currently)
- What is your international experience (where, when and duration)?
- What is the reason for your present work interest?

Information about the company

- Briefly tell about the company (when it was founded and reason for foundation)
- What are your products and service offerings?
- Competitive advantage
- Do you have any competing products (in the industry)?
- Can you tell what it means to be a cleantech company?
- Value of being a cleantech company
- Are you part of any networks or are there any benefit(s) for being a part of cleantech Finland or any other associations?
- What is your relationship with other Cleantech firms?
 - Can you briefly describe how the activities of other Cleantech firms affect your business operations or decisions?
- What are the countries of current operations and countries of immediate interest
 - How many countries have you exported to?

The Business owner(s) (Entrepreneur)

- How can you describe (your) the role of the owner(s) in the company?
 - How has your role or position in the company affected the internationalization process?
- How are the internationalization decisions for your company made?
- Which other people play a role in internationalization decisions (if not already mentioned earlier) and briefly tell how they go about it?
- How does your background or skill-set affect the company's internationalization? (If the interviewee is not the business owner)

Company internationalization operations and activities

- When did you start your internationalization activities?
- What motivated your internationalization efforts?
- Can you describe the situation of the market in Finland with regards to your business operations?
- What kind of challenges in Finland affects your business (manufacturing, customers, and suppliers)?

- What kind of legislation or regulations supports your internationalization activities (home and abroad)?
- Can you describe the way you have previously entered new markets?
- If you need to enter a new market will you use the same entry modes? Or what other methods will you consider using and why? (E.g. exporting, licensing etc.)
- What kind of international customers/geographic markets do you think you would target first and why?
- What kind of countries would you prefer to target first? (Risk extent)
 - What would you say are your company's motivations about more distant countries (geographic markets)?
- What kinds of challenges do you face abroad/what challenges affect your internationalization operations?
- What are the roles of your agents or important partners in your company?
 - How will you describe your relationship with these agents or partners?
 - In what way do they assist you in your internationalization decisions and operations?
- What kinds of credentials or certifications are relevant for your company's reputation and cross border activities?
 - Do the certifications impact internationalization activities?
- Briefly describe your internationalization plan?
 - To what extent have you used it in your internationalization activities
 - Are you satisfied with it?
 - What are the possible reasons to adjust the strategy if necessary?

Closing statements

- What is the general / entrepreneurial vision for the company?
- Can you give an overall summary of your internationalization strategy?
- Where do you see the company in the next 5 -10 years?

Numerical information about the company

- Number of employees (full time and part-time)
- Turnover in euros
- Foreign sales
- Start year of the company
- Number of countries exported to
- Share of turnover (% and in euros)