

Pertti Wathen

Decision-making moon-bridge

SMEs' usage of causation and effectuation perpetually
in motion



ACTA WASAENSIA 515



Vaasan yliopisto
UNIVERSITY OF VAASA

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ISBN 978-952-395-099-3 (print)
978-952-395-100-6 (online)

ISSN 0355-2667 (Acta Wasaensia 515, print)
2323-9123 (Acta Wasaensia 515, online)

URN <https://urn.fi/URN:ISBN:978-952-395-100-6>

Hansaprint Oy, Turenki, 2023.

ACADEMIC DISSERTATION

*To be presented, with the permission of the Board of the School of Marketing
and Communication of the University of Vaasa, for public examination
on the 15th of September, 2023, at noon.*

Monograph based dissertation, School of Marketing and Communication,
International Business

Author Pertti Wathen

Supervisor(s) Professor Arto Ojala
University of Vaasa. School of Marketing and Communication,
International Business.

Professor Jorma Larimo
University of Vaasa. School of Marketing and Communication,
International Business.

Custos Professor Arto Ojala
University of Vaasa.

Reviewers Professor Nina Helander
Information and Knowledge Management, Tampere University

Professor Pia Hurmerinta-Laukkanen
Oulu Business School, University of Oulu

Opponent Professor Nina Helander
Information and Knowledge Management, Tampere University

Tiivistelmä

Uusien yritysten ja pk-yritysten tärkeys taloudelle on ollut päätöksentekologiikan tutkimuksen kärjessä. Suhteellisen uuden toimintateorian (effectuation) vahvistamista ja monimuotoisuutta on kirjallisuudessa laajalti raportoitu, unohtamatta perinteisen kausaalisen (causation) lähestymistavan vaikutuksia päätöksentekoon. Kuitenkin, huolimatta aiheen yleisestä suosiosta tutkimukset päätöksentekologiikan roolista innovaatioissa, kansainvälistymisessä ja liikesuhteissa on varsin rajallista. Tämän puutteen korjaamiseksi tämä tutkimus hyödyntää ”causation” ja ”effectuation” -teorioita kehittääkseen (1) mallin, joka kuvaa; (1a) päätöksentekologiikkojen keskinäistä yhteyttä, (1b) tekijöitä, jotka määrittävät vallitsevan logiikan (1c) fokusilmiöitä, joihin päätöksentekologiikat vaikuttavat ja (1d) miten päätöksentekologiikka vaikuttaa yritysten reaktioihin mahdollisuuksiin ja esteisiin. Lisäksi tutkimus hyödyntää näitä teorioita kehittääkseen (2) konseptin, joka auttaa yrittäjiä heidän päätösten tekoon liittyvissä pohdinnoissa. Tulokset perustuvat abduktiiviseen monitapaustutkimukseen kuudessa suomalaisessa energiateknologia-alan yrityksessä, joista kolme on startup-yrityksiä ja kolme vakiintuneita pk-yrityksiä. Merkityksellisin tutkimusdata kerättiin puolistrukturoiduilla haastatteluilla ja havainnoilla kolmen vuoden seurantajakson aikana.

Tulokset osoittavat, että nämä kaksi logiikkaa eivät ole toistensa vastakohtia ja useimmat päätökset sisältävät molemmista logiikoista ainakin ituja. Itse asiassa havainnot vahvistavat, että absoluuttisen ”causation” tai ”effectuation” -logiikan käyttö on vähäistä ja toisiinsa kietoutuneiden logiikkojen käyttö on jatkuvassa muutoksessa. Tutkimuksen tuotos on selvä näkemys päätöksentekijän roolista sekä ympäristön, kontekstin ja itse aiheen vaikutuksista vallitsevaan päätöksentekologiikan ja näiden vaikutusten seurauksiin.

Asiasanat: syy-seurausteoria, toteutusteoria, innovaatio, kansainvälistyminen, liittoutumat, päätöksenteko, päätöksentekologiikka, energiateknologia, uudet yritykset, pk-yritykset

Abstract

The importance of new ventures and SMEs to the economy has been at the forefront of decision-making logic research. The growth and diversity of nascent effectuation have been reported in the literature, without forgetting the effects of the traditional causal approach. Despite the general popularity of the topic, literature on the role of decision-making logic in innovation, internationalization and business relationships is rather limited. To address this gap, this paper draws on causation and effectuation theories to develop: (1) a model that describes; (1a) the interconnectedness of the decision-making logics, (1b) matters that determine the prevailing logic, (1c) focus phenomena affected by decision-making logics, and (1d) how decision-making logic influences companies' reactions to opportunities and obstacles. (2) a concept that will assist entrepreneurs in their decision-making related considerations. The results are based on an abductive multi-case study on six Finnish energy technology firms, three of which are start-ups and three are solidly established SMEs. The main data were gathered through semi-structured interviews and observations within a time period of three years.

The data indicate that these two logics are not opposites and most decisions contain at least the seeds of both logics. Actually, the findings confirm that the use of absolute causation or effectuation logic is negligible, and the usage of logics are intertwined and constantly changing. The contribution is a view of the decision-maker's role, the effects of the operational context and the subject matter topic on the definition of the prevailing decision-making logic and its effects.

Keywords:

effectuation, causation, innovation, internationalization, alliances, decision-making, energy technology, new ventures

ACKNOWLEDGEMENT

It has been an interesting five years or so, and during this PhD process I have been surrounded with positive and supportive people, without whom I would not be writing these acknowledgements. First, I would thank my initial supervisor late Professor Jorma Larimo for getting me started. Second, I would like to thank Professor Arto Ojala for getting me to finish my work. Also, I would express my gratitude to Research Director Jari Kolehmainen at Tampere University for his support and constant encouragement. Along the way many people in the International Business Program of Vaasa University e.g. assistant Professor Tiina Leposky and associate Professor Tamara Galkina have helped me in different ways, e.g. by reading through my manuscripts and commenting on my presentations. The help and comments of these people have been very valuable and have allowed me to adjust and elaborate my research time and again. Especially I grant my sincere appreciation to my two pre-examiners Professor Nina Helander and Professor Pia Hurmelinna-Laukkanen who provided high-quality reviews and helpful suggestions to improve my manuscript. In particular, I am grateful to Professor Nina Helander for devoting her time to act as my opponent in the public defense of the thesis. Special thanks go to the interviewees of the six entrepreneurial companies who participated in my research. I appreciate your work as innovators, entrepreneurs and leaders, and truly admire your endurance and feistiness to run international entrepreneurial enterprises. Without your involvement, I would not have been able to finish my thesis. Above all, I would like to express my gratitude to my wife Marja, for her unconditional support, and to my son Rolf, who helped me in my early stages as a researcher. At the end I dedicate this thesis to my whole family.

Pirkkala, June 9th, 2023

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Abbreviations

AI	Angel Investor and Artificial Intelligence
ATEX	Appareils destinés à être utilisés en ATmosphères EXplosibles
BF	Business Finland (former TEKES)
C&E	Causation and Effectuation
CEO	Chief Executive Officer
CIS	Commonwealth of Independent States
CIT	Critical Incident Technique
CMO	Chief Marketing Officer
CTO	Chief Technology Officer
EU	European Union
IB	International Business
IE	International Entrepreneurship
IECX	International Electrotechnical Commission System...
INTV	International New Technology Venture
IOT	Internet of Things
LED	Light-emitting Diode
PSG	Pulsed Deflagration Combustion
SME	Small and Medium-sized Enterprise
NASA	National Aeronautics and Space Administration (USA)
VTT	Teknologian Tutkimuskeskus (Technical Research Institute)

Key Concepts

Alliance and partnership share the meaning and describe significant business relationships

Causation and effectuation are behavioral and cognitive processes used by entrepreneurs in opportunity identification and venture development

Event is a decision based and planned situation

Export is the outward international trade in goods and/or services, implemented either directly or through a third party

Incident is an unplanned situation that calls for a decision

Innovation is an invention that is commercialized on the market

Internationalization is the process of adapting firms' operations to match international environment

Intuition is a smooth automatic performance of learned behavior sequences that often can short-circuit a stepwise decision-making

Obstacle and barrier share the meaning and describe hinders to enterprise's ability to initiate, develop or sustain business operations

Opportunity is a challenge that is the outcome of exogenous phenomena

1 INTRODUCTION

One of today's biggest challenges is climate change, i.e., global warming caused by human activity. The biggest factor, without a doubt, is fossil energy. Reducing energy consumption will reduce the demand, but in the modern society saving can only be a part of the solution. The world needs innovative technical solutions. Thus, climate change is also an opportunity for innovative technology companies. Often new ventures provide radical solutions while established companies offer both radical and incremental innovations. Thus, both new and well-established firms together form the backbone for the economics of the society. In today's globalizing business environment, the well-being of that backbone depends on the combination of innovation and internationalization.

Implementing different types of innovation successfully in international business is subject to resource availability. In fact, the globalization of trade has not only increased enterprises' internationalization but also their need for cooperation and networking (Farooqi et al., 2012). The web of external relationships that surrounds any small business is capable of providing them with a wide variety of tangible and intangible benefits (Miles et al., 1999). Thus, strategic cooperation and networks are seen as effective means by which small and medium-sized enterprises (SME) can innovate and compete in dynamic business environments (Valkokari & Helander, 2007). In particular, "friendly" cooperation has been considered an effective way to utilize the knowledge-based synergy benefits of companies and thus promote e.g. innovation performance (Ritala & Hurmerinta-Laukkanen, 2012). Moreover, technology, market dynamics, buying behaviors and business processes are constantly changing and increasing in complexity and thus creating challenges, i.e., both opportunities and obstacles, for businesses. Whether externally or internally induced, challenges require strategic decisions to be made which in SMEs are typically concentrated in a few key person (Valkokari & Helander, 2007).

Outstanding decisions require excellent leadership, commitment and perseverance. For years researchers have investigated the traits of successful entrepreneurs and compared their achievements with those of less successful ones. Consequently, a lot remains to be done in terms of identifying and categorizing particular decisions in specific business functions. In fact, the basic fundamental question has remained unanswered, namely: Is it more efficient to plan in detail or improvise? Although rational planning (think first), i.e., causation and effectuation, which is associated with (act first) emergent strategies as alternative decision-making logics, initially recognized by Sarasvathy (2001), have been

studied from multiple perspectives, the consolidation and generalization of results are still ongoing (Street & Cameron, 2007). For example, Brinckmann et al. (2010) argue for the importance of business planning, and Salo (2006) suggests that managers who collect information and use analytical techniques make decisions that are more effective than those of managers who do not, whereas, for example, Baker et al. (2003) stress the importance of improvisation strategies for venture performance (Smolka et al., 2016).

The choice of either causation or effectuation affects the type of opportunities that are exploited (Harms & Schiele, 2012; Sarasvathy, 2001). This fact illustrates the wider point that decision-making logics do influence the types of decisions made, and ultimately their effectiveness in any given circumstances (Dean & Sharfman, 1996). Causation and effectuation offer different perspectives to entrepreneurial and managerial performances. Causation logic goes from many alternatives to one goal while effectuation logic starts with one set of alternatives that can end in many different ways (Andersson, 2011), as further elaborated below.

Causation logic has its roots in the theories of economy and strategic management aimed at understanding how entrepreneurs used their resources to achieve planned targets (Kurkinen, 2018; Lemos & Andreassi, 2015). Entrepreneurs and managers using causation logic in their planning try to prevent surprises and thus take advantage of analysis and predictions (Chetty et al., 2015; Kurkinen, 2018). Once the goals are defined, appropriate means are selected, and resources procured. The usage of causation logic is clearly an indication of a goal-driven organization (Kurkinen, 2018; Villani et al., 2018).

Effectuation logic questions the applicability of the traditionally accepted causation-based models of entrepreneurship (Morrish, 2009). The more complex and innovative the goods, services or other means of doing business, the less it is possible to get valid information ahead of time for optimizing actions: what aspects or features to push forward, with what kind of customers and market(s), in what forms, how, through what channels or distribution mode, at what price point, etc. (Grégoire & Cherchem, 2019). On the other hand, any acquired tacit information, e.g. in a new technological element, provides good defense against imitation (Hurmelinna-Laukkanen & Puumalainen, 2007). Therefore, since know-how is the primary source of competitive advantage for ambitious growth companies, it is ultimately a challenge for decision-making (Kukko & Helander 2012).

According to the effectual logic of Sarasvathy (2001), an entrepreneur strives to progress towards the desired goal with the means at hand. He or she deploys those means to achieve a wide range of potential goals. Another principle of effectuation is the “affordable loss,” which stipulates that entrepreneurs’ risk no more than they

are prepared to lose. Also, an effectual entrepreneur seeks stakeholders that are willing to contribute to his or her venture (Duening et al., 2012). And finally, when the causation principle aims to exploit capabilities effectuation calls for the utilization of environmental contingencies (Sarasvathy, 2001).

Nevertheless, in the literature, effectuation has challenged the traditional causal method of business forecasting and preplanning (Chandler et al., 2011) by providing evidence that some of the most successful new ventures have acted in line with effectuation principles (Harms & Schiele, 2012; Sarasvathy, 2001; Sarasvathy & Dew 2005). However, alternative results exist; for example, the research of Fisher (2012) suggests that a causal approach where goals are identified from the very beginning and means and activities are organized around these set goals is related to success for science-based ventures.

Also, whether these two theories are opposing (Brettel et al., 2012) or independent (Perry et al., 2012) approaches is debatable. Regardless of one's viewpoint, many researchers, e.g., Reymen et al. (2017), argue that both logics are combined in a venture's strategic decision-making, rather than one logic being used exclusively. Furthermore, previous studies, e.g., Smolka et al. (2016), show positive interaction effects between causation and effectuation on venture performance when environmental uncertainty is low and negative interaction effects when uncertainty is high. However, the research of Yu et al. (2018) reveals the opposite, i.e., that a positive interaction effect on performance is only valid when environmental uncertainty is high.

Moreover, some studies show the use of causation and effectuation logics shifts over time. Effectuation is argued to be more dominant in early phases of development whereas causation is more dominant later on (Berends et al., 2014). Any needs for resources vary with the organizational life cycle stages (Jawahar & McLaughlin, 2001), thereby resulting in different organizational behaviors. In different life cycle stages, firms have different strategies and structures (Chandler, 1962). Also, management priorities change with firms' life cycle stages (Smith & Stulz, 1985). Hence, an organizational life cycle phase may influence a firm's decision-making logic and relationships with its partners. When firms are in the early stage of their life cycle, i.e. the start-up stage, their needs for alliances are typically high and they react to the demands of partners with certain caution.

Also, a firm's phase in the organizational life cycle affects what type of pressures, threats, barriers and opportunities, summarized here as challenges, in the external and internal environment firms encounter. SMEs that are in the later stages of the organizational life cycle often find it hard to overcome these barriers and thus, for example, their innovativeness may decline (Dibrell et al., 2011). On the other hand,

the dominant decision-making logic fluctuates and may shift several times (Reymen et al., 2015), and both logics can coexist subject to the different degrees of uncertainty, e.g., in the technology, the market or in the number of decision-makers involved (Nummela et al., 2014).

Actually, decision-making logics have been studied from multiple perspectives: for example, the firm's size (Andersson 2011; Berends et al., 2014;), age (e.g., Reymen et al., 2017), an entrepreneur's experience (e.g., Duening et al., 2012), stakeholders (Galkina & Chetty, 2015; Sarasvathy & Dew, 2005) and usage of resources (Agogué et al., 2015; Yu et al., 2018). Also, although effectuation logic has been applied to management (Augier & Sarasvathy 2004), finance (Wiltbank et al., 2009), marketing (Read et al., 2009) and research and development (Brettel et al., 2012), including comparisons with causation logic, and the literature includes knowledge of the barriers' effect on decision-making logic (Futterer et al., 2018; Gabrielson & Gabrielson, 2013; Galkina & Chetty, 2015; Joensuu-Salo et al., 2018; Wu et al., 2020) and vice versa, there is a shortage of consensus on the subjects.

In light with the above, this study combines innovation, internationalization and business relationships with strategic decision-making logic and investigates decision-making logic from two perspectives: first, how the different decision-making logics, i.e., effectuation and causation, affect the handling of challenges in the innovation, internationalization and business relations of firms; and second, how and why certain types of challenges lead to the use of a certain type of decision-making logic. The study illustrates the linkages between the actors, contexts, processes and time, and, when feasible, the end results of certain decision-making logic. As Pettigrew (2012) points out, "interchange between actors and contexts over time is cumulative," and thus the past shapes the future. Applying Pettigrew's (2012) view to the content of this study suggests that, firstly, innovation shapes the realization of internationalization, secondly, the interaction between innovation and internationalization is cumulative over time, and thirdly, the interaction depends on available internal and external resources.

Innovation is a proven tool that contributes to enhancing firms' performance and competitive advantages (e.g., Castaño et al., 2016). An innovation can be a new product or service, a new production process technology, a new structure or an administrative system, a new plan or a program pertaining to organizational members. In particular, the distinction between administrative and technical innovations is important because they imply potentially different decision-making processes (Daft, 1978) and together they represent changes introduced in a wide range of activities in any organization (Damanpour, 1991).

Two decades ago, innovation and internationalization were the two main alternative (Onetti et al., 2012) transformation strategies for growth (Dobbs & Hamilton, 2007; Kyläheiko et al., 2011), whereas in today's business environment the combination of those two is considered business as usual. Actually, a firm's survival in the global markets depends on the combined effect of innovation and internationalization (Onetti et al., 2010). Moreover, Paul et al. (2017) imply that SMEs that have the ability to introduce product or service innovation will gain competitive advantages over their competitors and that these in turn will help their internationalization process.

Entering commercial markets requires both technological capabilities and entrepreneurial abilities, as noted by Schumpeter (1963, p. 88): "And to carry out any improvement into effect is a task entirely different from the inventing of it, and a task, moreover, requiring entirely different kinds of aptitudes" (Rilla, 2016). Furthermore, her research shows that the personal experience, abilities and motivation of an innovator/entrepreneur should be noted. Likewise, the characteristics of an innovation, for instance the radicalness and type of technology, will affect the internationalization path. However, despite their own strengths, small businesses need partners to complement their expertise.

Furthermore, Saridakis et al. (2019) suggest, based on empirical evidence, that different types of innovation affect internationalization differently. Also, their research provides evidence of the positive effects of combining different types of innovation. Apart from implementing different types of innovation successfully in the international business field, the content is subject to resources being available in one form or another. As Koskenlinna et al. (2005) argue, globalization of trade has not only increased enterprises' internationalization but also their needs for cooperation and networking.

Business relationships, e.g., alliances and partnerships, have always been a critical strategy for SMEs looking to grow in unfamiliar markets, tap new customer segments or sell additional products or services. For companies that have to rely on others in order to successfully "fight" in markets, alliances present great strategic importance and complexity (Vollmer & Egol, 2014). In fact, the web of external relationships that surrounds any small business, whether referred to as a "strategic alliance" (for example, Miles et al., 1999) or a "network" (for example, Curran et al., 1993), is capable of providing a wide variety of tangible and intangible benefits.

Cooperation as a process and business relations as derivatives evolving under the influence of a series of daily interactions and events can characterize firms. The accumulation of these interactions determines partners' dispositions towards

collaboration and thus the achievement of mutual objectives (Arslan & Arino, 2017). The more novel and innovative goods, services and other forms of doing business are, the less easy becomes to obtain, ahead of time, valid information for optimizing what aspects or features to push forward, with what kind of customers and market(s), in what forms, how, through what channels or distribution mode, at what price point to begin, etc. (Grégoire & Cherchem, 2019), the more important partners who provide the specifics become. Ultimately, a company creating the winning value is able to work successfully together with its customers, suppliers and other business partners.

The research will contain input from six Finnish case companies, three of which are innovative energy technology start-ups, while the other three are older manufacturers of traditional energy technology products. The operational ages of the older well-established case firms range from 30 to 90 years and those of the start-ups correspondingly from six to 13 years. At the time of the beginning of data collection in 2019, the turnovers of the older firms were between €2 and €10 million, and in contrast, the turnovers of the start-ups were less than €0.3 million. All established case firms, later identified as small and medium-sized enterprises (case SMEs), were family owned, while the start-ups, later identified as new ventures (case NVs) or international new technology ventures (INTVs), all had a more diversified ownership. The case firms' innovation-, internationalization- and business relations-related decisions were observed between 2019 and 2021 and through interviews were evaluated for a considerably longer period of time. Hence, firms' decision-making logics were viewed through a temporal process lens.

The activities that make up a firm's economy are not a zero-sum game. Gains in one area do not have to come at the expense of losses in other areas. As the economy grows, and value is created, entrepreneurs and enterprises create outputs that are more valuable than the sum of the inputs. Consequently, they must identify opportunities and face both foreseen and unexpected obstacles. Nevertheless, these issues contain challenges that require decisions to be made and thus, in this study, lead to narrative explanations. And then, when combined, a process path within each case company is identified. Thus, the study follows the argument of Poole and Roth (1989) that in a process view it is the sensitivity to the pattern that shapes the outcome.

The study finds out what happened, when it happened and why certain matters were worthy of attention. The observations are time specific and thus subject to a temporal process type of view. As Poole and Van de Ven (2010) point out, in the process approach, explanations include layers of causation at different levels and temporal scales. Smaller decisions are rooted in larger ones and it may be difficult

to understand a single decision without considering larger issues, previous decisions and often fuzzy boundaries (Poole & Van de Ven, 2010), like the reflection of moonlight in water.

An important part of the research process is colligating the procedure of explaining an event or incident through its observed relation to other events (Abbott, 1988) and then locating it in its temporal and historical context. In order to do so, critical events and incidents are identified in a sequence as turning points, conflicts or even shocks. These occasions can be planned for as events usually are, or incidents that are liable to happen and typically unexpected with a negative connotation.

A good practical way to dig out relevant meaningful events and incidents is using the critical incident technique the “CIT method.” It has been proposed as being particularly effective when used in the context of new concept creation, and to increase knowledge about a little-known phenomenon, or in hypothesis setting (Kurkinen, 2018). The CIT process includes identification of incidents -> review of incidents -> collection of facts -> analysis of data -> determination of outcomes -> evaluation of solutions, and thus provides an efficient approach for the study. The focus functions and binding of the study content are illustrated in Figure 1.

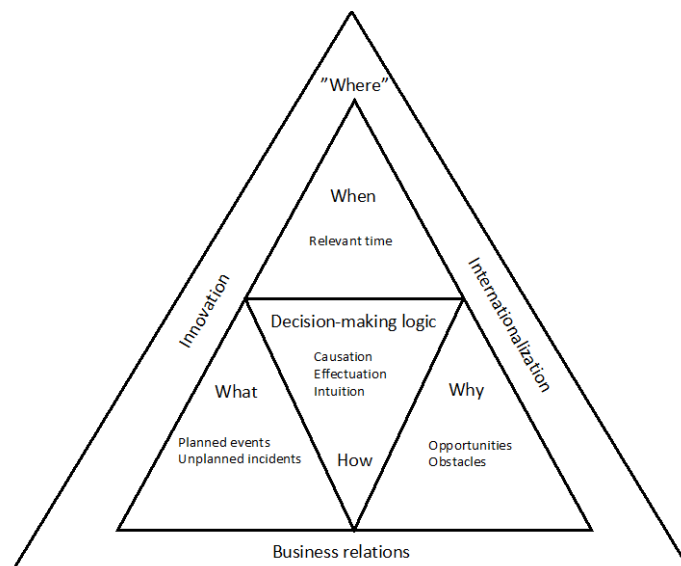


Figure 1. The Study's Approach Principles and Content

The “where” symbolizes the observed activities, the “when” symbolizes the temporal view, the “why” identifies the reasons for decisions made and the “what” explains the relevance of an identified issue and classifies it. To maximize the potential to learn about the qualitative phenomena that may change over time and are relevant in the economy, the study compares the decision-making of the new technology ventures with each other, the used logics of older case SMEs with each

other and start-ups with the SMEs in order to conclude whether any patterns can be identified and rules defined when firms are facing recognized opportunities and obstacles.

1.1 Research Gap

Previous empirical research linking planning and action to venture performance has provided inconsistent results (Smolka et al., 2016). While several researchers have concluded that early effectuation is replaced by causation logic as firms age, Kurkinen (2018), for example, concludes the opposite. Therefore, Kurkinen suggests the need for additional longitudinal research on the subject. He is not alone. Several other researchers focusing on decision-making logic suggest additional temporal process studies (e.g., Arend et al., 2015; Armario et al., 2008; Futterer et al., 2018; McKelvie et al., 2019).

Moreover, a large number of researchers suggest additional studies that fall in the set international business frame of this dissertation, i.e., innovation, internationalization and alliances (Blankenburg Holm et al., 2015; Freeman et al., 2006; Galkina & Chetty, 2015; Gassmann & Keupp, 2007; Guili & Ferhane, 2018; Guo, 2019; Karami et al., 2019; Roach et al., 2016; Tseng, 2016; Wu et al., 2020). In addition, some researchers (Berends et al., 2014; Chandler et al., 2011; Guo, 2019; Roach et al., 2016) call for decision-making logic-based studies on the innovation development of SMEs, and the suggestions of, for example, Brouthers et al. (2015), Harms and Schiele (2012) and O'Dwyer and Gilmore (2018) can be interpreted as calls for research on decision-making logic in the formation and management of alliances.

While all the above requests for additional research on effectuation or causation versus effectuation are valid and thus do justify this study, three specific justifications apply. First, the literature is clearly not unanimous regarding the antecedents' effects on the selection or performance of the dominant decision-making logic. Second, as Pohjola (2020) suggests, researchers tend to work on narrow subtopics and publish in specialized (niche) journals. This has caused segregation in academia and fragmentation of generated knowledge. Also, as the literature review reveals, the majority of relevant literature includes a maximum of only two contexts, e.g., innovation versus internationalization, alliances versus internationalization, or a plethora of one specific matter. This has caused fragmentation of knowledge and the omission of potential synergies, both in academia and to some degree also in practice. Hence, the untypically broad approach of this study is justified. Third, to the researcher's best knowledge, no

one has studied the effects of decision-making logics in a symbiosis of innovation, internationalization and alliances of small energy technology firms.

1.2 Purpose of the Study

The purpose of this qualitative multi-case study is to examine and compare the decision-making logics in the innovation, internationalization and alliances of international new energy technology ventures and firmly established small and medium-sized technology firms in Finland. The practical goal is to generate a concept for new ventures and SMEs to guide them to understand and challenge their own decision-making practices and thus to assist companies in their struggle to create and maintain international competitive advantage. Ideally, the concept should assist practitioners in their actions to shape their firms' future, bearing in mind that no future has been written as of yet (Harms & Schiele, 2012).

Consequently, as previously indicated, the theory development and empirical evidence regarding feasible synergistic effects between C&E approaches are still underdeveloped (Smolka et al., 2016). Hence, empirical evidence and theory development regarding potentially unifying and distinguishing effects between these two approaches need clarification. Providing that the interplay between the two logics is synergistic, this study clarifies how entrepreneurs and managers combine the usage of effectuation and causation for improved venture performance in innovation and internationalization in conjunction with partnerships and alliances.

Alternatively, in contrast, the study clarifies why there is no synergy of interplay of the logics. Hence, the purpose of this comparative multi-case study on decision-making logic is to strengthen our knowledge about unifying and distinguishing effects specifically on start-ups' and SMEs' innovation and internationalization when dealing with suppliers and more intimate partners. The end-result knowledge of the study is the sum of the two intertwined logics, supplemented by the effect of intuition. When feasible, the study followed any relevant decision along its winding and often surprising path through time (Poole & Van de Ven, 2010).

Also, if only one theory is used, there is a great danger that important aspects will not be considered. Consequently, this study covers cooperation and alliance research in the two operative functional areas of the case companies through a process lens and contributes to effectuation and causation theories, while also highlighting the relevance of the resource-based view and international new venture theories. The goals of the study are achieved through research questions

approached in phases of innovation and internationalization. The basic idea is taken from a new venture development: first innovate, then internationalize and in both phases utilize external resources as needed.

1.3 Research Questions

First research question: The purpose is to illustrate and compare how the nature and type of challenges, the form and development stages of innovation and internationalization at any particular moment affect the decision-making in Finnish energy technology start-ups and older, well-established energy sector SMEs. The aim is to capture the challenged decision-making points of the case companies. The study context reflects both time and place considerations (Langley et al., 2013), and thus the study will examine when major events or incidents took place, how they were interlinked and why certain decisions were made.

Research question 1:

What is the prevailing strategic decision-making logic of energy new technology ventures and established energy technology SMEs and how does it affect their innovation and internationalization processes and the solving of major challenges?

Second question: The purpose is to explore and compare a firm's preparedness to utilize alliances and partnerships. As customer expectations grow, so does the need for differentiation, for which partnerships can provide solutions. The primary motivation of these relations could be to improve the engineering and manufacturing processes, develop new products or enter new markets. The form of these relations ranges from contract-based alliances between two or three players to cross-industry networks and large, loosely organized ecosystems based on a dominant technology platform (Shipilov, 2020).

Research question 2:

How does the prevailing strategic decision-making logic of new energy technology ventures and established energy technology SMEs affect their utilization of alliances and thus their contribution to firms' success?

The third research question focuses on issues surfacing during the study and will supplement and dovetail the contents of the two previous questions. As is generally known, geographical, biological and economic forces create challenges. Yet, these challenges leave ample room for surprising developments, which do not seem

bound to any deterministic laws (Harrari, 2014, p. 267). Hence, the better a firm is prepared for changes, the better it can deal with surprises, emergent incidents and opportunities that are likely to surface during the company's growth arc, and thus be subject to analysis by this study through the process view of causation and effectuation theories. Therefore, contrary to previous questions, the third research question approaches the issues at hand from the opposite direction and aims to explain the effects of challenges in practiced decision-making logic.

Research question 3:

What are the influencing factors and how do they influence the decision-making logic of new energy technology ventures and established energy technology SMEs?

The main data collection method is the semi-structured interview, implemented in three phases followed by cross-comparison of data and analyses. In Figure 2, building up the concept and its constituents is visualized.

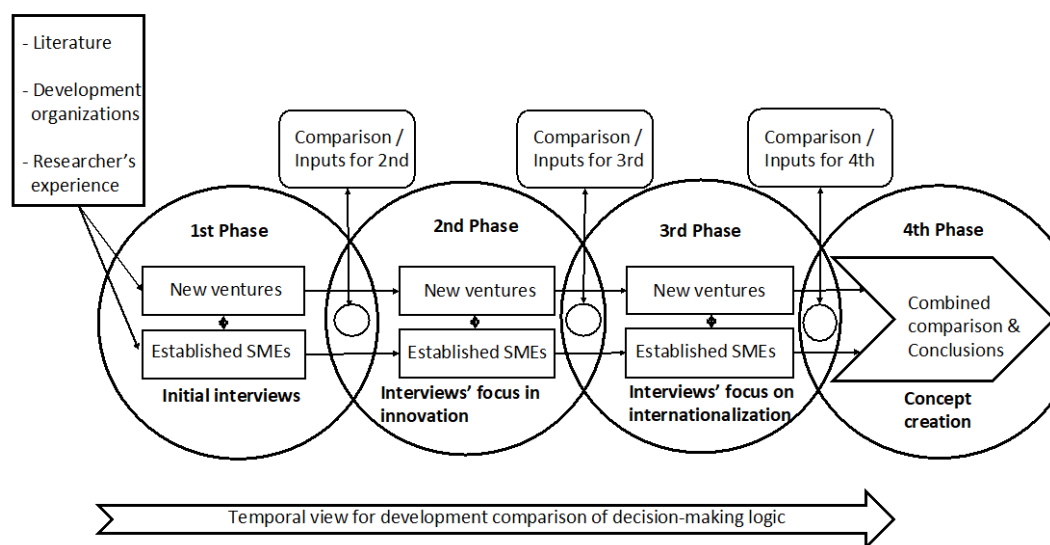


Figure 2. Research Data Collection and Analysis Schema

The purpose of the first interview round was to gather general information on the case firms, to perform a preliminary analysis and thus obtain input for the second round of interview questions. The second interview round focused on innovation activities and challenges. After completing the second round, all accumulated data were analyzed through both a causation and an effectuation lens. This information was then utilized in the formation of the interview questions for the third interview round, which focused on internationalization. The research questions were left

relatively open-ended to allow an inductive-type approach to the problem. For the same reason, “a challenge” is defined broadly as an obstacle, opportunity, factor, event or incident that was effected by the firm’s decision-making.

To support the research questions, a few postulates that work as guidelines for the study are formulated and presented herewith. These postulates are not hypotheses and thus, as in mathematics, not tested in this study, but rather their purpose is to sum up the researcher’s pre-understanding and beliefs, based on their own international management experience, and thus to provide a background and a “high-level framework” for the abductive research approach (Gummesson, 1991; Yin, 1990).

- a) The more complex and radical a technical innovation is, the more important are the capabilities to market it.
- b) Internationalization is a phenomenon that should be seen as a risky investment.
- c) Ruthless international competition is increasing small companies’ motivation to undertake partnerships to secure resources for competitive advantage.
- d) Business relations are complex ventures, which are increasingly important for small companies to manage.
- e) Business executives use both entrepreneurial, i.e., effectuation, and managerial, i.e., causation logic intertwined with their intuition when making decisions.
- f) Practitioners do not generally identify alternative decision-making logics.

Accordingly, the study follows Mintzberg’s (Pettigrew 2012) advice to start with an interesting question, not with a fancy hypothesis. Despite the complexity of the framework, the aim is to keep the research as direct, straightforward and simple as possible.

1.4 Theoretical Positioning and Contribution

The theoretical research approach used does not consist of only one approach, but a combination of several. This approach takes into consideration the differences between company functions and looks both backwards and forwards into a firm’s history and future. This research shows through case studies that some of the generally accepted statements of strategic decision-making logic are valid while some are still questionable. The work contains features of the conceptual approach

where the goal is a concept system that helps in describing various phenomena and creates instructions for future actions.

As discussed, while in practice, entrepreneurs use both causation and effectuation logics (Sarasvathy, 2001), theory development and empirical evidence regarding feasible synergistic effects between C&E approaches are still underdeveloped (Smolka et al., 2016). The study contributes towards clarification of the inconsistencies identified in the C&E literature. The study results are based on empirical data and extensive literature analysis.

Ultimately, the research contributes to the integration of our knowledge on the development of strategic decision-making in engineering and manufacturing SMEs on their journey from domestic-only to international players. Consequently, the aim is to avoid the concerns of famous physicist David Bohm (Pohjola, 2020) that researchers focus too much on analysis and constant differentiation of problems into narrow areas while they forget the broader connections. Similarly, the research agrees with Davidsson (2016), who pointed out that the process of new venture creation is iterative, interactive, complex and often long in terms of duration, and thus the research should not focus only on a small set of process milestones.

International new ventures (INVs) represent a growing and important type of start-up. An INV is defined as a business organization that, from its inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries (Oviatt & McDougall, 1994). INVs have been predominantly viewed as belonging to the international entrepreneurship (IE) field of studies. However, in practice, much of the research done on INVs has taken place in the international business (IB) domain and in broader strategic management research, rather than in the field of international entrepreneurship (Hallback, 2012).

Previous research has reported that the sophistication of a firm – for example, the technology being developed – influences the venture process by delaying it (Garonne et al., 2010). In addition, technology entrepreneurship depends more on the chosen development paths than on entrepreneurship in general (Garud & Karnøe, 2003). International new technology ventures (INTVs) thus form a special field for international entrepreneurship research. Accordingly, the three start-ups fall close to the INTV definition, whereas the three older firms are subject to the IB domain.

This study contributes to the IE and IB literatures in four areas. First, the study provides clarity on the internal interaction of the innovation and

internationalization processes of firms. Second, it provides additional clarity regarding internationalization's boundary conditions relative to effectuation versus causation, and particularly to the role of challenges. Third, the study identifies and compares the opportunities and main obstacles that new energy technology ventures and established energy technology SMEs face when searching for and developing international business relations. Fourth, it provides input to the knowledge gap: how INTVs and technology SMEs factually use causation and effectuation logics in innovations, internationalization and related decision-making.

Specifically, the contribution of this paper to practice is to increase entrepreneurs' and SMEs' senior managers' understanding of the impacts of business challenges on their decision-making. The contribution for the practitioners is a model that will help them to identify when they can act and when they cannot and how to move from "cannot" to "can" (Arend et al., 2015). In practice, the outcome is a model that will help firms to identify their primary decision-making logic in association with specific types of challenges. The "impactuation" of the decision-making logics in different functions should be measured as the firm's actual achieved competitive advantage. Yet in this study, "competitive advantage" is left for semantic attention only.

1.5 Research Philosophy, Approach and Methodology

1.5.1 Research Philosophy

The basis for understanding any scientific study is to position it according to the ontological, epistemological and methodological approach it takes (Westwood & Clegg, 2003). There are two main approaches to collecting data for research: hermeneutic and positivistic. Hermeneutic research represents a "softer" approach than positivistic research. Typically, hermeneutic research deals with nonquantitative data whereas positivistic research uses mathematical and statistical techniques to process quantitative data. A positivistic researcher is a spectator and a hermeneutic researcher, as in this study, is part of the action (Gummesson, 2000). Therefore, an important issue within this study and the chosen methodology is the researcher's own role, not only as a researcher but also as a "consultant," and thus the effects of the ever-present subjectivity (Walkerdine et al., 2002) must be properly stressed.

As the aim of this research was to find out what actually happened and the reaction to it, the ontological approach can be seen to be closer to realism than nominalism.

In the realism approach, a reality exists independently of the mind of the people involved (Perry, 1990). Nevertheless, it is the opinion of the researcher that individuals who are part of any organization studies are also central to the process. Hence, a positivistic approach (using the methods of natural sciences) would not give a proper picture of the type of social phenomena under investigation. Therefore, the epistemological standpoint of this study is approaching critical realism and has a bit of pragmatism.

1.5.2 Research Approach

Uusitalo (1991) suggests that both deductive and inductive reasoning are needed in research. However, deductive reasoning is criticized for its lack of clarity in terms of how to select theory to be tested via creating hypotheses. And on the other hand, inductive reasoning is criticized because “no amount of empirical data will necessarily enable theory building”. Luckily, a third alternative abductive reasoning overcomes these weaknesses via adopting a pragmatist perspective. Abductive reasoning is important because there are often many or even an infinite number of possible explanations for a phenomenon. Hence, abductive reasoning involves deciding what the most likely inference is that can be made from a set of data. If the chosen explanation proves to be faulty, then an alternative explanation will be processed (Dudovskiy, 2016). Due to the complexity of the research subject and the fact that there is a limited amount of relevant literature available, this study uses an abductive research approach.

An important aspect here is that the researcher is allowed to change his direction subject to the revelation of new data or insight. Also, the chosen approach allows certain creativity and the development of research-specific tools. This is fundamentally important when investigating a problem that is not clearly defined. In such explorative and interpretive research, answers to questions like what, why and how are often used.

1.5.3 Research Methodology

In traditional business studies, four methodological approaches have been conducted in the field research as defined, for example, by Neilimo and Näsi (1980), namely conceptual, nomothetical, action-oriented and decision-oriented approaches. The concept analytical research method is aimed at developing a new concept to recognize and describe phenomena (Olkkonen, 1994), and it can be described as being both theoretical and descriptive (Kasanen et al., 1991). The present study fits into such a definition.

Qualitative research is often used when how and why questions are being posed and the aim is to increase the understanding of a phenomenon previously under investigated (Yin, 2003). Thus, a qualitative case study method was defined suitable for the study. According to Bloch and Sapsford (1996), in social research the language of conversation, including that of the interview, remains one of the most important tools of social analysis, a means whereby insight is gained into everyday life, as well as the social and cultural dimensions of our own environment. As in many forms of qualitative research, interview data are favored as a means of illustrating findings and supporting the developed concept(s).

The primary data used are based on interviews and observations. In addition to a literature review of previous research, secondary data are collected and screened from official statistics, government reports, web information and relevant historical data.

1.6 Research Strategy

Case studies are suitable for examining processes, because they explain events, enable researchers to encapsulate relevant developments over time (Chetty et al., 2018) and provide rich data about the context, complexity and behavior of a firm (Muzychenko & Liesch, 2015). Gomes et al. (2016) argue that by employing case studies and temporal designs, researchers gain in-depth knowledge of the phenomenon to assist in tracking trends. Case studies typically combine data collection sources such as archives, interviews, questionnaires and observations. A survey type of research provides information about general trends but little in-depth understanding of specific mechanisms (Meijer, 2015). In that sense, an in-depth, comparative and temporal case study of the effects of opportunities and obstacles on decision-making logic forms an important contribution to the literature by highlighting the dynamics over time.

Hence, as pointed out by Langley et al. (2013), by and large, recognizing the centrality of time is essential for understanding organizational changes. And, as suggested by Langley et al. (2013), an organization is a dynamic bundle of qualities some of which persist in their efforts to exist more than others, but there is no content that remains untouchable.

Indeed, to avoid missing the nuances, i.e., in converging causation and effectuation in the international business context, this study follows a qualitative research strategy for comparative case study, and responds to calls for more process-based studies (e.g., (Galkina & Chetty, 2015). The following sections will further continue this guidance by presenting the context summary and structure of the study.

1.7 Research Context and Structure

1.7.1 Research Context

Verbally expressed, the research context is as follows: Through a literature review on the subject matter phenomenon and theories applied, multi-case data are collected and analyzed. The context and upper-level structure are illustrated in Figure 3.

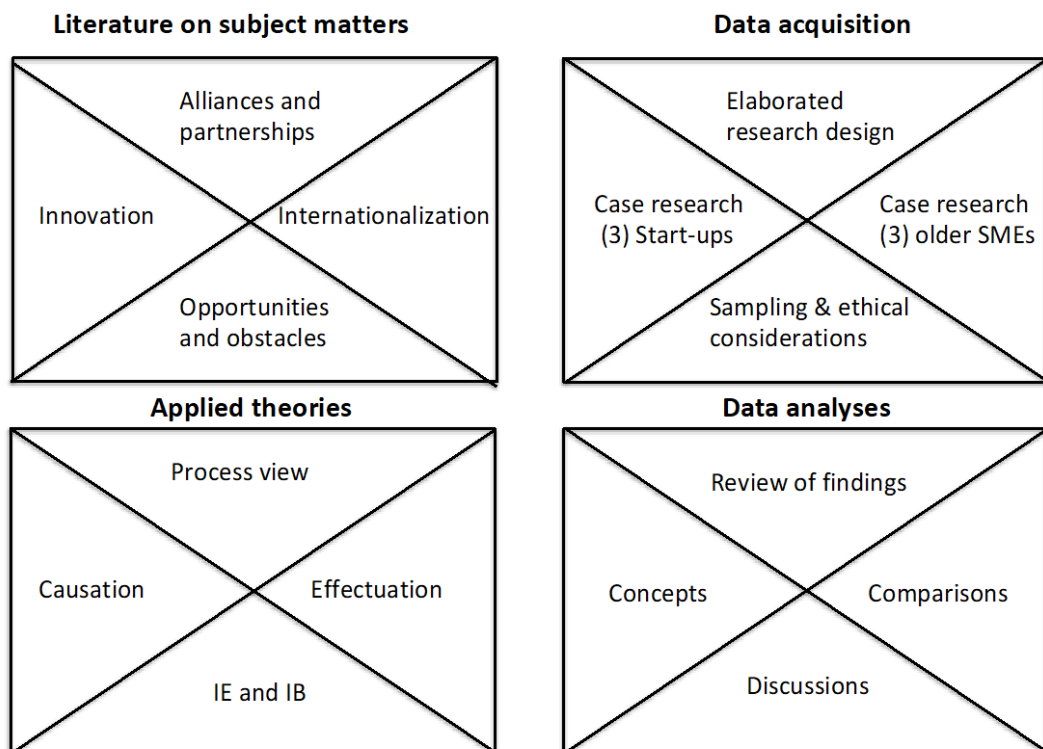


Figure 3. Study Context and Upper-Level Structure

Abduction encompasses all operations that create theories and concepts, regardless of the direction in which the process of reasoning itself progresses, whether that be from theory to practice or from practice to theory. Reasoning can be built on an intuitive assumption, but it can also be based on real facts or gained experiences, which should, in any case, be logical.

In light of that, the overall picture of innovation is built on elements of a variable nature. And the same principle applies to internationalization, which consists of a large variety of alternatives. Moreover, firms form alliances and partnerships for a plethora of reasons. Respectively, the types of alliance-specific positive and negative challenges are in constant movement. How firms tackle and make

decisions when facing such challenges does not, however, follow any one single theory or procedure and thus constitutes the leading clue of this investigation.

1.7.2 Research Structure

Chapter One explains the outline of the research. This chapter includes a brief explanation of the research background and defines the rationale for the selection of the research subjects. Moreover, the first chapter contains an explanation of the research goal and purpose and introduces the research philosophy and the overall context.

Chapter Two constitutes a literature review and, accordingly, contains an analysis of concepts and theoretical frameworks that have been previously introduced to the research area. This chapter contains definitions of main terms and explanations.

Chapter Three addresses methodology. The chapter explains the research design and process and addresses the choice and implementation of data collection methods. Sampling issues and ethical considerations are also discussed in this chapter.

Chapter Four contains a presentation of the primary findings through interviews, observation, secondary data, etc. Presentation of the primary data and findings is facilitated through feasible graphics in the summary session.

Chapter Five addresses comparisons and the creation of concepts. This chapter plays a critical role in the achievement of the research goal and objectives.

Chapter Six comprises discussions and analyses. Findings of the literature review have been compared to primary data findings in this chapter. Also, in-depth discussions have been provided in relation to each individual research objective. The chapter includes an acknowledgement of the limitations of the study and highlights the scope for future studies in the same research area.

Chapter Seven concludes the work and summarizes the level of achievement of the research goal and purpose.

2 LITERATURE REVIEW

In this chapter a comprehensive description of the phenomena under observation, relevant subjects and applied theories is presented. All matters discussed are potential variables for the six cases and thus potentially significant. The first phenomenon presented is innovation, followed by internationalization, business relations and decision-making. As a result, at the end of Chapter two the dovetailed effects of opportunities and obstacles of the phenomena are discussed and integrated to form the conceptual framework for the empirical part of the study.

2.1 Innovation

2.1.1 What is an innovation

As concluded by Pino Soto (2018), the literature proposes several typologies and definitions for innovation. He suggests that the definition by the OECD (2005) is the most popular among researchers. According to the OECD, innovations can be divided into two categories. Technological innovations include product innovation and process innovation, while nontechnological innovations include marketing innovations and organizational innovations. Service organization literature also suggests the existence of service innovation, technological innovation and administrative innovation (Damanpour et al., 2009; Pino et al., 2016). Moreover, the division into radical versus incremental innovation is embedded in the innovation literature.

2.1.2 Innovation Motives

The systematic nature of firms' renewal is based on a broad view of innovation. New ventures produce a vast variety of innovations. For instance, start-up firms are established to create a new product or service, and often under conditions of uncertainty. However, for established firms, achieving innovations could be more difficult. Consequently, all enterprises should want to proceed from their present position to a desired position and act accordingly.

The key is that the new ideas are applied in practice and that they provide the firm and its customers with added value. In the SME context, innovation management is not "rocket science" but more like strategic actions to renew the offerings or operations of the firm. However, strategic innovative actions call for good innovation capability, meaning the firm's ability to create and utilize different

kinds of resources and competences, both internal and external, within its own innovation activities. The innovation capability is based on sufficient analytical skills, appropriate knowledge of the entrepreneur's own and the firm's internal resources and competences, and a good understanding of its own operational environment and networks (Kolehmainen, 2016).

2.1.3 Innovation Types

In the following text, the literature is viewed through radical and incremental, technological, product and process, and nontechnological, i.e., organizational, and market innovation research.

2.1.3.1 Radical and incremental innovations

Radical innovation is fundamentally different from incremental innovation. Radical innovation can be a transformative business model that seeks to completely disrupt and replace an existing industry or create a whole new industry, or a new big market niche or just a radical solution to a challenging problem. However, on closer inspection, several innovations with undoubtedly radical effects comprise several small inventive steps that appear to be self-evident, even logical, to the inventors, whereas incremental innovations are, by definition, perceived to contain improvements to existing solutions (Kasmire et al., 2012).

Incremental innovations are often implemented through a systemic process whereas radical innovations require creativity and flexibility. There are several definitions for radical innovations (Rice et al., 1998; Song & Montoya-Weiss, 1998). In Figure 4, the landscape of alternative innovation types is illustrated.

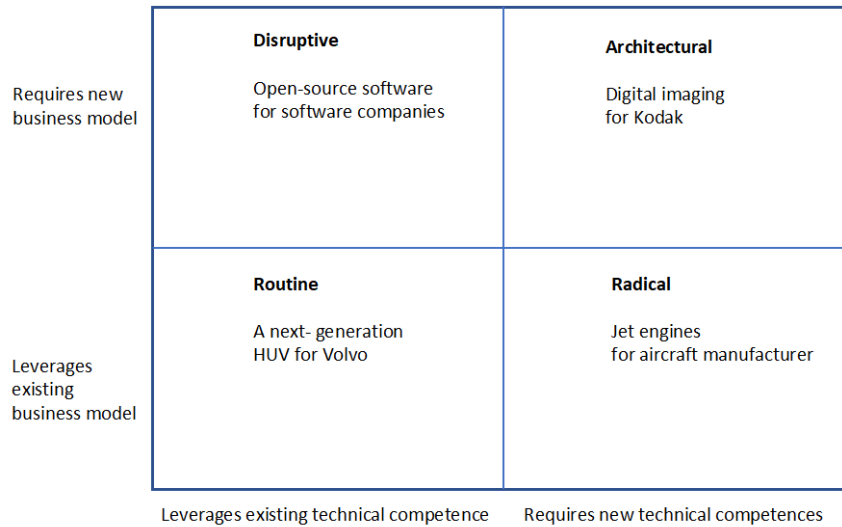


Figure 4. Innovation Landscape (modified from: Pisano, 2015)

However, more relevant than the definition is coping with the conflict between creativity and systematization. Although some researchers, e.g., Verworn and Herstatt (1999), think that the differentiation between incremental and radical is not sufficient, as the innovation differs depending on market or technology uncertainties, radical innovations are less prudent in following a predefined process.

Nevertheless, in the literature it is extensively discussed and empirically verified how the innovation process should be structured and systematized. Several of the models contain phases that are separated by gates. At every gate a decision on continuing or terminating the project can be made. The phase-gate model integrates the market and technological perspective (Verworn & Herstatt, 1999).

The market perspective leads to incremental and trivial new product developments, and this is argued to be the rationale for innovation that has the potential to create markets and customers (Bennett & Cooper, 1981). The abilities to understand customer needs and effectively develop and position offerings accordingly are critical capabilities for internationalizing firms aiming to attract customers and generate revenue. This could be achieved by testing early concepts of product and service offerings in the hands of customers, which provide the firm-critical insights necessary to make effective gate-specific product adjustments or go–no-go decisions (Buccieri et al., 2020). Recently, digitalization of business processes has enabled cheaper and faster testing and thus become an efficient tool for market penetration.

Digital transformation is defined as the use of digital technologies to create new business models and to provide new revenue- and value-producing opportunities in industrial ecosystems (Gartner Report, 2015). The literature has traditionally examined the implementation of digitalization in large firms, and specifics in typical challenges of SMEs are relatively few (Cenamor et al., 2019). Yet, entrepreneurial SMEs face specific challenges in implementing digitalization because of resource shortages, as well as a lack of skills and commitment (Cenamor et al., 2019). Consequently, the importance of digitalization is approaching the forefront in research of manufacturing SMEs.

In accordance with the above, Peillon and Dubruc (2019) claim that digitalization, while a widely noticed phenomenon, and digital transformation specifically among manufacturing SMEs, is still a major challenge. SMEs face a risk of being left out of large firms' supply networks if they do not follow suit.

2.1.3.2 Technological Innovations.

In the literature, technological innovation is defined as “a process by which firms master and implement the design and production of goods” that differs from their domestic or foreign competitors (e.g., Ernst et al., 1998; Pantano et al., 2017). Essentially, technological innovation involves an entrepreneur or an enterprise dealing with business constraints or future uncertainty by exploring new opportunities instead of merely exploiting current strengths (Menguc & Auh, 2006).

According to the literature, many general externalities and a plethora of risks associated with technological innovation can lead to market failures (Su et al., 2013), indicating that small manufacturing companies should also consider how to successfully transfer technological results into market practice (Gu & Su, 2018; Pandya, 2012). To commercialize new technologies originating from innovation activities, both new and older small ventures should implement market-orientation innovative strategies that explore new approaches to markets (Wainstein & Bumpus, 2016).

Undoubtedly, industries differ in many dimensions, with strong consequences for entrepreneurial innovation (e.g., Streb, 2003; Tether & Storey, 1998). Based on the perceptions of entrepreneurs and/or supervisors – what is possible with the materials and social structures at hand – there are different developments in different industries (Dosi, 1982; Tunzelmann et al., 2008) In addition, there are also different temporal rhythms involved (e.g., Eisenhardt & Bourgeois, 1988; Garud et al., 2011). For example, in the semiconductor business, two years is a long

time and five years is an eternity (Dryburgh, 2011), whereas for developing a new airplane or a paper machine five years is a short period of time. Naturally, the more complex the task at hand is, the more knowledge, capabilities, specific skills and planning are on demand.

2.1.3.3 Nontechnological Innovations

The first example of nontechnological innovations is organizational innovation, which can generate significant impacts on the firm's performance in terms of sales, market share and customer satisfaction (Pino Soto, 2018; Pino et al., 2016).

Organizational innovations are new approaches aimed at changing the organization's management processes through an improved strategy and structure and the motivation of the members (Birkinshaw et al., 2008; Damanpour et al., 2009; Pino et al., 2016). Organizational innovation is defined as the implementation of a new organizational method in the business practices and procedures of a company (OECD, 2005; Pino Soto, 2018). The organizational innovations are often fundamental for the generation of product innovations, process innovation and marketing innovations. Organizational innovation may involve changes in administrative systems, knowledge used in management, organization structure, internal processes and leadership skills with the purpose of using resources more effectively and for achieving competitive advantage.

From the point of view of innovation success, it is relevant how efficiently different resources, skills and capabilities are in forming a coherent whole. Therefore, organizational innovation acts as a support mechanism that helps create an environment that is conducive to the development of other types of innovation (Gunday et al., 2011; Pino et al., 2016). As even the most stable environments change (Damanpour, 1991; Hage, 1980), organizations should adopt innovations continually over time. Hence, organizational innovativeness is more accurately represented when multiple rather than single innovations are considered.

In the second example, market innovation can be defined as the implementation of new marketing concepts with regard to market research, product promotion, product advertising and field testing, which differ significantly from other firms and have not been previously implemented (Naidoo, 2010). Market innovation is an interactive process, particularly when innovative firms require the creation of a cooperative network/ecosystem, which is essential for their evolution (Scaringella & Radziwon, 2018). Moreover, the fresh innovation ecosystems literature highlights the importance of firms' cooperation for innovation (Durst & Poutanen, 2013; Gobble, 2014). In fact, innovation outcomes have been influenced by the

quantity and quality of cooperation between the institutions in the network (Mazzucato, 2016). Therefore, the importance of cooperation for internationalizing SMEs is widely accepted (Radicic et al., 2020).

In the third example, relationship innovation is defined as the philosophy of business that has shifted from a production orientation to a selling orientation, then to a marketing orientation and finally to a relationship orientation (e.g., Human & Naudé, 2017; Terblanche, 2005). Despite this development, both innovation and relationship orientation concepts have demonstrated that they have positive implications for business performance. While innovation orientation builds on a philosophy suggesting that customers will prefer superior and innovative products and services (Berthon et al., 2004), relationship orientation builds on the philosophical grounding of market orientation that suggests that understanding customer needs is the key to customer satisfaction and firm performance (Human & Naudé, 2017). Relationship orientation includes studies in sales, management, marketing channels, interaction, networks, service marketing and the *guanxi* in China (Human & Naudé, 2017). When building and maintaining relationships, trust, bonding, communication, shared value, empathy and reciprocity are defined as required characteristics, and thus central for customer-centered marketing innovations.

2.1.4 Innovation Process and Sources

In an entrepreneurial firm, ideas are initiated and converted to innovations by different drivers and aims, but some similarities can nevertheless be described in the process of transforming technological ideas into inventions and further into commercialized products or services. Actually, the innovation process view has evolved from early linear models (Balconi et al., 2010; Trott, 2005) to more complex cyclical models that acknowledge that innovation is often a process with overlapping activities (e.g., Dymond et al., 2012; Rothwell, 1994). While linear models proceed from one activity to another, in more integrated innovation processes, different activities progress partly simultaneously (Rothwell, 1994) and can have multiple routes towards the innovation end (e.g., Berkhout et al., 2010; Kline & Rosenberg, 1986; Rilla, 2016).

Actual innovation processes vary due to differences in the industrial sector, field of knowledge, strategy, experience, type of innovation and country (Varis & Littunen, 2010). One of the first steps in the innovation process is often the generation of ideas or concepts (Perks et al., 2005), which require searching for opportunities and utilization of knowledge. In Figure 5, the principle of an innovation process is illustrated as presented by Ikujiro and Hirotaka (1995).

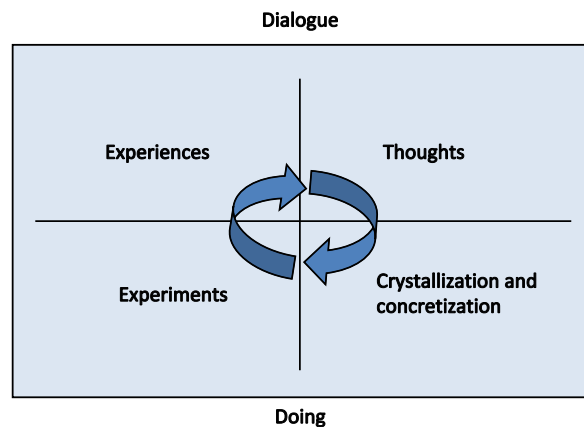


Figure 5. The Innovation Process (adopted from Ikujiro & Hirota, 1995)

In spite of their innovativeness when compared with established firms, new ventures are more likely to face low survival rates and poor performance because, for example, of the liability of their newness and smallness (Patel & Jayaram, 2014). Their significant weaknesses also include a shortage of skills and capabilities. Previous studies have shown that SMEs do not deploy the formalized processes identified as best practice for new product development (Berends et al., 2014). However, this conclusion is challenged by the recent study of Cenamor et al., (2019), who argue that SMEs' ability to offer tangible products is, in fact, the proof of the existence of such a process.

Nevertheless, O'Connor and DeMartino (2006) refer to Jelinek and Schoonhoven (1993), who argue that innovative firms do have institutionalized mechanisms for breakthrough innovation. And breakthrough innovation requires structure and clear reporting relationships to ensure there is the opportunity for both discipline and creativity. Moreover, some researchers have suggested that, in a successful radical innovation process, the activities overlap, and customer participation could be high.

2.1.5 Innovation Challenges for SMEs

Three key strengths of small firms are flexibility, a shortage of bureaucracy and hands-on management (Berends et al., 2014). However, as Berends et al. (2014) point out, many studies have shown that the lack of financial resources is the key barrier to innovation development. Such a restriction could seriously jeopardize the innovation processes of SMEs. On the other hand, as Covin and Wales (2012) argue, achieving innovation is particularly difficult for established firms.

Accordingly, to date, scholars have identified numerous innovation obstacles that prevent organizations from innovating successfully (Szambelan et al., 2019), as elaborated by Kelley (2009), Lynn et al. (1996) O'Connor and DeMartino (2006), Riffai et al. (2012) and Wood and Brown (1998). Szambelan et al. (2019) identify the following intrafirm barriers: a lack of innovation competence, a lack of resources or an unsuitable organizational structure, and market-based innovation barriers such as competitor rivalry or a missing market demand for innovation.

Regardless of how the challenges are solved and the innovation is implemented, research suggests that getting innovative products fast to market benefits the company (Stayton & Mangematin, 2016). Furthermore, different types of innovations are expected to influence the firm's internationalization activity through different mechanisms (Aspelund, 2018; Rodríguez & Rodríguez, 2005) and thus are subject to a variety of challenges. Consequently, excluding the "born global" (Stayton & Mangematin, 2016) internationalization is considered a second stage of the innovation process.

2.2 Internationalization

Arc et al. (2001) argue that globalization is changing the landscape of competition. Globalization and firms' internationalization are intimately connected. Be that as it may, internationalization and international entrepreneurship among SMEs has remained a topic of considerable contemporary relevance.

2.2.1 What is internationalization

Calof and Beamish (1995) define internationalization as "the process of adapting firms' operations (strategy, structure, resources, etc.), to match the international environment." Among others, Mograbyan and Autio (2018) have identified three internationalization ontologies, namely process model, network perspective and new international venture approach. These ontologies are discussed in Section 2.2.3.

Regardless of the chosen strategy, internationalization has become a key requirement for SMEs to gain competitive advantage, which results in an increasing effort in managing the companies' internationalization processes (Dutot et al., 2014). For SMEs, exporting is often their initial stage of internationalization specified by Love and Roper (2015) as the "outward international trade in goods and/or services, implemented either directly or through a third party."

2.2.2 Internationalization Motives

The subject has triggered a plethora of literature, thus a number of surveys examining the drivers of SME internationalization have become available from private and public sources across OECD and APEC member economies (e.g., Lloyd-Reason et al., 2009). The study of Lloyd-Reason et al. (2009) does not include Finland, but it does describe the export motivations in Sweden, which can be reasonably considered to be almost the same as in Finland. The reasons for this are growth, managers' previous international experience, unique products or technology and the limited domestic market. Also, according to the same report, SMEs in seven EU countries and in the UK reported market position, knowledge and relationship search as drivers for internationalization. A summary of various reasons for internationalization is presented in Figure 6.

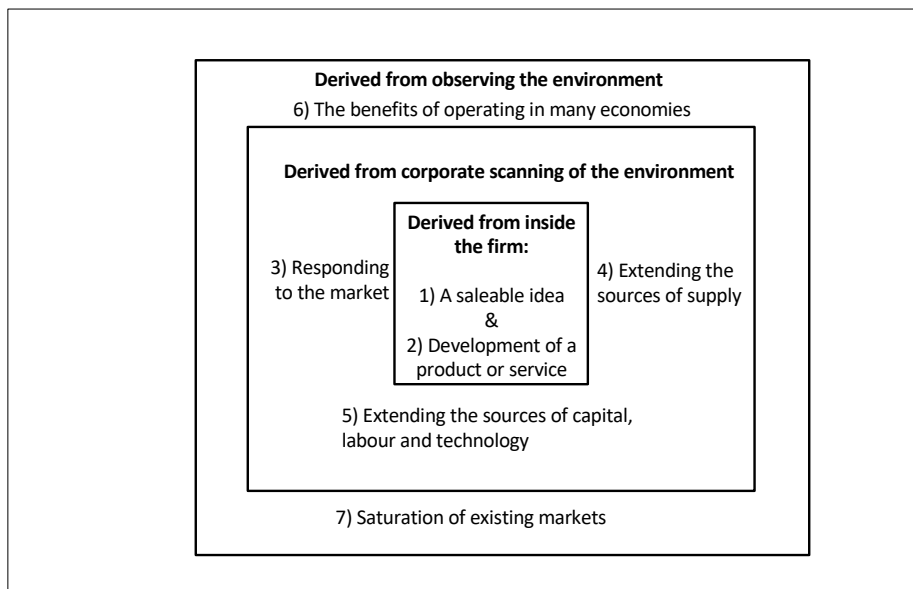


Figure 6. Reasons for Internationalization of a Firm (adopted from Brooke, 1992)

Lloyd-Reason et al. (2009) conclude that the foregoing review of relevant evidence suggests the continuing relevance of both internal and external motivations for SME internationalization. Small firms may prefer to go global either to follow their customers and tap potential markets or to have access to knowledge in order to improve their competitive advantage (Zhou & Wu, 2014). Other firms may enter foreign markets to gain access to primary resources. New ventures can assimilate new knowledge into their operations by accessing knowledge from a network of stakeholders. Likewise, new ventures are often likely to internationalize by forming international research alliances because their own ecosystem's international alliance intensity has a signaling effect and attracts more potential

international partners (Al-Laham & Souitaris, 2008). Furthermore, relationships with domestic partners motivate new venture internationalization as well (Jang et al., 2020).

2.2.3 Internationalization Methods

Traditional internationalization is often referred as the internationalization process theory or the Uppsala model of gradual internationalization (Paul & Gupta, 2014). It has been described as an incremental process (Johanson & Vahlne, 1977, 2015) starting from neighboring countries and facilitated by evolving resources.

According to the Uppsala model, exporting happens in stages and this staged approach reduces risks and barriers associated with exporting. This staged approach contains four stages, namely: no regular export activities; exporting via an independent representative or agent; sales subsidiaries; production/manufacturing (Cussen & Cooney, 2019). As previously mentioned, SMEs often choose exporting as an entry mode when accessing international markets as it does not require any foreign investment of assets because main operations remain domestic. This approach is particularly suitable for relatively small firms as it allows them to gradually develop their international operations (Rasheed, 2005). Yet a significant number of researchers argue that the Uppsala model does not explain the concept of accelerated internationalization of SMEs (Freeman et al., 2010; Lopez et al., 2009).

As a matter of fact, a growing number of firms no longer follow the traditional models of internationalization. For example, an international new venture (INV), defined as “a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries” (McDougall & Oviatt, 2000), represents an important and growing type of modern enterprise. The term international entrepreneurship, which comprises novel and innovative activities that cross borders with the aim of creating value and growth in business, is strongly attached to the term INV. Another term that is strongly connected to rapid internationalization was introduced by Rennie (1993) in McKinsey Quarterly, namely “born-global firms” (BGs), defined as firms that internationalize, on average, within three years of being founded and generate at least 25% of total sales from foreign countries (Knight et al., 2004).

Hennart (2014) argues that the key difference between INVs/BGs and other internationalizing firms lies in the business mode. INVs/BGs sell niche products and services to internationally dispersed customers using low-cost information

and delivery methods. Paul and Rosado-Serrano (2019) suggest that the born-global phenomenon is influenced by technology and macroeconomic changes such as globalization. Their position is supported by the fact that there have been several studies on born-global firms operating in technology-intensive industries (Andersson & Wictor 2003; Crick & Spence, 2005; Lopez et al., 2009). Likewise, there are examples of born-global firms in other industries such as metal fabrication, furniture, processed food and consumer products (Madsen & Servais, 1997; Paul & Rosado-Serrano, 2019). As a matter of fact, technological developments herald an emergent business environment that will enhance the ability of young firms to internationalize and perform optimally in the global business environment (Cavusgil & Knight, 2015; Paul & Rosado-Serrano, 2019).

To summarize and for the sake of clarity, it is relevant to note that early internationalization and accelerated internationalization are the two distinguishing characteristics of born-global firms. Moreover, the effectiveness of these processes is directly related to the ways in which companies establish collaborative networks (Ciravegna et al., 2018) and learn to use internationalization-related knowledge (Basly, 2007; Fletcher & Harris, 2012). However, whether the firm chooses to follow the Uppsala model or acts like the “born-globals,” time remains of the essence. The faster any action brings in profitable revenue, the better for the firm.

Furthermore, the choice of entry mode decision between traditional exporters and born-global firms could be attributed to the experience and background of the owners/managers (Madsen & Servais, 1997). Specifically, an entrepreneur’s international experience may impact on his/her perception and valuation of the opportunities in foreign markets, creating bias or desires toward cross-border activities. Prior studies have found that some entrepreneurs have developed a strong network of contacts as a result of their previous international experience, which has allowed them to internationalize faster than others (Contractor et al., 2005; Kundu & Katz, 2003; Paul & Rosado-Serrano, 2019).

In fact, there is strong evidence that in the internationalization process the use of networks has been shown to help international new ventures to skip the traditional phases of internationalization and expand rapidly by linking themselves to established networks (Coviello & Munro, 1995). Among other benefits, participation in networks includes acquiring the necessary knowledge for international operations.

In the literature, three major network types have been identified, namely social, business and intermediaries, where each form has its own benefits in the internationalization of SMEs (Farooqi et al., 2012). Evidently, any type of alliance

network can be of fundamental importance for a venture's international success (Coviello, 2006). Early internationalizing smaller born-global firms build relational trust through long-standing, preexisting connections accessed through established network partners (Freeman et al., 2010), which also reduces risk and enhances organizational learning (Cussen & Cooney, 2019; Gabrielsson et al., 2008) and referral trust and solidarity (Zhou et al., 2007).

The effect of technological and market knowledge on the initiation of foreign sales is contingent on network cohesion. In the development of technology, networking is viewed as a "partnered learning approach to research and development management" (Daniel et al., 2002) and is accessed through structures such as strategic alliances or collaborative relationships between smaller firms and large suppliers (Freeman et al., 2006). Moreover, as internationalization is an investment, the financial resources and mentoring advice provided, for example, by venture capitalists in the cluster ecosystem are vital to new venture internationalization (Al-Laham & Souitaris, 2008) as well as to domestic-only operated SMEs.

2.2.4 Digitalization in Internationalization

Digitalization can fundamentally shorten the time from idea to domestic or international markets. While there are different approaches in the literature to looking at digitalization and digital technologies related to business, the phenomenon is likely to affect all the activities of a firm. Innovation itself can be based on digital technology; digital tools will allow faster access to market information and speed up the evaluation of strategic options, and digitalization can intensify international product launches regardless of the chosen ontology.

According to Mograbyan and Autio (2018) the majority of studies indicate that digitalization in the internationalization process reduces the liability of foreignness, fosters business model innovation and reduces the number of obstacles to the foreign entry market. To emphasize the issue, Peillon and Dubruc (2019), for example, conclude that SMEs should become aware that there is no way around digital transformation and thus firms should note that in their strategy.

Finally, as internationalization and digitalization are becoming increasingly intertwined, the question arises as to whether digitalization is shifting the borders in such a way that new, borderless internationalization concepts have to be developed (Schmitt & Baldegger, 2020). Hence, the research questions of this study that aim to explore and explain the "how" and the "why" (Yin, 2003)

alternative strategic decision-making logics affect alliances of internationalizing SMEs must also consider the effects of digitalization.

2.2.5 Internationalization Challenges for SMEs

In the end, the intensity of international activity of a firm is influenced by the owners' and managers' perceptions and by public policies (Claver et al., 2008). Governments have different kinds of tools to enforce their policies, such as grants, contracts, regulations and import taxes, to name a few. Yli-Viitala et al. (2019) emphasize the relevance of research on the barriers to internationalization and refer to Arteaga-Ortiz and Fernández-Ortiz (2010) who identify barriers to internationalization that could inhibit SMEs' development of international business activities. These barriers include, among others, the perception of management, i.e., the perceived difficulty of starting international activities. In fact, Arteaga-Ortiz and Fernández-Ortiz (2010) conclude that there are very few definitions of export barriers, although their importance is generally recognized in the literature.

However, some specifications exist. For instance, Putniņš (2013) identified legal barriers along with a lack of knowledge about the foreign market and exporting processes, and Leonidou (1995) divided export barriers into more or less self-explanatory internal and external barriers. Actually, Leonidou (2004) specifies international barriers as all those obstacles that hinder an enterprise's ability to initiate, develop or sustain business operations in a foreign market. Moreover, while Westhead et al. (2002) divide barriers into four basic categories, namely strategic, informational, process-based and operational, Arteaga-Ortiz and Fernández-Ortiz (2010) and Freeman et al. (2006) identify certain key barriers that smaller international ventures face: a lack of economies of scale, a lack of resources (financial and knowledge) and an aversion to risk taking. Supplementing the above, Sarasvathy et al. (2013) found that many barriers are harder to overcome due to exporters' cross-border uncertainty.

Also, exporters find strong competition an issue in foreign markets and struggle to build up a brand reputation. As Cussen and Cooney (2019) suggest, these barriers are in turn affected by network barriers, as exporters struggle to build and maintain international networks, which have been found to reduce barriers (Johanson & Wiedersheim-Paul, 1975; Putniņš, 2013; Sarasvathy et al., 2013). The conclusion is most evident: Potential barriers for internationalization can be vast and many. In order to overcome these constraints, firms succeed by using a fleet of relationships and alliances, as well as more traditional expedition strategies (Crick & Spence, 2005; Freeman et al., 2006). Nevertheless, if a company ends up

binding its limited resources with a “wrong” partner, the results can be devastating. For example, without much financial slack, SMEs can be vulnerable to partners’ delays in product development or in market entry.

2.3 Alliances and Partnerships

Alliances, partnerships and general business relations cover an immense variety of issues and forms. In the literature, several widely used theoretical paradigms, i.e., research theories (Barringer & Harrison, 2000), are used to explain the motivation behind the formation of interorganizational relationships. Of these, transaction costs and the resource-based view are the most commonly referred to.

2.3.1 What is an Alliance

According to Ferreira et al. (2014), alliances are interfirm collaborative models that allow firms to create value by sharing an array of possible resources (Anand & Khanna, 2000), obtaining market influence (Koza & Lewin, 1998), learning (Vermeulen & Barkema, 2001) and accessing new markets (Harzing, 2002). When simplified, an alliance is defined as “a close, collaborative relationship between two, or more, firms with the intent of accomplishing mutually compatible goals that would be difficult for each to accomplish alone” (Street & Cameron, 2007, referring to Spekman et al., 2000, p. 37). Moreover, Gulati (1998) claims that alliances are voluntary agreements that involve the sharing and co-development of product, technologies or services.

Gravens (1997) divided business-to-business relationships into five categories: (1) outsourcing, i.e., purchase of goods or services; (2) partnerships, i.e., coordinated actions; (3) strategic alliances, i.e., formal agreements to collaborate; (4) joint ventures, i.e., shared ownership; and (5) ownership of an activity or operation by one party, as presented in Figure 7.

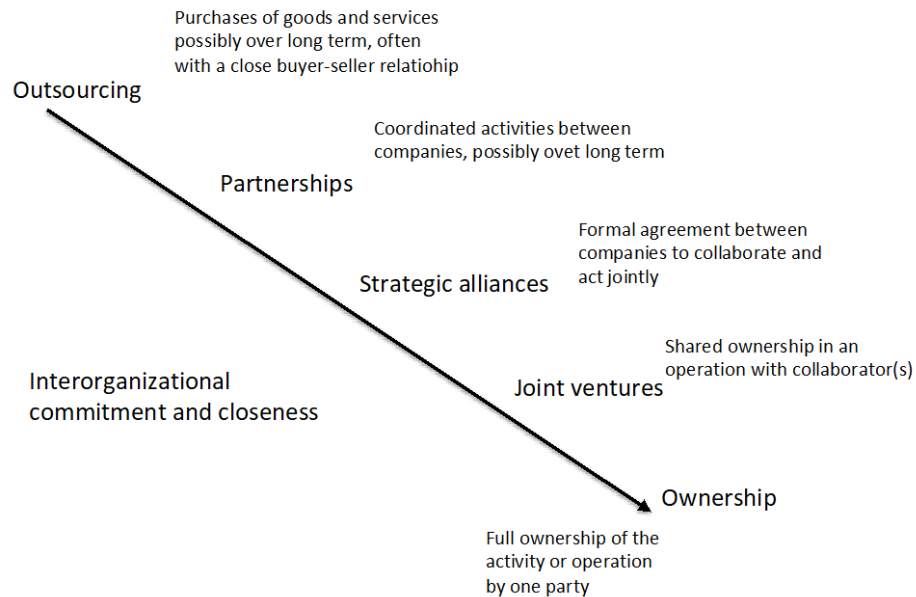


Figure 7. A Spectrum of Collaborative Relationships from Transactional to Full-Scale Vertical Integration (adopted from Gravens, 1997)

In this study, definitions for alliances and partnerships include points 1 through 3 because any of those can be fundamentally strategic for an SME. Therefore, an external business relationship is defined as a commercially oriented connection between a small business and other organizations. The words "alliance" and "partnership" share the meaning and describe meaningful business relationships. Specifically, that is the case when an interfirm alliance is widely regarded as crucial to sustain case firms' development and success as defined by Shah and Swaminathan (2008). A critical partnership should allow the achievement of competitive advantages and strategic goals that a firm alone cannot reach (Clements et al., 2007; Franco & Haase, 2015; Hanna & Walsh, 2002; Merchant & Schendel, 2000). Once the need for an alliance has been identified, the SME should carefully define the steps to follow to ensure that the alliance is formed appropriately and is balanced fairly.

2.3.2 Alliance Motives

Based on their literature search, Todeva and Knoke (2005) have identified the following motives in Table 1 to enter an alliance:

Table 1. Motives to enter an alliance (Todeva & Knoke, 2005)

1	Market seeking
2	Acquiring means of distribution
3	Gaining access to new technology, and converging technology
4	Learning & internalization of tacit, collective and embedded skills
5	Obtaining economies of scale
6	Achieving vertical integration, recreating and extending supply links
7	Diversifying into new businesses
8	Restructuring, improving performance
9	Cost sharing, pooling of resources
10	Developing products, technologies and resources
11	Risk reduction & risk diversification
12	Developing technical standards
13	Achieving competitive advantage
14	Cooperation of potential rivals, or preempting competitors
15	Complementarity of goods and services to markets
16	Co-specialization
17	Overcoming legal/regulatory barriers
18	Legitimation, bandwagon effect, following industry trends

Whatever the motives are for collaboration, companies are surrounded by a network of alliances from which they gain information, know-how and power. When a company understands the advantage of a network they are more likely to survive in the international markets (Shipilov, 2020). Furthermore, the formation of alliances can enable SMEs to act with the capacity of a large or even a multinational company in order to create and capture additional value (O'Dwyer & Gilmore, 2018). Correspondingly, research suggests that SMEs that are not successful in developing external alliances do not possess sufficient organizational capabilities to effectively compete in international markets (Cegarra-Navarro, 2005).

The effects of globalization have intensified traditional barriers to growth for SMEs. Advanced SMEs are turning to multifaceted alliances for solutions. For example, Sulej et al. (2001) claim that especially in innovative, technology-based industries, SMEs have used strategic alliances as a mechanism for growth. By doing so, companies can secure innovative capabilities to explore new ideas, undertake experimental ventures and search for untested ways to solve problems (Brouthers et al., 2015). However, a lack of certain resources may push even less

advanced companies to seek additional resources from other market participants (Hillman et al., 2009).

Nevertheless, when the effective use of alliances is viewed as important for SMEs (Rothkegel et al., 2006), the importance of developing trust and commitment within alliances, associated with effective collaborative partnerships, will be useful to them. Also, an integrated network structure may offer more opportunities than a hub-and-spoke type where companies cooperate with partners individually (Shipilov, 2020). Naturally, opportunities are only any good if the firm can utilize them.

2.3.3 Networks and International Alliances

The web of a firm's external relationships that surrounds any small and large business, whether referred to as a "strategic alliance" (e.g., Miles et al., 1999) or a "network" (for example Curran et al., 1993), is able to provide a wide variety of tangible and intangible benefits. One example of an alliance definition is "a close, collaborative relationship between two, or more, firms with the intent of accomplishing mutually compatible goals that would be difficult for each to accomplish alone" (Street & Cameron, 2007, referring to Spekman et al., 2000), whereas a network is defined "as a collection of relationships that binds a group of independent organizations together" (e.g., Street & Cameron, 2007 and Das & Teng, 2002). Alliances, supply networks, customers and competition then form together the firm's ecosystem.

In the literature, the network view takes a different perspective on (strategic) alliances. According to the network view, all firms are embedded in one or more networks in which they collaborate with others to create value, in order to service the markets (Granovetter, 1985). The network view is a process view in which dynamic changes are highlighted (Prashantham & Birkinshaw, 2015). Over time, interactions facilitate knowledge creation and transfer by lowering the barriers to combining and exchanging intellectual resources (Nahapiet & Ghoshal, 1998). Thus, a network of relationships facilitates capability learning when partners want to acquire some critical knowledge from each other and strategic behavior aimed at enhancing partners' competitive position or market power. Similarly, the literature evidence suggests that the initiation of foreign sales by new ventures is enabled by the alliance networks to which the ventures belong (e.g., Carnahan et al., 2010; Coviello & Munro, 1997). Furthermore, Oviatt and McDougall (2005) noted that network partners are not only vital for creating awareness of attractive opportunities, but they are also increasingly important for helping new ventures proceed in their learning curve and accelerate internationalization.

The exploitation of networks to expand foreign markets and penetrate international segments, and to lock in customers as an early mover, is an important objective of growth-hungry SMEs (Freeman et al., 2006). Therefore, the strategic importance of SMEs' partnerships, regardless of their form, cannot be understated.

2.3.4 Alliance Formation

Forming an alliance is a dialectic process engaging interorganizational and external networks, and acknowledgement of the social structural context (Franco & Haase, 2015). Kohtamäki et al. (2018) and Rao and Reddy (1995) suggest that alliances are formed to build and strengthen core competencies and to progress strategic goals rather than address tactical and operational concerns. Typically, alliances should lead to a reduction in market entry risk and costs, increased capacity optimization and additional economies of scale (Gulati, 1998; Osborn & Hagedoorn, 1997). Each reason to form an alliance contains specific challenges. In addition, SMEs face special challenges and features in forming and managing alliances (Franco & Haase, 2015). The nature and depth of these challenges depend, for example, on who is the initiator in the partner selection. Mitsuhashi (2002) has differentiated these alternatives and defined a proactive alliance as where the focal firm is the initiator, whereas in a reactive or passive alliance formation the focal firm is contacted by another organization.

In fact, one of the crucial criteria for success in the formation and operation of an alliance is the partner selection (Parkhe, 1993; Rumpunen, 2011). Rumpunen (2011) claims that the selection of the right partner can lead to excellent performance, whereas selecting the wrong or less suitable partner may lead to great problems both in management and operational performance. The findings of Wang and Rajagopalan (2015) reinforce the significance of careful partner selection, and that alliance design and relationship life cycle management are critical for alliance success. This is emphasized when SMEs are looking for international partners. In order to increase the likelihood of finding the best possible partner, companies can use a variety of tools. A simplified example of a relevant tool is presented in Figure 8.

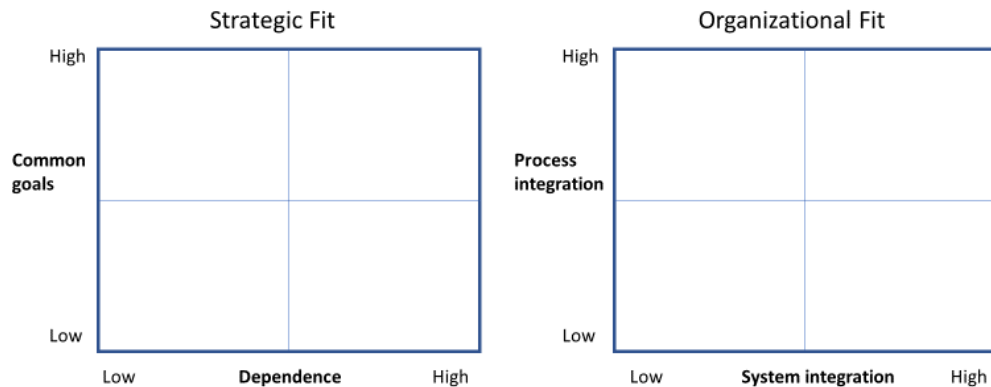


Figure 8. Basic Tools for Partner Suitability Evaluation

Several authors describe the alliance formation process as a sequence of steps (e.g., Keen & MacDonald, 2000; Kuglin, 2002; Lewis, 1990). The actual content details and the number of the steps vary but include the following elements: 1) goal; 2) alternative options for strategy; 3) identified need for an alliance; 4) establishing the needed alliance type; 5) searching and scanning opportunities; 6) choosing a partner and building an alliance. Moreover, after the need for an alliance and the type of alliance needed have been defined and the potential partner identified, the next crucial step is to construct an appropriate alliance agreement (Kuglin, 2002). Once legal documents are in place, the process is then followed by managing and further developing the alliance.

2.3.5 Alliance Management

As argued by Mayer and Salomon (2006), in order to bridge inter-partner differences and facilitate cooperation, it is feasible to opt for a suitable governance structure to organize collaborative activities (Tseng, 2016). Since an alliance brings together companies that are inevitably different in the production chain and/or downstream market coverage, it is important to agree on an appropriate governance form to deal with inevitable differences in the management practices of the partners (Tseng, 2016). In fact, there is a wide consensus on the importance of the role of management in the success of an alliance and that the governance structure of an alliance, in equity or nonequity modes, is a significant strategic choice, particularly for SMEs (Choi & Contractor, 2016; Colombo, 2003; García-Canal et al., 2014; Tseng, 2016).

Due to the complexity and diversity of the issue, previous studies proposed following conflicting governance models (Tseng, 2016). Nevertheless, if an alliance has jointly agreed on goals, partners are more likely to develop their management practices through mixtures of firm-specific material and generalized alliance knowledge in order to optimize performance and critical capabilities (Wassmer, 2010). Alliance capabilities can be classified into three segments: 1) individual alliance capabilities; 2) alliance portfolio capabilities; and 3) dyad-specific capabilities. According to Wang and Rajagopalan (2015), individual alliance capabilities refer to a firm's ability to manage the alliance life cycle with a particular emphasis on resource management throughout, while alliance portfolio capabilities refer to a firm's ability to develop and coordinate an alliance portfolio, and dyad-specific alliance capabilities refer to didactic relational capability.

The more intimate a relationship is, the more essential it is to agree on the operational means and ways. Ultimately, openness between partners increases trust and trust increases openness. Decision-making in SME alliances is largely dependent on trust. Trust is defined as the degree of confidence shared by the partners regarding each other's honesty and benevolence (Aulakh et al., 1996; Kumar et al., 1995). Alliance partners' diverse insights and potential aversion to the dependence introduced can lead to caution in building trust (Johnson et al., 1996). Also, the heterogeneity of resources available to an alliance can make productive resource integration challenging and create implementation problems (Tiwana, 2008).

Furthermore, decision-making in an alliance of SMEs depends, first, on the nature of the constituent membership of the alliance, which can be based on interpersonal relationships rather than purposive rational selection of partners, and second on the entrepreneur's personal decision-making habitus. In both of the above occurrences, confidence in perfect information for decision-making is limited. Therefore, the capture of capability integration, target setting, structural integration, knowledge creation and internationalization through a process view is essential (Kohtamäki et al., 2018; O'Dwyer & Gilmore, 2018).

2.3.6 Alliance Disruption

The longevity of an alliance is determined by the satisfaction, competence, commitment and compatibility of the parties involved and the achievement of alliance goals (Shamdasani & Sheth, 1995). An alliance success is based on the management of organizational structures and the organizational and individual learning experience (Kale et al., 2002; O'Dwyer & Gilmore, 2017). Yet, it is more than likely that one day any alliance will come to its end.

Conflicts are more likely to arise when the perceived performance of an alliance is controversial. Typically, accounting-type performance measures have the clear advantage over subjective measures of not giving rise to concerns about same-source variance, and they can also be interpreted with more confidence than subjective measures (Beamish & Lupton, 2009). On the other hand, subjective measures could be divided into measures of overall satisfaction and of achievement of partner goal/objectives (Arino, 2003; Geringer & Herbert, 1991) and thus reflect the overall alliance success or mortality.

A group of authors defines conflict as “an awareness of the parties involved of discrepancies, incompatible wishes, or irreconcilable desires” (Jehn & Mannix, 2001). Moreover, authors generally argue that conflicts, i.e., critical incidents, affect performance negatively, as they are likely to lead to misunderstandings, distrust and anxiety and so result in less than efficient integration of activities, while the effort required to unravel them may take up time needed for important decisions (Steensma & Lyles, 2000). The impact of conflicts in the development arc of an alliance is shown in Figure 9.

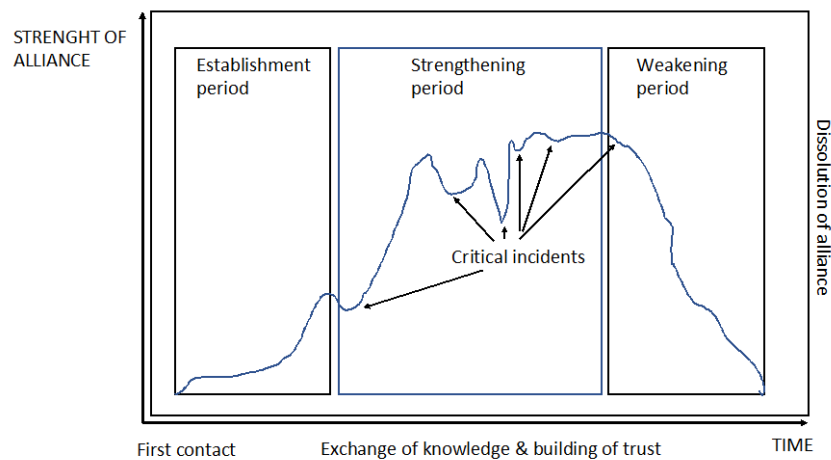


Figure 9. A Simplified Life Cycle of an Alliance (Wathen, 2015)

Many researchers see critical incidents as indicators of poor performance, which can, in some cases, lead to curtailing/closing down an alliance’s operation, thus evidencing that partners no longer see an alliance as the most appropriate organization mode (Christoffersen, 2013; Lu & Beamish, 2006). Intraorganizational conflict aligns with understanding about a partner’s function-specific challenges.

The area or function in which the alliance is formed, e.g., sales and marketing, distribution, research or production, and whether the alliance is organized as a joint venture, equity investment, consortium, licensing, partnership or an integrated supply agreement, will affect the detachment and exit procedures. The detachment can be smooth provided contractual obligations are fulfilled and good will is practiced. In the case of a supply agreement, there is probably a need for far less legal maneuvering. Nevertheless, the outcome can be devastating and thus a contingency plan could become of utmost importance. Unfortunately, however, small companies in particular may have a bias towards written, legal contracts when companies cooperate (Macaulay, 1963).

Accordingly, one way of looking at different types of alliances is whether they have been formalized in writing or not. Here, formal cooperation is defined as cooperation where a contract has been signed to make the cooperation officially legally binding. For example, Campbell and Reuer (2000) argue for the role of contracts in alliance creation and identify several important aspects of alliance agreements. These aspects are embedded in the alliance type and subject matters of the alliance. In practice, the legal document will define a certain framework for an alliance, but the actual alliance performance depends on such antecedents as bargaining power, commitment, control, trust, cooperation, cultural distance, goal compatibility and conflict resolution (Ren et al., 2009).

2.3.7 Alliance Challenges for SMEs

Every company wants to proceed from its present state to a better, desired state. However, during the voyage, firms run into challenges, some of which can be critical while some are less relevant. In order to utilize, circumvent, avoid or win these challenges, firms form alliances. Accordingly, in the previous sections it has been clearly demonstrated that SMEs fall short of a variety of resources, and thus different forms of alliances that contribute to their needs to reduce the effects of these shortages are required. The rule “Never innovate alone” is feasible advice for any small company. The same basic idea could be extended to internationalization and could read “Always get an internationalization partner.” Consequently, the selection of an alliance partner could be absolutely critical for SMEs. On the other hand, SMEs could possess strengths, e.g., a shortage of bureaucracy, that they should maintain and selfishly nourish.

Actually, a firm’s market-specific alliance may provide an essential channel for acquiring resources to underpin the fuzzy processes of innovation orientations towards business performance (Krasnikov & Jayachandran, 2008). As Silva et al. (2017) stated, a market partnership facilitates access to complementary, diverse

and original market-based resources that are necessary for new ventures to innovate successfully. Thus, it is particularly relevant for international new ventures. Moreover, maintaining a strong market partnership enables new technology ventures to build a better understanding of customer needs and market changes (Gu & Su, 2018).

Also, research has shown that international alliances differ from domestic partnerships (Sirmon & Lane, 2004), and that alliances of SMEs differ from those involving larger firms (Alvarez & Barney, 2001; Kirby & Kaiser, 2005). Creating and managing international alliances is a challenging activity for SMEs (Street & Cameron, 2007). According to Swoboda et al. (2011), international SME alliance success is defined by the partners' strategic, structural and cultural fit but can be negatively influenced by partner selection and contract problems. In particular, when an SME is teaming up with a considerably larger company, the risk of losing the independence of the resulting bureaucracy increases. Evidently, the more integrated an alliance is in its formation, the more a small company is at risk of losing its future negotiation power.

On the other hand, digitalization affects all motivational paradigms of alliances; for example, it improves efficiency and provides access to information and knowledge. Therefore, digitalization will affect a vast variety of reasons why companies enter into strategic or operational alliances and how those are managed. Indeed, in an unbalanced partnership where there is a risk that SMEs' potential benefits are offset by the costs and unfair treatment (Rothkegel et al., 2006), digitalization may provide balancing effects for opportunity utilization.

2.4 Interrelatedness of Identified Challenges

In this section, challenges, i.e., opportunities and obstacles, identified in the literature in connection with previously discussed phenomena are further discussed and supplemented. Subject matter challenges that emerged during the empirical part but were not identified in the literature are discussed in the Findings chapter only.

2.4.1 Opportunities

An opportunity is a challenge that is the outcome of exogenous phenomena such as market or technology changes (Alvarez & Barney, 2007; Shane & Venkataraman, 2000). These sudden changes lead to opportunity discoveries, because alert entrepreneurs recognize them, and they convey information about

available opportunities (Alvarez et al., 2013; Chandra et al., 2009; Chetty et al., 2018). Planning, entrepreneurial alertness and information seeking to learn about the characteristics of independent opportunities may facilitate discovery (Alvarez & Barney, 2007; Tang et al., 2012). Recognizing and utilizing opportunities is an art that entrepreneurs and entrepreneurial companies can gain an advantage from.

Understanding how opportunities are discovered, created and connected can help SMEs manage uncertainties, channel resources appropriately and avoid unnecessary failures. Although no established definitions of opportunity discovery or creation exist (Chetty et al., 2018), in this study, opportunity discovery is defined as the act or process of perceiving or finding a favorable set of circumstances to create value. An opportunity can be a foreseen one and thus planned for or an unplanned incident. Correspondingly, opportunity creation or utilization only are acts or processes of shaping or creating a feasible set of circumstances to create value.

As Chetty et al. (2018) point out, some scholars consider opportunities not to be independent of entrepreneurs but rather are created in ongoing entrepreneurial practices and interactions (Alvarez & Barney, 2010; Dew et al., 2008; Venkataraman et al., 2012). Entrepreneurs creatively experiment on contingencies, using their own and partners' skills and capabilities, both before and during an opportunity creation process (Dew et al., 2008; Read et al., 2016). According to Chetty et al. (2018), critical factors that connect opportunities include knowledge (general vs. context-specific) and resources, networking capabilities (knowledge exchange and resource adaptation) and entrepreneurial capabilities (alertness, listening, innovativeness, creativity and agility). Typically, SMEs are challenged by the scarcity and potential alternative uses of their resources (Chandra et al., 2012; Leonidou et al., 2007).

Recently, the effects of traditional business obstacles have intensified, and new opportunities and game changers have emerged. A relevant example of possible game changers is provided by digitization. Digitalization and the IOT have enabled connected systems, creating new opportunities and novel solutions for individual firms, alliances and whole ecosystems. For SMEs, working with a network of technology partners can provide keys to speedily develop new technologies to exploit such opportunities. On the other hand, digitalization affects all motivational paradigms of alliances; for example, it improves efficiency and provides access to information and knowledge.

2.4.2 Obstacles

As previously discussed, scholars have identified numerous innovation challenges that prevent organizations from innovating successfully (Szambelan et al., 2019). Some of those are internal, while some involve other organizations. As already exemplified, the following intrafirm barriers have been identified: a lack of innovation competence; a lack of resources or an unsuitable organizational structure; and market-based innovation barriers such as competitor rivalry or a missing market demand for innovation. Moreover, from a cognitive perspective, the knowledge, skills, abilities and expertise of focal factors will likely cause challenges for a small firm's innovation and internationalization pursuit. Some of these are presented in Table 2.

Table 2. Examples of Discussed Obstacles an SME May Face in its Innovation and Internationalization Actions

Innovation	Internationalization
lack of competence	management perception
lack of resources	lack of resources
unsuitable organizational structure	lack of economies of scale
market-based barriers	process or operational barriers
competitor rivalry	unknown brand
missing demand	legal barriers
focal factors	cultural barriers
	aversion to risk taking

Westhead et al. (2002) divided topics into strategic, information, process-based and functional ones of nature. Freeman et al. (2006) recognized barriers such as a lack of economies of scale, a lack of resources (financial and knowledge) and an aversion to risk taking. These definitions were supplemented by Cussen and Cooney (2019) when they examined the significance of brand identification. Moreover, the reader may recall from an earlier discussion how Leonidou (2004) defines international barriers as any barriers that hinder a firm's ability to internationalize. More specifically, he identified barriers to exports and divided them into internal and external barriers. Also, in their study on smart services, Töytäri et al. (2017) identified three categories of barriers in their study of smart services, namely internally induced barriers, organizational capability gaps and

externally induced barriers. As a conclusion, the challenges for subjects in this study have been grouped as displayed in Table 3:

Table 3. Grouping of Challenges for SMEs' growth (adapted from Töytäri et al., 2017)

Internally induced	Organizational gaps	Externally induced
Strategy	Competence and skills	Markets related
Structure	Human resources	Customer related
Management perception	Knowledge management	Competition related
Operational or process issues	Financial resources	Government
Cultural issues	Technology	Culture
Aversion to risk taking		Unbalanced sizes

Challenges, i.e., opportunities and obstacles, that emerged that were not identified in the literature review are addressed in the empirical section of the research. All recognized events and incidents of the case firms that required decisions are particularly interesting from the point of view of this study because of the importance of SMEs' decisions' "impactuation" on operations. Accordingly, changing circumstances and multifactorial interactions combined with the cognitive perspective are likely to cause differences in entrepreneurial/managerial behavior and the ability to follow a causal, an effectual or a hybrid approach (Futterer et al., 2018).

2.5 Decision-making

In this chapter, the decision-making – (1) alternative decision-making logics, i.e., causation and effectuation, (2) intuition in decision-making; and (3) the decision-making process – is discussed.

The term "decision-making" contains traces of problem formulation, problem analysis, criteria development, solution evaluation and construction, and in the end, implementation planning (Poole & Van de Ven, 2010). The traditional view of decision-making suggests that the decision is reached only through a series of stages. These stages include the identification of the "problem," and clarifying the objectives and alternatives, followed by the assessment of risks (Vershina et al., 2017). Further, such a view explains decision-making as a rational process of which

the individuals are in control (Cunningham et al., 2002; Vershinina et al., 2017). However, this does not necessarily correspond with reality, and thus an alternative, i.e., irrational, process is also present in a person's decision-making. Irrationality is explained as including conscious and unconscious acts and thoughts driven by wishes, feelings or so-called "intuition," which Kettler and Loader (2017) defined as "substantial rationality or intuitive rationality" (Vershinina et al., 2017). The ratio of rationality to irrationality in decision-making is likely affected by the seriousness of the issue.

2.5.1 Causation and Effectuation Decision-making Logics

Causation and effectuation are both behavioral and cognitive processes used by entrepreneurs in opportunity identification and venture development (Guili & Ferhane, 2018). The basic principles of causation rely on phase planning and progress, while effectuation processes are said to be more consistent with emergent strategy processes (Chandler et al., 2009; Mintzberg, 1978). Effectual logic is assumed to apply to unpredictable situations and causal logic to foreseeable ones. For example, Mintzberg (2003) argued that it is more difficult to follow predefined strategic plans in uncertain environments because, in turbulent environments, companies face unexpected barriers (Vanderstraeten et al., 2020). Accordingly, causal decision-making logic is better suited to stable environments described by certainty and predictability (Vera & Crossan, 2004). Correspondingly, in hectic operational environments, business planning becomes less effective because firms face unexpected contingencies not accounted for in predefined plans (Fisher, 2012; Mintzberg & Waters, 1985; Suikki et al., 2006; Vanderstraeten et al., 2020).

Defined as a "general theory of decision-making in uncertain situations" (Sarasvathy, 2008, p. 227) that highlights human action as the "predominant factor shaping the future" (Sarasvathy, 2008, p. 87), Sarasvathy states: "Causation processes take a particular effect as given and focus on selecting between means to create that effect. Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means" (Harms & Schiele, 2012). To stress the differences, the principal characteristics of causation and effectuation (C&E), based on Chandler et al. (2009), are presented in Table 4.

Table 4. Key Characteristics of Causation and Effectuation (Chandler et al., 2009)

Subject	Causation	Effectuation
Goals are...	Predefined	Emerging
Decision parameters include	Maximization of expected return	Affordable loss
Dealing with uncertain future through...	Business planning and competitive analysis	Precommitment and alliances
Exploitation of...	Capabilities and resources	Environmental contingencies

In spite of the differences, the literature disagrees as to whether causation and effectuation are polar opposites (Brettel et al., 2012) or just independent approaches (Perry et al., 2012; Sarasvathy, 2008). Likewise, there is no consensus as to whether the logics can be measured at opposite ends of scales (Alsos et al., 2014; Roach et al., 2016). However, often causation and effectuation have been presented as duels, and described in terms of four plus four key dimensions (Sarasvathy, 2001). First, causation practice begins with predefined project targets and derives the required means on that basis while effectuation practice emphasizes the utilization of existing means. Second, while causation logic reflects the expected returns, effectuation considers potential risks and affordable loss. Third, in a causative approach, market studies and other types of fact finding are of the essence, whereas an effectual approach requires prior commitments and contributions from other stakeholders. According to the fourth dimension, causation follows a linear process that strives to achieve the project's goal as efficiently as possible and with as few surprises as possible, while effectuation deals with unexpected events during the innovation as a vital source of opportunity (Sarasvathy, 2008).

The logic of causal decision-making is based on accurate prediction of the future and rational planning to overcome contingencies (Sun & Bisht, 2013; Wiltbank et al., 2006). The entrepreneur literature suggests that once an opportunity has been considered feasible to exploit, a causal approach will follow (Fisher, 2012). This approach is in line with the traditional management paradigm of rational decision-making, where the process starts with a comprehensive plan and justified targets. Based on the plan, the necessary means are identified and selected in order to maximize possible returns with optimum environmental constraints. The underlying logic is that managing environmental

uncertainty through prediction will reduce risks in exploiting opportunities (Roach et al., 2016).

Central to an effectual approach is that ventures do not act and operate with a predefined plan and goals, but goals emerge out of acts between a venture and its stakeholders over time (Read et al., 2010). Effectual logic is based on five foundational principles (Sarasvathy et al., 2013). First, the “bird in the hand” encourages entrepreneurs to use the resources they currently control, i.e., deploy given means to achieve a wide range of potential goals. Such means may include talents, physical equipment, intellectual property, access to markets or capital. Second, the “affordable loss” principle suggests that entrepreneurs risk no more than they are prepared to lose. Entrepreneurs, following the “affordable loss” principle, understand that in establishing a new venture and considering sweat, energy, their time, etc. to be sacrifices that are needed over time, and are possible reducing their other opportunities to prosper. Third, the “lemonade principle” suggests that entrepreneurs make the best of the unexpected. In particular, expert entrepreneurs have learned that predictability is reserved for only a few domains in business as well as in life. They realize that adaptability is a key characteristic for building successful ventures (Duening et al., 2012). Fourth, the “crazy quilt” principle encourages entrepreneurs to constantly look for people who could contribute to the company's success. Adding value can be achieved by several means and in numerous ways, e.g., expertise, capital, or access to a new network and markets. Finally, the fifth principle, “pilot in the plane,” is about control. The unique aspect of effectuation is the perceived control of the unpredictable future. Entrepreneurs who believe they can control their individual futures are primary examples of applying effectuation logic to the resources they manage. In other words, such entrepreneurs do not focus on adapting to their environment but on adapting their operational environment to them (Duening et al., 2012).

In fact, previous research has pointed out the impacts of the operational environment on the suitability of, and preference for, used logic. For example, Brews and Hunt (1999) concluded that formal planning is less suited to highly dynamic contexts due to the required flexibility to act. Moreover, the findings of Garonne et al. (2010) suggest that for innovative new ventures facing Knightian-type uncertainty, i.e., highly dynamic disruptive environments, the effectual approach is beneficial because tools for predictive strategies are more or less useless. Also, Garonne et al. (2010) indicate that effectuation has a positive effect on becoming operational for new ventures developing higher degrees of newness, whereas causation is more useful for ventures engaging in lower levels of newness and even becomes harmful at the higher end of innovation development.

In line with the above, prior studies by Wu et al. (2020) indicate that effectuation is an efficient decision-making logic for product innovation under competitive conditions. Also, case studies by Coviello and Joseph (2012) suggest that effectuation can boost innovation in firms with young technology. On the other hand, some existing research emphasizes that upfront planning proficiency may not improve the speed of new product development, particularly when the future is difficult to predict (Cankurtaran et al., 2013). Apparently, the phased emergent nature of effectuation shares characteristics of spiral approaches to innovation development. This means that instead of planning and predicting the whole process upfront, the forward actions are addressed in recurring cycles (Berends et al., 2014). On the other hand, for example, in science-based ventures the tendency is towards a causal approach, where goals are identified from the beginning and means and actions are organized around goals (Fisher, 2012). This is explained as depending on the experience of science-based entrepreneurs, who are more risk-averse and lack industry experience. For them, business planning is perceived as reducing the likelihood of venture disbanding and accelerates venture organizing activities (Fisher, 2012; Villani et al., 2018).

Nevertheless, from a cognitive perspective, the knowledge, skills, abilities and expertise of focal factors will likely cause differences in entrepreneurial behavior and in the proficiency of following a causal or an effectual approach (Futterer et al., 2018). The differences between the behaviors of entrepreneurs either having prior experience or not have been the subject of research in a variety of research settings (Harms & Schiele, 2012; Long et al., 2017; Wiltbank et al., 2009). They suggest that experienced entrepreneurs tend to apply effectuation rather than causation in their actions. However, there are also totally opposite research findings about the effect of prior entrepreneurial experience on the use of effectuation, causative or actually any other logics in business decision-making (Kurkinen, 2018).

Undoubtedly, an entrepreneur's experience is the result of their own and observed decisions made, combined with observed and understood outcomes (Nelson, 2012; Ruiz-Jiménez et al., 2020). Learning from successes and failures builds up experience, which may motivate entrepreneurs to develop action plans to boost up performance (Ruiz-Jiménez et al., 2020). Moreover, the results of Ruiz-Jiménez et al. (2020) confirm earlier studies (e.g., An et al., 2019; Cai et al., 2017) indicating that effectuation has a positive and direct influence in the context of new technology-based firms, both for expert and novice entrepreneurs. On the other hand, they conclude that causation has a positive effect on the performance of expert founders, but not of novices. These findings contradict several previous studies suggesting that novices have a tendency to follow more causal principles

while experts have a more effectual approach (e.g., Dew et al., 2009; Read & Sarasvathy, 2005).

Effectuation theory has been increasingly supplanted by causation and applied to internationalization studies of SMEs. International entrepreneurship (IE) researchers have internalized effectuation, and internationalization is considered one of the four major streams of effectuation research (Karami et al., 2019). For example, the findings of Andersson (2011) suggest that effectuation fits with early development of born-global firms because it takes into account individual, enterprise and network levels and contains a proactive entrepreneurial perspective. Likewise, effectuation has been connected with established theoretical models in international business (IB), such as the adjusted Uppsala model (e.g., Sarasvathy et al., 2013; Schweizer et al., 2010; Vahlne & Johanson, 2017), and explains the process by which firms develop international opportunities (e.g., Chetty et al., 2015; Harms & Schiele, 2012; Karami et al., 2019).

Some researchers link effectuation to an unplanned or just lucky internationalization process (e.g., Evers & O’Gorman, 2011; Galkina & Chetty, 2015), while some others link effectuation to limited resources (Frishammar & Andersson, 2009). Such differences are noted for example, by Read et al. (2016), who argue that while effectuation may be a sign of unplannedness, it can still be described as a distinct process and principles that can be applied to unplanned internationalization (Caliskan et al., 2006). Moreover, Read et al. (2016) presented an interesting idea of the applicability of both effectual and causal approaches in different conditions (Read et al., 2015). An example of this was presented by Sarasvathy et al. (2013), suggesting effectual approaches to open up and create new markets at low costs of failure, and then switching to causal approaches to help stabilize and establish leadership in those new markets.

Furthermore, Guili and Ferhane (2018) conclude that “effectuators,” contrary to “causators,” do not act alone but work together with different members of a specific network when they test new ideas or markets. However, “causators” do not act in a vacuum either but also have contacts, partners and stakeholders they work with. Several researchers, e.g., Mainela and Puhakka (2009) and Kalinic et al. (2014), have argued that effectuation has the potential to explain unintentional aspects of networking by, for example, internationalizing SMEs. However, firms that follow their well-defined plans are probably not immune to unexpected opportunities or barriers, and thus must react according to the situation at hand. This basic rule is applicable to both internal and external factors and in particular to business relationships.

One of the central claims of effectuation is that it is more likely to be used early on in the venture creation process (Sarasvathy, 2001). Accordingly, the research of Berends et al. (2014) shows that effectuation is dominant in earlier stages, while causation is more visible in later stages of innovation trajectories. In addition, they claim that small firms' effectual product innovation approach is resource-driven, stepwise and open-ended. On the other hand, several researchers have concluded that new ventures and older established firms do not face the same challenges and thus need to suit different strategies in planning, goal setting, market entry and alliances (Garonne et al., 2010; Porter, 1980). Studies (e.g., Ciavarella et al., 2004) show that entrepreneurs should become more managerial when their company has reached a certain stage in the growth arc, or face potential performance issues (Garonne et al., 2010).

Recent research on dynamics in decision-making reveals how causal and effectual logics are combined in an enterprise's strategic decision-making, rather than one logic being used exclusively (Reymen et al., 2017). Berends et al. (2014) and Reymen et al. (2015) argue that effectuation is more dominant in early phases of development, whereas causation becomes the dominant logic in later stages. For example, Ciszewska et al. (2016) showed that on the inception of a company, the decision-making logic was effectual, then changed to being mostly causal, and in the third phase when the company built its international presence the two logics were applied simultaneously.

Moreover, in Rust's (2010) study on the influence of causation versus effectuation on entrepreneurial firm survival he concluded that the occurrence of "pure" causal or effectual approaches in dynamic industries is nonexistent. Most entrepreneurs use both causation and effectuation approaches. In line with the above, Svensrud and Åsvoll (2012) claimed that even in large organizations, effectuation is not a zero-sum alternative of causation, while both may exist side by side.

Furthermore, the dominant logic may shift multiple times (Reymen et al., 2015) and both decision-making logics can coexist depending on the level of uncertainty in the market and technology (Nummela et al., 2014; Reymen et al., 2017). Previous studies on the interaction effects between causation and effectuation indicate positive results for venture performance (Smolka et al., 2016; Yu et al., 2018). However, the research of Yu et al. (2018) suggests that the interaction effect on performance is positive only when the environmental uncertainty is high, while the interaction effect is negative in circumstances of low uncertainty. Hence, they second the statement of Fisher (2012) that causation and effectuation can conflict with and/or complement each other.

Most obviously, as suggested by Sarasvathy (2001), causation and effectuation are distinct logics, but neither is universally superior to the other, and actual processes may exhibit a combination of causal and effectual reasoning. Finally, causation and effectuation strengthening empirical research on effectuation has consisted chiefly of studies of individual decisions in an experimental setting (e.g., Dew et al., 2009; Read et al. 2009; Sarasvathy, 2008). Also, the majority of, for example, new product development studies consist of cross-sectional variance research, rather than longitudinal process research (Langley, 1999; Van de Ven, 2007). Hence the temporal process approach of this study is justified.

2.5.2 Intuition in Decision-making

Khatri and Ng (2000) describe intuition as the “*smooth automatic performance of learned behavior sequences that often can short-circuit a stepwise decision-making, thus allowing an individual to know almost instantly what the best course of action is.*” Both intuitive and analytical thinking is used in the decision-making process. In the literature, the roles of tacit knowledge and intuition have received limited attention. However, some researchers (e.g., Brockman & Anthony, 1998; Langley et al., 1995) have addressed the intuitive decision-making process. According to their studies, many factors can affect decision-making that is based on intuition. These include personal values, intentions, goals, stress, fatigue and emotional factors. People’s minds tend to work to an old pattern on which decisions are easily based.

Moreover, according to Kuo (1998), the way we perceive the world from one moment to another depends on our sensing capability; one part of what we see is with our eyes, while the rest comes from inside our brain. Human vision somehow combines the information that comes from the outside with structures in our own memory. Sayegh et al. (2004) recognize that a manager’s explicit knowledge may influence her/his cognitive schema and tacit knowledge. Emotional memory may influence the manager’s sense of efficacy (i.e., sense of self-confidence) based on past successes and failures and their remembered attendant emotions. Hence, emotion may not only be seen as a contributing factor to good managerial decision-making, but it may also be an essential element in the intuitive decision-making process used when a firm faces critical incidents.

On the other hand, in the researcher’s opinion, it takes several years of experience and training for a manager to apply intuition properly. Accordingly, as Agor (1989) suggests, those who score highly intuitively on tests on such instruments as a Myers-Briggs-type indicator tend to be the most innovative in strategic planning and decision-making. Such entrepreneurs and managers are more insightful and

better at finding new ways of doing things. In business, they are the people who can sense whether a new product idea will fly in the marketplace. Such individuals may generate ingenious new solutions to old problems that may have festered for years.

2.5.3 Decision-making Process

The foundation for explaining processes is to detect patterns that are generated over time. These patterns are then supplemented by external shocks, events and incidents plus the relevant social and historical context (Poole & Van de Ven, 2010). Also, these researchers argue that the temporal order is critical to the outcome, and that explanations include complex, multilayered causation and temporal scales. In line with the above, Pettigrew (2012) concludes that while actors and actions drive processes, actions in particular are embedded in multiple levels of context and thus both the actors and context are shaping and shaped. Furthermore, this interchange is cumulative over time. This means that past proceedings are effectively shaping the coming ones. What happens, why and how it happens, and what the outcomes are depend on when it happens. Every decision an actor makes involves a series of activities and choices embedded in the operational environment, policies and organizational culture. Such chained activities and patterns are studied using process theories and/or observed through process lenses.

Process theory explains how a sequence of events leads to certain outcomes. Van de Ven et al. (1999) identified four distinct types of process theory, namely life cycle, teleological, dialectical and evolutionary models. These models could be used for partial explanation of complex phenomena. However, as Pettigrew (2012) points out, none of these meta-theories are useful for explaining the substantive problem of recognizing any generative mechanisms that cause events to happen, or the specific circumstances or contingencies behind causal mechanisms. Nevertheless, an important and widely used approach in process research is colligation, a process in which an event is explained by tracing its inherent relationships to other events (Abbott, 1992) and thus locating it in a historical context.

Moreover, often the most interesting are events and/or critical incidents requesting decisions in a sequence as turning points, conflicts or external shocks colliding with the process. No firm can avoid facing such impingements. Hence, it is crucial to understand how to unpack the critical factors of success or failure. And thus, as Sarasvathy (2001) suggested, identifying and categorizing particular decisions in particular functions facing particular challenges is of interest.

2.6 Process View

A “longitudinal” construction can best be achieved via a process approach. Process research differs from variance research in that it investigates sequences of events of activities that describe how things change over time (Van de Ven, 2007), and thus it is appropriate to this study, which aims to examine how decision-making logic related to innovation development, the forming of international strategic alliances and digital opportunities of the same develop in chronological sequences of events and incidents (Poole et al., 2000). In fact, Gomes et al. (2016) argue that by employing case studies and longitudinal designs, researchers gain in-depth knowledge of the phenomenon to track trends. A process view in case studies can explain events, enable researchers to encapsulate relevant developments over time (Chetty et al., 2018), and provide rich data about the context, complexity and behavior of the firm (Muzychenko & Liesch, 2015). The study defines the process as “a sequence of events or incidents that describe how things change over time” (Chetty et al., 2018) and why firms take certain action related to the events in question. The process contains interacting events, incidents, and activities requiring choices and decisions to be made as exemplified in Figure 10.

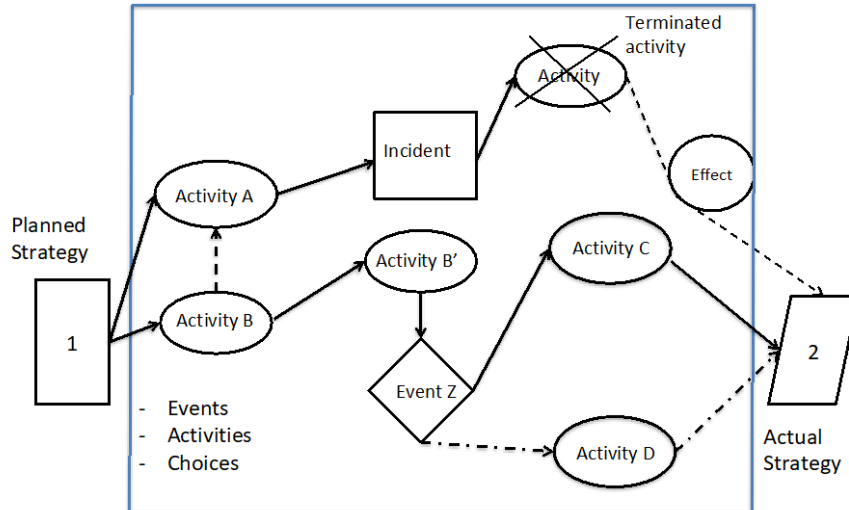


Figure 10. Visualization of the Process Theory (adapted from Fuerst, 2017)

A planned strategy triggers activities A and B. A leads to an incident that terminates the aim. Activity B leads to B', which produces an event creating two

alternative activities from which C is chosen. However, the terminated activity as well as alternative D both contribute to the actual strategy.

In the international marketing and strategies literature, various concepts are, typically, linked through linear causality (Alegre & Chiva, 2008; Molero, 1998). For example, this approach is used in the research of organizational learning, innovation and internationalization, where one concept causes another, but the latter has no effect on the former (Chiva et al., 2014). As Chiva et al. (2014) point out, authors are then taking a deterministic world view in which the universe is a chain of events following one after another according to the law of cause and effect. Such an approach may provide nice and solid theoretical solutions, but they do not mirror the real world, which is far more complex. Consequently, although a process is often described as having linear input and output stages, within the process there are a variety of cascade connections and iteration loops. Hence, given that some papers conclude that one concept affects another, and other papers find the opposite, this body of research could be considered contradictory or inconsistent (Chiva et al., 2014).

Furthermore, quite recently a new stream of research has emerged that characterizes cooperation as a process and alliances as a trajectory evolving under the influence of a series of daily interactions and events. The accumulation of these interactions determines partners' dispositions towards collaboration and thus the achievement of mutual objectives (Arslan & Arino, 2017). However, in the literature it has remained unclear whether such a process can be characterized as a chain of linear causality or of a more complex nature.

2.7 Summary and Synthesis of the Research Framework

Both new and old firms can be great sources for innovations that may contain new products and processes, or encompass, for example, new internal practices, organizational forms or access to customers. Generally, old firms' innovations are motivated by the desire to proceed from the present to a desired position, while new ventures may exist to advance someone's idea. Typically, the root causes for an innovation define the innovation type. Besides classifying innovations based on their level of radicalness, innovations are also sector- and industry-specific (Malerba, 2002; Pavitt, 1984). Industry-specific uniformities, such as technology intensity and sources of knowledge and expertise, guide several innovation dimensions and especially innovation development processes. Moreover, technological regimes guide the innovative activities in the sector (Nelson & Winter, 1982; Rilla, 2016). While the industry sector regime specifies the types of

incremental challenges companies are to solve in their innovation activities (Rilla, 2016), radical innovations may change the regimes. Hence, it is relevant to specify the type, newness and sector when innovation-related decision-making is studied.

Advances in technical innovations, manufacturing, transportation and communication developments have endorsed SMEs' and international entrepreneurs' access to global markets (Dabić et al., 2020). Hence, the innovation and internationalization of small firms are closely connected. As previously discussed, scholars have identified three international ontologies: process model, network perspective and new international venture. Reasonings for the process model were introduced by Johanson and Vahlne (1977). They showed that internationalization starts from the closest neighboring countries, and when experience is gained expansion to further markets happens in stages. The network perspective has, on the other hand, indicated that the use of networks has helped firms to skip the stage model. The ultimate challenge to the process model is a new venture that from inception seeks to enter international markets (McDougall & Oviatt, 2000). However, regardless of the internationalization method, small firms face a plethora of internal and external obstacles when entering foreign markets (Leonidou, 1995). Naturally, firms have to balance the potential benefits of foreign markets against the risks that arise from them.

In any case, internationalization is a "time-based process of entrepreneurial behavior" (Harms & Schiele, 2012), and "[i]nternational entrepreneurship is a combination of innovative, proactive and risk-seeking behavior that crosses national borders and is intended to create value in organizations" (McDougall & Oviatt, 2000). Therefore, it is not the firm's temporal internationalization process alone but also the process and preceding factors that lead to specific actions taken that should be analyzed as an international entrepreneurship (IE) process (Jones & Coviello, 2005). Also, as already noted, previous research has reported that the sophistication of the firm, for example technology being developed, influences the venture process by delaying it (Garonne et al., 2010). Thus, a start-up firm may aim for international markets from its inception but due to a temporally demanding product development stage the actual internationalization gets delayed. In this study, such enterprises are defined as "delayed international new technology ventures" (DINTVs).

Furthermore, progressive companies know that "[c]ompetition is no longer between individual firms but between alliance networks" (Brodoni, 2010). When facing global competition, the survival of any company depends on its "overall competitiveness." This again depends on the coherent actions of business networks and partnerships, which depend on the resources available. Russo &

Cesarini (2017) refer to Ireland et al. (2002), who claim that similar resources allow firms to gain economies of scale and thus exploit the existent competitive advantage whereas different complementary resources allow the gaining of economic scope and synergies, developing new resources and in the end achieving new forms of competitive advantage. For the studying of resources and characteristics that SMEs may employ to grant them competitive advantage in international markets (Dabić et al., 2020) the resource-based view (RBV) offers a solid theoretical perspective (Barney, 1991; Wernerfelt, 1984).

Moreover, as the principal idea of effectuation theory, entrepreneurs begin with three categories of “means,” namely who they are, what they know and whom they know and corresponding “means” at firm level are physical, human and organizational resources the resource-based view is relevant (Barney, 1991; Sarasvathy, 2001) for consideration when studying causation versus effectuation logics. Causation processes are excellent at exploiting knowledge and typically effect-dependent, whereas effectuation processes are good at exploiting contingencies and typically actor-dependent (Sarasvathy, 2001). Effectuation is speculated to be more general and more omnipresent than causation processes in human decision-making (Sarasvathy, 2001). When studying decision-making logics, the researcher must follow the decision process along its winding and often unexpected path through time, revamping its significant features (Poole & Van de Ven, 2010).

These processes that are shaped with continuous causality, historical and social context, intermittent causal factors, complex conjunctions and contingencies consists challenging events and incidents. Abbott (1984) proposes that an incident and an event are “distinctly” different. Abbott defines an incident as being an empirical observation whereas an event is not directly observable. Furthermore, an event would be a construct in a model that makes sense of, or captures, important incidents. Likewise, each event could include any number of incidents and indicate the occurrence of a specific event. Another definition suggests that events are when something happens that is typically unusual, whether planned or unplanned, whereas incidents are defined as “when something happens, and it interrupts something else.” However, in this study, an event is a planned thing, e.g., a new product launch or technical seminar. An incident, on the contrary, is usually unplanned. It is something that happens unexpectedly, and often there is a negative connotation. Naturally a planned event could turn out to be an incident, e.g., a demo product fails in the market launch event. Therefore, both events and incidents can be, or can become, critical for an organization and thus be defined as critical challenges.

On the other hand, challenges can be either negative, e.g. barriers or obstacles, or positive, i.e., opportunities. In each case, whether planned for or not, decisions are expected to be made. Will the opportunity be utilized, and how? How to solve the sudden obstacle? In such a situation, practiced decision-making processes are based on some logic that depends on the nature and seriousness of the situation at hand and on the decision-maker's experience, position, knowledge and even intuition. In fact, it is the opinion of the researcher that both causation and effectuation logics are complemented by intuitive ingredients. However, intuitions are less useful the more unknown factors are involved, such as new markets or new unknown partners. Hence, entrepreneurial alertness, experience, managerial know-how and fact seeking to learn about the characteristics of challenging events and incidents are needed for successful navigation whether the “market ocean is red or blue” (Kim & Mauborgne, 2004).

The three phenomena in conjunction with the decision-making logic discussed above provided the basics for developing the framework. The approach is primarily built on causation and effectuation theories through a temporal view but complemented by the theories of international new ventures and international business because zooming too narrowly to C&E could lead to the disappearance of some relevant objects. The interconnectedness of the research elements is presented in the chart of the conceptual framework in Figure 11.

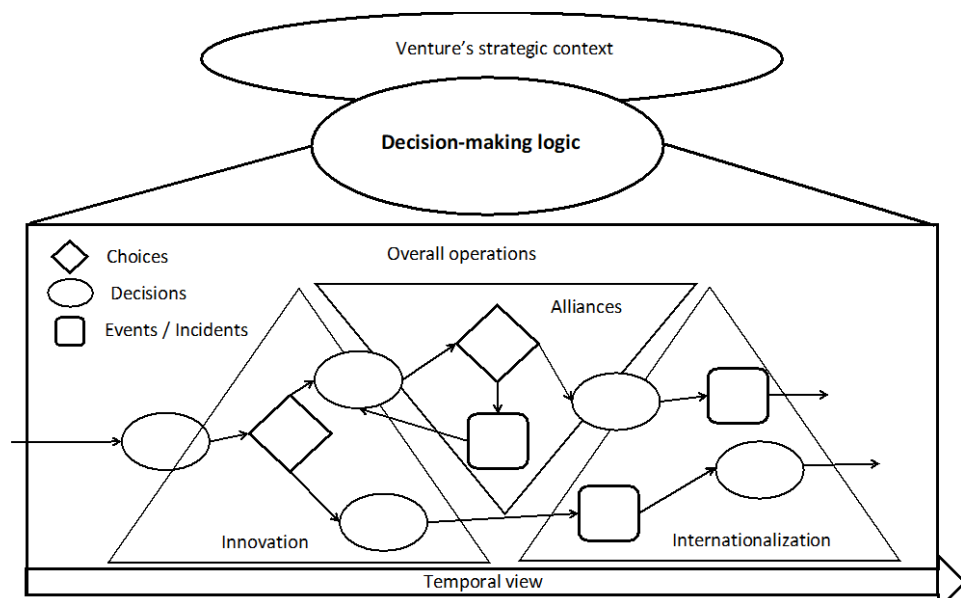


Figure 11. Interconnectedness of the Elements and the Conceptual Framework

Following the process logic innovation phase contains events and incidents which are the result of decisions and or causes for decisions to be made. The result of innovations can lead to internationalization activities subject to market conditions and resources available. Thus, the arrows in the process schema in Figure 11 illustrate the use of internal or external resources.

Moreover, the conceptual framework presented above is best explained through the following five postulates:

- 1) The strategic context plays a central role in the decision-making of a firm.
- 2) Whether implicit or explicit, a firm's decisions are the result of its own stratagem.
- 3) The decision-making logic influences, and is influenced, by the phenomenon.
- 4) The decision process is dynamic and influenced by a plethora of variables. These variables can originate from within or from outside the enterprise.
- 5) The internationalization process is a consequence of innovation and is possibly dependent on alliances.

Scholars tend to specialize in one single phenomenon only, but the actual state of knowledge requires efforts to integrate and cross-fertilize each phenomenon. For such domain crossing a multi-case study of new ventures and older SMEs provides an excellent research field. Hence, the research objects are six small energy technology companies. Answers to the RQs are searched for through challenges identified here as opportunities or obstacles.

3 RESEARCH DESIGN AND METHODOLOGY

This study has elements of explorative theory development but also of theory testing as indicated earlier and described later in detail. Two academic disciplines, IE and IB, are related and have been developed both in parallel and separately, and as integrated disciplines. Hence, the study consists of interlinked subjects that focus on the actual challenges.

As defined earlier, an abductive approach was used to address weaknesses associated with deductive and inductive approaches. Abductive reasoning requires deciding what is the most obvious conclusion that can be made from a set of data. If the chosen explanation proves to be faulty, then an alternative explanation can be processed (Dudovskiy, 2016). This is the core idea for the empirical section of the study.

3.1 Research Design and Process

The methodological choices made for the study are derived from ontological and epistemological views and the view of human nature as discussed hereunder. As noted earlier, it is the aim of this study to find out what actually happened and how it was reacted to. Because time is a distance filled with activities, existing as memories of the past, actions of the present time and projected future activities (Stayton & Mangematin, 2016), the responses are also subject to when it happened.

On the one hand, the aim is to explore and describe challenges in innovation, internationalization and related alliances, but on the other hand, the study aims to find some sort of concepts and structure that would make it feasible for employees of companies other than the case company to learn from the study.

3.1.1 Critical Incident Technique – Methodology

The critical incident technique (CIT) is a qualitative research methodology. It has a clear focus. Studies that apply this technique make use of various methods for data collection and analysis (Viergever, 2019). In business studies, the CIT has been used but in a limited way only. This is somewhat surprising because the CIT is a method that relies on a set of procedures to collect, content-analyze and classify observations of human behavior, and thus is a very useful method for detecting and studying decision-making. The CIT was first introduced to the social sciences by Flanagan (1954) over 60 years ago. Originally, Flanagan implemented a series

of studies focused on differentiating effective and ineffective work behaviors. Since its initialization, the CIT method has been used in a wide range of disciplines.

The critical incident technique is defined as a systematic, open-ended method that may be employed in a variety of ways. The method places the analysis in the context of the event. For example, interviewees may be asked to reflect on and identify a specific incident they perceive as being critical for the outcome (Allen, 2017). These events can be considered negative or positive and thus include experienced obstacles, opportunities or other identified events.

The actual critical incident process has five steps:

1. Determining and reviewing positive and negative incidents.
2. Fact finding, i.e., collecting details of a particular incident.
3. Identification of relevant issues.
4. Solving the issues.
5. Evaluation of the solution.

Researchers have described the CIT method as offering many benefits. For example, the data collected are from the interviewee's perspective and in his or her own words (Gremler, 2004). Hence, the method provides a rich source of data by allowing managers and entrepreneurs to define which incidents have been the most relevant to their firm for the phenomena being investigated. However, because the CIT is a retrospective research method, it has been criticized over issues of reliability and validity (Chell & Pittaway, 1998). Specifically, respondents' stories containing incidents can be misinterpreted or misunderstood (Gabbott & Gillian, 1996). The original CIT method is indeed based on respondents remembering the events, and it requires accurate and truthful reporting. An incident may have taken place long before the collection of the data, thus the subsequent description may lead the respondent to reinterpret the incident (Gremler, 2004). These are valid concerns also in this study. However, such concerns can be somewhat reduced by limiting the actual period of time under investigation and getting verification from other sources.

3.1.2 Applicability of CIT

“Qualitative methods, like their quantitative cousins, can be systematically evaluated only if their canons and procedures are made explicit” (Gremler, 2004;

Corbin & Strauss, 1990). The CIT as a research process fulfills such criteria. *“The CIT method has been proposed to be particularly effective when it is used in the context of new concept creation, to increase knowledge about a little-known phenomenon, or in hypotheses setting”* (Kurkinen, 2018). Also, according to Kurkinen (2018), the CIT is a competent method for research where influencing factors are challenging to specifically pinpoint and thus applicable to this study. In particular, because effectuation is still an emerging theory and that both effectuation and causal logics have had only limited exposure to comparative studies in the start-up vs. older SME context, the CIT’s process, i.e., Identify incidents -> Review incidents-> Collect facts-> Analyze data-> Determine outcomes-> Evaluate solution, provides an efficient approach.

As defined earlier, the critical incident technique in the context of this study denotes that incidents that were critical either in the innovation phase, in the internationalization phase or in a “potential” future phase of the case companies should be thoroughly described verbally by the entrepreneurs or managers in person- to-person interviews. The study defines an incident as critical when it has triggered an activity or when an incident is perceived as being critical by the interviewee. Correspondingly, critical events or incidents within the context of this study are identified as obstacles or opportunities that have had a fundamental negative or positive effect for the firm in question. Incidents related to business relations are of particular interest. Furthermore, the firm’s strategy in response to these incidents is considered to depend on practiced decision-making logic. Critical challenges should be separated from general adverse issues and other important key issues as illustrated in Figure 12.

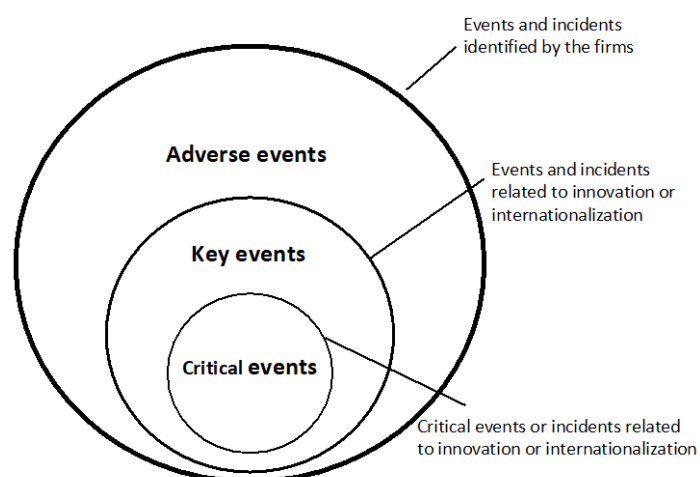


Figure 12. Description of Incidents’ Relativeness to Each Other

In order to bring the main challenges “to the surface” a think-aloud method was combined with the semi-structured interviews.

3.2 The Case Study Strategy

Case study researchers typically have two types of particular interest, namely they attempt to derive general conclusions from a limited number of cases or seek to arrive at specific conclusions because the case is of particular interest (Seppälä, 2004). The focus of this study is the latter alternative.

The empirical work started using a multiple-case study approach (Chetty et al., 2018; Eisenhardt & Graebner, 2007). Six energy technology companies were studied: namely, three Finnish energy technology start-up firms, aiming to engage in business-to-business international marketing and sales, and three older, firmly established energy technology SMEs. The study investigated (1) the unfolding of international new ventures’ growth from the innovation stage through internationalization towards future challenges and rollout within case companies’ real-life context, and (2) as far as feasible the same phenomenon of older well-established SMEs. The phenomenon qualifies as contemporary and evolving, and thus justifies the exploratory approach (Töytäri et al., 2017). The multi-case approach provides analytical benefits over a single case by enabling comparison and contrasting of the results and aiming for case-specific findings and potential general phenomena.

In light of the actual research process, the proper definition for the implementation of the case study at hand could be a version of action research or participatory research (Dudovskiy, 2018; Reason, 1988). Action research is the most demanding and far-reaching method for doing case study research. It can be defined as “an approach in which the action researcher and the client collaborate in the diagnosis of the problem or challenge and in the development of a solution based on the diagnosis” (Dudovskiy, 2018). In other words, one of the main characteristic traits of action research relates to collaboration between the researcher and a member of the case organization in order to solve identified problems.

As in many forms of qualitative research, interview data are used as a means of illustrating findings and supporting the developed theory and concept. According to Bloch (1996), in social research the language of conversation, including that of the interview, remains one of the most important tools of social analysis, a means whereby insight is gained into everyday life, as well as the social and cultural dimensions of our own environment. Interviews may take many forms: They may

be structured, unstructured, group, face-to-face or conducted over the telephone. Probably the most suitable form of interview is the face-to-face unstructured or, more realistically, semi-structured, open-ended, ethnographic, in-depth conversational interview. This was favored because it has the potential to generate rich and detailed accounts of the individual's experience.

The study draws on diverse data, including semi-structured interviews with case company representatives; in addition to interviews typically used in the CIT approach, secondary sources in the data collection process were included. These contain general information about the individuals to be interviewed, the history of their companies, core businesses and products, and main stakeholders, which can be found and thus verified from the companies' websites, industry-associated websites and other available press releases. This information was used both to prepare for the interviews and to validate the information obtained during the interviews (Cassell & Symon, 1994; Galkina & Chetty, 2015).

When feasible, the interviewing process followed a kind of think-aloud method (Sarasvathy, 2008). Entrepreneurs were asked how they solved critical events during the innovation development stage, solved or are solving problems in their internationalization stage and expect to utilize future opportunities. Interviews were flexible enough to allow the discussion to lead into areas that may not have been considered prior to the interview but which could potentially be relevant to the study.

Action research calls for active communication between the management of the case firms and the researcher. Such action research calls for a mixed approach, meaning in practice that the iterative study was going back and forth between theory and practice. The idea is that empirical experiences influence the theory, which in turn influences further empirical effects in a continuous cascade of linkages. In practice, prior interviews contributed to the planning of the next interviews.

3.2.1 The Case Selection

As previously discussed, the planned purpose of this comparative multi-case study on decision-making logic was to strengthen our knowledge on unifying and distinguishing effects specifically on start-ups' and SMEs' innovation and internationalization when dealing with suppliers and more intimate partners. Hence, in order to reduce the research cap and have information-rich companies to engage with, companies were selected using theory-based purposeful sampling (Palinkas et al., 2015). The method means that instead of totally random sampling,

the samples were selected from a group of companies that participated in a development project described hereunder.

The starting point for the selection of the case firms was to choose the industry from which the cases would be selected. This was done as part of a European Union (EU)-financed development project. In order to set boundaries for the case selection, all cases were selected from the energy sector. Besides the fact that the energy sector is an area that is characterized by rapid growth and global attention, it employs different strategies and contains a large variety of alliances. The choice of studying this sector was influenced by two main factors. First, small companies developing solutions for improved energy efficiency, reduced emissions and better process control are fundamentally important for the society. Second, case companies representing the energy industry were evaluated and identified to provide a large variety of useful data from the point of view of the study.

Initially in the spring of 2018, 140 SMEs, mainly in western Finland, were contacted and asked about their interest in joining the EU-financed development process. Out of this group of companies, 22 indicated their interest and thus were briefly interviewed. The researcher personally interviewed entrepreneurs/CEOs from eight companies, seven of which qualified for the EU project. They all represented the energy sector and were developing solutions for improved energy efficiency, reduced emissions, better process control or other innovations with good potential for success.

3.2.2 Description of the Cases

After initial interviews and in-person meetings with the CEOs of eight participating Finnish SMEs, the researcher concluded that three start-up firms and three already well-established energy technology SMEs qualified for, and agreed to participate in, this study as case companies. In Table 5, very basic information about the six companies is presented.

Table 5. Basic Information about the Case Companies

Case	Incorporated	Turnover €M /2019	Employees	Product
N1 Turbina	2009	< 0.2	3–4	Micro-turbines
N2 Pulsare	2013	< 0.2	4–5	Pressure-gain technology
N3 Lambada	2015	< 0.2	4–5	Industrial lightning
E1 Fornello	1924	1.5–2.0	14–15	Cooking technology
E2 Camino	1992	> 2.0	12–14	Modular chimneys
E3 Calore	1955	> 10.0	80–90	Heating technology

N1 is a Finnish start-up company that produces micro-turbines. It was founded in 2009, and its solutions find applications in industries, landfills and farms. N1 employs directly two or three workers and uses a few subcontractors. Developing and commercializing its innovation has been demanding and time-consuming. In fact, it took until 2019 for the firm to create a saleable product. From its inception the company has been aware that its main markets are abroad. The annual turnover in 2019 was less than €0.2M.

N2 is a Finnish start-up company that has engineered so called pressure-gain technology. It was founded in 2013 and its innovation finds applications in maritime, flight and energy industries. N2 employs four or five workers. Commercializing the innovation has been challenging because potential customers are large global multinationals that have their own established solutions. In 2019, the annual turnover was less than €0.2M.

N3 is a Finnish start-up company that designs and procures industrial lightning. It was founded in 2015 and it offers solutions for hazardous locations. N3 employs four or five workers itself and 30–50 workers as subcontractors. Commercialization of the innovation started in 2019, and in spite of Covid-19 its annual sales in 2020 approached €1M.

E1 is a family-owned Finnish SME that manufactures mobile cooking devices and other heating elements. It was founded in 1924 and its products find customers in armed forces, catering industries and households. E1 employs 14–15 workers and uses some subcontractors. In the past, the company has had some export projects, but only recently has it started planned internationalization. In 2019, the annual turnover was close to €2M.

E2 is a family-owned Finnish SME that manufactures modular chimneys. The company was founded in 1992 and its products are mainly sold to households through distributors. E2 employs 10–12 workers and uses few subcontractors. In recent years, E2 has had some cross-border deliveries, but only in 2020 did it start to study nearby foreign markets more systematically. In 2019, the turnover was about €2M.

E3 is a family-owned medium-sized Finnish company that manufactures boilers and environmental equipment. It was founded in 1955 and its products find applications, for example, in biomass heating systems. The company employs 80–90 workers. E3 is a relatively strong exporter and it has local partners in main target markets. In 2019, the annual turnover was a bit over €10M.

As supplementary foreknowledge for the reader: All of the case companies except E2 are managed by the original entrepreneurs or their direct descendants. In contrast, E2 is managed by a professional CEO, while the original entrepreneurs are active members of the company's board. Case firms' owners and/or senior managers have agreed to provide access to relevant information for this study, thus enabling the researcher to become familiar with historical and current information about firms' subject matter development stages.

3.2.3 Data Collection

The sample size matches the recommendations for exploratory research (Corbin & Strauss, 2015). Following purposive sampling as defined by Eisenhardt and Graebner (2007), the CEOs of the case companies were identified as the key interviewees. Moreover, in two start-up cases, because of the team-type of management, it was also feasible to interview other management team members. The starting point and foundation for the round of interviews were based on the literature findings, input from regional development companies and the researcher's 30 years of international management experience.

Prior to the first interview round of case companies' decision makers, subject-specific representatives of four regional development companies and of one midsize Chamber of Commerce were also interviewed. The aim was to obtain their input for the actual study, i.e., by identifying potential barriers to Finnish SMEs' internationalization.

The actual interview process was implemented in phases. In the first phase, in the fall of 2019, general information about the cases' innovation, internationalization and digitalization activities was searched for. Following that, two interviews were

conducted roughly at yearly intervals, so that the second interview round focused on innovation issues and the third interview round focused on internationalization issues.

In order to secure the continuation of “the red thread,” the following interview rounds’ contents were adapted on the basis of the previous interviews. The interviews consisted of open-ended questions, initially crafted based on the literature review, and then modified and adjusted during the research process. All interviews were planned to be conducted face-to-face. However, due to some time constraints and Covid-19 restrictions, Zoom and Teams technologies were also utilized. The transcribed data obtained from interviews were analyzed and adjusted during the research process. The interviews were coded and analyzed based on a data matrix that is in line with the theoretical models (Boeije, 2010; Sarasvathy, 2001).

All interviews were carried out before the end of 2022. Each interview lasted between 30 and 90 minutes. In total, each firm’s representatives were interviewed three to four times. The preparative round of interviews, in early 2019, was executed to get an overall “picture” of potential case companies’ innovation, internationalization and digitalization activities. Based on the results of the tentative interviews and some additional information collected from secondary sources, the participating six companies were invited to join the study.

The first round of actual interviews, implemented in the autumn of 2019, started with a precise historical account of each respondent's involvement in the company. Specific questions were asked about the involvement of other actors and their contributions to innovation, internationalization and to potentially relevant subjects.

The second round of in-depth interviews, focusing on innovation, was implemented in August–September 2020, while the third round of interviews, focusing on internationalization, took place in the fall of 2021. In Table 6 the interviewees, dates and duration of the interviews are summarized.

Table 6. Summarized Data of Interviews

Firm	Incorporated	Business area	Interviewee	Year / Duration of interview	Year / Duration of interview	Year / Duration of interview	Year / Duration of interview
N1 Turbina	2009	Micro-turbines	Founder & CEO	2019 / 15 min	2019 / 42 min	2020 / 40 min	2021 / 63 min
N2 Pulsare	2012	Pressure gain technology	Founder & CEO	2019 / 15 min		2020 / 33min	2021 / 49min
N2 Pulsare			Founder & CEO Founder & CTO R&D Manager		2019 / 48 min		
			CTO			2020 / 47 min	
N3 Lambada	2015	Special lighting	CMO	2019 / 15 min			
N3 Lambada			Founder & CFO CMO Bus. Dev. Mngr		2019 / 55 min		
			Founder & CEO			2020 / 33 min	2021 / 57 min
E1 Fornello	1925	Cooking equipment	Owner & CEO	2019 / 15 min	2019 / 49 min	2020 / 28 min	2021 / 55 min
E2 Camino	1992	Modular chimneys	CEO	2019 / 15 min	2019 / 25 min	2020 / 19 min	
E3 Calore	1955	Biomass boilers	Owner & CEO	2019 / 20 min	2019 / 138 min	2020 / 35 min	2021 / 60 min

Since observational studies should be particularly useful for studying what decision-makers actually do in different phases, e.g., in alliance formation (Andersson, 2011; Frishammar & Andersson, 2009), field-based observations formed an integral part of the research. Observations were implemented before, during and after interview sessions and during other interactions among participants. Such interactions included, for example, workshops among the case companies' representatives as part of the EU project. Another example of the researcher's contribution to case companies' operations was Canvas Business Development (CBD) forms, that the researcher worked out, based on mutual discussions, and the content of which were then iterated together with some of the case companies.

Thus, the critical decision-making points were determined by the interviewees or justified by the researcher. Decisions were driven by the uncertainty of technology, resource status, alliance interaction, changes in the market and stakeholder groups, i.e., investor interaction, all of which were in line with the dynamics defined by Reymen et al. (2015) for C&E.

3.2.4 Data Analysis

Due to the complexity and multidimensionality of the subject, a manual data analysis method was selected. The study includes comparative analysis of the responses from the companies and company groups. This study signifies the importance of decision-making along with innovation, internationalization and connected alliances while combined with enterprise orientation.

The data analysis follows abductive analysis procedures and thus the next interview contents were adapted on the basis of earlier implemented interviews. Although the literature also guided the initial analysis, the study relies on open coding and describes emerging issues based on the actual language used by the interviewees. The intention was to code actual critical events, i.e., obstacles and opportunities, decisions, activities, practices, assumptions and beliefs that impact case companies' alliance work for competitive advantage. The data analysis is illustrated in Figure 13.

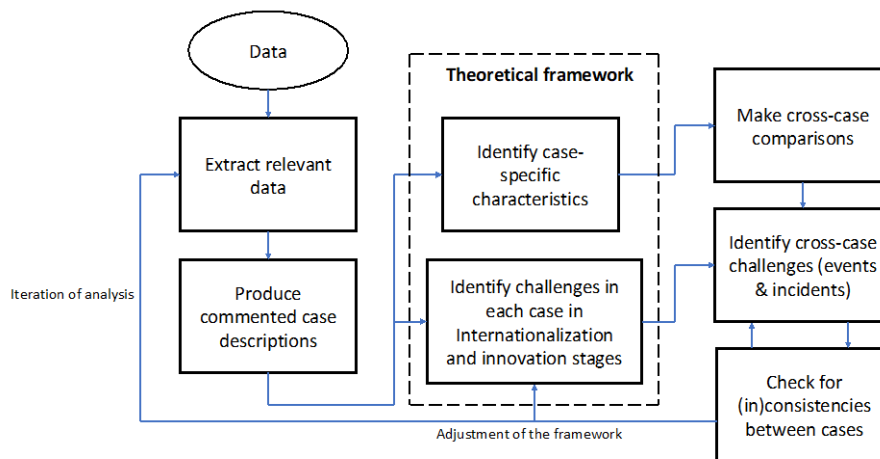


Figure 13. Data Analyzing Schema

Furthermore, empirical analysis was conducted and relationships investigated between a set of causal conditions and the outcomes. The empirical analysis reveals the role of affective and cognitive evaluations in the choice of either effectuation or causation, thereby increasing our knowledge of, for example, decision-making under pressure. Respectively, the relevant question for an SME is: How to decide how to decide? In Table 7 some examples of interpreted markers for causation and effectual logic are presented. For causation those markers are: Business planning, Exploitation of capabilities and resources and Predefined goal setting, respectively for effectuation: Work with all who contribute, Exploitation of contingencies and Affordable loss.

Table 7. Markers Used to Identify and Categorize Decision-Making Logics

Causation logic identified decision markers in <i>italic</i>	Effectuation logic verified decision markers in <i>italic</i>
Business planning	Work with all who contribute
Q: Do you have an internationalization strategy?	Q: How would you describe your innovation activities?
A: Well yes! <i>We can call it internationalization strategy, because we have a plan to do it, how to do it and what to export and...our own products abroad.</i>	A: <i>Actually we are very open and we get many suggestions from around the world. ...A kind of network has come to this, over the years we have circulated and discussed with folks, so that through that comes inquiries. Would this be possible? We have been used for sparring of ideas.</i>
Exploitation of capabilities and resources	Exploitation of contingencies
Q: How would you describe your practical innovation and development activities?	Q: Do you have partnerships with foreign firms?

Causation logic identified decision markers in italic	Effectuation logic verified decision markers in italic
A: Well, the development activity has been very active. Probably too much, the product has changed all the time. <i>I have, as boring as it sound a little restrained it because a product cannot change all the time.</i>	A: No, <i>we do not yet have actual agreements. And often we have proceeded the way that there has been a Finnish well know businessman through whom we have proceeded.</i> He has brought these options to the fore through his knowledge of an area.
Pre-defined goal setting	Affordable loss
Q: Have you made cooperation agreements?	Q: Do you consider potential risk when you consider starting a development project?
A: <i>Yes, we would have made if we had had resources.</i> Now in the spring we made an application for BF for a loan or grant, in order to make a partnership agreement with Stockholm, but it was not approved.	A: Yes, we evaluate and exactly so because this is a family company, which is in this age group. <i>So under no circumstances we would participate in such project that would endanger the existence of the whole company.</i>

Naturally, some question-answer pairs were more difficult to place in either the causation or the effectuation category and therefore the researcher had to ignore such data. Nevertheless, although the literature is not unanimous as to whether causation and effectuation are polar opposites (Alsos et al., 2014; Roach et al., 2016), this dissertation, for comparison and visualization purposes, has made a distinct effort to present the relative differences in the logics used. Accordingly, if the logics were opposites, their development could mirror each other as illustrated in Figure 14.

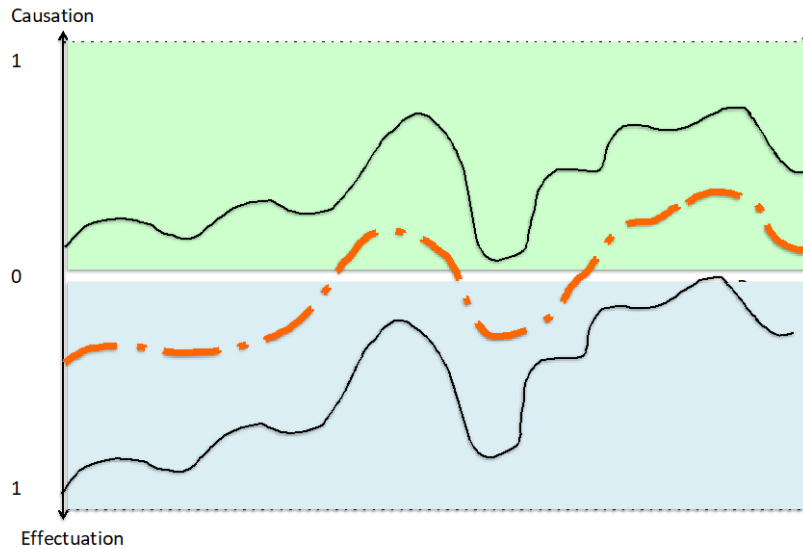


Figure 14. Theoretical Temporal Development of Decision-making Logic

Figure 14 illustrates causation and effectuation as opposites, thus when the portion of causation decreases, the portion of effectuation increases and vice versa. However, this does not mean specific opposites but rather that each decision can and often has non-polar elements of both logics. According to the example, the organization is gradually shifting from primarily effectual to causal decision-making logic (Reymen et al., 2017).

3.3 Evaluation and Validity

3.3.1 Research Ethics

The stakeholders of this study are the subject matter case companies, their owners, employees, customers, certain authorities, the researcher and finally his instructors. The most important stakeholders from the point of view of the research are the participating companies and their employees. They could be seen as the study's customers. Hence, they should be treated as such and have first-class ethical priority.

Such an approach will also serve the whole research community and build up trust between researchers and practitioners. If there is any risk of harm it has to be carefully evaluated and solved. Of course, any ethically sensitive situation must be evaluated and considered from the consequential and relevant rules point of view.

When approaching the research “customers,” the researcher needs to create trust and gain mutual confidence, which is created via actions, manners and behavior. Often the so-called “first impression” is fundamentally important, because such an impression is very difficult to change. Generally speaking, researchers should practice their opening words and invest in their appearance when approaching the field. Also, the research subjects’ and objects’ perceived behavioral control affects the terms and strategy in terms of how much attention has to be given to ethical issues. This research focuses on case companies’ decision-making in innovation and internationalization phenomena with special attention given to business relations. What kinds of ethical challenges might it face? Here are some relevant issues.

- 1) General confidentiality regarding the data received from the case companies
- 2) Information from one case that could benefit/harm another and vice versa
- 3) Access to new business ideas that could be commercially used elsewhere
- 4) Pricing-related information that would be useful for someone in the network
- 5) Potential shortages of resources that could provide opportunities for others

Frankly defined: “Cross-leveraging information and data from case sources must not harm anyone.” The ethical solution should take into consideration all groups the researcher is a member of, i.e., “industrial network partners, colleagues, customers, underwriters and sponsors.”

The company-specific narratives and analysis were sent separately to the CEOs of the respective companies for comments or requests for adjustments in September 2022. No requirements for changes have been received.

3.3.2 Validity

Case studies have been accused of being too situation-specific, and not appropriate for generalization (Seppälä, 2004). Further, Seppälä goes on to list three other weaknesses in case study research. First, case studies could be used in quasi-deductive ways. Second, case studies are sometimes merely descriptions of an event about which the readers should make their own interpretations. Third, researchers use multiple-case studies and thus claim a sort of statistical generalization. In order to avoid such problems, this study will follow the example of Seppälä (2004) as follows:

- It will go beyond mere descriptions by presenting cross-case analysis and conclusions based on findings
- It will use an abductive approach for a stronger reliance on theory compared to true induction
- It will not claim any type of statistical generalization based on the cases

There are two major ways of treating and analyzing interview responses. On the one hand, there is the realist approach, which “has high plausibility among social scientists who theorize the world in terms of the impact of objective social structures upon subjective dispositions” (Silverman, 2000, pp. 122–125). In the realist approach, it is important to have some methods by which the accuracy of the responses can be validated – for example, through observations and other relevant information (Seppälä, 2004). Finally, there is pragmatic narrativism, in which the aim is not to create a “true picture of reality” but rather to find value in the discussion and experiences of the interviewee alone and view the answers as building blocks of company stories.

As Turner et al. (2017) claim, all research methods on their own are flawed, but the shortcomings can be alleviated by combined or mixed methods. A fundamental concept in the social sciences is triangulation, which refers to the usage of multiple and different approaches in order to generate a better understanding of a given phenomenon (Burton & Obel, 2011; Turner et al., 2017). According to Turner et al. (2017), theoretical and methodological purposes are at the foundation of triangulation-based research.

Turner et al. (2017) state that in the design of triangulation-based studies, multiple research strategies are linked together to realize the theoretical purpose of the research. They suggest that there are three core processes for linking research strategies: convergent triangulation, holistic triangulation and the combination of the two. Hence, an adjusted triangulation was used to validate data and capture different dimensions of the studied phenomenon. The main point is to obtain a solid understanding from different perspectives of the investigated phenomenon.

Accordingly, the study has implemented a variety of tactics to improve the quality of the research and the trustworthiness of the findings. First, companies were selected using theory-based purposeful sampling to gain access to empirical data that would provide theoretically and contextually rich insights in terms of the focal phenomenon. Second, the study applies a number of triangulation forms (theory, researcher and data) to increase the credibility and validity of the study. In practice, the study combines effectuation and causation theories with the process

view, resource-based view and international entrepreneurship as the analytical lenses, drawing empirical insights from several key informants, and different data sources. Third, the researcher conducted frequent checks and some peer debriefings to reduce researcher bias and increase the objectivity of the study. Fourth, by providing a comprehensive set of direct interview quotations to demonstrate interpretations, the study ensures the conformability and transparency of the findings.

4 FINDINGS

In this chapter, the findings of each case company are first discussed separately and thereafter case specifics are cross-compared. Findings are dealt with in a temporal order from the inception of start-ups and, in the case of previously established companies, mainly from the takeover of the current management. Both negative, i.e., obstacles, and positive, i.e., opportunities, events and incidents are reviewed. As discussed earlier, events are considered planned and incidents unplanned points for decision-making. Relevant issues are identified by the interviewed entrepreneurs and managers and processed as defined by the CIT methodology. However, subjective evaluations of case companies' decision-making logic are based on the total primary evidence from interviews, observations and open unrecorded but registered discussions.

The paths for successful business relations in the innovation and internationalization of case companies are fragmented and varied, thus the interconnections and synergies that emerge on the surface of different areas are wide and many. Hence, the range of items included in the observation captures the entire domain of both C&E constructs. Moreover, as stated earlier, the phenomena under observation are entangled with each other and subject to the passage of time. Therefore, it's practical to present the outcomes of each case analysis in a temporal process view as illustrated in Figure 15's principal concept. The fundamental idea of the presentation form is that decisions are linked to each other and each decision may or may not contain elements of both causation and effectuation logic. So, logics are not mutually exclusive although they can be opposites. The actual concepts of the findings are discussed and presented in the overview in Chapter five.

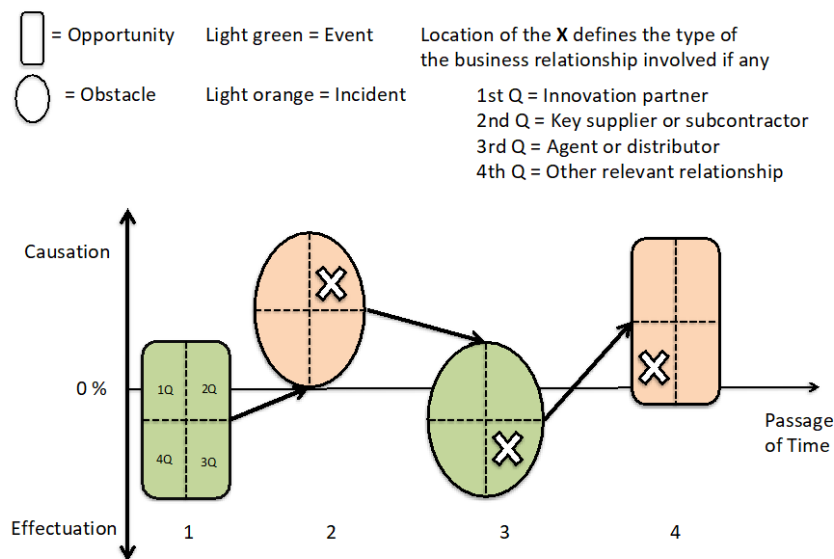


Figure 15. Example Process of a Case Firm's Identified Decision-making Points (rough idea from Reymen et al., 2017)

The analysis of the use of causation and / or effectuation logic follows the principles described by Saraswathy (2001). Moreover, in the case-specific identification of causation vs. effectuation constructs the study utilizes the work of Chandler et al. (2011), who refer to Saraswathy (2001) in their detailed definition of C&E constructs. Consequently, the causation process as described by Saraswathy (2001) and as taught in entrepreneurship textbooks is a process consisting of several stages. It begins with an environmental assessment and an analysis of long-run opportunities in the market. This is followed by the identification and analysis of target markets. Subsequently, a business plan is developed, resources are gathered, and the new venture is organized, implemented and controlled. The decision criteria for selecting an opportunity is based on the expected return of the decision. Saraswathy (2001) states that causation processes focus on the predictable aspects of an uncertain future, attempt to control the future by predicting it and are most likely to be applied in an attempt to gain market share in existing markets.

The effectuation process “takes a set of means as given and focuses on selecting between possible effects that can be created with that set of means” (Saraswathy, 2001). Chandler et al. (2007) provided some evidence that items measuring effectuation processes did not load purely into one factor. Based on this, Chandler et al. (2011) identified the following five subcomponents of effectuation in Saraswathy's (2001) seminal research : (1) experimentation is the process of trying

different approaches in the marketplace before settling on a business concept ; (2) experiments that would cost more than the entrepreneurs can afford to lose are rejected in favor of affordable experiments ; (3) flexibility – entrepreneurs following effectuation processes must be flexible enough to take advantage of contingent opportunities ; (4) the resources that entrepreneurs have access to are the starting point for effectuation processes ; (5) effectuation processes rely on the logic of control rather than the logic of prediction. Thus, getting precommitments and partnering with customers, suppliers and other strategic partners helps reduce the uncertainty associated with the possible venture. Furthermore, indications of planning first, i.e., causation, versus acting first, i.e., effectuation, are searched for recognition at any point of decision-making.

4.1 New Ventures

4.1.1 Case N1 Turbina

N1 was originally founded in 2009 by a sole proprietor still running the company as its CEO. The initial impetus for the innovation and new company came from the founder's acquaintance, who said:

“If you ever invent a power machine capable of burning biofuels, I am interested in it and will have the capital to support the progress of a firm.”

Soon after the incorporation, two more private individuals became N1 shareholders. And in the fall of 2020, the company had a dozen private owners and had started discussions with potential private equity investors. Until recently, the board of directors consisted of some of the owners. In addition to the official board, N1 has had an informal advisory board with a few high-level business professionals.

N1 is located in a remote industrial area of a small Finnish inland town. The firm shares a rather old industrial workshop building with other tenants. However, there are no visible synergies with the other tenants. The office consists of two separate rooms and a boardroom attached to a rather large workshop space, which is large enough for volume production activities. As such, the location and operations illustrate the principal entrepreneur's background and the initial strategy of the company to become an equipment manufacturer. N1's core innovation is an extremely high-speed micro-turbine that can utilize a large variety of fuels, and in particular biofuels such as landfill gas. Hence, potential end-users

are cities and other public actors for whom actual suppliers could be, for example, energy engineering companies and constructors.

The company is a solid example of a DINTV. Up until 2019, the company had spent 10 years in its main activity of product development. Hence, 2019 was the year of the product launch and the very first year the company gained some turnover. Expectations for 2020 indicated strong growth, but Covid-19 ruined those expectations. For example, an order from a French multinational was put on hold due to their Baltic end user's decision to cancel all joint development actions. Luckily a domestic replacement application for the already manufactured micro-turbine was found.

All in all, the study identified six decision-making required critical events or incidents that N1 faced between 2009 and 2021. Naturally, the first event was the initial foundation of the company. The second took place in 2012 when an innovation partner "dropped its gloves" and withdrew from their joint project. Then, in 2018, N1 got its first full-scale prototype up and running and soon after signed an agreement with a French multinational for a joint delivery project to Lithuania. However, in 2020, due to the coronavirus pandemic, the project was put on hold. Furthermore, in 2021, N1 got an opportunity to fundamentally change its strategy from an equipment manufacturer to an energy provider. As a matter of fact, recognition and utilization of opportunities have proven to be of utmost importance for N1.

The foundation of the firm was the first and strongest indication of utilizing an opportunity. The entrepreneur did not have a plan to establish a new business but took up the challenge when an opportunity emerged. Hence, typical characteristics of an effectual decision-making logic such as act first, means orientation and contingency exploitation were dominant. The entrepreneur wanted to control the future and did not bother to predict it. However, the future proved to be very challenging. In this context, innovation and internationalization, as well as other alliance-specific critical events and incidents, are addressed in the following sections.

4.1.1.1 N1 Innovation Occurrence

Using the innovation specification of the OECD, N1's existence is built on a semi-radical technical innovation. However, future success may rely on a nontechnological innovation, namely a new business process. Until 2019, N1 did not have any specific innovation strategy but was focused on one technical product only. However, N1 had identified several ideas for potential spinoffs. During the

initial technical product innovation phase the company collaborated with several partners. Often the most difficult challenge was to find the right suppliers for key components, or even a network of suppliers.

N1 knew that for their biggest technical challenge they did not have the needed know-how in-house. Hence, during the first years of the technical innovation development, N1 collaborated with a technical university and a small motor company (MC), which operated at the same university campus. Cooperation among the three parties started smoothly and exchange of information was rapid and open. Unfortunately, there were some big egos involved, which could be described by using the well-known saying: "We've never done it that way, we've always done it this way." Hence progress was delayed. As N1's CEO concludes:

"Maybe we listened to these people too much when we should have proceeded according to the original plan."

In any case, after three years of close collaboration without a breakthrough, MC concluded that they could not achieve the set goal and were running out of financial resources. Therefore, MC wanted to abort from the collaboration. Thus, N1 was facing a major critical incident, which really came as a surprise. How did N1 react? In the words of the CEO:

"The board made a plan for what would be done. It was a critical moment for us – to continue or not, because then no other partner was known to have the needed know-how. The development work had gone too far to be canceled. We were close but had not quite crossed the border. The board felt afterwards that I had been very optimistic about it. But in a way, I knew that we could do it, we had the know-how."

Hence, after serious consideration, N1 decided to proceed and take the whole development work in their own hands. As a result of the decision, it took N1 only five additional months to get the first pilot plant running at the desired revolution speed. This decision-making characterized the goal orientation, control of the future, partners and N1's own means.

One of the fundamental ideas of N1 during the development phase had been openness. This policy opened up many domestic and international contacts through which N1 built a network of partners. This network became handy when N1 had to take the whole development process under their own control and find substitutes for MC and its sub-suppliers. The following three years were dedicated to development work with selected partners and business associates. And then the

next potential crisis emerged in 2018 when the first full-scale pilot had been running for one year. The CEO's description of the situation was as follows:

“A lot of money had been spent, but there were no sales. The owners were losing their faith. N1 had entered the valley of death. We knew that no sales would take place without resources. That is the situation we were in. We were looking for markets... this was clear... a pilot project for landfill gas application.”

At the end, enough multilateral trust still existed and monetary resources were secured for continuous operations. Obviously, owners did not want to lose their investments and still hoped, one day, to gain some returns.

4.1.1.2 N1 Internationalization Occurrence

The literature suggests that reasons for internationalization are growth, managers' previous international experience, a unique product or technology, and a limited domestic market. In the case of N1, the CEO put it this way:

“The domestic market is really, really small when it comes to global potential. But equally, the domestic market is really important to us in terms of credibility and evidence.”

Hence, N1 aimed for solid references in Finland prior to any cross-border sales.

The Uppsala model suggests that exporting happens in stages and that this staged approach reduces the risks and barriers associated with exporting. This phased approach contains four stages, namely: no regular export activities; exporting via an independent representative or agent; sales subsidiaries production/manufacturing (Cussen & Cooney, 2019). Although more and more companies no longer follow the step-by-step patterns of internationalization, N1 was aiming for such a staged approach. During the innovation development stage, N1 had made some loose connections with agents and some distributors in Scandinavia, Baltic countries and Russia. Thereafter, N1 would take their actions towards central Europe and later through licensing to North America and China. However, no signed distribution, agent or license agreement existed at the end of 2020. Consequently, the sales marketing was done as the CEO described it:

“We don't have a salesperson who does footwork. But then again, the owners have taken on the responsibility and we have a lot of owners who are active, touring around the world, so that whenever they see the potential, they bring out this company and marketing has been done that way. Also, in certain areas, well-known Finnish businessmen have been of assistance.”

Strong evidence may suggest that the use of networks may speed up ventures' internationalization. However, start-ups that are aiming for the global markets may still choose to proceed quite slowly. Respectively, although N1's owners and key personnel were strongly networked, N1 had chosen a step-by-step exporting approach as an entry mode when accessing international markets, as it does not require any major investment. The end result of not investing was obvious – slow progress in market entry. However, N1 was open to an international alliance when an opportunity emerged in the form of a French multinational (FM). The CEO described the opportunity and its consequences:

“Yeah, the actual internationalization started for us through cooperation with FM. Not really until then had we searched here in the domestic market for potential targets for various turbine applications. We were found by FM, a big French company, through their Lithuanian office. We were contacted and they wanted to come and inspect our machines. That was really the point. Of course, we have been doing internationalization, e.g., participating at various trade fairs, but nothing concrete had come out of those.”

“That MF cooperation brought us the potential of the landfill gas market. We hadn't realized it at that point. And we conducted our own surveys and found that there are more than 500,000 landfills in Europe that produce methane emissions. Then, through the cooperation, it also became clear that our power plant was running on lean gases, that energy could be produced in those landfills, and thus it was a working potential for us.”

It is significant that FM found N1 and not the other way around. With some other large companies that N1 had contacted in search of collaboration the answer had been: “You seem to have some interesting technology. Show us some references and then we can talk more.” With FM it was different, and although they had some concerns about the small size of N1, they respected the potential of N1's technology and were ready to work together as partners. The concrete outcome was that FM placed an order for a micro-turbine power plant to be delivered to Lithuania. During the manufacturing period, the parties learned more from each other and discussed how to continue collaboration once the first installation was up and running and could be used as a reference. For N1, starting the collaboration was a no-brainer; the potential benefits did not need much investigation and decisions to act were made fast.

Then Covid-19 struck. The end-user in Lithuania did not want to proceed and FM had to put the project on hold. FM still wanted to collaborate, but nothing could be done to turn that decision around. Hence, N1 had to find an alternative location for the landfill application. Luckily a suitable domestic location was found, and the

power plant was successfully assembled and commissioned. However, the plant as proof of concept remained on N1's balance sheet and thus did not help the firm's financial situation. Moreover, the delay of the joint project was not the only negative outcome of Covid. The CEO described the situation in a nutshell:

“Well, Covid changed everything. It kind of stopped us, in that there were no longer any messages, the phone did not ring. Covid came here and it hurt. That's how it went.”

There is doubt that Covid was an incident that caused a lot of damage. However, N1 kept on fine-tuning its technology, keeping in touch with some potential customers, working with FM on a potential new application and trying to engage new investors.

4.1.1.3 Other Pertinent N1 Occurrences

In 2020 and early 2021, N1 had contacted several potential investors but none had committed to an investment in N1. The situation was quite typical. Potential investors wanted a certain company valuation, existing shareholders wanted to maintain their own portion of ownership. Financing solutions did not progress. N1 was kept hanging. Then in the spring of 2021, the CEO got a phone call from one of the biggest private equity investors in Finland. That phone call led to a meeting with a foreign banking professional. His visit initiated a major turnaround. While N1 was facing the ultimate risk of discontinuation, it ended up changing its whole business concept from an equipment manufacturer to an energy provider. With this change, investor interest in N1 improved significantly. Excerpts from the CEO's interview described the change in September 2021 as follows:

“Annual General Meeting immediately, Extraordinary General Meeting, change in strategy, change in earnings model.”

“We were sent to hone such an internationalization strategy that we are an energy company. And the technology we developed only works as a commodity in it.”

“How did it continue? A plan was quickly drawn up by the new board. We knew that a huge amount of investigation was needed and we had to buy external services.”

“With the current chairman of the board, we worked for a week and we had funding secured.”

N1 had faced an incident in the form of a great new opportunity and decided quickly to utilize it. Not all existing stakeholders unreservedly supported the change, but that did not slow down the actions taken. The old strategy was scrapped, and new plans were defined and implemented rapidly. Clearly access to strategic business knowledge made the change feasible and convinced the shareholders of a new “blue ocean strategy.” The speed of securing funding showed that investors trusted N1 to have the capabilities needed to gain a solid competitive advantage. Again, the company was ready to exploit contingencies and control its future.

4.1.1.4 N1 Relationships Dependency

Domestic markets for N1 exist but offer limited potential only. The company did engage with a multinational partner that would provide them with access to the markets of several countries. N1 would also gain access to additional technical resources and complementary knowledge. A fundamental advantage would also be that a big partner has a signaling effect and thus attracts potential new partners and customers (e.g., Guahua et al., 2020). N1’s new strategy could potentially distance it from FM, in particular because the emerging collaboration was targeting landfill applications. However, both parties have indicated their interest in continuing their collaboration. Their new joint interest is in biogas applications. As N1’s CEO defines the situation:

“FM has a shocking number of subsidiaries. I don’t know how many there are. There is a local company in every country, which is known, and thus there are those local interpersonal relationships. They have a lot of power plants out there, for example on the biogas side. Then there is the opportunity to get easily to the landfill side as well. Of course, there is good support for that, and now we are thinking about the earnings model. How to move forward through cooperation?”

Also, on the supply side, N1 will still be dependent on its supplier network and other business partners. N1 has two or three foreign suppliers of critical components. The main suppliers are turbine component manufacturers in England. Respectively, for example, electrical design providers are domestic. Typically, the firm has found new domestic partners within or through its expanding network. For foreign contacts, Google has been of great help, although recommendations of some acquaintances and known references have played an important role. In case of significant problems with any of the suppliers, N1 had identified sources for substitutes. This is of utmost importance. In fact, the more power plants N1 sets up, the more critical the performance of the supply network becomes.

4.1.1.5 Decision-making Logic of N1

The key decision-maker is the founder and CEO of N1. He is an engineer in his forties. Until mid-2021, the firm's board consisted mainly of some local businessmen who had invested in the company. Due to the change in the business model, and the extended ownership, the board was also renewed. These changes are expected to introduce major changes to the firm's operations. The board meets frequently and is in close collaboration with the main owners. In addition to planning and advancing the new business model, the board formed a separate development team that was mandated to use external expertise whenever needed. All in all, the CEO describes N1's decision-making style as conversational.

This study identified five significant events or incidents (CIT) that either provided opportunities or impeded the functioning of N1 and thus required significant decisions. These were:

(1) Inception of N1

N1 was born to create a new product that differs from those already in the market. At the beginning there was not much planning but a lot of action. Actions were based on the means available and existing acquaintances of the entrepreneur. Clearly his aim was to exploit a contingency, and this was made possible by his business partner's financial support. Hence, main elements at this decision-making point strongly refer to effectuation logic.

(2) Partner failure

N1 partner's failure to fulfill its obligations led to a situation where N1 had to decide how to continue. One alternative considered was to terminate the development work. However, due to the time and money invested and the options available, the board took a decision to continue and enlarge the share of N1's own innovation work. Prior to the decision, some planning was done, but the outcome relied on available means to achieve a goal and the desire to control the future. Thus, this decision-making point contained elements of both causation and effectuation logic, the latter of which was somewhat dominant.

(3) First international order

Like many start-ups, N1 was also facing financial challenges. Although no actual innovation and internationalization schedule existed, the product development took much longer than intuitively anticipated. In fact, it took exceptionally long for N1 to have a marketable product. Therefore, the receipt of income was also delayed. Key resources were harnessed in technical development. Evidently, part

of the challenge was that N1 did not have any dedicated marketing or sales force. Marketing equated to the company's home pages and side activities of some of the board members. Then, more or less by pure luck, N1 was found by a multinational company looking for a micro-turbine manufacturer. The initial contact led to a commercial order and discussions of a joint business development. The decision to start cooperation was a no-brainer. N1 grabbed the opportunity and aimed to exploit the contingency. Hence, at this decision point effectuation logic was dominant.

(4) Continuing in spite of financial challenges

Before the delivery of the first (international) commercial agreement took place, the world was struck by the Covid pandemic. The deal was put on hold and once again N1 was facing a cash crisis. N1 was really facing the valley of death, as the CEO put it. The solution was to keep going and search for a new site for the canceled turbine. Luckily, a suitable new site was found but for the technical proof of concept only as the equipment stayed on N1's balance sheet and thus there was still no improved cash flow. After careful consideration, N1's board and owners decided to continue the operations but also mandated the CEO to search for new investors. All potential partnerships were activated as the limits for existing owners' affordable losses were approaching. This decision point was indistinct and evidently represented a mixture of decision-making logics, intuition and deliberation. Yet the goal was firm, new money was needed and thus plans were made.

(5 & 6) New business strategy

Covid created an obstruction for sales but also reduced any internal resistance to new ideas and opportunities. Through his contacts, the CEO was introduced to a foreign business development professional. An appointment was arranged and the outcome was that N1 changed its strategy from an equipment manufacturer to an energy company. Due to this change, the business professional and his acquaintances invested in N1. Furthermore, some domestic investors that had hesitated about coming on board indicated their renewed interest and now wanted to invest, only to learn that the opportunity had shrunk. N1's phone started to ring again.

A change in strategy led to a diluted ownership and some new board members. According to the CEO, the old board had from time to time discussed possible changes in the strategy, but a certain creed or risk avoidance among the owners had prevented progress. Some of the long-time owners still resisted the changes, but the majority had matured and were ready for a major turnaround. The decision

to change the strategy relied on a contingency exploitation in a situation where other options hardly existed. The new board mandated markets to be studied, plans to be made and thus goals to be specified. Decisions made thereafter have been firmly of the causation type.

4.1.1.6 N1 Summary

The initial innovation idea emerged in 2008, a new company was founded in 2009 and the product became marketable in 2019. As the CEO confirmed, the firm's main challenges during that time period were of a technical nature. Moreover, even if the firm did have some tentative plans for commercialization and stage-based internationalization, the actual actions in terms of marketing were dismal. On the other hand, N1 had identified the need for local partners and the CEO acknowledged in 2019 that finding the right partners was the company's biggest challenge. His wish was to partner with a large European power machine supplier. Therefore, as such a company approached N1, the situation was favorable for the initiation of cooperation.

Indeed, N1's success relied on partnerships on many fronts. Private shareholders and investors were particularly patient and thus secured the continuation. A certain consensus was present. In fact, no major disagreements occurred before the main change in the business. However, without the change in strategy the company was heading towards failure as the already unattended sales and marketing were hit by Covid-19.

At the beginning of operations, N1's decision-making mostly had elements of effectuation logic. Although, over the years, N1 produced several plans on various issues, no other clearly communicated goals except getting a marketable product were defined. This changed as part of the strategy change and enlarged ownership. One can draw the conclusion that the firm's age alone had little impact on the dominant decision-making logic. The firm's ability to control or manage its partners during the innovation phase was rather weak and probably not affected by the decision-making logic per se.

According to the CEO, N1 had a basic plan for internationalization. However, it was only carried out superficially. There was no evidence of solid goal setting, nor solid plans for internationalization actions, yet the company was ready for international collaboration when an opportunity emerged. It was evident that N1 suffered from a specific resource gap that was challenging to fill. As the resource-based view (RBV) suggests, firms possess bundles of capabilities and resources that they combine in specific ways to generate the required performance (Barney,

1991). This applies to both small and large firms. The multinational company needed supplementary resources, searched for such and found N1. Would such a matching partner have been found earlier if N1 itself had searched for it more systematically? The study analyzed six decision-making matters of N1 Turbina.

4.1.2 Case N2 Pulsare

N2 was founded in 2013 by two technology experts who later became entrepreneurs and were joined by a third shareholder. In 2020, these three ran the firm as its CEO, chief technology officer (CTO) and chairman of the board (COB). The company was born when one of the experts had an “idea.” He then contacted a well-known university professor, through whom the other technology expert came on board. At the beginning of 2021, the company had some 40 private owners. N2 is located in Helsinki, the capital of Finland. As the company’s innovation is not a physical product it does not need production facilities, although the office is located in an old industrial complex. The building has been partly modified for office use. Nevertheless, finding the right door and the right floor in the complex can be somewhat time-consuming. N2’s office is on the fifth floor and consists of two small rooms. One is reserved for the CEO, and it also functions as the meeting room. Another three employees occupy the other room. It would probably not be a good idea to invite potential customers to these premises.

The customer needs that N2’s innovation aims to address are the emission reduction targets set by the authorities, primarily CO₂ emissions. A by-product will be a reduction in fuel consumption, which is another driving force for commercialization. Potentially N2’s technology can alter the course and direction of global warming. N2’s product innovation itself is intangible but its utilization is strongly tied to engines and turbines. The firm’s strength is in engineering. The innovation could fundamentally change the construction and performance of some broadly used energy equipment and processes. However, its sales and marketing have proven to be a major challenge. The actual commercialization strategy has fluctuated, indicating difficulties, and has also created some tension between the two founders. However, both founders are experienced engineering professionals in their sixties and have certainly learned to cope with some frustration. Moreover, the chairman of the board fits in the same category.

The complex challenges N2 has solved are related to pulsed deflagration combustion (PGC) technology. The PGC system delivers a clean, low-emission burn that can handle a variety of conventional as well as renewable fuels, including hydrogen and alcohol with water content. Such technology was originally introduced in the 1920s but was then “forgotten,” because the challenges involved

could not be resolved. Thereafter, over the years, many small, large, scientific and hands-on organizations have tried to solve the technical puzzle without success. In 2015, N2 invested in a pilot plant. It has allowed the company to test their ideas, enabled applications for several patents and just recently, in 2020, provided data for a published academic paper.

Based on sophisticated technical simulations, the new company wanted to develop a micro-turbine that utilizes pressure-gain technology. However, during the active development work, entrepreneurs learned that their innovation could also be utilized in large turbines. This changed the course of the entrepreneurs' thinking. Hence, the firm started to contact large international turbine manufacturers. Because such companies have heavy and in-depth integrated engineering and production processes, radical design changes would be subject to serious moments of inertia and thus investing in a revolutionary new design would be very costly. N2 is now well aware of not only the technical but also the commercial challenges caused by the inertia of change. Solving the latter was strongly influenced by Covid-19, as it prevented physical customer visits and reduced visits from potential customers to Finland.

4.1.2.1 N2 Innovation Occurrence

The literature suggests that technological innovation involves an entrepreneur dealing with business constraints or future uncertainty by exploring new opportunities instead of merely exploiting current strengths (Menguc & Auh, 2006). Although N2's innovation does not directly master the implementation of the design and production of goods, it is technical in nature. Furthermore, N2's innovation can be defined as radical as it offers a radical solution to a challenging global environmental problem. In fact, the innovation would potentially disrupt its users' production processes and end-user energy consumption practices, i.e., by increasing flexible usage of fuels. The firm's innovation capability is based on the skills and knowledge of its founders and the firm's access to other resources.

As pointed out in the literature review chapter, a plethora of risks associated with technological innovation can lead to market failures (Su et al., 2013), indicating that small manufacturing companies should also consider how to successfully transfer technological results into market practice (Gu & Su, 2018; Pandya, 2012). The findings of case N2 do suggest that its innovation development and market approach are closely intertwined.

Initially, as discussed, N2's strategy was to develop micro-turbines because entrepreneurs thought their technology would be best suited for them. However,

as they learned that it works just as well, if not better, in large turbines, the strategy was changed. For this reason, N2 began to focus on working with multinational turbine manufacturers and focusing on combustion chamber technology. Since then, the firm has contacted several potential partners and presented their innovation in technical seminars to foreign research organizations and in person, for example to some representatives of the National Aeronautics and Space Administration (NASA). The feedback has been positive and often overwhelming; nevertheless, finding a solid industrial partner has proven to be demanding and frustrating. Typically, potential customers have shown interest but not been willing to commit to actual collaboration. In fact, the small size of N2 has slowed down potential customers' interest. Evidently, due to N2's shortage of financial resources, some potential academic research partners have remained passive as well. The CFO put his frustration on the subject into words:

"The further you go, the more expensive it becomes. At least I have had the view that we should have stepped up and got the money mobilized, but there has been no trust in this in Finland. So this innovation is too exotic in Finland, because there is no gas turbine manufacturer in Finland, let alone some special solution for gas turbine technology."

Therefore, N2's financial situation, the nature of the technical innovation and the revised strategy to focus on large turbines do require N2 to find a partner who would integrate PCG into their own technical solutions. N2 would then be dovetailed into the development as an engineering know-how partner. Both entrepreneurs stressed that N2 has a justifiable idea for the division of work but any progress with a potential large partner seemed to encounter moments of inertia. Despite the challenges, N2 had succeeded in making some breakthroughs with one vast multinational airplane engine manufacturer and with one medium-sized European industrial turbine manufacturer. The former even placed an order for some engineering work and thus provided N2 with some cash flow. For the sake of clarity, this research defines these potential successes as events.

Unfortunately, both engagements ended before marriage. First, the engine manufacturer left the collaboration. N2 is not aware of the exact milestone or reasons for the end of the cooperation, as it kind of just faded. Reasons could only be speculated and would not contribute to this study. The collaboration with the industrial turbine manufacturer lasted longer and maintained N2's hope for a deeper partnership. Eventually, however, this potential relationship also faded. With these two, and with a few other hints of collaboration, N2 may have lacked a saleable concept. As a result, due to apparent inertia in finding a technology

partner, N2 changed its strategy again with the goal of designing and acquiring a micro-turbine for 250 kW of electrical capacity.

And then N2 took part in a competition organized by Shell for the best possible new energy solutions. N2 won the race for second best by a large margin. This success led to an actual development project with Shell. The project was a success and Shell committed to the second phase of the project. At the beginning of 2022, N2 was looking for ways to match Shell's financial commitment.

4.1.2.2 N2 Internationalization Occurrence

As Wainstein and Bumpus (2016) suggest, when commercializing new technologies originating from innovation activities, new small ventures should implement market-oriented innovative strategies that explore new approaches to markets. Hence, the findings of case N2 offer a serious case in point. Accordingly, despite the fact that British, Italian, American, French and German companies have been interested in N2's technology, the biggest challenge for the firm has been sales, or the lack of it, as pointed out by the CTO:

“So yes, I would assume that sales are an important development target. We are completely neglected in sales. Sales are at least one such clear development target, of course it is extremely challenging that when .. So sales means getting contracts where we then deliver that information to the customer as a service.”

The lack of sales has been in conjunction with another major challenge for N2, namely its strategic bias between two potentially good but totally different businesses. Potential customers for micro-turbines are large multinationals as well as small operators. Applications are found in industries, landfills and farms. Typically, these customers would buy equipment, or at least tangible products, whereas another customer group, manufacturers of large industrial turbines, would, at best, buy technical know-how. Servicing both industries simultaneously may not have been an option but selecting one only has been difficult as well. In both strategic options, N2's internationalization and innovation successes are closely connected. The main markets for micro-turbines are abroad, and practically all large turbine manufacturers are foreign multinationals. Consequently, when it comes to the internationalization of N2, the CEO describes the effect of the strategic change from a turbine manufacturer to an engineering know-how provider:

“In a way, it didn't change much in that internationality issue; if we had become a micro-turbine manufacturer, then it would also have been worth moving immediately beyond Finland.”

When focusing on the engineering know-how business potential, customers are large foreign companies. Selling high-tech know-how is a very demanding, consulting type of activity. Success in such business-to-business sales requires direct contacts and N2 has sought to establish contacts with potential customers. When needed and feasible, N2 has used middlemen for creating contacts. Hence, practical internationalization began when N2 started to contact potential customers/partners. As the CEO put it:

“Well, in a way, it can't be said to be or is said to be so ... it's because that premise was ... So we're an international company right from the beginning. Actual internationalization could be thought to have started when we got in touch with several gas turbine manufacturers and then, one by one, we got to work together, and then we set the targets to start modeling the efficiency for their small as well as for their large gas turbine.”

The firm has been lucky to find both domestic and foreign potential partners through the network of acquaintances. It is clear that without the input of both the firm's own and its partners, N2 would not have the power to achieve positive cross-border results regardless of the product to be marketed. Yet in practice, attempts have been made to implement internationalization only through the sale of technology know-how.

4.1.2.3 Other Pertinent N2 Occurrences

Obtaining adequate funding is a very typical challenge for start-ups. Addressing this issue reduces management involvement in operational activities. N2 is not immune to this challenge as they aim for large operations with limited capital as expressed by the CEO. In 2019, the CTO defined the main challenge of the company like this:

“The main challenge is that we have to sacrifice a great deal of time and money to develop technology before we have anything we can really offer our customers.”

This CTO's statement triggered the development manager to express his frustration:

“And on the other hand, we are doing well now. . if we talk about what is the challenge at the moment, then... we don't have enough resources to make progress in the actual technological development because we have to focus on securing resources.”

Then the CEO summed up:

“So yes, I see that we have such a unique situation today because we really have that measured pressure and with just the right test device. So, the main challenge is that we should get someone domestic ... even if the state realizes that, hey ... now here's that opportunity. Now we need shoulders, it's capital shoulders that's ... the main challenge.”

And finally, the CTO concluded:

“It is now worth stepping up instead of looking at those sources of funding.”

The above expression of opinions took place in an interview situation. It became clear to the researcher that the management team had a unanimous view of the situation. Later in the individual interviews in 2020, expressions sharpened slightly, but views on the main obstacle to faster progress, the lack of capital, remained unchanged. Thus, finding either a business and technology partner such as a large industrial player or an independent financier remained crucial. Additional investments by the present private owners had kept the firm operative, but their patience would not last forever. N2 was approaching challenges referred to as the valley of death.

4.1.2.4 N2 Relationships Dependency

Typically, as previously discussed, SMEs are challenged by the scarcity and potential alternative uses of their resources (Chandra et al., 2012; Leonidou et al., 2007). Critical factors affecting N2's management have not only been potential funders but all resources, including its own, and the network's capabilities (Chetty et al., 2018). During its operative years, N2 has created an impressive network of contacts. Some of the contacts are actually helping the firm to distribute its message among potential customers. Hence, understanding the situation that N2 was in should have helped managers to channel resources appropriately, and avoid unnecessary failures.

Unfortunately, the complexity of potential impacts on existing technical solutions and time spent without much of a commercial breakthrough have made investors and potential user industries cautious. For example, Business Finland (BF) has

strongly supported N2's work in the past. However, recently BF has refused additional financing, citing the technical challenges and questioning N2's overall resources. Moreover, the difficulties in continuing to work with Shell provide a larger problematic picture of public funding. Shell has committed money to continuity, but the company also requires the involvement of others. Finnish government organizations are hesitant. When this chapter was written, N2 had not given up. On the contrary: In order to exit the impasse, N2 has recently started disseminating their message among the general public. This is expected to create pressure for industries to invest in N2's technology as part of the global efforts towards making major savings in fossil fuel consumption and in reducing CO₂ emissions. Also, N2 has applied for the European Union's green financing project.

4.1.2.5 Decision-making Logic of N2

The main decision-maker is one of the founders and the present CEO of N2. He is an engineer in his sixties and thus has extensive experience in technology companies. Other key decision-makers are the chief technology officer and the chairman of the board. At the beginning, they formed the nucleus of the firm both in terms of operations and ownership. Since then, over the 10 years, the number of owners has exceeded 40. Nevertheless, the original trio have remained in power. Although some disagreements surfaced during the observation period, a certain harmony was prevalent. All in all, the CEO describes N2's decision-making style as conversational and consensus seeking:

“The aim is that as much as possible goals would guide the actions. We set a goal and search for a solution for the goal. We do that together, discussing. Sometimes it's a little easier and faster, and sometimes there are hardships. For these issues neither the literature nor any source provides ready solutions.”

In addition to the firm's inception, this study identified five significant events or incidents (CIT) that provided opportunities or impeded the functioning of N2 and thus required significant decisions, namely:

(1) Formation of the firm

First, there was an idea. Using the existing network, the entrepreneur got his idea pre-evaluated and tested. Following successful experiments, a company was formed. The foundation for the company's formation was the contingency exploitation, as successful testing demonstrated that a long-known but unutilized technical phenomenon could be feasible. According to the CEO, some planning was done at that time, but clearly the start was means oriented and actions were

based on affordable loss. Two of the three entrepreneurs contributed to the technical development while the third brought in commercial know-how. Evidently the trio had strong trust in their own competencies and skills and that affected their decision-making logic, which was heavily effectuation emphasized.

(2) Successful pilot plan – new strategy

Further technology testing and process modeling indicated that the technical concept was applicable not only to small turbines but to any size of turbines. From the market point of view, the emerging market was very attractive as the potential market size for large turbines is billions. This is a fact that did not need any analysis as large turbines are used in airliners, ocean vessels and heavy industry. Hence, the opportunity led the trio to change N2's strategy.

Again, not very much planning took place before N2 rushed to implement the strategy. So, the decision-making logic was notably more causative than effectual but included signs of both. Moreover, with the new strategy and target market, new challenges emerged. And finding a partner became a necessity in practice.

(3) Multinational collaboration

N2 started to look for international partners, as there were no suitable potential industrial partners in Finland. At the same time, N2 approached Business Finland, explained the strategy change and applied for additional public finance. After active communication and networking, N2 was able to make contact with a couple of large potential partners. After initial discussions, technical collaboration started with two enterprises, one being an airline engine manufacturer and the other a producer of industrial turbines. For N2, both were so-called "no-brainers" as N2 needed partners and there were not very many serious candidates. Hence, N2 followed the plan to find partners. The firm was once again exploiting contingencies and tried to control its own future by seizing opportunities. Therefore, the decision-making logic in these events was like the light of the moon reflecting on water, i.e., shaky.

Later on, these partnerships became incidents when cooperative work did not lead to deeper joint activities but faded away. Actually, neither collaborator gave notice for ending the joint development, and thus N2 kept on hoping for some time. All the time, new partners were sought and innovation furthered. As no feasible partnerships emerged, Business Finland had become skeptical and owners impatient, and the trio decided to change the strategy more or less back to the original, i.e., develop an energy-producing device. This change may not have been

unanimous but reflected the difficult situation N2 was in. The CEO described the decision-making:

“We did not have much time for planning. It was clear plans were made but not in great detail. It is important to get decisions made and goals set. But then if very detailed plans are made, those can become constraints, particularly in a small organization like ours.”

N2 felt they had to do something. The threshold for going back to the original strategy was seen as rather low. The logic was means oriented and reflected the “act first” attitude, and thus effectuation was strongly present.

(4) Scientific article

Moreover, N2, alongside strategy adjustments, took actions to improve their relevance and proof of concept by publishing their technical achievements in a respected scientific magazine. Publishing a paper was a result of goal setting, detailed planning and focus. The paper was well received and lifted the firm’s reliability considerably among the relevant energy industry and research community. Decisions that led to the publication were clearly goal oriented, and expected returns were solidly articulated and thus causation was strongly present. On the other hand, the aim was also to strengthen the firm’s grip on its future and thus be “pilot in the plane,” i.e. effectuation was also present.

(5) Shell competition and potential collaboration

Shell organizes an annual competition for the most revolutionary innovation in the energy sector. N2’s participation in the competition was not an outcome of any in-depth planning and analysis but rather N2 ran into this opportunity and decided to participate. N2 had nothing to lose but a lot to gain and thus an ad hoc type of decision was made. There was probably some intuition involved. After a hectic period, N2 was informed that they were second to none and had won the competition. Later on, Shell indicated their interest in investing in further collaboration.

(6) Financial crisis

Shell was willing to continue but requested another organization’s financial participation. Now N2 had a potential partner who believed in their technology but N2 needed to find other financiers and they did not have the money to match Shell’s investment. N2 contacted several potential sources for money, and some with little such potential. Among others, Business Finland, who had already supported N2 to the tune of €700,000–800,000, was not willing to invest any

more in the innovation. They had started to think the challenge was too difficult for N2. Many others indicated the same. At this point, the strategy fluctuation become a concrete burden. Yet, N2 had no alternative but to keep looking for a solution. Means orientation and affordable loss were strongly present, but causation prevailed, i.e., planning for alternative solutions and scenarios consumed the management's resources.

4.1.2.6 N2 Summary

N2 has solved the complex challenges related to pulsed deflagration combustion (PGC). The firm claims to be ready for the global launch of their comprehensive patented PGC technology. The initial innovation idea emerged in 2011, and a new company was founded in 2012. But a tangible product never materialized, and the company was still looking for partners to concretize such a product in 2021. According to the CEO, the firm's main challenges during that 10-year period were primarily of a technical nature but later on become commercial. N2 identified their fundamental shortcomings in sales and marketing action but corrective action may have come too late. Indeed, the entrepreneurs were able to systematically integrate technical information and make educated decisions, but their experience was less relevant in commercial issues.

In 2019, the CEO stressed the need for marketing communication. However, even if the firm did have some tentative plans for commercialization, its actual sales activities were initially weak. Later on, both marketing communication and commercialization activities improved considerably, but the actual offering remained somewhat unspecified. Thus, N2 needed partners to actually utilize its innovation. At least one, but preferably several strong industrial partners would make the use of PSG technology feasible. Along the development arc, N2 talked with a few potential partners, but for unspecified reasons they faded away. The entrepreneurs have to be given credit for constantly trying. Finally, when a sophisticated and suitable partner was found, N2 had difficulty in providing matching resources. The issue of resources surfaces several times in the interviews and discussions.

In fact, during the observation and mutual communication period, the researcher became aware of the challenges and provided his assistance on several occasions. Nevertheless, a dominant decision-making logic had to be identified. As the CEO said:

“At the beginning we had a plan, later on we just tried to survive.”

However, the content of the initial plan reflected effectual characteristics, as it did not include any market studies or concrete financial projections. The development work started with the means available. The study analyzed six decision-making matters of N2 Pulsare.

4.1.3 Case N3 Lambada

The two founders of N3 previously worked for a company that manufactures electrical equipment. There, they had learned that consumer lighting products were modernized with LED technology. However, there was no LED product for high-risk industrial facilities. This piqued their interest and they began to explore market opportunities for the industrial applications. As a result, they both resigned. The next step was to draw up a business plan, and based on their plan, the founders began looking for funding. After securing financing, they set up company N3. An essential detail in this development arc is that the founders consulted some potential clients as part of their design process, from whom they received encouragement to continue.

N3 was founded at the end of 2015. In 2016, an additional equity partner came along, which allowed the innovation of the two product groups to begin. In the fall of 2020, the company had five owners. The business idea was to provide LED-based lighting solutions for heavy industry and for spaces requiring IECX and ATEX certification (= high risk for explosion). N3 has a well-defined product portfolio that includes physical lights, lighting solutions and lighting as a service. Physical products are made of recirculated raw materials such as marine aluminum and car plastics. N3's own core process is sales and distribution, while it outsources engineering, manufacturing and assembling. Yet, N3's core competencies are LED, IOT and DC technologies. The firm's business concept relies on digital solutions. Indeed, N3's products are highly innovative and the business model is very modern. Interestingly, N3's products are replacing old industrial installations that are over 30 years old.

N3 is located in a business center close to the regional airport. The rented premises are modern and surrounded by several other enterprises. Employees have access to a variety of support functions, including lunch restaurants across the street. The first impression when entering the premises is that of a professional high-tech company that is focused on its core activities, i.e., engineering and sales. Key personnel work in an open office. The communication and the atmosphere seem relaxed. Everyone works towards a unified goal and is in agreement about the strategy. N3 has a three-member board of directors with two founding members who are still employed by the company and the lead financier. In the CEO's view,

they could benefit from a professional board that would, with good questions, challenge operations.

As previously discussed, the company's offerings are based on verified customer needs. Having an initial idea of their offering, entrepreneurs visited potential key customers. During those visits they learned details of customers' product requirements and got a good understanding of the actual market size. Indeed, the market demand is international and strong. Therefore, once the technical challenges are resolved, expectations for rapid international growth are realistic. However, in the meantime, N3 is facing the same general challenges as other start-ups, as expressed by the CFO:

“Overall, our challenge is to balance resources. How to plan sales volume, hire staff, etc. covering the entire palette. And then, we who should get the money into our bank account, the products we develop should pay double the cost of product development, those developed plus those of future products. There are many important things to consider.”

“A great term is market entry and through that comes the ramp-up phase. There they are. In those two challenges are crystallized, the slope of the ramp-up, and its control.”

Also, as with many other companies, Covid has impacted N3's operations. Due to the virus, customers are not met in person and N3 has not been able to show them physical products. Building up trust through Teams or Zoom is not easy, particularly when customers cannot physically touch the offerings. Also, what has suffered is the feedback from the market and customers. As the CEO puts it:

“Yes, we have been left without such so-called ‘inside information’.”

Moreover, due to Covid, N3 experienced some difficulties in the subcontracting chain and in the transportation of parts, among other things. On the other hand, N3 did get an order from a new customer, who because of Covid had not been satisfied with their current supplier.

4.1.3.1 N3 Innovation Occurrence

N3 does have an innovation strategy that is verified in the field by end-users. The basics that led to the formation of the company follow the suggestion of Perks et al. (2005), i.e., entrepreneurs search for opportunities and utilize knowledge. By visiting and listening to customers, entrepreneurs learned about the potential opportunities and thus laid the foundation for technical innovation. N3's

innovation is, by definition, radical but also somewhat disruptive (Pisano, 2015) as it enables new business models, e.g., in the form of distance monitoring. On the other hand, it is worth noting that the founders of the company had no idea how laborious it was to develop the new products and what permits and certifications would be required for it. There was very little expertise available on the subject. Now, through trial and error, N3 has become an expert in the field. An example of an instructional error that cost money and time was the product design, as the CEO described:

“We wanted to make a product with the ‘wow’ effect that matches the specifications that were obtained from that field. We took an industrial designer to draw those products. They really became ‘wow.’ They looked great. But then this industrial designer stepped aside and was replaced by an incomprehensible mechanical designer who made the wrong decisions, or in all fairness was unable to combine the technical requirements with the designed format. That exercise cost us a lot.”

Nevertheless, the main challenges during the innovation development phase have been in certification. The certification process is extremely demanding and contains several steps. Actually, obtaining certificates and permits has been one of the slowdowns in the company’s growth. They have, on several occasions, felt that they were about to cross the finishing line in terms of finding a solution, but then, in the final certification test, another shortcoming has been identified that requires rectification. Corrective actions take time and consume resources. First, the root cause for the failure has to be identified. Then, the outcome of the analysis will define the actual execution plan, including the needed time, resources, etc. Finally, once the changes are implemented, the new certification test must be outsourced. Organizations like VTT in Finland have limited capabilities for the necessary tests and thus N3 has outsourced testing abroad.

In addition to the impacts on N3, each rejected certification test result has consequences for customers waiting for modern lights, for the sales network and for the main subcontractor. In particular, the latter is affected as it has reserved a certain production capacity for N3’s products. Repeated test failures gnaw away at confidence and may reduce partners’ willingness to collaborate. Through active and open communication, N3 has faced up to the challenge.

Naturally, the complex and demanding safety regulations have formed natural barriers for new entrants entering the business as described in Porter’s classic business model of five forces. The high threshold for entrance benefits N3. In addition to complying with the strict safety regulations, N3 has invested in environmental friendliness to gain a competitive advantage, as the CEO describes:

“I would say that all our actions emphasize that we support that sustainable development. We use materials that are re-cyclable or the product can be repaired and put back in the field. With such solutions that support sustainable development and energy efficiency and longevity, we will certainly be able to win the cheapest-price competition.”

Moreover, mobile Internet-based data management is one of N3's core competencies. Product performance follow-up can be done online as each unit is equipped with the necessary sensors. Also, lights can be intelligently connected to each other and thus provide value-added solutions for customers.

In conclusion, N3 is an excellent example of an international new venture (INV) as it has strived, from its inception, to derive competitive advantage from its resource base and focus on cross-border business (Oviatt & McDougall, 1994). Moreover, N3 is also an excellent example of technology entrepreneurship as its development path is uniquely technology dependent. Indeed, the certification needs of the main products have delayed the venture process as suggested by Garonne et al. (2010). The step-by-step vision of the entrepreneurs has been realized, the necessary certificates have been redeemed one by one, and the first certified products have been delivered and commissioned.

4.1.3.2 N3 Internationalization Occurrence

N3's first internationalization activities were related to procurement processes. When the company could not find the necessary components in Finland, they had to go abroad. Suitable suppliers were found, for example, in Norway, Germany and China. Generally, N3 has been satisfied with its foreign suppliers. Once a business relationship has been established, cooperation has been smooth and supplies have arrived as agreed. Unlike with some domestic suppliers or subcontractors, there have not been issues that have led to the termination of relationships. Partners were sought for tasks that N3 did not have the capabilities to undertake. To satisfy certain needs, it was a challenge to find even one potential supplier, while for some other needs, three or four inquiries were sent out to identified potential suppliers. Roughly half of the partners have been found through N3's stakeholders' own networks, and the rest through using Google, other search engines and various publications. The same approach applies to N3's outbound activities as well.

When the company started its export activities those were based on the strategic decision that the firm would focus on countries similar to, and close to, Finland. The thinking was that it is easier to understand customers that think the same way as the Finns. Similar environmental conditions were also expected to be an

advantage for market entries. Only after the product structures had been tested and the product family was ready would the expansion of the market area begin. Nevertheless, N3 proclaimed itself to be a born-global company, as the CMO expressed twice:

“The Finnish market is way too small for our type of product; we must internationalize and we need to find the right means to do so as fast as possible.”

“We are at the beginning, well, we are like born global, i.e., a company with global markets. Finnish markets are too small, and our competitors are global operators. With those we compete against, we must take them into account, and we need to be better than them.”

N3's initial market study was implemented in a very practical way. Equipped with four or five PowerPoint slides, the firm's representatives toured some of Finland's largest industrial plants. The outcome was so encouraging that innovation work was started. Initial international marketing activities were based on loose studies on competition, and on potential customer industries. As a result of the work, potential partners and competitors were identified. Also, studies have guided N3 to define its priority markets and some key customers. However, no in-depth market research has been implemented in any foreign target market. ATEX certification is a passport to international markets but does not guarantee access to all countries, some of which have their own regulations. The reasons for national regulations can be political or commercially protective only. Examples of such protectionism exist, for instance, in Russia, the USA and Brazil. For N3, entering these challenging markets will require some specific efforts.

The born-global type of INV approach was evidenced, for example, by the construction of an international sales and marketing network in parallel with the product development. Therefore, it was important for the company to quickly present a working version of its product and show the value it brings to customers (Rancic Moogk, 2012). In fact, setbacks in the certification process twice delayed N3's main product launches. Therefore, order intake has not proceeded as planned and N3's extensive network of agents and distributors has remained somewhat idle.

The early sales network of N3 contained some 25 actors with contacts in the mining, chemical, pulp and paper, oil and gas industries. The geographical focus has been, as planned, on the Nordic and Baltic countries as well as on the United Kingdom. Interestingly, even before N3's main product line had passed its final certification tests, the company had learned that many of its international partners

did not have the necessary competencies for technical consultative sales. The CMO expressed his concern:

“It is not difficult for us to find distributors; we have a problem finding the right distributors.”

Consequently, the sales network is under constant adjustment, and the ultimate goal is having its own competent sales representatives in the main European target markets. Asia and America will be targeted later, and then it is expected to be served by local manufacturing sources.

4.1.3.3 Other Pertinent N3 Occurrences

N3’s operations depend on its partners’ performance. The benefits of using a large supply network are minimized fixed assets, flexibility and access to suitable competencies without the burden of human resources issues. However, relying on others may be expensive, as the example presented by the CEO demonstrates:

“We have an aluminum frame that contains four pressure-casting parts. It is molded at 780 degrees Celsius. In less than 100 milliseconds the mold is filled with molten aluminum. Then it is cooled down. These parts are to be used in the ATEX product and thus only a minimum amount of porosity is accepted. Otherwise some surfaces may get holes through which gases may escape. We had a major problem with the product because our supplier delivered castings of which only 10% passed the pressure test. We asked for corrective actions. Those did not happen, so we had to reclaim the molds and take them to another actor. He used the same manufacturing apparatus and did the machining. The end result was that all products were accepted. This led to discussions with the original supplier regarding the buffer inventory. How many were of acceptable quality and how many were not had to be agreed on, and then incurred costs divided. Negotiations were challenging but finally an agreement over related costs, etc. was achieved. It was an expensive ordeal.”

All in all, it took N3 some time to learn that it is more feasible to optimize the number of suppliers rather than trying to minimize the costs by dividing the procurement into many small flows of goods. This realization led to an agreement with one larger operator to whom parts from various sources go direct. The arrangement frees up N3’s resources to concentrate on other challenges.

4.1.3.4 N3 Relationships Dependency

As Brodoni (2010) puts it, *“competition is no longer between individual firms but between alliance networks.”* N3’s core business idea follows Brodoni’s statement and is based on strong networking. The network’s key members are the customers and thus N3’s key partners are also the customers, as the CMO stated:

“So there are key partners, i.e., of course, the most important key partners are the customers, i.e., a lot of information has come from them, what they want to buy.”

The company has four of its own employees but indirectly employs considerably more. Once the certification challenges are solved and marketing is in full swing, N3 does not intend to increase the number of non-sales staff. Relying on partners is essential for N3’s success. Therefore selecting, testing and managing partnerships is of utmost importance. The CEO says:

“The management and development of partnerships is guided by the company's quality system and the main processes defined there. The company's product sector is rigid and does not allow for customer-specific wish updates as all changes affect certification.”

These boundary conditions enable N3 to manage the supply network but do not eliminate the risks involved. Thus, when individual contracts are made, potential risks are mapped, as the CEO explains when asked about the issue:

“Well, that risk analysis has been done when we have made an agreement with these actors. That is how the risks have already been considered.”

When a supplier is not performing as agreed, it is given a chance to take corrective actions. If remedies are not made in time, the supplier is quickly given a termination notice. Thereafter, the stakeholders’ network is used for finding a potential replacement partner.

4.1.3.5 Decision-making Logic of N3

The main decision-maker is one of the founders and present CEO of N3. He is an engineer in his forties and has extensive experience in various positions in SMEs. Other key decision-makers are the chief financial officer and the chairman of the board, who is also the main financier. These three make up the company's board of directors. Moreover, two key resources are the sales director and the director of

business development. In fact, the company has a comprehensive competence and skills pool, the management of which the CEO describes as follows:

“This company has great people. They all have their own area of expertise. Our company is built on a Trivial Pursuit kind of circle that contains pieces of different colors. Alone, these pieces are nothing, but when put together inside the circle they all support each other. Managing such a unit... Well, I would not call it managing. It is more like rounding up these pieces and keeping them together... like motivating... like one understands the shortcomings of the others and thus supplements those with their own capabilities. It is more... kind of mediation through perspectives, and bringing out solutions. That is meaningful and in my opinion very interesting. In any case, we do not have any goals of an autocratic-type management.”

In addition to the firm’s inception, this study identified one event and four incidents (CIT) that provided opportunities or impeded the functioning of N3 and thus required significant decisions. Major incidents caused delays in innovation development and product certification and thus delayed the product market launch. Interestingly, the events and incidents described hereunder never seemed to undermine the company’s progress towards its goals.

(1) Company’s inception

Working for a company that used LED technology, the two founders realized that no company was providing LED-based lighting solutions for certain industrial applications. Hence, they studied the market in more detail and visited some potential customers. The outcome was a detailed business plan. The plan was convincing enough to secure financing. Hence, N3 was incorporated. N3’s business concept is modern and based on strong partnerships and networking. Entrepreneurs understood from the beginning that even innovative products must be sold. Therefore, the team was soon strengthened by an experienced sales and marketing professional. All in all, the road leading to the inception of N3 and its actions thereafter point towards professional planning, goal orientation and certain avoidance of the unexpected. These “components” are typical of a causation type of decision-making logic. However, the main idea as such was built on contingency exploitation and thus effectuation was also present.

(2) Industrial design vs. functionality

N3 wanted to have a product that creates a “wow” effect. An industrial designer was engaged. The design outcome was as desired but could not be implemented because it limited the product’s functionality. Therefore N3’s original plan had to

be adjusted. Corrective actions were taken effectively and purposefully. Experimenting was put aside and functionality was lifted to the top of the design priorities. Hence, the firm's initial causation-oriented decision-making logic prevailed.

(3) Subcontracting

The firm's business model is built on partnerships and networking. One of the key components of one product type is the aluminum-casted frame. This component was subcontracted from a supplier recommended by one trustworthy business partner. Testing components were of acceptable quality and thus a commercial agreement was signed and a purchase order placed. However, starting from the first lot of frames, quality problems occurred. The supplier was given another opportunity but he failed again. N3 terminated the agreement, called back its own casting molds and negotiated a reasonable withdrawal agreement. This was possible because the original contract was professionally constructed. Again, N3 followed causation-type decision logic.

(4) First industrial reference

Getting the first industrial application up and running was indeed an event N3 had been working for. It was an event the CEO called one of the fundamental milestones along the firm's growth arc.

"It has remained in my mind when the first certified product left the production and landed at the end-users. It was an important event for the customer and a very significant event for us."

The occasion increased the staff's motivation and was also important for other stakeholders. It also enabled active selling and thus the earnings needed for the development of the more demanding ATEX type of products. In short, N3 could continue on its planned path.

(5) Certification

EX and ATEX certifications were of utmost importance for N3. The actual certification comprises several stages. Entrance to a certification stage requires approval and the product's passage through the previous stages. Hence, the process is long and costly. If the product fails in the last certification stage there is a risk, after technical adjustments, that all previous tests have to be repeated. Three times N3 was convinced they had done their homework and the final testing would provide positive results. But twice, before the final approval, N3 had to face disappointment.

Moreover, adversity slowed down larger marketing efforts. Suppliers and subcontractors were disappointed. Distributors and agents were not happy either. The same was applicable to certain customers in waiting. However, thanks to various parties' determination, good planning and N3's adequate financial resources, disappointments were dealt with and N3 continued on its chosen track. In practice, after each failure, N3 analyzed the situation, made a plan for corrective actions and proceeded to implementation. The approach was very systematic and thus followed the causation type of decision-making logic.

(6) Covid-19

From early on, N3 was building up an international sales and marketing network. The strategy was to focus on countries similar to Finland. Cultural similarities were expected to facilitate market access. When forming the initial network, N3 used its employees' existing contacts and other sources for input data. Some of the recruitments were successful, some were not. N3 had a marketing plan but it had not defined in detail the requirements for partners. Delays in the product development gave N3 opportunities to adjust the sales force prior to massive marketing efforts. Effectuation-type trials were used in sales and marketing until Covid-19 raised questions over these possibilities.

However, while the pandemic impacted negatively on the firm's sales efforts, according to the CMO, it was less than expected. In fact, old customer contacts were maintained, but the situation became quite demanding in terms of new customer acquisition. As the CEO put it:

“We can meet people in Teams and so, but you do not hear any extras. When you visit customers, you move around and can meet two or three outsiders with whom you do not communicate regularly. You get hints about what has happened and what is going to happen. Yes, in other words, we have been left without such so-called ‘inside information’.”

In the end, even the pandemic did not force N3 away from its determination and action steps for reaching its goals.

4.1.3.6 N3 Summary

The foundation for N3 was laid by a market study that included customers' inputs. The study led to a business plan, which led to the formation of a company. The company had clear development steps for how to work on technical issues and how to approach the market. It acquired both internal and external resources. This was

made possible by a solid financial background, which has also helped the company to stay on the course taken. The initial strong planning and goal setting are probably key reasons why the financing was, and has stayed, in place. Regardless of the extensive plan bringing the initial idea, the development road has been bumpy and contained unforeseen obstacles. Yet, since its foundation in 2015, N3 has followed its initial main strategy. The fundamental aim of the strategy is to keep its own organization lean and rely on partners and networks.

The strategy has proven successful despite partners causing challenges in the innovation stage as well as in the internationalization. Even though N3 did not have contingency plans for its partners' shortcomings or actual mistakes, the firm acted swiftly to stay on course. However, the biggest challenges of the observation period were not caused by business partners but by the results of product certification. Due to the high-risk application environment of N3's main products, they had to pass extensive multilevel certification. On more than one occasion, the product passed the other levels of testing, but was rejected at the final stage. Corrective action consumed time and money and delayed the product market launch. Luckily the firm had other less demanding but more competitive products to get some cash flow prior to the acceptance of the key product.

Most probably, the extensive and broad business expertise of the key management had reduced the potential for several mistakes and the desire for extra contingency exploitation. N3's management experiences have kind of prepared them to face obstacles and unexpected situations. In conclusion, the company's systematic approach to planning and facing obstacles has been fundamental to its success and refers to causation-type decision-making logic. The study analyzed six decision-making matters of N3 Lambada.

4.2 Common and Distinctive Features among New Ventures

Most of the literature argues that effectuation is more prominent in the early stages of a venture while causation can become more prominent later. However, "most" is not the whole population. Changes in decision-making logic can be greatly altered by the operational environment, the industry sector, actual activity, and the entrepreneur's own experience and perceptions. Following this line of thought, this section of the research considers and compares the case start-ups' decision-making logic in the real-life context. The key questions are whether entrepreneurs/managers follow causation and/or effectuation logic in certain situations, which logic is the more dominant and how it affects the firm's alliance

performance. A discussion of the common and distinctive evidence follows the grand logic, i.e., the process approach of the study.

4.2.1 Overall Review

Process research, i.e., a temporal view, is useful in the theorization of fundamental mechanisms of decision-making (Berends et al., 2014). The majority of, for example, new product development studies of small firms consist of cross-sectional variance research, rather than longitudinal process research (Berends et al., 2014). However, this study does not follow the crowd. It is the firm opinion of the researcher that time and timing affects all aspects of business activities and thus contributes to the decision-making process and logic. The latter forms the basis for decisions and the former determines the actual implementation of the decisions. Therefore, critical matters of the cases were identified and observed over time and are hereby summarized in Table 8.

Table 8. Dominant Decision-making Logic in Critical Events and Incidents of INTVs

Critical events and incidents / dominant logic						
Case firm	causation = C, effectuation = E, both = B, unclear = U					
	1st	2nd	3rd	4th	5th	6th
N1	Incorporation/ E	Partner failure / B	First international order / E	Financial crisis/ U	Covid pandemic / U	New strategy/ B
N2	Incorporation/ E	Strategy change/ B	International collaboration/ E	Scientific article / C	Shell competition/ E	Financial crisis/ C
N3	Incorporation/ C	Industrial design/ C	Subcontractor failure/ C	First reference/ C	Certification / C	Covid pandemic/ U

The decision-making logic and the process associated with it are seen as subjective and dependent on the personality of the decision-maker, and thus on his or her opportunity recognition experience and views of running the business. Therefore, and due to the uniqueness of the case companies' critical events and incidents, companies' comparison to each other per decision-triggered item or issue is fundamentally not relevant. Instead, using abductive reasoning, the findings of the data collected provide a useful method for comparison of common and

distinguishing features of case companies' decision-making. The abductive reasoning is based on the overall intuitive view arising from the researcher's comprehensive expertise. As such, it produces educated guesses that are, at best, very close to being correct (Pohjola, 2020). Hence, in Table 9, an integration and comparison of the concluded findings of the start-ups are presented. (Correspondingly, in Table 11, the concluded findings of SMEs are shown.)

Table 9. Derivative Comparison of INTVs' Findings

Pseudonym	N1 Turbina	N2 Pulsare	N3 Lambada
Product innovativeness	high	very high	high
Years before product to market	10	7	5
Entrepreneur's technical experience	high	high	high
Entrepreneur's marketing experience	low	medium	very high
Firm inception planned	no	yes	yes
Market prestudied	no	no	yes
Level of goal setting	low	low	high
Innovation cooperative	yes	yes	yes
Alliance strategy	no	no	somewhat
Internationalization plan	medium	low	high
Internationalization type	process-like	born global	process-like
Internationalization cooperative	high	a must	high
Avoids uncertainty	no	somewhat	yes
Open to change	medium	high	low
Takes opportunities	yes	yes	somewhat
Perception of environment	low risk	substantial risk	low risk
Managing principles	teamwork	teamwork	teamwork
Dominant logic C /E	Effectuation	Effectuation	Causation

4.2.2 Inception and innovation Review

Earlier studies of small firms' innovation paths reveal that new firms' innovation processes comprise a combination of effectual logic regardless of the entrepreneur's earlier experience (Sarasvathy, 2008). Berends et al. (2014),

among others, conclude that effectuation is dominant in earlier stages, while causation becomes more visible in later stages of innovation trajectories. The results of the study at hand do not unequivocally confirm or refute the above statements. Rather, the results indicate that in this matter there is no other regularity except diversity.

Grégoire and Cherchem (2019) refer to McMullen and Dimov (2013) and argue that the more innovative a product, service or business model is, the less possible it becomes to search for valid customers or market information and thus effectuation logic prevails. As they explain, this is understandable because the more radical an innovation is, the less easy it is for market actors to take an informed position on the subject and vice versa. This may be a reasonable conclusion but does not prove that some entrepreneurs would not under unknown circumstances still prefer a causation type of approach.

As previously discussed, the entrepreneur of N1 formed the company without much planning, i.e., he followed more of the effectuation logic, whereas the entrepreneurs of N3 studied the market, made a detailed business plan and searched for solid financing and thus followed more the causation type of logic. Interestingly, the level of newness of their innovations was roughly the same on the radical–incremental scale. Hence, it is justified to conclude that the novelty of an innovation does not alone define the prevailing decision-making logic. The findings of case N2, however, support the arguments of Grégoire and Cherchem (2019) as the innovation of N2 is without doubt very radical and the inventors' initial actions fell demonstrably within the definition of the effectuation emphasized logic.

Moreover, these identified logics apply to case companies' approaches to innovation alliances. N1 had a rough plan on with whom to work; N3 had a quite detailed plan on with whom and how to work; but N2 proceeded and worked more "by ear." Once N2 had changed its strategy, they put a lot of effort into finding an innovation partner. However, the approach reminded one of hunting with a shotgun instead of a sniper rifle and thus effectuation logic still ruled. All in all, the results of this study only partially confirm Sarasvathy's (2001) suggestions.

The thought that an entrepreneur should practice both causal and effectual logic depending on the particular situation received some support. However, the most successful of the case companies, N3, seemed to implement causation logic only. The evidence is strong that planning, goal setting and market analysis increase the likelihood of success. On the other hand, the lack of causation does not necessarily mean failure as case N1 demonstrates. Moreover, according to the research data and contrary to Sarasvathy's (2008) suggestion, a new firm's innovation process

may not comprise any effectuation type of logic. This could be the case apart from the entrepreneur's experience or lack thereof. The fact is that all N firms' entrepreneurs had strong industrial experience prior to their entrepreneurship. However, only the principal entrepreneur of N3 had earlier been an executive in a few small firms and thus been in close contact with the everyday life of an entrepreneur.

Hence, the findings challenge the conclusions of previous research that expert entrepreneurs are more likely to apply effectuation logic (Read et al., 2009) and rely more on a contingency than on a predictive approach due to their accumulated knowledge in performing entrepreneurial and managerial tasks (Nelson, 2012; Ruiz-Jiménez et al., 2020). On the contrary, the evidence suggests that experienced entrepreneurs rely more on established plans and predefined goals. However, the conclusions remain fuzzy and thus are further discussed in the chapter comparing the findings of start-ups and SMEs.

Likewise, the evidence does not support the common understanding, e.g., by Berends et al. (2014), that effectuation is dominant in the early stages of an innovation project while changing to causation later on. At least the findings raise a question. How much time is needed for a change in dominant logic? Maybe time is relevant but strongly connected to innovation results. For example, it took 10 years for N1 to bring a product to the market.

And during that time there had been no signs of transformation from the dominant effectuation to causation. Consequently, no unambiguous correlation between time and a change of dominant decision-making logic seems to exist. However, the data of established SMEs provide some more insight into this question.

4.2.3 Internationalization Review

There are many reasons why small firms turn to foreign markets, some out of choice and others out of necessity. A strong motivator could be a small domestic market. Often entrepreneurs and SMEs choose exporting as an entry mode when accessing new markets as it does not require any major foreign investments and can be controlled domestically (Cussen & Cooney, 2019).

On the other hand, many reasons can prevent companies from exporting or practicing it successfully. For example, high trade costs, legal issues, strong competition, a lack of brand recognition, cultural differences and a limited international network can hinder or slow down firms' exporting activities (Cussen & Cooney, 2019), whereas having access to international networks and

partnerships has been found to reduce the effects of these obstacles (Putninš, 2013; Sarasvathy et al., 2013).

Typically, the decision to invest in foreign markets is filled with uncertainty and risks (e.g., Aharoni, 1966). Figueira-de-Lemos et al. (2011) suggest that uncertainty in the internationalization process influences the firm's willingness to commit resources in order to make a start in cross-border business. However, if the firm's markets are mainly abroad, the alternative of concentrating on domestic markets is hardly an option. Internationalization itself can be incremental or fast track (Oviatt & McDougall, 1994), and it can be planned, i.e., goal driven, or unplanned, i.e., means driven (Chetty et al., 2015). In any optional situation, founders of new ventures can use their existing knowledge and relationships to enter foreign markets as soon as necessary.

All three case start-ups were aware of the importance of international partners and had taken actions to engage with foreign partners. N3 did this systematically from the outset, N2 started its search after it changed its strategy and N1 adopted a sporadic approach by utilizing its owners' international actions. The outcomes reflected the actions. N3 had access to a sales network even before it had a saleable product, N2 had to cooperate with anyone who showed some interest and N1 was simply lucky, albeit because of its networking.

Anyway, the data suggest that the dominant decision-making logic may have little impact on successful internationalization. In fact, the findings illustrate how causation and effectuation are intertwined and used as substitutes. Maybe the wise words of Brian Tracey are true: *"The harder you work the luckier you become."* Of course, you also have to run on the right track.

4.3 Established SMEs

4.3.1 Case E1 Fornello

E1 was established in 1925 by the great grandfather of the present CEO. He is now also the majority owner. The other owners are his mother and sister. The company employs 14 people generating an annual turnover of about €2 million. The main product is mobile field kitchens and the main customer is Finland's armed forces. Other products include large-scale mobile cooking devices and equipment for saunas. The company has a modern factory in a small rural town in western Finland. The factory buildings and the land are owned by E1. The products are nicely displayed in the entrance of the two-story building.

According to the CEO, E1's employees are proactive and that has resulted in constant product and operations improvements. One fundamental reason for this has been the customer orientation. Customer needs have steered operational activities. Yet, recently the firm has taken action aimed at more systematization of its development work. Digital tools are utilized in engineering and considered to be of major importance for the potential service business. The main customer need that E1 wants to satisfy is defined by the CEO:

“That's it for cooking outdoors. That is it, very roughly crystallized. In other words, we strive to provide the best possible tools for it, regardless of the circumstances.”

Major innovation challenges include modularization of the product portfolio, and servitization of offerings and international activities. Similarly to many other companies expanding to new markets, the development of the new service business was hampered by the Covid-19 pandemic. And the pandemic demonstrated the importance of the diversity of offerings. As the CEO put it:

“If we had had only one customer segment, it would have been pretty grim.”

His other thoughts about the effects of Covid are also very pertinent for the future success of E1.

“It will be interesting to learn what the long-term impacts are. Is the market going to recover? What will the fate of public events be? What's it like with professional cooking equipment?”

All pandemics end one day. So, companies that can predict future competitive advantages and provide solutions to achieve those are more likely than others to succeed. E1's CEO and his team have pondered possible future scenarios. One trend that affects their business is people's desire to spend time outdoors and possibly wanting to eat outdoors as well.

4.3.1.1 E1 Innovation Occurrence

Modern times' most important challenge and the foundation for the coming success took place in the 1980s. At that time, E1 was at a crossroad and they had to figure out: “What should we do?” Field kitchens had been produced sometime in the past. At the same time, the Finnish army had published a project aiming for the modernization of field kitchens that dated back to the Second World War. The army had procured some prototypes and their idea was to send out tenders for a new design. Some 30 companies participated, and in the end, E1 was selected for

future cooperation. Although that event determined E1's success for years to come, the case can only be used as background information for this study and its value is only narrative.

Had E1 not won the competition in the late 1980s, the challenges of generational change some 20 years late may not have been necessary. When the father of the current CEO died, suddenly E1 happened to be in the middle of product modernization discussions with the military again. The CEO described his thoughts from that time:

“When I – really – switched to the role of an entrepreneur and CEO, in a way suddenly, surprisingly, I wondered if the customers and the partners had the confidence to keep it going; it was probably one such fear in itself.”

His fear may or may not have been justified, but the outcome was continued cooperation on all fronts. Nevertheless, the sudden change of the CEO was an incident that required ownership arrangements and many other major decisions to be made.

Since that time, innovation activities as well as other activities have been quite smooth. Historically, products have been designed and manufactured to satisfy customer needs. That has been the way of progress. Recently, efforts have also been made to model this approach and define more the actual process. In any case, E1's innovations have been incremental. No radical technical or nontechnical innovations have been made, but products have been improved on several fronts, manufacturing processes have been intensified, etc.

The ongoing project of product modulation could also be considered an incremental innovation because it is likely to produce improvements in the design, procurement and manufacturing of the present product portfolio. Categorizing new service businesses is rather more difficult. Many equipment manufacturers evolve into service businesses and thus could be labeled “incremental,” but in the case of E1, radical innovation is a more relevant expression. E1 was not only planning to develop industrial services but also to introduce a brand-new business concept. The company would lease out outdoor cooking devices to organizations in need of such, and in order to achieve geographic coverage, they would engage with local partners. Such a service provider would, at least in Finland, be a game changer and require new financial as well as other resources. Preliminary plans had been made but implementation is on hold at least partly because of Covid-19.

In innovation activities, ensuring adequate resources is one of the main reasons to form partnerships. As CEO puts it:

“It is not possible to reach today's standard with a company of this size doing everything itself.”

Working with others requires planning. Although E1 does not yet have a written innovation strategy, the CEO is considering increasing planning practices in general. And thus, he concludes that there would certainly be an order and a place for an innovation strategy.

4.3.1.2 E1 Internationalization Occurrence

A growing number of firms may no longer follow the traditional models of internationalization but E1 does. In the past, E1 had exported only periodically. Maybe in the past, managers of E1 had perceived it as being too difficult to start dedicated international activities. For example, E1 had sold, somewhat systematically, sauna equipment to northern Sweden in the late 1990s. The business had started due to personal acquaintance but faded away due to E1's limited resources and commitment to continuation when the Swedes stopped selling. No doubt when E1 had started exporting, the company had not conducted any market analysis or made any action plan. It was a perfect example of the act first phenomenon.

Currently E1 has an agent in Estonia for the field kitchen product line, whereas in Sweden, E1 has managed direct contacts with the customer's procurement department. In both markets the arrangement has worked well, although as the CEO explained, the Swedish model has required much more work. On the other hand, direct contacts have meant unabridged information between the parties. All in all, E1's international activities have been limited and periodic. While there is some room to expand in their domestic market, the foreign market potential is extremely large. The CEO describes the situation as follows:

“At present, those are project-like export cases. Mostly we have been active in the export of field kitchens (to armed forces). Typically, these customers have projects now and then, and we may get an inquiry and thus an opportunity to quote. So, it's kind of like, how I would say, it's hard to predict, you don't have that kind of constant export of these field devices. For this reason, more continuous exports are being aimed at for the civilian cooking appliances. And there, the market has been preliminarily studied in Sweden and some opportunities have been explored in other Nordic countries or northern Europe.”

Consequently, in 2020, the company became keen to start a more serious internationalization. Without doubt, E1's reason to start investing in exports has

been traditional, namely growth. Due to their own limited resources, it was quite obvious that E1 needed external resources both in the market research stage and in the actual exporting stage. After defining some preliminary selection criteria and their own research, E1 was ready to proceed.

Hence, E1 has contracted consulting companies to search for agents in Sweden and Holland. Sweden fits perfectly in the traditional Uppsala international process theory of gradual internationalization (Paul & Gupta, 2014), i.e., start from neighboring countries and then expand further as their knowledge and experience grows. Holland is bit a further away but is culturally quite close to Nordic countries. Also, foreign market studies and actions on the subject are connected to an internationalization strategy under construction. Moreover, market expansion may include innovation activities, which is in line with the idea of adapting E1's supply in the target market. Planned actions are a good sign of the professional approach towards market challenges and possible barriers that may hinder the enterprise's ability to initiate, and develop exports. A good plan distinguishes serious barriers, such as a lack of resources, from less significant ones and includes risk analysis and possible future scenarios.

Late in 2019, E3 was invited to participate in a development project funded by the European Union (EU). The target group of the project was SMEs in certain regions in Finland and Sweden. The participants were expected, among other things, to network with other participants. This networking opportunity with Swedish companies motivated E1 to participate as it provided a natural extension to their market studies.

4.3.1.3 Other Pertinent E1 Occurrences

The board of directors has only one independent member. At the moment (late 2020) E1 does not have any defined *modus operandi*. Product group-specific issues are evaluated and processed in the board, e.g., what has been sold, where, what will be done, etc. It is a kind of analytic approach but still not very strategic. The measures taken are not based on solid strategic planning. Hence, E1 is a well-managed company but its strategic planning has some room for improvements.

4.3.1.4 E1 Relationships Dependency

As already demonstrated, E1 needs, and is prepared, to engage in new partnerships when strengthening its export activities. On the sourcing side, E1 already has several foreign suppliers. For example, the company procures components from

central Europe, mainly from Germany and Italy. Some of the components are absolutely vital and hard to replace, and thus maintaining the supply relationships is crucial. Typically, when approaching a new potential foreign supplier, they are somewhat careful, i.e., the first few purchase orders may require upfront payment. Later on, when mutual trust has developed, terms and conditions become more relaxed. Currently, E1 is satisfied with its suppliers and vice versa, and thus no major changes or challenges are expected.

As a matter of fact, one of E1's operational principles is to look for partners whenever feasible. In addition to just increasing resources, partnerships are considered to have a broader impact as demonstrated in the CEO's statement:

“Whenever possible, we will look for partners. As an example, Business Finland (BF) has been involved in the latest product development project. That way a significantly larger and higher-quality project entity has been obtained, especially in terms of the actual product development work and the mapping of customers' requirements.”

E1 has well embraced the learning from others and it advances the company to enhance its existing knowledge capital. Hence, the company is a living example of the suggestion that strategic alliances have become a popular vehicle for organizational learning and knowledge sharing (Gomes et al., 2016). They do also warn that companies should be aware of possible negative aspects of sharing, such as knowledge leakage or the risk of core competencies appropriation. In order to minimize such risks, firms need to develop “relational and social capital” among partners (Russo & Cesarini, 2017). The development of social capital enhances openness and accessibility, increasing the scope of the relationship and mutual learning (Kale & Singh, 2009).

4.3.1.5 Decision-making Logic of E1

E1's main decision-maker is the majority owner and CEO. He has a master's degree in engineering and is in his thirties. Except for one business professional, the board of directors consists of family members. The work of the board is described as being informal. However, the CEO indicates his desire to make decisions based on reliable information. When such information is not available, then, he thinks, one has to improvise and utilize intuition or even make decisions based on emotions. In general, he describes the firm's decision-making as follows:

“We do make plans, but how detailed they are is probably a bit of a matter of taste. In strategic planning and decision-making, the firm does not have a

defined mode of operating, but the closer to the actual operations an issue at hand is, the more detailed the planning that is done.”

“The evaluation of sales of a particular product may not always be systematic but rather intuitively based, not necessarily involving any major analysis.”

During the study’s two- to three-year actual observation period, the CEO has given an impression of a relaxed and unfussy manager who runs his business with dedication. In addition to the sudden request for him to take over the company, this study identified two events and one incident (CIT) that provided opportunities or impeded the functioning of E1 and thus had required, or required at that moment, significant decisions.

(1) Ownership change – takeover

Although it had been discussed and planned to a certain extent, taking over the responsibilities as the CEO was not really a planned action. The need surfaced without much warning when the previous owner and former CEO passed away. Hence, the company and its owners had to act fast. Because the owners of the family company wanted continuation and to avoid the unexpected, they agreed to utilize the means available. The son of the previous principal owner had the appropriate education and some experience, and after giving it consideration, he was willing to take the reins. The arrangement was immediately communicated to customers and other stakeholders, all of whom seemed to nod in agreement.

From the point of view of the company and its customers, it was about two cases first: A well-known and experienced manager and business partner left and then a new face took over. Viewed from the distance of time and from the side, the prevailing decision-making logic is hard to emphasize, but circumstantial evidence suggests that elements of effectuation were strongly present.

(2) Tender request

The Finnish army's request for tenders was the first major challenge for the new CEO. As the army had been a partner for E1 for several years, it was obvious that E1 would prepare a quote. In addition to normal technical and commercial requirements, the challenge on the table was trust. Was the new CEO able to convince the army procurement office? The work required planning and demonstrating future commitment to meeting the customer's requirements. Thus, causation-type decision-making was needed and also implemented.

(3) New service business

Historically, E1 had had only one main customer. The new CEO realized that some diversification was needed. Thus, various options were considered and decisions to expand into the B-to-B and service business were made. Like many other SMEs, E1 is short of resources and thus partnerships are formed to supplement its own capabilities and skills. When feasible, E1 has applied for financing from Business Finland (BF) as it brings in not only money but also requirements for systematic actions. Service development was no exception while suitable partners and BF were engaged.

As previously discussed, for E1, service meant a business concept resulting in something unknown. The CEO and his team were aware of the challenge, and thus prior to full implementation certain preplanning and some testing were executed. E1 wanted to manage the risks involved. Decisions contained some intuition, some market analysis and some testing. Based on observations and interview results, it is reasonable to conclude that both causation and effectuation types of logic were practiced.

(4) New markets

The firm was actively searching for new domestic as well as international markets. The goal was to expand into the field of the cooking device business. For international markets, the firm was looking for sales and marketing partners. The first careful steps had been taken, i.e., in Sweden and the Netherlands. As the CEO pointed out, when targeting new markets both competitive analysis and network inputs are considered important. Consequently, it is reasonable to conclude that decisions made and actions that followed point towards causation. Again, however, the cut between the C vs. E logics was not sharp but fuzzy.

(5) EU project, network & partnerships

E1 has participated in a few development projects. An excellent example of such a project is the recent EU project. E1 had identified the need for international partners and had started the process for an Uppsala type of internationalization. When the company was then contacted by certain university researchers and invited E1 to a project where it could take the matter forward, it was a no-brainer to join. Hence, the dominant decision-making logic was effectuation, although it relied on the firm's strategic plan.

(6) Covid-19

The impacts of coronavirus for E1 were of the same nature as for the other case companies. It made maintaining existing and getting new customer relationships more difficult. All business segments suffered but the professional cooking segment suffered the most. As a matter of fact, it became obvious that having several product and customer segments is of utmost important. As the CEO put it:

“Had we been dependent on one only, it would have been very grim.”

All in all, Covid forced E1 to put some development projects on hold, but no major strategic changes occurred. Decisions needed and actions taken were done quickly, bearing in mind the resources available. The prevalent decision-making logic tilted towards effectuation.

4.3.1.6 E1 Summary

E1 was established in 1925 and thus the firm has been successful for almost a hundred years. It is a remarkable achievement and tells a story of right decisions taken at the right time and correct actions in an ever-changing operative environment. The fourth generation being in charge is an indication of the owner family’s commitment. Yet, contrary to the current recommendation of engaging professional board members, E1’s board of directors has only one nonfamily member. That could be a limiting factor for future development.

The main strategy of E2 has been customer intimacy. Although employees are proactive and constantly searching for improvement, customer needs have steered operational activities. Not directly customer demand driven innovation project are modularization of the product portfolio, servitization of offerings and international activities. The driver for modularization is cost efficiency, while for servitization and internationalization the driver is to find new markets. Both servitization and systemic internationalization require local partners and learning. For both expansions, E1’s approach has been careful and included some testing types of activities.

The development started from the fact that the firm needed to reduce its dependence on its main customer, the Finnish army, and was the result of internal pondering of possible future scenarios and trends that may provide opportunities or create obstacles for the business. Consequently, in 2019 and 2020, the company engaged with consulting companies to study the culturally close markets, e.g., in Sweden and the Netherlands. Hence, the company is a living example of

incremental internationalization defined as the Uppsala model (ed.). On the international sourcing side, meanwhile, E1 has already been active for several years.

Events and incidents identified in the study indicate that the present CEO has the strategy and tactics under control. This may be due to the solid operational practices of the firm, experienced personnel and the CEO's own technical education. Nevertheless, there is a long way to go to become a successful international service provider for outdoor eating. Steps forwards resemble both causative and effectual characteristics. The study analyzed six decision-making matters of E1 Fornello.

4.3.2 Case E2 Camino

Case company E2 was founded in 1992. Three brothers founded and still own the company. Today they act as the board and one of them is also an active employee. In 2017, the company hired its current CEO. He has a solid background in the building construction industry. During his time the company has focused on improved operational efficiency and stabilization of the offerings. E2's main products are modular steel chimneys for fireplaces. The product portfolio also includes tailor-made smoke removal solutions. However, E2 does not offer installation. This is mainly due to the business model, as the CEO describes:

“Chimneys are sold to fireplace suppliers. And we don't sell the installation, we just sell the material, which these fireplace suppliers then sell to consumers with their fireplace package.”

E2 is located in a rural area some 20 kilometers from the nearest commercial center. Occasional passersby would probably not notice the factory. It is, in fact, located behind a detached house that serves as E2's office. The manufacturing equipment of the firm is somewhat outdated but still well suited to the purpose. Undeniably, expanding markets require efficient production. E2 did have an investment plan for improvements in its own manufacturing process. However, the CEO put the plan on hold. He aims to improve the production process by streamlining procurement, and subcontracting. This change in strategy has caused resistance among employees. Overcoming opposition is a challenge the CEO is working to solve.

E2's largest customer segment is fireplace specialty stores, e.g., in Finland, shops that sell and install fireplaces. The industry is quite conservative, and in a way, E2 is at the mercy of these retailers in Finland. They choose the favorite brand they

sell. The customer to whom they are selling the package does not question the make or type of the chimney. Hence, the benefits of E2's products may not reach the potential customer. This is a challenge that E2 has identified and is working to improve. Simultaneously E2 is working to have more Finnish fireplace manufacturers as their customers because the present low number of key customers is considered a major risk. Moreover, on the supply side, E2 is quite dependent on only one large manufacturer of insulation material and thus it limits E2's degree of freedom.

E2's competitors in Finland come from abroad. The biggest of them is part of a German international conglomerate. In the past, E2 itself has not had any significant export activity, except for occasional inquiries from foreign operators. A few of the inquiries have led to orders. Quite recently E2 has taken actions to change the situation and aims to increase and systematize its export activities. When doing so, E2 expects to face international competitors and local operators. Learning how each foreign market functions will improve E2's likelihood of developing and gaining a competitive advantage.

4.3.2.1 E2 Innovation Occurrence

In the past few years, E2's strategy has been to stabilize the business. The CEO described the situation:

“Our strategy needs to be reformulated. For the past three years, our strategy has been to stabilize this business. So, three years ago when I came into the house this company was in a not-so-good condition financially. Yet there was a huge interest here in developing sales, expanding, developing products even though there was no real resource for these activities. So now, for the last two to three years, we have only tried to get this company to the point where this basic business is on a solid footing and this is profitable as such. Now that we have succeeded we can start thinking a little bit about what else we could do.”

E2 does not have an actual innovation strategy or concept. New ideas are processed in an order, which depends on where the idea originates. Quite often the idea comes from the owners and then the CEO discusses it with them. Then, if he finds the idea feasible, he brings it into production for joint pondering and discussions. This practice has been implemented out of serious need. As the CEO described, the firm has too actively developed and changed product designs. Among other hyper activities, this has led to poor profitability and therefore he has focused on improving operational efficiency.

Consequently, recent innovations are very incremental and mainly production process- or manufacturing-related improvements. In fact, the manufacturing process has been E2's most important innovation in enabling the firm's product solutions. This includes the one product innovation that clearly differentiates E2 from its competition. In that design, the combustion air is brought into the fire through channels along the length of the chimney. This construction allows the air to be preheated prior to combustion, and thus improves the combustion and reduces emissions.

E2 has successfully sold this innovative product both to existing and new customers, and, as the CEO explained:

“We have also gained new customers with this new product. Or let us say that true old customers have revived interest in us with these product solutions.”

E2's products need certifications and activities are subject to authorization. This calls for collaboration with research institutes and organizations like VTT. Because the number of actors dealing with chimneys and combustion research and development is rather small in Finland, they have formed a kind of club. Doing things together will reduce costs and improve the overall development efficiency. All in all, the regulated market creates its own moments of inertia for any new innovations.

In addition to peers, public and semi-public partners, E2's innovations are subject to subcontractors and suppliers. In fact, a couple of major component suppliers have a dominant market position and thus can indirectly affect E2's product design. Cooperation is also important from the cost point of view. Testing is expensive and thus it is in the interests of E2 to share the cost with others. Naturally, any co-innovation should benefit all participants and thus long-term business relationships are expected.

4.3.2.2 E2 Internationalization Occurrence

Over the years, E2 has randomly exported to some Nordic countries. Typically, a driving force has then been a localized Finn or some other person with contacts with Finland. Until recently, no internationalization strategy has existed. However, in 2019 and 2020, nearby foreign markets were studied as the company was looking for ways to grow. One alternative access route to international markets could be partnering with some larger Finnish enterprises. Also, in domestic markets the company is considering alternative sales and delivery routes. The driving force for this is the fact that E2's chimneys are high-end products that

require consultative sales. The current delivery channel consists of hardware stores that are mainly focused on price and thus their sales teams are not interested in selling more expensive but technically innovative chimneys.

Nevertheless, E2's main growth potential is in internationalization. In order to succeed, the company must adapt its operations in terms of strategy, structure and resources to match the international environment (Calof & Beamish, 1995). When doing so, E2 can use both the network perspective and the process model. Measures taken indicate that E2 follows the Uppsala process model, according to which exporting happens in stages. This staged approach comprises four stages, namely: no regular export activities; exporting via an independent representative or agent; sales subsidiaries production/manufacturing (Cussen & Cooney, 2019). E2 is clearly approaching stage two as it has started to study the Nordic and Baltic markets and is in the process of finding and appointing local agents. As Rasheed (2005) suggests, such an approach is suitable for relatively small firms as it allows them to gradually develop their international operations.

4.3.2.3 Other Pertinent E2 Occurrences

One challenge that was mentioned above is E2's limited access to end-users and its limited means to influence consumers' purchase decision. To overcome this obstacle, E2 uses digital tools in marketing and sales, i.e., tools as means that enable communication directly to and with the end-users and thus create pull-market demand.

4.3.2.4 E2 Relationships Dependency

The supply network of E2 is absolutely crucial for its success, as the CEO explains:

“Somehow, at least for now, it seems that the features of the product do not guarantee a competitive advantage, but the reliability and functionality of the company and the quality of the cooperation we offer to our vendors and installers do.”

E2's two biggest challenges are tied to external actors. The company has only one supplier for a critical component, which also limits flexibility in product design. Furthermore, E2 has only a few big customers and is quite dependent on them. Hence, E2 has to hold them even if terms and conditions are not always favorable. Most obviously the operational box E2 is in limits its options for innovation and growth and affects decision-making.

4.3.2.5 Decision-making Logic of E2

Three brothers formed E2. They now make up the board of directors and one is also working for the company as a sales manager. Decision-making among the peers was challenging. Plans were made and changed before implementation. New product innovations and changes were introduced regularly. Many innovations failed or were too expensive to manufacture. The firm was in constant financial turmoil. Finally, the owners decided they needed a professional manager to run the company.

(1) New professional CEO

The path for hiring a professional CEO was not due to a straightforward strategy but an act of necessity. Earlier experimenting and contingency exploitation are typical for an effectuation type of management, but the recruitment was a sign of causation. A fundamental change was needed.

(2) Stabilize operations

The new CEO took over. He analyzed the situation and acted fast. The expansion project, manufacturing improvements, product improvements and new business developments were put on hold. It took roughly a year for the CEO to stabilize the situation. Thereafter it was time for new plans and renewing. At the very beginning the logic the CEO implemented was of the type act first, then he switched to plan first and then implement. The decision-making logic was mostly of a traditional causation type.

(3) Make or buy

The decision to put investments in manufacturing on hold and strengthen subcontracting faced some objections among the employees as well as the owners. However, the CEO pushed the plan forward using arguments that all stakeholders understood and were not able to object to. Again, the CEO followed the minimize hassle causation logic. He made plans and defined expected returns. In short, the approach was goal oriented.

(4) Start export

Once the business was stabilized and profitable, it was time to expand the markets. The possibility of finding new marketing channels in the domestic markets was studied. Likewise, potential cross-border markets were researched. There had been some sporadic exporting but now it was time for a systemized approach. The

following actions match with the Uppsala model – start with nearby foreign markets, learn and expand further. The CEO explains:

“Exports are being taken forward all the time. I think we were in a good situation already in the spring, but then there was a small setback. Now again, negotiations are going on. We have one potential prospect in Norway, and then we sold one chimney to Latvia. We have some potential cases in Poland and the Czech Republic. As I said, we see some opportunities emerging.”

(5) Study Swedish market

E2 decided to study systematically the Swedish market in particular. After completing the study, the plan was to make a go or no-go decision, i.e., possibly set up a local agency or distribution coverage. As a matter of fact, the CEO has taken a systematic and professional approach toward internationalization, i.e., plan, do, act and adjust. Naturally he has to bear in mind the firm’s overall as well as function-specific resources. Planning and studying refer to causation logic.

(6) Future competitiveness

The company takes systematic measures to secure its competitiveness, on the basis of which the Business Model Canvas was prepared. Several action steps have been taken in production, procurement, engineering and sales. The results show that the actions taken have been beneficial for the success of the company. For example, the turnover increased from € 2 million in 2018 to €3,2 million in 2022. A causation type of approach has prevailed.

4.3.2.6 E2 Summary

Case company E2 was founded in 1992 by three innovative but less systematic brothers. Hence, their tendency to act without much planning, being open to unsystematic trials and eager to fulfill customer-specific demands almost destroyed the firm. E2’s main products are modular steel chimneys for fireplaces. Strict regulations apply and thus too much customizing is very costly. The rescue of the company came in the form of a new professional CEO who joined the firm in 2017. His first goal was to improve operational efficiency and stabilize the offerings.

E2 does not have an actual innovation strategy or concept but products are incrementally developed within the frame of possibilities. In addition to regulations and the somewhat outdated manufacturing process, a third retarding factor for new designs is the dependency on one supplier. This supplier is reluctant

to change the dimensions of its products. Consequently, recent innovations have mainly been production process- or manufacturing-related improvements. These improvements have allowed E2 to design a chimney that is clearly different from what the competition is offering. The challenge is to get the message to end-users.

E2's main customers are domestic fireplace specialty stores. Its main competitor is a German multinational, while some Asian firms have shown up on random occasions. Until recently, E2 has only sporadically exported in quite nearby countries. Nevertheless, E2's main growth potential is in internationalization. The CEO is well aware of this, and while he has taken action to increase access to domestic end-users, he has started to study Nordic and Baltic markets. In doing so, the company is a prime example of the Uppsala model.

All in all, E2's decision-making logic is strongly inclined towards causation. And as discussed earlier, if the owners have the patience to stay away from operational management, E2 is likely to successfully grow internationally. The study analyzed six decision-making matters of E2 Camino.

4.3.3 Case E3 Calore

The father of the current CEO and his brother founded E3 in 1955. The CEO has been in charge since the early 1980s. In 2020, the company had six owners, all representing members of the second generation. The current product portfolio contains different kinds of farm equipment and central heating boilers. The boilers are designed for the use of solid biomass fuels. A third outrigger of the firm is sub-contract machining. Over the last few years, E3's turnover has been around €10 million and results have been positive.

E3 is located in a rural agricultural area in western Finland. The distance to the nearest city is about 10 kilometers. When approached by car, one cannot miss the factory complex. It contains several buildings rising from the middle of a field. The "head office" is in a typical industrial building, which reflects the mood of "doing." The site speaks for itself as one anecdote describes: Once a potential British customer came to evaluate E3. When he saw the site, he was convinced and commented: "I have seen enough."

The firm's customer base is very diversified and includes farms, greenhouses, energy entrepreneurs, municipalities, including schools, district heating power plants and industrial companies. The CEO describes their offerings:

“We offer solutions to a wide range of problems – for example, heating problems, profitability challenges. Today’s trends in particular – that’s why I talked about the environment and others because our products interact strongly with renewable fuels like biomass.”

“There are hot water boilers, then burners and conveyors, then of course all the aids associated with that combustion, i.e., sooting, ash removal, flue gas cleaning, etc. We also offer ready-made packages, because then we can take responsibility for the whole installation. This is a relevant issue, for example, in the Russian market.”

E3 operates in close collaboration with several enterprises. It is also a part owner in some energy consulting and development companies. Overall, E3 is well integrated into the corporate society, is part of it and has clearly taken on some social responsibility. The company has a positive reputation and is perceived as a pioneer in its field. E3 exports its products to Nordic, Baltic and some other European countries. The CEO has studied in Germany and speaks the language, and thus Germany has emerged as an important export market. Export activities are partly handled by their own resources and partly through agents.

In recent years, the focus has been on the development of services. Therefore, opportunities, requirements and demands that are particularly relevant for industrial services are of interest. As is well known, digitalization can improve efficiency and customer orientation, e.g., due to fast remote connections. Hence, digitalization is part of the puzzle. Because of that, one of the CEO’s visions is a shared database where customer process data are stored and accessible to a group of participating operators. The outcome should be a solid, continuous “permanent” type of business relationships among the operators and customers.

Covid-19 has had an impact on E3’s operations as all global incidents do. However, according to the CEO, the global environmental movement has had, and continues to have, a stronger influence in the industry that E3 serves.

4.3.3.1 E3 Innovation Occurrence

As previously mentioned, Covin and Wales (2012) argue that achieving innovation can be particularly difficult for established firms, whereas in an entrepreneurial firm ideas are perceived to be initiated and converted to innovations more easily. Then what comes to the actual commercialization of innovation the performance of established firms may be ahead. Incremental innovations are, by definition, perceived to contain improvements to existing solutions (Kasmire et al., 2012) and

are often implemented through a systemic process, whereas radical innovations require above all creativity and flexibility. Although E3 does not have any written research and development strategy, strategy-type discussions take place on a constant basis. Discussions include alternative strategic scenarios for development directions. To support the planning, different kinds of analysis are utilized. Innovation activities interact closely with customers whose wishes the firm tries to fulfill. Also, the management follows general trends and discussions that take place on environmental, technical and societal issues. Ideas for potential innovations are discussed in the management team and even in larger forums. Evidently, over the last few years, E3's innovations have to a great extent been incremental in nature.

The possible innovation scope and speed of activities are subject to resources, incurred costs and the suitability for existing machinery and other facilities. Other possible obstacles to innovation and to being verified include a lack of demand and competitor rivalry. A frequently asked question among E3 management is:

“How suitable are our own and the network's resources for the potential new offerings?”

“A lack of resources is a clear barrier to innovation, as are financial constraints. If your own human resources are not enough, then it may not be worth starting to hire new ones.”

Moreover, before entering into any major development project, E3 tries to recognize and evaluate risks. Likewise, the company evaluates the risks of not keeping up with market and technology developments. Hence, E3 is aware of the risks of not keeping up with new market and technology developments. Today, E3's innovation work is aimed at developing industrial services. The firm has an extensive installed base and aims to utilize that in its service business development. In this development initiative, digital technologies form an essential element. According to Peillon and Dubruc (2019), obstacles that SMEs like E3 may face during their path to digitalization are technical/technological, organizational, human resources-related and customer-related. In fact, E3 had identified the opportunity and barriers connected to digitalization and thus was considering ways to proceed. Specifically, E3 linked digitalization to service business and competitive advantage, as the CEO explained:

“Future competitive advance is service. Better service and digitalization and things that improve efficiency, and customer intimacy. So that the customer relationship will last and is solid and it has remote connections. Leading to better and faster customer service. The customer does not want to buy worries and

sorrows, instead he wants... ok, when we enter in this business relationship... this solution is so good and permanent that it's worth doing it."

By chance, in 2019, E3 was invited to participate in a European Union (EU)-financed development project. The project's target group was SMEs in specific regions both in Finland and Sweden. Among other targets, participants were expected to network and implement their own development projects. E3 seized the opportunity because it offered a platform to promote the firm's service business initiative. The specific target E3 was aiming to achieve was an open digital platform for data gathering and distribution. Ideally, E3 was looking for user partners and software expertise. In short, the project offered E3 the means to achieve one of its business development goals at a very reasonable cost. Hence, the firm signed up.

On a general level, the CEO has concerns about the future of the industry. When asked what kind of innovation opportunities he sees in the future, the CEO was somewhat unclear but realistic optimist:

"Well, yes... Of course, we have opportunities; we only need to expand that supply on the solid fuel side. I do not think it will end completely, but we will develop it further in that diversity and in the direction that politicians seem to be twisting, so it is not worthwhile for us, as a small company, to embark on a crusade against the whole world."

Based on the implemented flexible, think-aloud interviews, it became clear to the researcher that E3 had implemented several incremental development processes simultaneously and had used multiple routes to the innovation end, as suggested, for example, by Berkhout et al. (2010). Probably due to the CEO's hands-on management style, there wasn't much bureaucracy to slow down decision-making. Neither were E3's innovation actions jeopardized due to financial constraints. The organization is resilient and inclusive. Proof of that was its survival through the recession of the 50s, 70s and 90s, the financial crisis of 2008 and the recent Covid epidemic.

4.3.3.2 E3 Internationalization Occurrence

E3's first cross-border actions were not based on any plan but were taken when someone from Sweden contacted the firm. Since those early times, things have changed, and today the firm has an internationalization strategy that is updated from time to time. The basic intent is to grow thoughtfully. The market is also in constant movement and requires actions to be taken – e.g., distribution has to be reconsidered. Entering new markets even within the EU often requires technical

adjustments because every country seems to have its own rules. Protectionism is strongly present in the energy industry.

Today it's justifiable to say that E3's products are exported all over the world. Sweden is the main export market area and 90% of the exports go to the EU area. The rest goes to Asia, the USA and Russia. Currently, the company is investing in Germany to support aftersales services. Also, E3 has a fresh strategy for the Commonwealth of Independent States (CIS). No doubt Russia's invasion of Ukraine affected the implementation of the plans. Fortunately, the market had not been very important to E3.

Exporting began in the 1980s. The first deliveries went to Sweden and Great Britain. Then, in the 90s, it was Germany's turn. The furthest deliveries have gone to New Zealand, Australia and South America. As in Finland, in many foreign markets E3 has local distributors. Participation in regional exhibitions and marketing on various platforms and with different methods take place in close cooperation with distributors. E3 is a prime example of stagewise internationalization. The company has gradually extended its international presence.

In addition to foreign joint sales and marketing, E3 has entered into joint development activities, e.g., with foreign businesses and universities. Such collaboration has produced saleable solutions for specific applications and thus increased international sales. Also, E3 uses large amounts of foreign parts and components in its solutions. In most cases, however, these are not procured directly from the countries of origin, but from a Finnish distributor. When needed, direct contacts with potential foreign suppliers are searched for using Google and existing networks. Overall, foreign procurements are necessary regardless of the purchasing route available to E3.

4.3.3.3 Other Pertinent E3 Occurrences

The recession of the early 90s was a challenging time for E3. Like many other Finnish SMEs, the company had taken a foreign currency loan. Then, contrary to what had been promised, Finland devalued and thus the loan became much more expensive to repay. E3 emerged from the crisis, but many others did not. The more recent global financial crisis in 2008 was much less challenging for E3, although it did require different arrangements and adaptations. The crisis had the same effect as a severe credit loss of the kind the company had faced. One example of a serious credit loss occurred when E3's agent in Scotland sold boilers to an old castle. As it

turned out, the customer did not have money to pay for the delivery. Such incidents need special actions, although the end result being a major loss may not change.

E3's CEO is well aware of global trends. He has found that the climate change debate, which has lasted for about 20–30 years, has intensified. The use and acceptability of biomass energy directly affects E3's business and is a critical factor in E3's future success. If the new regulations come into force gradually, it will give companies time to adapt. Similarly, when new regulations enter into force without an appropriate transition period, their effects can be dramatic. A good example is the rapid shutdown of peat production in Finland in 2021. Indirectly, such sudden measures also have a negative impact on the success of equipment suppliers such as E3. Over the years, however, the company has faced a number of negative and positive challenges and thus demonstrated to itself and its customers its ability to adapt to change.

4.3.3.4 E3 Relationships Dependency

Over the years, E3 has cooperated with a vast variety of domestic and foreign organizations including universities, consulting services and research organizations like VTT. Cooperation has taken various forms, from supplier agreements to joint ventures.

The CEO confirms the current situation:

“We need partners. Today, products are so complex that we are dependent on others. We pay for flexibility, programming and all kinds of services.”

Essential collaboration is done with many organizations, with programming being probably the most difficult to replace. Generally speaking, distance is considered one of the most serious disadvantages when forming partnerships. Language problems are also often associated with this issue – for example, all communication with German partners is done through the CEO because he speaks the language.

4.3.3.5 Decision-making Logic of E3

The main decision-maker is the CEO. He is an engineer in his sixties and has been in charge for about 40 years. The name of the company refers to the brothers who founded the company. Interestingly, the name is still relevant as the CEO has brothers with whom he discusses both strategic and operative issues. As the CEO says, it is teamwork that rules. Moreover, he explains that E3 being a family-owned

company has often been beneficial as decisions can be made fast and frequently on the spot. As the CEO argues:

“Quick decision-making has helped us when new windows of opportunities have opened up. Procrastination and in-depth studying could have prevented our actions so long that the window would have closed.”

He adds:

“Broad strategic lines are kind of planned for, but when problems and events occur, they will be solved quite quickly and then with little prior clarification.”

During the interviews and less formal discussions, six events and incidents (CIT) surfaced. As in the other cases, identified incidents are not necessarily directly coupled to innovation, internationalization and business relationships. However, more or less everything influences everything and thus these events and incidents will assist in the analysis of E3’s decision-making logic. Case in point: The first major challenge that the CEO described took place in the recession of the early 90s. E3 had taken a currency loan because the company had been strongly recommended to do so by its longtime bank. The named incident and five other identified issues are discussed hereunder.

(1) Recession of the early 90s

The recession of the early 90s was particularly severe for Finnish SMEs. Many had taken currency loans when Finland was forced to devalue the markka. At the same time the Soviet Union had just collapsed, causing many companies to lose their markets, etc. E3 was no exception. It suffered from the devaluation as well as from losing the Russian market. The company had to enter survival and damage control mode. This required quick and solid decisions to be made. There was no time for much planning and thus the flexibility of the family ownership was put to good use. E3 used its own resource pool, partnerships and the government’s special financing to conquer the challenge. The dominant decision-making logic was undoubtedly effectual.

(2) Global finance crisis 2008

The global finance crisis in 2008 affected E3’s domestic and export businesses. There were several critical incidents related to crises. They were resolved on a case-by-case basis. An illustrative example is the credit loss in the Scottish castle case. Through its local agent, E3 had secured a major order and delivered boilers to an old castle. Unfortunately, the customer was hit by the crisis and could not pay for the equipment. After considering its few options, E3 decided to just write off the

loss. The common denominator for all the incidents that occurred due to the global crisis was damage control. As the old saying goes, when the house is on fire you must act.

(3) EU project, event, some planning, opportunity, network & partnerships

E3 has participated in a variety of development projects. An excellent example of this is one EU project. E3 had identified a need for a production database of its customers' processes. A joint database with other boiler manufacturers would be even better. However, E3 had not really done anything to advance the issue. It then happened that the company was contacted by some university researchers who invited it to participate in a development project where it could take the matter forward. Hence, an opportunity emerged that included cooperation with other companies and universities. E3 joined the project. Thus, the dominant decision-making logic was effectuation.

(4) Energy policy

Changing regulations are a constant challenge for manufacturers of energy equipment. Some changes come more or less as surprises while firms have more time to prepare for others. Changes seemed to really frustrate the CEO. In particular, it bothered him that some politicians are unable to outline the overall picture. Whenever possible, however, E3 did plan for changes, and when it didn't, it adjusted. Clearly, the firm wanted to control its own future and considered what it could afford. Again, effectuation logic seemed dominant in the decision-making.

(5) Coronavirus pandemic

When it comes to Covid-19, E3 was not an exception. The pandemic seriously affected its business. The firm did what it could to minimize the damage. It acted in controlling costs, took care of key partnerships and applied for government support. All these actions together got the firm through the long-lasting challenge.

(6) Russian attack in Ukraine

Russia was an important market for E3, albeit less so than in previous years. Covering the effects of the war for E3 and for the other case companies would probably not bring anything substantial from the research questions' point of view and thus they are not covered in depth here. Yet, it is obvious that E3 had to improvise in terms of damage control.

4.3.3.6 E3 Summary

E3 is a family company, some 60 years old, that has survived domestic and global recessions, changing government policies and smaller firm-specific incidents. Size-wise, E3 differs from the other case companies as it is clearly a midsize enterprise. Over the years, the firm has produced a vast variety of products ranging from farm equipment to biomass boilers. Some of the products have been very innovative, if not radical, while recently innovations have been of an incremental nature. The firm does not have an innovation strategy but follows environmental trends and wants to be prepared. Ideas for potential innovations are discussed and evaluated. Decisions on whether to go or not go depend on the innovation scope, its own and its partners' resources, and potential costs. Recently the focus has been on the development of industrial services. Based on E3's installed base, service business offers good low risk potential for domestic and international growth.

Initially E3 had started up internationalization as in the other case SMEs through sporadic orders to Sweden. Today, E3 is heavily involved in international business. It has successfully exported to most European countries as well as to the CIS. The furthest customers have been in New Zealand. As with many other European firms, Covid-19 had a negative impact on E3's international activities, while Russia's war of aggression against Ukraine terminated all activities in the relatively good Russian markets.

E3 collaborates with several other firms and networking is a fundamental element of its operations. In addition to its domestic partners, E3 has an extensive network of foreign agents and distributors. Moreover, E3 has cooperated with Finnish and German universities and been involved in the founding of joint ventures for research and development activities.

The results of the interviews and observations undoubtedly show that E3 is managed by a well-experienced CEO. He makes decisions based on facts, gut feeling and intuition developed and fine-tuned over the 40 years of his reign. He and his team do make some plans, observe the markets and follow industrial trends, but in the decision-making, means orientation, affordable loss, partnerships and experimenting, typical of effectuation, dominate. However, causation is also present – for example, in the form of risk avoidance, as the CEO pointed out:

“When we evaluate, and especially when we are such a family business that belongs to this age group, we will not under any circumstances take on projects that would completely jeopardize this company.”

4.4 Common and Distinctive Features among Established SMEs

According to the conservative model, opportunities are discovered through a purposeful search process. This is the normative model employed by neoclassical economists where the decision-making process involves defining, diagnosing, designing and then at the end making the decision (Mintzberg & Westley, 2001). However, many behavioral researchers have challenged the model (Pfeffer & Khan, 2018). Among others, James G. March challenged the notion of rational goal-driven decisions and argued that we cannot make decisions in terms of a goal that will only be known later. Moreover, he challenged the dogma of preexisting goals and requested better decision-making models (Augier, 2004; Pfeffer & Khan, 2018).

Effectuation theory provides an alternative, gradually strengthening approach. Effectuation argues that entrepreneurs do not solely understand certain phenomena as they are typically applied in the natural or social sciences, but rather, they understand how these phenomena can be designed and how new artifacts can be created (Szambelan et al., 2019). As previously discussed, the bulk of the literature claims that effectuation is dominant in the early stages of new ventures, while the classic causation approach becomes more prominent later. Hence, the key question here is: What is the dominant decision-making logic of seasoned SMEs and how does it affect decision innovation and internationalization activities? The discussion follows the overall research structure: overall review → innovation review → internationalization review.

4.4.1 Overall Review

Without doubt the environment, industry, ownership, management and the firm's offerings all affect the decision-making logic and process. If not quite unanimously, then strongly, the literature suggests that over time, causation overtakes effectuation as the dominant logic. The findings challenge this conclusion and suggest that, depending on the area, well-established firms use either effectuation, causation or both logics as summarized in Table 10. Thus, the results support Sarasvathy's (2001) initial idea that although causation and effectuation are conceptually distinct, they can occur simultaneously, overlap and intertwine, depending on the context of the decisions and actions taken.

Table 10. Dominant Decision-making Logic in Critical Events and Incidents of SMEs

Case firm	Causation = C, Effectuation = E, Both = B, Unclear = U					
E1	Takeover/ E	Army inquiry/ C	New service business/ B	New markets/ C	EU project/ E	Covid pandemic/ E
E2	New CEO/ C	Stabilize operations/ C	Make or buy/ C	Start exports/ B	Swedish market go or no go/ C	Future competitiveness/ C
E3	Recession early 90s/ E	2008 finance crisis/ U	EU project/ E	Government's energy policy/ E	Covid pandemic/ U	Russian attack/ U

To refresh the reader's memory, E1's main products are outdoor food preparation devices. The firm's main competitive advantages are its own manufacturing and key customer intimacy. Recently, E1 has begun quite systematically to study means and ways to export products to countries culturally close to Finland. E2 is a manufacturer of modular chimneys. Its competitive advantage is strongly linked to its own engineered-to-order design and peculiar manufacturing. E3 has a diversified product portfolio, the main product being biomass boilers. Also, E3 relies on its own production but has, over the years, like E1 and E2, built up a large production and procurement value network.

All SMEs initially started exporting occasionally without much planning. They just seized the opportunity. In each firm's initial export order, a third party was involved. Since then, internationalization activities have become more systematic, as has the collaboration with other organizations. Recently, E1 decided to invest in international growth while E2 is more or less on stand-by, and E3 has been conducting international business successfully for several years. Over the years, E3 has experienced both successes and failures, including legal battles. It is also worth noting for the reader that E1 is run by a fourth-generation entrepreneur and E3 by a second-generation entrepreneur, while E2 is managed by a professional manager. That alone may explain the differences in the dominant decision-making logic.

Furthermore, the derivative findings as for INTVs, of the data collected are used for the comparison of common and distinctive features of the SMEs' decision-making. Because INTVs and established SMEs differ in many ways, so do the observed contents of decision-making as presented below in Table 11:

Table 11. Derivative Comparisons of SMEs' Findings

Pseudonym	E1 Fornello	E2 Camino	E3 Calore
Product innovativeness	high	medium	high
Innovation strategy	no	no	somewhat
Innovation resourcing	goals	goals	means
Innovation cooperative	medium	medium	high
CEO's technical expertise	high	high	high
CEO's marketing experience	medium	high	high
New market potentials studied	somewhat	somewhat	yes
Product launch planned	somewhat	no	yes
International markets studied	somewhat	somewhat	yes
Internationalization strategy	some kind	no	some kind
Internationalization type	stage-wise	stage-wise	stage-wise
Internationalization cooperative	medium	low	high
Alliance strategy	no	no	somewhat
Alliance dependency	strong	strong	medium
Avoids uncertainty	yes	somewhat	yes
Open to change	high	medium	medium
Takes on opportunities	medium	low	high
Level of goal setting	medium	high	medium
Perception of environment	risks assessed	some risks	risks assessed
Digitalization preparedness	medium	low	high
Future visioning	yes	somewhat	
Managing principles	laissez-faire	change	democratic
Dominant logic C /E	Effectuation	Causation	Effectuation

4.4.2 Innovation Review

Proactive entrepreneurial firms seize opportunities and introduce innovative products and services ahead of the competition (e.g., Rauch et al., 2009). On the

other hand, it has been argued that obstacles to innovativeness are represented by market perceptions resulting from organizations' actions (D'Este et al., 2011). From this perspective, innovation barriers can be interpreted as artifacts on the boundary between the internal firm and external market environment (Szambelan et al., 2019). Moreover, entrepreneurial concepts are introduced to help in explaining how these barriers to innovation can be overcome. However, for an established company, entrepreneurship may be less important than resource management.

Also, as presented by Thuy (2013), small business owner-managers' ability to identify potential opportunities has been recognized within the literature as a critical determinant of the firm's success (Kirzner, 1997), as their decision-making in innovation is often based on personal intuitive knowledge (Lindman, 2002). Therefore, SMEs' commitment to innovation to boost their growth rate may suffer due to a lack of commercialization success as a result of their informal planning and management (Wheelen & Hunger, 1999). The argument is that careful planning allows companies to repeatedly engage in entrepreneurial activities and thus be innovative (Brinckmann et al., 2010; Palmié et al., 2018; Vanderstraeten et al., 2020).

Excess innovativeness on the part of the founders of E2 led the firm into constant changes and struggle. Being ahead of the competition in terms of innovation was expensive. Commercial success kept on moving forward due to the constant introduction of product and production modifications. Clearly the firm was lacking the benefits of careful planning. The situation did not improve until the owners were able to agree on the need to step aside from the upper management. Thereafter, causation dominated the decision-making.

Correspondingly, both E1 and E3 provide alternative development arcs. These companies have a proven track record with enough innovativeness to survive and prosper for decades. Specifically, the findings suggest that previous and present entrepreneurs of E3 have seized opportunities and conquered obstacles to innovations by building up successful international operations. The data indicate that the present entrepreneur is open to opportunities and is not much inclined towards formal planning. E3's innovation development is primarily means oriented, but when changes in the environment or opportunities require it, goals are set and resources searched for. The fact is that E3 is big enough to implement some development work independently and thus uses supplementary resources on a case-by-case basis only. In contrast, E2, although it appears partially follow the same decision-making practices, is more dependent in regard to external

resources. This is most obvious when E2 under the present management invests in new business as well as new markets.

4.4.3 Internationalization Review

Internationalization is an investment that increases the commercialization challenges substantially. Moreover, internationalization is a decision-making process that typically evolves over time and thus the findings will contribute to the question of the logic's impact on the firm's internationalization method and performance and vice versa.

Nevertheless, different results have been reached about the impact of the decision-making logic on internationalization (Schweizer et al., 2010; Vissak et al., 2020). A few studies propose that causation logic enhances internationalization (Brouthers & Nakos, 2005; Lukas et al., 2007), while some other researchers conclude that effectuation decision-making logic hastens internationalization (Andersson, 2011; Gabrielsson & Gabrielsson, 2013; Vasilchenko & Morrish, 2011). Likewise, other studies suggest that actually the change of the decision-making logic from causation to effectuation accelerates the internationalization process (Bell et al., 2004; Kalinic et al., 2014; Vissak et al., 2020).

As previously discussed, a small domestic market and low demand, combined with the allure of better opportunities for growth and market share in foreign markets, suggest that SMEs adopt international expansion for market-seeking reasons. Antecedents, stimuli, capabilities, strategy, process and outcomes encapsulate the actual dynamics of internationalization (Kahiya, 2020). In fact, an SME's weak resource base is likely to make the decision to enter into international markets particularly challenging. Indeed, a significant amount of research has been devoted to understanding how SMEs resolve this challenge. And a large amount of literature proposes that interorganizational collaboration may reduce such challenges (Zahoor et al., 2020). Collaboration helps SMEs to resolve their resource limitations (Lu et al., 2010; Zahoor et al., 2020) increase credibility and lower the risks associated with entry into foreign markets (Zhou et al., 2007).

All case SMEs have taken a stagewise approach to internationalization. All three had, sometime in the past, carried out some trial exports and received cross-border orders initiated, for example, by expatriate Finns or some occasional business partners. Hence, at the beginning, case firms' internationalization was of the act first type, means oriented and partnership driven. Subsequently, E3 gradually and more systematically expanded its international operations to current levels, with exports accounting for a significant share of its turnover. However, entering new

international markets is still less goal oriented than exploiting contingencies and E3's desire to control the future. Hence, even if the size, age, international experience and use of its own resources seem to suggest causation emphasized decision-making logic, E3's internationalization is strongly opportunity seized and effectual. Without much doubt, the reason is the CEO's hands-on management style and the fact that he has run the company for 40 years. Such solid experience is likely to build up self-confidence as well as confidence among stakeholders. Maybe early effectuation transforms to causation and then under certain circumstances back to effectuation.

E1, although older than E3 as a company, is in a different situation at the beginning of its internationalization. The company has not strived for strong growth but has contented itself with serving its core customer. The relatively new CEO has assessed the situation and the risks of having only one customer. He has made preplans to change the situation. A new service business has been conceived and some export markets have been studied. However, no detailed plan for implementation of the service business nor for an internationalization process has been made. Planning refers to causation, but the lack of a detailed plan suggests effectuation. Moreover, the CEO did confirm that sometimes decisions are made intuitively. Hence, the CEO's academic education is likely one reason for his desire to plan, but the firm's size, stimuli, capabilities and culture suggest an effectuation type of approach in the decision-making.

E2, the only case company led by a nonentrepreneur, is a classic example of causation. Had the firm not hired an outsider, it would have failed. The effectuation-type approach of the founders was leading towards disaster. The firm was too flexible in response to customers' requirements, always willing to test things and exploit contingencies. The founders wanted to control the future but could not. Luckily, they were able to agree on stepping aside. The results of causation-type systematic management are bearing fruit and E2 is in a position to search for growth opportunities. International markets are being studied and tested, starting with nearby countries. Implementation of any major act will call for partners and tight control of costs, and thus causation is intertwined with effectuation as some scholars suggest.

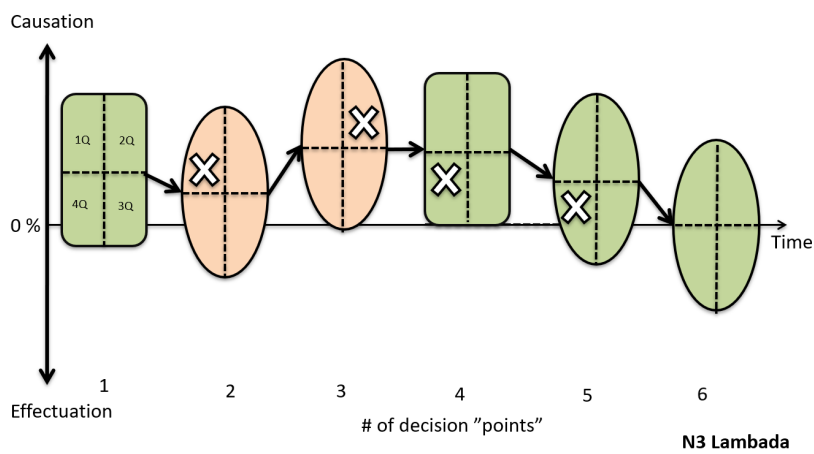
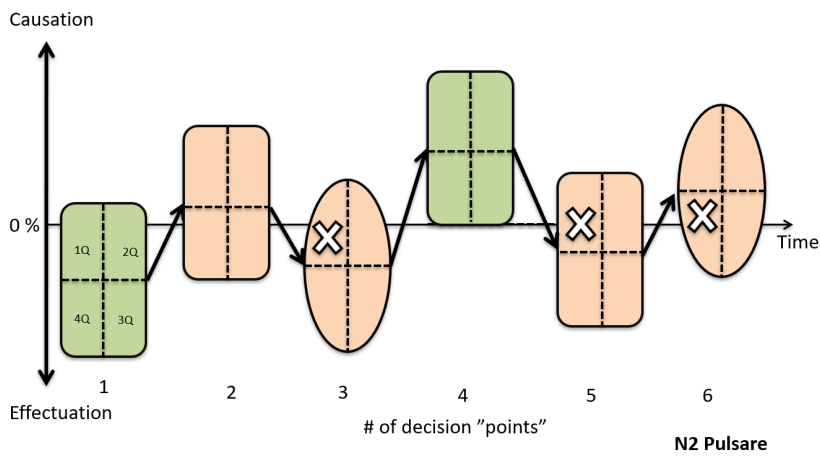
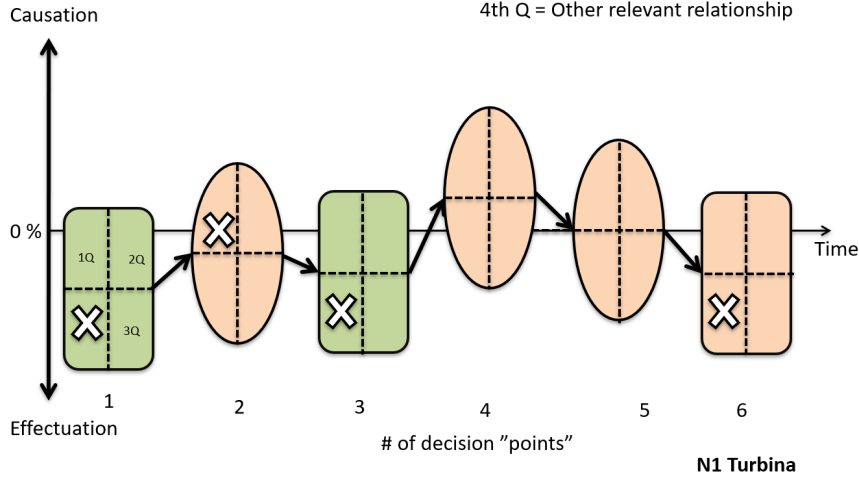
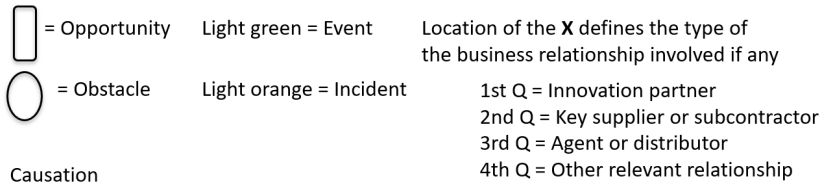
The findings confirm that no single decision-making type is used when established SMEs innovate and internationalize. Both internal and external stimuli and the situation itself affect the logic.

5 COMPARISONS, CONCEPTS AND CREATION OF A MODEL

Companies face external challenges, such as urbanization, climate change and electrification, and internal challenges, such as the information gap, digitalization and financial challenges. On the other hand, the "blue ocean" type of possibilities is limitless because the future is open and progressive. New companies can come up with novel ideas and existing companies can move from one value proposition to another. The success and survival of companies require decisions to be made. Yet companies do not make decisions, people do. Individuals make decisions based on expectations, facts, intuition and experience. Their actions, thoughts and feelings influence each decision. A change in one element affects the other two. This "cognitive" type of triangle is present in each individual's decision-making logic and process.

Undoubtedly, decision-makers consider circumstances such as economics, technology, the market at hand, goals and strategies as their organization faces new opportunities and obstacles, yet the actual decisions and actions are case-specific and thus unique. However, the idea of a change in one business function or element affecting some others is generally valid. Rarely is anything permanent. This applies to the decision-making logic and previous studies have shown that in practice, absolute causation or effectuation logic does not exist. They overlap and intermingle, even if one is the dominant logic. When examining decisions, one must take into account both temporal and historical contexts and the fact that smaller issues are rooted in larger decisions. However, relevant connecting elements are often hidden and thus interactions between decisions are less than obvious. A similar type of challenge is applicable to the identification of details of the decision-making logic used.

In the previous chapter, the prevalent decision-making logic of each case firm's critical challenge considered in the study was defined. The interpretation of prevalent and recessive decision-making logics is derived from several different factors. The main input factors were the interviews, while other inputs came from casual discussions, phone calls, workshops, case companies' websites, social media, i.e., LinkedIn, and commercial performance. Elements that contributed to the relationship between C & E logic were influenced by the experience and education of the decision-maker, his or her relation to the company, ownership, company culture, firm age, i.e., history, firm size, complexity of technology, market situation, governments' policies, resources available and financial situation. Visualized results of the overall evaluation are presented below in Figure 16.



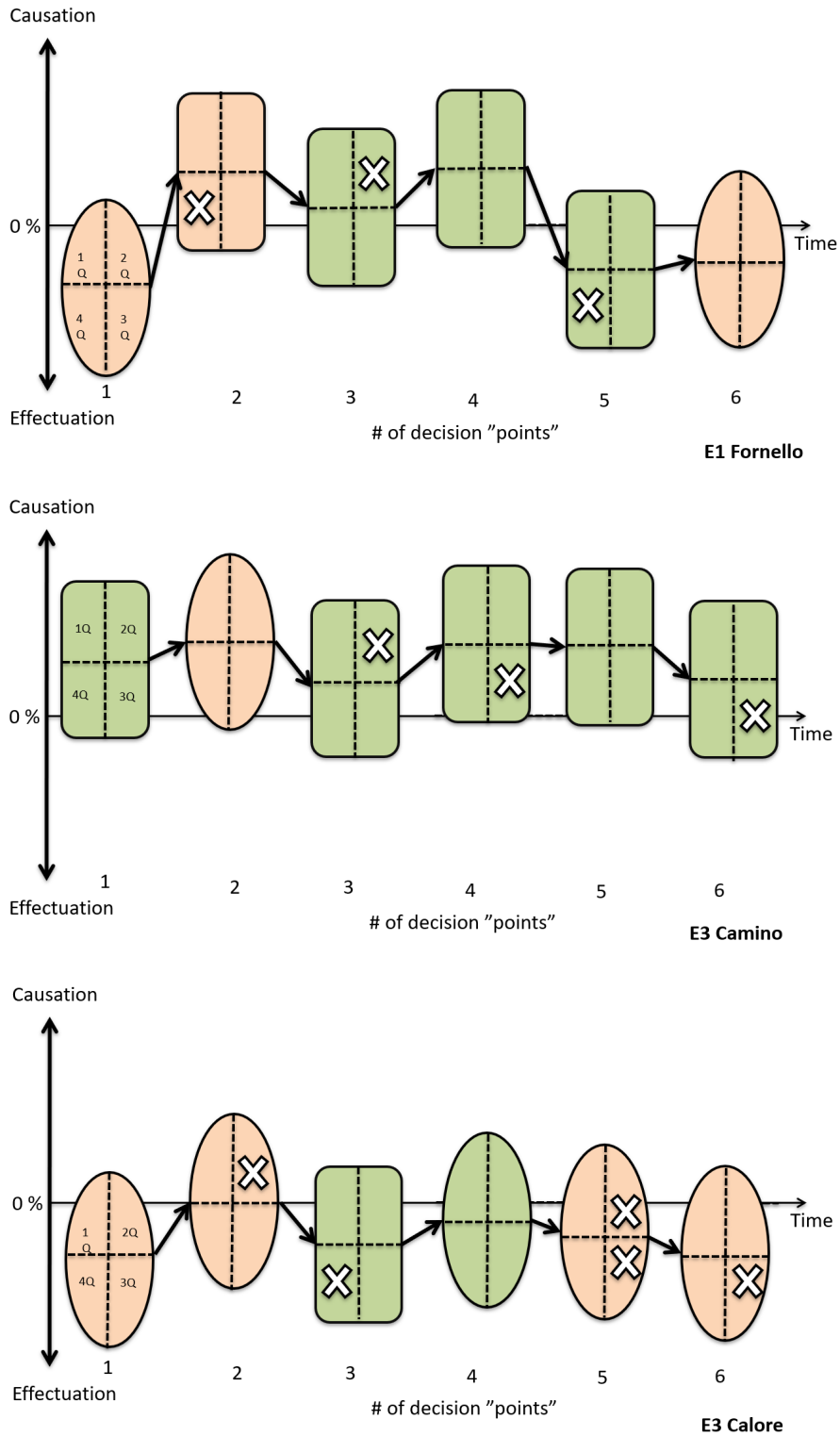


Figure 16. Summarized Comparisons of the Variation of Decision-making Logics

The figure depicts that although certain decision-making logic was identified as dominant in each recorded decision-making point, as shown in Tables 7 and 9, most decisions contained elements of both logics. Clearly, divisions for causation versus effectuation are not absolute but illustrate the continuous movement, variation and diversity of the relationship between the logics as summarized below.

- The two logics are often intertwined
- Rarely does any decision follow one only logic
- The use of certain logic does not develop linearly
- Events and incidents reverberate to each other throughout the time
- Either decision-making logic can be decisive in new ventures and established SMEs
- Innovation and/or internationalization with or without partners can call for causation and/or effectuation logic regardless of the company size

Consequently, the graphics in Figure 16 illustrate the similarities and differences in logics between the new ventures and the SMEs as discussed in the next section.

5.1 Comparison of the New Venture and SME Cases

Although the study's focus is on innovation, internationalization and alliances, the comparison also includes derivative subjects as introduced in Tables 9 and 11. This broader approach will strengthen the inputs at a later stage for the conclusions.

All in all, the results suggest that in both sets of cases, only two companies stand out where causality is the dominant decision-making logic, namely N3 Lambada and E2 Camino. N3 is the youngest of the start-ups being a five-year-old DNITV, while E2 has been operative for over 20 years. However, although other case companies are more effectual than causal, none is effectual or causal only. The findings suggest that the firm's age alone does not define the prevalent logic practiced.

Moreover, the same conclusion applies to firm size. E3 Calore's turnover is five times higher than that of the other two SMEs and several times higher than that of start-ups. Yet, effectuation is strongly present in E3's decision-making. Certainly, E3 has made plans, but as the CEO stressed often, the firm has to act fast and thus

rigid plans could become retarders. The thinking of E1 Fornello's CEO was along the same lines. Actually, the key to the prevalent logic of decision-making seems to be more the characteristics of the leader's personality than the subject in question or firm-specific factors. More evidence follows.

The business ideas of the three start-ups were based on technical innovation. N1's innovation activities were motivated by a promise of initial support. N2's innovation was maybe the most technology driven. Once the implemented initial technical simulations were successful, N2 was established. No market studies were done. N3's innovation, however, was clearly market driven as the founders identified an opportunity and tested it with customers before establishing an enterprise. On the other hand, one common denominator for the firms was the complexity of their technology.

Evidence of the complexity was the long lead time from the initial idea to a marketable product. While all three DINTVs had been focusing on technical challenges, only one, namely N3, had studied the market and made marketing, including internationalization, plans from early on. Hence, once N3's products were ready for launch they had customers in waiting, whereas N1's internationalization actually started when a potential customer/partner found them through Google. Thereafter, N1 just had to seize the opportunity. In contrast to N1 and N3, N2 was struggling over what to sell and to whom. Their marketing message was fuzzy and thus formed a self-made obstacle to success. N3 was a good example of a well-known fact that technology alone seldom brings success.

Indeed, the CEO of N3 is both commercially and technically experienced. Although he is also an entrepreneur, his identity is strongly that of a professional leader. In this respect, he resembles the nonentrepreneurial leader of E2. As noted earlier, both N3 and E2 are inclined towards causative logic. This observation suggests that neither entrepreneurship nor ownership alone defines the prevailing logic. Moreover, the clear majority of entrepreneur-driven, new and older, case companies seem to favor effectuation, which contradicts the common literature that when a company ages, causation becomes the dominant logic. Naturally, the conclusion is subject to a rigorous debate for which further ingredients are hereby provided. In order to assist the reader, the identified decision-making points are grouped and presented in Table 12 by subjects rather than strictly in temporal order.

Table 12. Identified Decision-making Points per Observed Subject

Pseudonym	Company birth or new CEO	Strategy change or new business	International market	Subcontractor or customer	Regulations	Finance
N1 Turbina	1 / E / company's birth	6 / E / new strategy	3 / E / first export	2 / C&E partner failure	an issue	4 / U / company's financial crisis
N2 Pulsare	1 / E / company's birth	2 / C&E / new strategy	3 / E / foreign partner	an issue	an issue	6 / C / company's financial crisis
N3 Lambada	1 / C / company's birth	not relevant	an issue	2 & 3 / C partner failure	5 / C	an issue
E1 Fornello	1 / E / new CEO	3 / C&E / new business	4 / C / start exporting	an issue	an issue	not relevant
E2 Camino	1 / C / new CEO	5 / C / new business	4 / C&E / study exporting	an issue	an issue	an issue
E3 Calore	not relevant	not relevant	an issue	an issue	5 / Unclear	1 / E / global financial crisis

Moreover, although all start-ups had made initial business plans, only N3 had secured long-term financing before moving forward. Later on, while N1 and N2 were struggling to secure additional financing, N3 could focus on solving other obstacles. Nevertheless, initial business plans of DINTVs focused on innovations while corresponding plans of SMEs could be called "innovation strategies." Yet, none of the case SMEs had an actual innovation strategy. Their innovations were mostly incremental and included improvements in products, services, production and procurement. Most likely, as the data indicate incremental innovations were both planned and ad hoc. In any case, the "gut feelings" of E1 and E3 entrepreneurs were strongly present in their decision-making. Actually, the CEO of E1 identified intuition as a decision-making factor, particular when information available is limited. Accordingly, the CEO of E3 emphasized the impact of experience on the decisions made.

Furthermore, the data suggest without doubt, that innovation and internationalization can be interlinked. If a new company is heading for international markets from early on it may either do it based on a comprehensive plan as N3 Lambada had done or prepare some guidelines at some time during the product development stage as N1 had done, or just start doing it when an opportunity arises. When older companies aim for international market they can adopt a variety of methods for implementation. All case SMEs had started their internationalization on a case-by-case basis without much planning. The driving force had been a local expat or another interested external actor. Since those early days, E3 has become a strong exporter whereas E2 and E1 are still in the starting pits. Yet, based on age, E1 could well have become an international player already but until recently it had chosen to focus on domestic markets. Indeed, now the CEO has plans to change that. Likewise, E2 is reaching for new markets. Both CEOs proceed carefully because of their inexperience in international business and risk awareness. In order to manage the risks, firms were testing nearby markets and looking for reliable partners.

A conclusion can be drawn from the data that internationally inexperienced managers of new technical ventures focusing on technology cared less about international market studies. Hence, their market approach towards international events and incidents was fundamentally effectual. Instead, the internationally inexperienced managers of older SMEs decided to plan and research new markets before entering them. Therefore, specific subjects such as internationalization seem to have an impact on decision-making logic. However, the data are incomplete, and the conclusion can be challenged. Only by observing a relatively

long period of the life cycle of a specific company from its birth with specific managers could one draw more reliable derivative conclusions.

Moreover, the industry in question plays a fundamental role in any firm's decision-making. As pointed out, the energy industry, including its processes and equipment, is highly regulated. All products and systems are subject to certifications and approval by named authorities. Getting new products certified in certain markets for certain applications may be very demanding. For each case company fulfilling specific regulations is a must. Unfortunately, approval in one country does not mean acceptance in another. This applies on a global scale as well as within the European Union. When a case SME wants to enter a new market, it has to fulfill local requirements. When a new company wants to enter any market, it needs to get its product approved. However, even for an established company, changing government policies may cause extra havoc.

In light of the above, when Covid-19 caused N1's customer to cancel an order, the company struggled to find a new location for the unit in production. When such a site was found, N1 ran into a large number of regulations they had not anticipated. Hence, the firm had no option but to work out ways to fulfill the requirement specification. They faced a kind of forced effectuation, whereas N3 had been aware of the technical requirements throughout the innovation and product development stage but still failed the certification test twice. The demands for N3's products were extremely tough. Without rigorous planning before and after each testing, N3 would not have survived even though its financial base was strong. Furthermore, as the data suggest for incumbents, policies and regulations are something they deal with as business as usual. For new companies, strict regulations can cause financial challenges even when careful planning is done.

Indeed, finance is of utmost importance for every company. Management can do the right things at the right time but a firm may still end up in financial disaster. In the early 1990s, many successful Finnish SMEs were facing such a fate. And again, those who survived, as well as many younger companies, were shaken by the global recession in 2008–2009. Two of the case SMEs, E1 and E3, had lived through those periods. For E3, the turbulent times of the 1990s were a challenge because of currency loans. Neither company had made any plans for such a business environmental quake, but they survived. Most probably several difficult decisions had to be made. Correspondingly, a new company may face a critical cash shortage situation without any specific external cause.

Certainly, all three DINTVs had made some kind of financial plan when they started their businesses. Yet, they had all been too optimistic in their product-to-market estimates. N1 and N2 faced repetitive and costly technical challenges while

N2's major challenge was to define a saleable product or service. The economic history of N1 shows that the company needed several injections of money in 11 years. Finally, when the product was ready for sales, the market was hit by the coronavirus pandemic. The financial situation became very serious as the investors were losing their patience. Then, at this critical moment, a savior emerged leading to major strategic change. Interestingly, N2 went through somewhat similar peaks of hope as well as the valley of death. Was the similar type of financial performance of these companies due to their decision-making logic or pure chance? The research data do not provide an answer. However, the data suggest that having made a comprehensive business plan, N3 had secured a strong financial position and thus was less vulnerable to adversity. Hence, causation seems a more successful decision-making logic to tackle a prolonged technical development phase.

Moreover, the data suggest that the same conclusion is valid for old firms. Although E1 Fornello and E3 Calore were inclined towards effectual decision-making, they did not want to take risks that would jeopardize the well-being of their companies. E2, on the contrary, had been managed according to more than a few effectual criteria, resulting in consistently low profitability. Finally, the owners of E2 realized that they needed a change and hired a professional manager to bring in more planned management practices. Hence, firms can be successfully managed based on effectual and causation logic. However, pure effectuation could lead to underperformance, which needs a causation type of approach as a solution.

5.2 Seeking Resources through Alliances

The chapter includes some repetition, but this is justified when evaluating business relationships as a whole and in particular the effects of events and critical incidents in the decision-making logic. All case companies' successes rely on specific business relationships, representing three of Gravens' (1997) five relationship categories, namely outsourcing, partnerships and strategic alliances.

N1 Turbina became involved with a technical partner from early on. Partnering had been an issue of both resources and costs. Yet, when the key partner withdrew, N2 had to decide whether to go or not go. The "go" outcome of this critical incident was a strong example of effectual decision-making. The entrepreneur aimed to create his own future. However, later on, N2 encountered a technical problem that required specialized expertise to solve. After a systematic search, such expertise was found in the United Kingdom. After initial contact, a fruitful relationship emerged. On the other hand, while concentrating on technical development, N1

was quite reactive in its marketing efforts. Hence, more or less due to pure luck, a large multinational found N1, leading to joint marketing efforts.

The partnership was of immense importance for N1 as it gave the firm access to international markets. And although Covid disrupted the collaboration, which had started so well, the relationship held and may even have strengthened. The incident also made N1 more receptive to strategy change, the opportunity for which arose through the CEO's network. As a result of the opportunity and prior to the implementation of the strategy change, the management of N1 implemented a variety of studies and scenarios. These findings concluded the feasibility of the business model change. Moreover, in the process, the decision-making logic of the firm became, no doubt, causal.

N2 Pulsare needed business partners for a variety of functions. It partnered early with a manufacturing company because its business idea was to produce small turbines. After the strategy change, N2 was looking for large international partners with whom to continue the technology development. The strategy change was effectual, as were the actions that followed. A perfect partner would have provided access to technical resources and ultimately have become a customer. The search for such a partner brought in a few potentials. Two of them were interested in starting a cooperation. However, tragically, both partnerships, which started well, faded away without N2 really learning why. Instead of capturing value, N2 was left in limbo. Would a detailed preplanning and risk analysis have prevented or reduced the damage? Anyway, after the incident, N2 was struggling until the Shell competition that it won. Again, there was hope, but due to N2's smallness and newness, Shell probably considered a mutual collaboration risky. Hence, Shell requested a certain financial commitment from N2, which N2 had difficulty in fulfilling. The long lead time from initial innovation to market was taking its toll. Nevertheless, there were no noticeable changes in the firm's decision practices.

For N3 Lambada, outsourcing was the cornerstone of its strategy. At the very beginning they had several suppliers, but they quickly learned to minimize the number of them. The development led to a partnership with a large Swedish manufacturing company. N3 had a clear goal to build up trust with its key suppliers. However, if a supplier failed repeatedly, N3 took decisive action for a replacement. Indeed, having a solid business strategy backed by enough funding strengthened N3's negotiation position with suppliers and other partners. Also, in the forward integration, N3 was, from early on, looking for agents and distribution partners. Thus, it is clear that N3 was proactive in forming a variety of inter-company collaborations. It is worth noting that the events or incidents related to the business relationship did not affect the company's decision practices.

E1 turned out to be a relatively typical engineering company. The company's success was built on its own core competences, which were complemented by long-term business relationships. The almost 100 years of family ownership indicate dedication to the cause. On the other hand, the fact that the firm has not grown bigger could be an indication of risk avoidance and a certain carefulness. Only recently has the quite new CEO taken action for growth. He does it carefully and by trial and error, and in that respect he is loyal to the firm's decision-making tradition. The crux of the matter, however, is the response to changes in the operational environment. In the hybrid world, the market is changing but also becoming more universal. This means that firms can no longer feel safe even in their home market. Hence, E1 has studied exporting possibilities and new business opportunities. In doing so, E1 was well aware that implementing such actions would require alliances. Specifically, E1 needed partners for market seeking, distribution, risk reduction and co-specialization. E1 made plans and took advantage of opportunities that supported the plans. The critical incident of the coronavirus pandemic did affect E1's decision-making logic but did not drastically change it.

The owners of E2 had come to realize that they needed more structured management and decision-making. Thus, they hired a professional manager. The impact on the firm's decision-making was fundamental. Strong effectuation was replaced by strong causation. This change affected the firm's business relationships as well. Cooperation with various partners needed to be developed more systematically. The basic principle of doing everything possible itself was changed. Although there was resistance to the changes among the owners and staff, the new CEO proceeded with his make or buy strategy. Part of the strategy was to find alternatives to a supplier that the firm was highly dependent on. The aim was obvious, as the CEO wanted to increase flexibility and reduce risks. He had internalized the suggestion of, among others, Kohtamäki et al. (2018) to build alliances to strengthen its own core competencies and to increase capacity optimization, as suggested, for example, by Gulati (1998). Once the CEO had concluded that an alliance for a specific purpose was needed, he aimed for a balanced partnership, but he quickly learned that that was hard to achieve with some considerably larger companies.

Contrary to other case companies, E3's turnover and number of personnel are much higher. At least among other SMEs, E3 has considerable negotiation power. Moreover, during its existence it has been involved in a large number of business relationships stretching from outsourcing to joint ventures and full ownership. The firm had lived through several life cycles of alliances as depicted in Figure 9. Some incidents had been resolved and collaboration continued, while some others, e.g.,

with the Scottish distributor, had led to the termination of the alliance. It is worth noting, as previously mentioned, that the CEO of E3 favored flexibility and this attitude marked the decision-making in the business relations as well. Some of the relationships had been planned for, and thus certain strategic and organizational fits were identified, while some other partnerships were born out of sudden opportunities. All in all, no event or incident was identified that had caused the management principles to wobble.

5.3 Interconnectedness of Causation and Effectuation Logics

The data undoubtedly support Sarasvathy's (2001) argument that the success or failure of a company depends on an unlimited amount of interacting factors. A variety of these factors require decisions. As with factors, decision-makers also vary from each other in different ways, and thus too how they approach decisions to be made. There is seldom only one right approach to a solution for an issue. Likewise, there is no uniform best-fitting decision-making logic for a certain type of challenge. The material of this study confirms that conceptually different decision-making logics overlap and intertwine. Moreover, neither, for example, Brinckmann et al.'s (2010) arguments for business planning nor Baker et al.'s (2003) arguments for improvisation for venture performance receive unreserved support. On the other hand, the data strongly support Pettigrew's (2012) argument that while actors and actions drive processes, the actual actions are embedded in a multilevel context and thus the overall situation affects the decision-maker's actions.

As discussed earlier, previous studies have provided inconsistent results on the temporal development of the decision-making logic (e.g., Kurkinen, 2018). Neither do the data of this research provide any firm conclusion to the issue. For example, the decision-making of the two older case companies uses, undoubtedly, more effectuation than causation. Neither do the data provide evidence that more experienced entrepreneurs tend to prefer effectuation as suggested by, among others, Harms and Schiele (2012) and Long et al. (2017). On the other hand, when comparing the start-ups N1 through N3, the CEO with the most entrepreneurial experience preferred a causation type of an approach to decisions. All in all, it was hard to identify any decision-making patterns with the exception that effectual logic was applied to unpredictable situations more often than causation.

Consequently, a planning manager may have to act quickly without a contingency plan when the situation demands it, and likewise an improvising manager may

need an in-depth plan for his maneuvers for survival. As a matter of fact, the data confirm the point made by Alegre and Chiva (2008) that linear causality does not mirror the actual world. Thus, although planning is usually beneficial, the plan should not inhibit creativity when the terrain changes. Also, as expected, the data show that the more novel the innovation is, the more creativity is needed for its successful marketing. Furthermore, being technically innovative does not mean one is automatically commercially innovative. In fact, the contrary may be the case, and thus technically innovative companies may need professional partners for commercialization of their products.

The data support such a conclusion and show that alliances played a critical role in new case firms' survival and provided access to critical resources and thus allowed competitive advantages to be gained in their turbulent economic environment, as suggested by, for example, Russo and Cesarini (2017). But there were differences. N3 had a business plan based on alliances. N2 did not have a plan but had come to realize they needed a strong partner. N1 was looking for some partners to supplement its own resources, whereas all case SMEs used alliances as the need or opportunity surfaced.

5.4 Synthesis and the Revised Framework

5.4.1 Synthesis

The objective of this study was to understand the decision-making logic in the interrelatedness of innovation and internationalization processes, particularly in conjunction with business relationships, i.e., alliances. In order to reach this objective, the role of critical events and incidents in different phases of the innovation and internationalization processes in six case companies were investigated, and dimensions of decision-making logic were identified.

A common feature for all the case companies is that they operate in a business-to-business market, where their customers are very diverse. In addition, the energy industry is quite conventional and regulated, which means that, in order to introduce new technology, the old practices of many operators must be unlearned. Also, credibility and reputation among the potential users are challenging to gain. Therefore, sales processes in particular with new technology take a relatively long time to complete. For the reader's convenience, some of the basic data are reproduced in Table 13 and discussed thereafter.

Table 13. Relevant Data Reproduced for the Synthesis

Pseudonym	N1 Turbina	N2 Pulsare	N3 Lambada	E1 Fornello	E2 Camino	E3 Calore
Size	micro	micro	micro	small	small	medium
Age in years	12	8	6	90	20	60
Ownership	entrepreneur & private investors	2 entrepreneurs & private investors	2 entrepreneurs & investor	family	family	family
Board	entrepreneur & investors	1 entrepreneur & investors	2 entrepreneurs & the investor	family members	family members	family members
CEO's status	entrepreneur	entrepreneur	entrepreneur	4th generation entrepreneur	professional	2nd generation entrepreneur
Innovation type	semi-radical	radical	semi-radical	incremental	incremental	incremental
Internationalization	groping process	groping born global	planned born global	experimental process	experimental processs	strong exporter
Alliance dependency	high	very high	very high	high	high	medium

For the new ventures a joint feature is that they serve global niche markets with their radical or semi-radical new innovations, or they are envisaged to serve such markets when their inventions reach commercialization.

In light of the findings, it was observed that among the new ventures, innovation and entrepreneurial internationalization processes were closely connected given that internationalization was estimated to start upon product launch at the latest. However, in all new ventures, the situation did remain kind of on hold for from four to ten years before the actual product launch due to delays in the innovation processes. In the data analysis, the lead time from the initial registration of the firm to the actual commencement of purchase orders was judged, although not defined, as a critical event in all new ventures. The criticality was observed around two factors. First, entrepreneurs and investors alike had to rely on positive results to maintain the operative ability of the firm. Second, reaching commercial markets requires technological capabilities, marketing skills and also entrepreneurial abilities. All in all, the findings verified the firmer suggestion that to implement an innovation in practice is a challenge entirely different from the inventing of it, and indeed a task requiring completely different kinds of aptitudes, as suggested, among others, by Schumpeter (1963, p. 88).

Moreover, this study supported the behavioral phase-based internationalization process model proposed by Johanson and Vahlne (1977, 2009), who claimed that firms begin internationalization by exporting to nearby markets and that the commitment to the international market intensifies along with the company's experience and its manager's learning. The present data exhibits the same phenomenon for all case companies. For the SMEs another common nominator is that their innovations are of incremental nature and they have solid position in their respective domestic markets. Hence, the present data exhibits that E1 and E2 have both relied on the organic internal growth strategy, and prefer to internalize slowly, whereas E3 had utilized acquisition opportunities for faster progress.

All case companies' successes rely on specific business relationships, representing three of Gravens' (1997) five relationship categories, namely outsourcing, partnerships and strategic alliances. Respectively, it was observed that innovative entrepreneurial companies engage in interorganizational relationships to gain complementary resources early in their innovation development. Such actions helped to strengthen legitimacy and credibility and to develop capacities for international entry with lower risks (Zhou et al., 2007). However, routine and experience aspects of the competence to seek external resources were revealed to define how systematically partners were searched for. When an alliance was embedded in the strategy and thus planned for, the outcome contained fewer conflicts, disappointments or failures. However, for some case company opportunistic alliances could prove crucial to success.

Undoubtedly, any firm needs the ability to create and maintain long-lasting relationships by using a set of routines, or skills, or both (Al-Tabbaa et al., 2019; Khalid & Bhatti, 2015). This is especially important for new companies, as older companies are more likely to be able to use existing collaborative relationships to quickly enter foreign markets (Chetty & Stangl, 2010). Still, clearly the results are in line with the argument of, among others, Hughes et al. (2019) that the international experience and know-how of the entrepreneurs gives new ventures the opportunity to start export operations right from birth, unlike companies with less international experience.

This was observed, in particular, among the established companies, which had all gained a solid domestic market position before gradually expanding to international markets. Interestingly, out of all the case start-ups that aimed for international markets from early on, only one had worked out a plan how to do it. The same start-up company stood out from the others by being the only entrepreneur-led company that strongly relied on causal logic. As the CEO of this start-up had more managerial and entrepreneurial experience than the other two,

the findings also suggested that the personal experience, abilities and motivation of an innovator/entrepreneur should not be neglected when decision-making logics are studied. In fact, the data suggest that experience among start-ups' management leads to causative planning, while among older entrepreneur-driven firms effectuation is slightly dominant.

Accordingly, the findings contradict previous research suggesting that expert entrepreneurs are more likely to apply an effectual logic in decision-making (Read et al., 2009; Read & Sarasvathy, 2005), relying more on a contingency than on a predictive approach due to their knowledge accumulated in performing entrepreneurial and managerial tasks (Nelson, 2012; Ruiz-Jiménez et al., 2020). The findings challenge the connotation of Read and Sarasvathy (2005) that the lack of expertise would make entrepreneurs more prone to employing deterministic behavior guided by predefined goals and established plans. In fact, in regard to the new technical ventures, the data suggest strongly the opposite. On the other hand, it was witnessed that entrepreneurial heirs of the older SMEs did practice more effectual decision-making than causative.

Owners and managers of new ventures face substantial uncertainty surrounding new technology, available resources, market channels, subcontractors, customers and strategic alternatives (Baum et al., 2000; Boeker & Wiltbank, 2005; Shepherd et al., 2000; Thornhill & Amit, 2003). These challenges frequently culminate in financial constraints. Not surprisingly, all the case companies had encountered financial challenges at some point in their existence. Whereas SMEs had variably solved their acute challenges for the new ventures, shortage of funds were often acute and present in all business decisions. Often the first source of outside equity in a new venture comes from private (angel) investors (Wiltbank et al., 2009) or public organizations such as Business Finland (formerly Tekes). This phenomenon could be observed among the new venture cases. They all had angel investors as owners in addition to the entrepreneurs themselves. However, differences were observed. Whereas the source for capital for N3 was solidly secured, the entrepreneurs of N1 and N2 had to allocate some time and energy for securing funds on a constant base. When considering investment decisions investors may focus on how an entrepreneur deals with uncertainty, while for others, business planning and prediction may be decisive. As all the new ventures had external investors entrepreneurs those had to act according to given guidelines whereas the entrepreneurs of family owned firms had more lebensraum to act.

One conclusion that can be drawn from data is that internationally inexperienced entrepreneurs of new venture focused on technology and cared less about international market studies. Whereas, internationally inexperienced managers of

established SMEs preferred to plan and study new markets upon entry. However, at the end, the findings suggest that in both sets of three companies, only two stand out where causation is the dominant decision-making logic. However, as stated earlier, all of the more effectual firms did also practice some form of causation type decision-making.

Additional interesting issues that arose from the case analysis, although not in the direct focus of the study, were related to e.g. the firm's size, and firm's age and discussed later on.

5.4.2 Revised Framework

The initial aim was to focus on decision-making in innovation and internationalization activities in a broad sense in conjunction with business partners i.e. alliances. During the study, such a demarcation proved to be too narrow. Thus, some identified critical events and incidents beyond the original frame and criteria were identified and evaluated. A major example of such an incident was the coronavirus pandemic, which acutely affected several operations of the case firms. Also, the role of alliances regarding the identified incidents turned out to be less significant than anticipated. Overall, however, stake holders including investors appeared to be very important for new technology ventures and thus directly or indirectly exposed to decision-making logic.

In accordance with the enlarged focus and observations, the conceptual framework is adjusted as illustrated in Figure 17. The dotted frames of innovation, internationalization and alliances indicate their porosity within the overall operations. Also, with each decision being subject to macro processes and overall circumstances, it is worth noting that an individual decision involves a micro process of its own which includes factors (a) preceding the decision, (b) the decision itself and (c) the final results, such as the circled "focus shot" in the example in Figure 17.

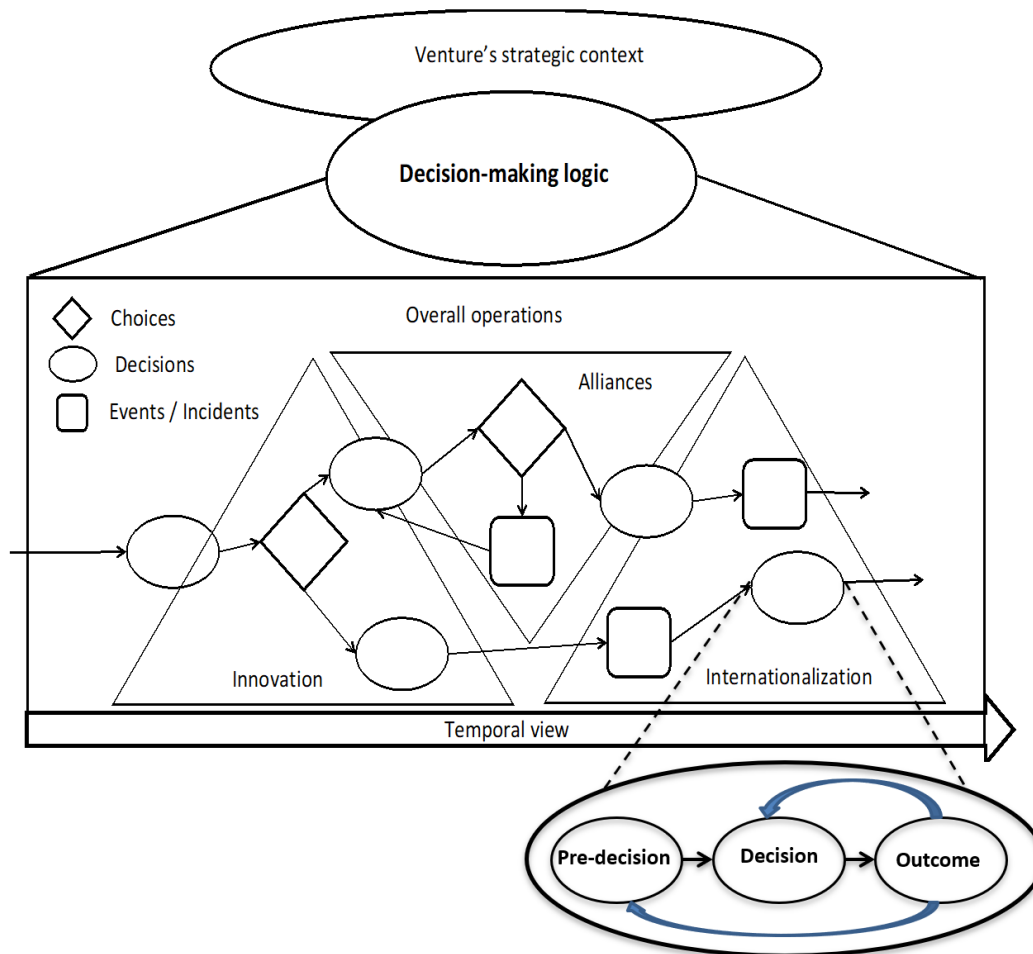


Figure 17. Revised Conceptual Framework of the Study

The basic idea that innovations can lead to internationalization activities utilizing internal or external resources i.e. alliances remains as in the original framework. However, the interfaces between the phenomena were found to be alive and therefore described as porous.

As discussed, the findings suggest that, depending on the issue, circumstances and timing, either causation or effectuation logic was dominant. However, rarely did any logic emerge alone. In fact, throughout the research, including the literature view and empirical work the two decision-making logics were shown to be intertwined. However, the interconnections were not clear-cut but fuzzy.

5.5 Development Arc and Model of Decision-making

As already discussed, the research community is far from reaching a consensus on the advantages and disadvantages of causation vs. effectuation decision-making. There is no unanimous explanation of how the logic develops over time or is impacted due to internal or external disturbances. This study contributes to the dilemma when the focus is on new technology ventures and medium-sized companies in the energy sector. The suggestions hereunder have been concluded using data from the literature, the fresh findings of the study and logical reasoning.

- 1) Dominant causation logic at an enterprise's birth is likely to remain as the predominant logic as the firm ages. Obstacles or opportunities do not influence the logic very much.
- 2) Dominant effectuation logic at an enterprise's birth will change towards causation when the firm faces major obstacles like:
 - Unfulfilled or failed alliance
 - Unsuccessful marketing
 - Shortage of finance
- 3) Dominant effectuation logic in the start-up phase of the company remains as it is when its investors have an entrepreneurial background, but changes towards causation when institutional investors get involved.
- 4) Extreme effectuation logic may lead to financial crisis and require management changes.
- 5) Mere information about the firm's age alone is not indicative of the predominant logic.
- 6) In family businesses, effectuation can be the dominant logic for several generations.
- 7) Broad entrepreneurial and managerial experience favors some planning, i.e., a causative approach.
- 8) Strong technical competence but weak international experience combined with effectuation logic leaves successful internationalization to chance.

- 9) Strongly prolonged development of technical innovation and market launch require a strong commitment from stakeholders regardless of the prevailing logic.
- 10) Typically, the causation and effectuation logics are dovetailed and somewhat adjusted according to the firm's internal and external relationships.

Naturally firm-specific circumstances differ and, for instance, the more novel a firm's offerings are, the less possible it becomes to plan in detail for optimum actions, as Grégoire and Cherchem (2019) argue. Also, in light of the literature and the findings, expected events are likely to call for causation whereas sudden incidents may require an effectual (act first) approach. However, only significant issues such as a serious shortage of money, or management or ownership changes can be expected to instigate a change in the predominant logic. An example of such a development is illustrated in Figure 18.

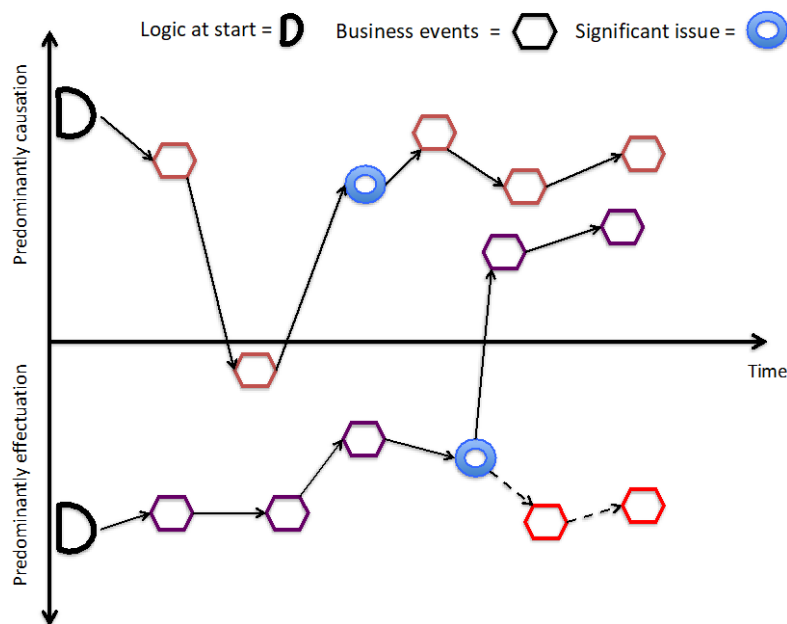


Figure 18. Temporal Development of Decision-making Logic Due to Business-as-usual Issues and Significant Challenges

The figure aims to show that firms managed and operated under causation logic regardless of the seriousness of the events or incidents they are facing remain causative. When these firms face sudden incidents, they may act fast, i.e., act effectually, but the dominant logic will remain intact. In contrast, when an effectuation logic-dominant firm faces a serious incident it may either resolve it

and remain effectual or be “forcefully” made to transfer towards causation dominance. Moreover, once it has transferred to causation logic there is a great potential for the firm to remain causative. Nevertheless, one should remember that, regardless of whether the dominant logic is causation or effectuation, decisions are made by people. Therefore, while education and experience are important at all decision-making points, human emotions and intuition have an impact on the outcome and should be acknowledged.

In the next chapter, the main focus is on the conclusions drawn and the contributions for the research and practice. The reader is hereby reminded that the conclusions are based on abductive reasoning.

6 DISCUSSION AND CONCLUSIONS

An American “business guru” named Brian Tracey used to advise his audience: “*The harder you work the luckier you become.*” He had a point, as luck favors those who are prepared and success is more likely to happen when opportunity meets preparation. But how can one get prepared? The literature has identified two distinct approaches, namely the traditional causative and the still nascent, but gradually maturing effectual approaches for decision-making logic and thus alternative approaches for the preparedness and actions of a firm. Causation involves planning, prediction and scenarios to deal with the future. Effectuation advocates flexibility, experimentation and precommitments from customers and partners to create the future (Sarasvathy, 2001).

While causation and effectuation are considered contrasting logics, they are not necessarily opposites (Perry et al., 2012; Sarasvathy, 2008), and thus entrepreneurs may use a combination of both principles (Alsos & Clausen, 2014; Kraaijenbrink et al., 2012). For example, Berends et al. (2014) provide evidence that small companies adopt a combination of causation and effectuation logic in innovation processes; Smolka et al. (2016) show evidence of the interaction at the time of company founding; and Andries et al. (2013) suggest that in uncertain circumstances, companies that simultaneously utilize causal and effectual principles might be more innovative. On the other hand, some recent studies show how the use of these logics shifts over time. Effectuation is argued to be more dominant in early phases of development whereas causation is more dominant later on (Berends et al., 2014). Moreover, as Reymen et al. (2015) have shown, the dominant decision-making logic may shift multiple times subject to the different degrees of uncertainty, e.g., in the technology, market or number of decision-makers involved (Nummela et al., 2014).

To remind the reader, decision-making logic has been studied, for example, in relation to management (Augier & Sarasvathy, 2004), finance (Wiltbank et al., 2009), marketing (Read et al., 2009), research and development (Brettel et al., 2012), risk and uncertainty (Welter & Sungho 2018), innovation and size (Berends et al., 2014) and venture capital (Ciszewska et al., 2016). The majority of the studies are variance based. Thus, several researchers on decision-making logic suggest additional temporal process studies (e.g., Arend et al., 2015; Armario et al., 2008; Fütterer et al., 2018; McKelvie et al., 2019). Moreover, a large number of researchers suggest additional studies that fall in the set international business frame of this dissertation, i.e., innovation, internationalization and alliances (e.g., Blankenburg Holm et al., 2015; Freeman et al., 2006; Galkina & Chetty, 2015; Gassmann & Keupp, 2007; Guili & Ferhane, 2018; Guo, 2019). Moreover, for some

time, calls have been made for research on the antecedents and consequences of effectual and causal behavior (e.g., Perry et al., 2012).

Therefore, the present multi-case study addresses the call for research that goes beyond just examining direct influences on causation and effectuation (Dew et al., 2009; Honig et al., 2005; Sarasvathy, 2001a, 2001b), identifying the roles and impacts of firm size, age, ownership, the CEO's experience, business function and relationships in the decision-making. The framework aimed to focus on innovation, internationalization and alliances but did not exclude other business functions when relevant for the study.

In light with the above, in adopting a temporal perspective, this dissertation examines and clarifies decision-making logic from the point of view of opportunities and obstacles in innovation and internationalization with an emphasis on business relationships. While the majority of the literature on decision-making logic considers effectuation as a tool for new ventures only, this dissertation contributes to the international business literature by introducing empirical findings on the use of causation and effectuation logics both in nascent international ventures and in solidly established SMEs. The overall aim of the research is to enhance our understanding of how the (predominant) logic affects companies' decisions when experiencing planned events and unplanned incidents. As a side effect, the study brings out a comprehensive set of elements affecting decision-making from antecedents to consequences as illustrated in the decision-making onion in Figure 19.

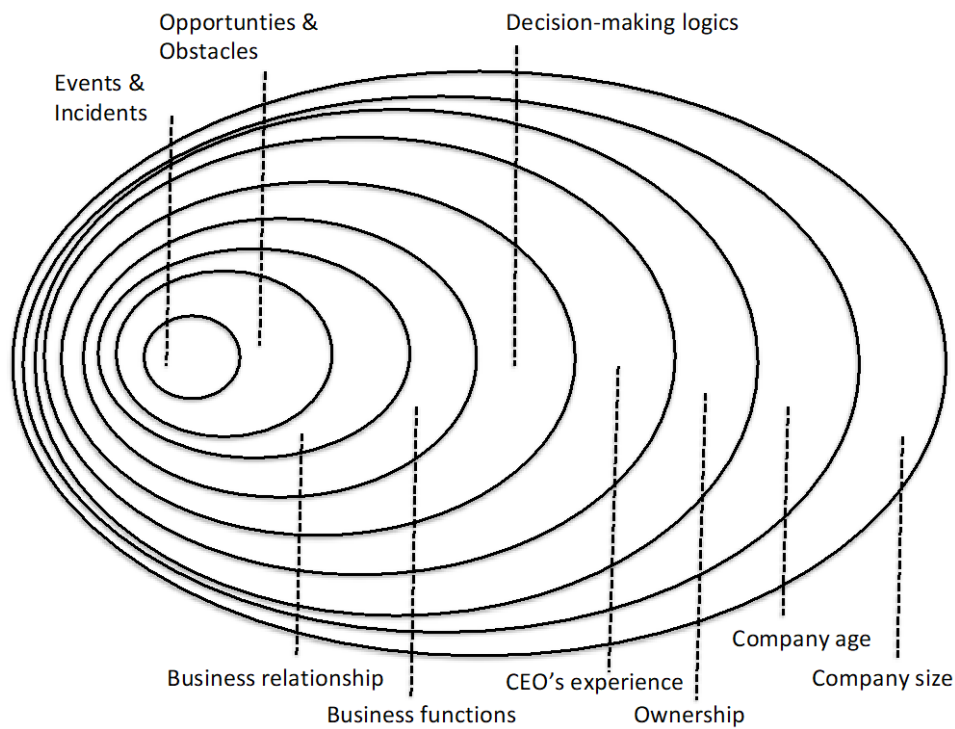


Figure 19. Set of Elements Affecting Decision-making (inspired by Saunders' 2009 research onion)

The subject matter of each ellipse contains alternatives that influence the other matters. Moreover, the influence is multidirectional and the temporal order is critical for the outcome, and then the explanations contain layers of causal factors at different levels and in time (Poole & Van de Ven, 2010). Indeed, decision-making is a multifaceted process. In a narrow view, it is evaluating and choosing among alternatives; in a comprehensive sense, it refers to problem identification – planning – implementation. Moreover, smaller decisions are nested within larger issues and decisions, all of which affect, and are affected by, the decision-making logic.

6.1 Theoretical Contribution of the Study

To begin with, it is justified to clarify that the literature has made several attempts to create a measurement scale to compare the decision-making logics. There are two main schools on the subject: the two-sided scale where causation and effectuation are treated as opposites and mutually exclusive (Brettel et al., 2012), and the scale that treats causation and effectuation as independent logics (Chandler et al., 2011), the latter being the most widely tested (Roach et al., 2016). This dissertation does not take a strong position on the scale discussion but

stresses that decisions are linked to each other and each decision may or may not contain elements of both causation and effectuation logic.

The extensive empirical research data collected stress the importance of using both logics while predominantly causative or effectual logic can provide positive results. For new international technology ventures, some planning is essential to keep the venture on course. However, at the same time, a certain amount of flexibility has to be maintained. On the one hand, the results support the claims of Reymen et al. (2015) that a scope extension increases uncertainty and calls for effectuation (i.e., SMEs E1 and E3), while a narrower scope leads to specific goal formation and therefore a causation approach prevails (E2). On the other hand, it has been evidenced that regardless of the scope of the strategic decision, the prevailing decision-making logic may shift multiple times (Reymen et al., 2015), although the decision-making process does not change (Pfeffer & Khan, 2018). However, both logics may coexist depending on the degree of uncertainty (Nummela et al., 2014). The research provides evidence that pure causation or effectuation logics are rare or completely absent. Also, the overall results mimic a pendulum of focus in decision-making logic – away from business planning, towards adjusting (Arend et al., 2015) and back to planning.

Overall, the study adds to our knowledge by addressing a substantial gap in the process research on effectuation and causation. The conceptual contribution of this dissertation corrects notions of effectuation theory, strengthens notions of causation theory and provides evidence that small companies adopt a combination of causation and effectuation logic in innovation and internationalization by providing empirical material on recent research developments in the field. As planned, alliances, and when relevant operations, are combined within the scope under review. The following discussion on the contribution follows the scope of the decision-making onion presented in Figure 19.

6.1.1 Decision-making Logic Is Affected

6.1.1.1 Company Size

One key question in the decision-making research has been, how the organizational size affects the degree to which causation and effectuation are used (Berends et al., 2014). While causation is commonly adapted by large companies (Sarasvathy, 2001), the traditional research on decision-making logic has considered effectuation as a tool for nascent companies (e.g., Matalamäki, 2018). Matalamäki's results then showed that when established firms get an opportunity,

they seize it and thus respond to market demands rather than sticking to previous plans. In line with that, the study of Svensrud and Åsvoll (2012) shows that in large organizations, effectuation logic is not a replacement for causation logic, but the two exist in parallel (Sun & Bisht, 2013). Actually, Svensrud and Åsvoll (2012) suggest that effectuation logic is almost as important in large enterprises as for start-ups, and indeed causation and effectuation processes dovetail. Correspondingly, the research of, among others, Rust (2010) discovered that absolute causation or effectuation is negligible, and the majority of entrepreneurial firms combine the logics in their decision-making (Sun & Bisht, 2013).

As the present study covers size-wise the range of technology firms only from micros to medium-sized, As the present study covers size-wise the range of technology firms only from micros to medium-sized enterprises certain prudence is recommended in interpreting the effects of bigness. Yet, the study contributes to the discussion on decision-making logic by providing evidence that within the framework of Finnish energy technology micro and medium-sized companies, the size or scope has only a marginal impact on the logic of decision-making and that both are equally important for taking action (Dew & Sarasvathy, 2002).

6.1.1.2 Company Age

The literature is quite unanimous (e.g., Berends et al., 2014); Reymen et al., 2015) in indicating that initial effectuation logic molds towards causation when the venture matures. The results of the dissertation do not directly support such a conclusion. Although two of the new ventures practicing effectuation logic in their early days did become more causative as they aged, the reasons were more external. For example, a new shareholder, i.e., a venture capital investor (VCI), demanded a major change in the firm's strategic approach. On the other hand, effectuation was the dominant logic of the two older firms, while the third shifted towards causation due to financial constraints. Yet, at the end, the final clincher as to which logic to choose can be accredited to finance and thus financial performance.

This paper contributes to decision-making literature by providing solid evidence that entrepreneurs of both new and older firms practice both causation and effectuation logic. The evidence supports the findings of Berends et al. (2014), Smolka et al. (2016) and Andries et al. (2013), who all support the idea of intertwined logics. However, decision-makers are more or less prone to external and internal influences and rather than the company age it is the personality, experience and position of the decision-maker that are pivotal while firmly combining with the ownership.

6.1.1.3 Company Ownership

In owner-managed SMEs, power and decision-making rest with the entrepreneur. Firms' strategy-related decisions are influenced by the owners' and management's perception of the risk entailed in performing any activity (Claver et al., 2008). For example, from any SME's point of view, expanding to international markets is always an investment and investments contain elements of risk. A firm's ability to take risks depends, for example, on its financial situation, size and ownership. A wealthy owner entrepreneur may be prudent whereas a poor owner has to be. This may slow down innovation or hinder the introduction of the changes required to undertake, for example, internationalization (Gallo & Garcia, 1996).

Financial slack allows for a more effectual approach, while a severe lack of financial resources requires causative planning and actions accordingly. Therefore, if external investors are required for financial security, causative logic may be required. Here the key is the type of investors. Moreover, as, for example, Kalinic et al. (2014) claim, as new stakeholders emerge, bringing new visions, goals and resources into the equation, the means are transformed into "who we are, what we know and whom we know." In addition, while new stakeholders bring in their three "Ws" they may also bring in new decision-making practices. In light of this, it is worth noting that the ownership of the three older case companies is firmly within the families while the ownerships of the new ventures are more diversified and on the move. In addition to the entrepreneurs of the start-ups themselves, from early on "angel investors" were involved.

The term "angel investor" describes a wealthy individual who acts as an informal venture capitalist and invests his or her own money (Wiltbank et al., 2009). All three case start-ups have angels on board. In addition to their financial role, they take part in firms' boards and thus influence the strategic decision-making. The findings of Wiltbank et al. (2009) suggest that angel investors who emphasize control experience fewer investment failures without experiencing fewer home runs. While they do not provide an exact explanation for the reasons, they speculate that the uncertainty in angel investing may undermine the effectiveness of predictive approaches. However, contrary to institutional venture capital investors (VCIs), who seek to maximize the venture's returns and thus may require formal planning and competitive analysis (Fried & Hisrich, 1995), angel investors may accept more effectual approaches.

In addition to planning, venture capitalists can bring in other demands and calls for change. While a causative entrepreneur may adapt painlessly to new demands, an effectual entrepreneur is likely to encounter more task conflicts with VCIs. For

example, an effectual entrepreneur may be overly trusting while others would urge caution when pursuing new commitments (Appelhoff et al., 2016).

In light of the evidence, the paper makes a unique contribution to decision-making logic literature, concluding that while driving forces from effectuation towards causation could be the firm's size, age and ownership, no transfer is inevitable. Actually, the ownership could also be a retarding or inhibiting force from effectuation towards effectuation because the owner manager may prefer to lead based on gut feeling and intuition regardless of business growth and maturity.

6.1.1.4 Expertise and Experience

It has been suggested that entrepreneurs choose causal or effectual behaviors, or combinations of them, depending on their perception of the level of uncertainty (Chandler et al., 2011; Sarasvathy, 2008) and on their level of expertise (Dew et al., 2009; Sarasvathy, 2008). Accordingly, several studies among expert entrepreneurs have documented that both causal and effectual types of approaches exist (Dew et al., 2009; Gabrielsson & Politis, 2011; Goel & Karri, 2006; Harms & Schiele 2012), and that they exist combined (Alsos & Clausen, 2014; Kraaijenbrink et al., 2012). Contrary to findings in the literature (e.g., Kurkinen, 2018; Vershinina et al., 2017), the new evidence challenges the interpretation that among new ventures entrepreneurial experience would guide entrepreneurs to use effectuation over causation. Among the three entrepreneurs of the new ventures, only one had entrepreneurial experience and his actions were clearly in line with causation. As has been proven, for the most part he planned, studied and looked outside to find solutions to emergent issues. The reason, however, could be the company's general strategy, which considers sales and marketing as its own core process and aims to procure everything else.

On the one hand, among the older firms currently managed by the heirs of the initial entrepreneurs, effectuation was the dominant logic. In fact, this was strongly evidenced by the fact that both the experienced second-generation and the inexperienced fourth-generation entrepreneur CEO practiced an effectuation emphasized type of decision-making. In addition, the third older company had practiced effectuation to the extreme and had to hire a professional manager to gain control of the operations. Thus, the dissertation contributes to the theoretical development of the complementary and conflicting effects of expertise and experience towards causation and effectuation.

6.1.2 Decision-making Logic Affects

6.1.2.1 Innovation

What counts as an innovation? There is no universally shared conceptualization. Innovation may refer to various kinds of novelties regarding technologies, products, markets and system configurations, among others (Varis & Littunen, 2010). In line with the above, some literature suggests that radical innovations imply high levels of innovativeness, while low innovativeness suggests incremental innovations (Brettel et al., 2012; Tatikonda & Montoya-Weiss, 2001). Furthermore, Brettel et al. (2012), for example, argue that effectual dimensions impact positively high innovativeness, and causal dimensions indicate better performance in low innovativeness. On the other hand, Palmié et al. (2018) build on Brinckmann et al. (2010) and suggest that causation relates positively to innovativeness. Moreover, the results of Vanderstraeten et al. (2020) show that causation is positively, consistently and significantly related to innovative performance. Furthermore, their results suggest that an enterprise simultaneously adopting a causal and an effectual decision-making logic is more innovative than a company only opting for a causal one. Hence, the present case setting provides an excellent environment to examine the relationships and impacts of the normative causal planning approach and iterative effectual innovation problem-solving process.

Typically, new high-tech ventures are at the cutting edge of technology and face greater challenges in innovation development due to chronic resource constraints (Antolín-López et al., 2015; Guo, 2019; Yli-Renko et al., 2001). Scholars have argued that effectuation allows new ventures to create a variety of goals given the resources and capabilities available (Cai et al., 2017; Perry et al., 2012; Smolka et al., 2016). Also, according to Guo (2019), previous research suggests that creative opportunities can be created using effectuation logic and can be transformed into innovative offerings through a different combination of resources. Likewise, there is a positive impact of partnerships when innovativeness is high (Brettel et al., 2012). When new ventures use effectuation they may conduct short-term experiments to recognize viable ones among a variety of innovative opportunities at a relatively low cost, probing into the future (Chandler et al., 2011; Nicholls-Nixon et al., 2000). Specifically, as argued, for example, by Guo (2019) and Deligianni et al. (2017), a new venture using effectuation can obtain complementary resources to share risks and thus reduce investment into own resources.

Consequently, the results of this study are partially in line with the literature. The evidence is strong that radical innovations imply high innovativeness. However,

there is no evidence that radical innovations require effectuation. In fact, according to the data, both causal and effectual approaches can produce radical innovations. Likewise, the dominant logic being effectuation does not exclude an incremental approach towards innovations, as shown by the findings of the SMEs. Furthermore, while the actual strategy and nature of means may differ, both effectuation and causation approaches benefit from, for example, customers' pre-commitments. Actually, the new venture, namely N3, practicing causative logic not only studied the market but also received preorders for their products not yet fully engineered. On the other hand, no evidence suggests that the two ventures that have a logic with an effectual emphasis would actually benefit from unexpected events during their innovation journey. Actually, they only faced negative incidents, some of which could have been avoided with some planning.

6.1.2.2 Internationalization

As suggested in the present study, internationalization and innovation are strongly interrelated, and the evidence forms a strong link from innovation to entrepreneurial internationalization. The results verify the finding of, among others, Rilla (2016) that an attentive entrepreneur evaluates what kind of collaboration to seek, where resources are found and which markets to enter at the early stages of innovation development. Such an approach fulfills the principles of causation, whereas effectuation theory, with its focus on nongoal-driven logic, improvisation and leveraging contingencies (Sarasvathy, 2001, 2008), describes how instead of conducting extensive and expensive pre-research, effectual entrepreneurs prefer collaborating with all interested stakeholders (Galkina & Chetty, 2015).

Effectuation theory complements older IB theories explaining the phenomenon of internationalization of INVs and SMEs (Ciszewska-Mlinaric et al., 2016; Kalinic et al., 2014). It differs from the causation concept of the strictly rational entrepreneur who follows rational decision-making procedures promoted in textbooks and practiced in large companies. Among others, Gabrielsson and Gabrielsson (2013) argue, based on multiple case studies of high-tech born globals from Finland, that the effectual logic may compensate for the deficiencies of resources and capabilities, thus enhancing rapid internationalization.

Moreover, Vissak et al. (2020), for example, show that typically in early internationalization the predominant decision-making logic is effectual due to considerable uncertainty, the lack of a long-term network relationship and higher reliance on weak ties, whereas in later internationalization a mixture of causal and effectuation logics is present, characterized, nevertheless, by quite high

uncertainty, long-term relationships and higher reliance on strong ties compared to early internationalization.

As previously verified, all three case SMEs had initially started exporting on a trial-and-error basis. Actions had been experimental: visiting trade shows, working with local firms, receiving unexpected inquiries, etc. Later the export activities had become more systematic, but two SMEs were still in a testing stage. Correspondingly, all three start-ups aimed for foreign markets early on but only one had a systematic plan for how to implement it.

The findings suggest that effectuation may be a more common decision-making model among small energy technology companies when entering foreign markets, while a stage-wise process is experienced. However, the findings do not unequivocally confirm whether a causative or an effectual approach is more successful. Actually, it is worth noting that it is useful to understand that prediction accuracy is an important consideration when addressing internationalization performance (Welter & Sungoh, 2018). Furthermore, the predominant decision-making logic in internationalization does not solely depend on any one factor, e.g., the firm's size, age, ownership, technology or access to expertise, but is an outcome of several factors.

One of the important contributions of the dissertation is understanding that both new and older firms may be subject to the same type of internationalization processes. Hence, researchers should strongly consider the risks of systemic errors when studying decision-making logic to avoid distorted views of the reality of a firm's internationalization process.

6.1.2.3 Alliances

Adopting a temporal perspective and clarifying decision-making logic from the point of view of alliance implementation offer an understanding of the innovation and internationalization activities of new companies and established SMEs. A strong emphasis is placed on decision-making activities taking place when firms face alliance-related expected events and unexpected incidents.

Many authors, e.g., Cravens et al. (1993), Das and Teng (2000), Lorange et al. (1991) and Parkhe (1993), see alliances as an extension of the strategy. Networks and partnerships are searched for to reduce uncertainty, to reduce one's own cost burden and to increase flexibility (Kerr & Coviello, 2020). The basic approach in effectuation is that entrepreneurs create opportunities in cooperation with other, precommitted stakeholders, who have an impact on the results of

entrepreneurship (Sarasvathy, 2001, 2008). This differs fundamentally from classical entrepreneurship theory that locates agency with a single entrepreneur (Kerr & Coviello, 2020; Shane & Venkataraman, 2000). Moreover, although causative entrepreneurs may perceive outsiders as competitors (Dew et al., 2009) typically, all small companies rely on partners and networks whose members they know (Gil-Barragan et al., 2020; Stam et al., 2014).

Networking increases flexibility and reduces the risk of stubbornly sticking to the initial business plan. On the other hand, too much dependence on partners can increase the risk, as some of the observed cases showed. The effectual approach favors openness and welcomes everyone who can, and is willing to, contribute. However, such partnerships are difficult to coordinate because actors cannot know the motives of other actors (Galkina & Chetty, 2015). Accordingly, the causal approach towards partnerships is more formal and perhaps easier to coordinate. Moreover, the literature on international partner selection shows that internationalizing new ventures strategically choose foreign partners according to their portfolios, their fit to the firm (Varis et al., 2005) and their knowledge about local consumers, competitors and networks (Lu & Beamish, 2001).

This study contributes to IB, alliance and decision-making literature and confirms that alliances are used as an elemental part of both firms' innovation and internationalization strategies. Regardless of the prevalent decision-making strategy, both new ventures and older SMEs rely on alliances to perform certain tasks. However, the results do not unequivocally show whether carefully planned for or alliances by chance are more successful.

6.1.3 Decision-making Logic Affects and is Affected

6.1.3.1 Opportunities and Obstacles

A company can only exploit the opportunities that it has recognized, and it can only utilize further opportunities from what it has exploited (Blankenburg Holm et al., 2015). They also argue that companies locked into a certain development path can become too rigid and then unable to take advantage of opportunities. On the other hand, experienced entrepreneurs have learned that there must be valid reasons for changes (Duening et al., 2012). In the present context, the key question is how the decision-making logic affects firms' approach towards opportunities and obstacles. When facing unexpected events, a causative approach suggests exploitation of preexisting knowledge while an effectual approach suggests exploitation of contingencies. In fact, both logics are used in search of blue ocean

opportunities or for exploiting areas where demand exceeds supply (Shane & Venkataraman, 2000).

This research shows that the dominant decision-making logic is not a prerequisite for opportunity recognition. Indeed, firms practicing effectuation are more open to opportunities as expected, but unless they are prepared, they cannot take advantage of such opportunities. Preparation is case-specific and often time-bound. For example, when a new technology venture gets an opportunity for its first international order, the product has to be ready. While it may be tempting to sell an immature product, it can lead to catastrophic failure.

Obstacles – or barriers, as they often referred to in the literature – such as a shortage of financial resources for innovation or internationalization, a lack of technical or commercial capabilities and disturbances in the market can seriously slow down or even prevent a company's growth (Hölzl & Janger, 2014). Some of the issues are predictable, some the company may face without any, or just weak, pre-warnings. In theory, a company practicing effectuation decision-making logic would be less vulnerable to sudden disturbances than a company whose operations are embedded in causal logic.

Yet, the findings of the present study do not unequivocally support such a conclusion. Rather, the conclusion is that depending on the type, timing and relative severity of an obstacle, predominantly causative or effectual logic is preferred. Moreover, just as the external and internal requirements change over time, so does the logic. The chance can be slow or sudden while the scale is of less relevance.

6.1.3.2 Events and Incidents

Effectual entrepreneurs view surprises as opportunities and try to leverage them. Moreover, effectual logic suggests that an entrepreneur uses the resources available to deal with challenges (Cussen & Cooney, 2019), while causation logic suggests they identify the best solution first and then resource it. Actually, the latter strive to overcome the unexpected. They focus and work hard to avoid surprises, either positive or negative (Denrell & March, 2001; Dew et al., 2009).

In this study, unplanned situations that call for decisions are named incidents while events are planned for and thus expected. Broadly considered, both events and incidents are defined as critical if an interviewee has so specified or the researcher so concluded based on his observations. Also, an event could become an incident. An example of such is the certification test planned for N3's product.

While acceptance of the test would have led to market launch, rejection created a major incident that required decisions and actions. Furthermore, the first rejection caught the company by surprise, while for the second rejection the firm was better prepared. This case firm was identified as being causative. In practice, the firm confirmed the argument of Politis (2015) that entrepreneurial experience alone is not sufficient for learning to happen, but it requires that something be done with that experience.

Under the conditions of risk and uncertainty, accuracy of prediction is an important consideration. Vanderstraeten et al. (2020) show that causation leads to innovative performance in a stable environment but not in a dynamic one. Welter and Sungho (2018) research show that effectuation outperforms causation in general, but when an entrepreneur can accurately predict more than 75% of his or her future decisions correctly, the results change. Yet, the probability of such high predictive accuracy in all business decisions is low (Welter & Sungho, 2018). While causation and effectuation can conflict with and/or complement each other, often the best outcome is achieved when causation and effectuation can be combined (Vanderstraeten et al., 2020).

The dissertation does not provide robust evidence of the use of goal orientation, expected returns and competitive analysis, nor of effectuation principles of means orientation, partnership or actual leveraging of the unexpected. Yet, overall the study contributes to the decision-making literature and argues that regardless of the dominant decision-making logic, small companies “look inward first” when searching for solutions to planned events or sudden incidents and only thereafter do they look for external solutions. Entrepreneurial experience, like any other relevant experience, can be utilized in causative and effectual thinking and decision-making.

6.1.4 Applicability of the findings to other industries

Internationalization and international entrepreneurship among SMEs have demonstrated capacity to drive economic development and growth at national, regional and global levels (European Commission, 2014). The context of this study, energy technology, is a highly regulated, technology-oriented and innovative field and is increasingly prone to opportunities for SMEs. These basic characteristics are present in many other industries. Medical devices are highly regulated, and many devices are classified as medical since the definition is very wide. The construction industry has to follow different standards in different countries. Automotive are subject to both international and local laws and regulations, so are the marine and rail products. Furthermore, the Cambridge on-line dictionary

claims (2023) that forestry is the most regulated industry. In addition to being strictly regulated, the forestry, construction, automotive, marine and rail industries share common goals, namely carbon reduction and energy efficiency. Thus, innovative technology and especially innovative energy technology are needed in all of them.

Innovations vary in types and are industry and sector specific (Malerba, 2002). Industry-specific conformities, such as technology intensiveness, know-how, skills capabilities, guide the innovation dimensions and in particular the innovation development processes. These technological characteristics guide the innovation activities of the industry (Nelson & Winter, 1982) and thus define what type of problems companies have to solve in their innovation activities (Malerba & Orsinigo, 1997). However, provided that the industry specifics are recognized and other characteristics such as size, ownership, and experience are in line with those of the case firms the findings of the present study regarding decision-making in innovation are probably applicable to other regulated industries.

Trials and trial deliveries are the most demanding factors in the successful completion of the energy innovation process. Depending on the local energy regulations new technology needs to perform trials and certification in one or more phases. For smaller companies, performance tests can prove to be a breaking point if they fail, driving away potential customers and investors. The conclusion is that the effect of these trials and certification tests together, with other regulations on commercialization are immense as trials are extremely costly and may take a long time to perform. The case companies operate in a business-to-business market, in which their main customers represent a variety of different operators. Yet a common nominator in most cases is that the sales processes take a relatively long time to complete. Taken into account the diversities of the case firms' applications and long lead-time sales projects, it is the opinion of the researcher that the events and incidents that requested decisions in the case firms' internationalization can also be realized in other regulated industries. Therefore, when the conditions of internationalization are near the same as those of the case companies, the use of causation and/or effectuation logics are most likely in line with the findings.

For new ventures, alliances are of utmost importance, especially in new market areas, to get user experiences and accelerate the certification of an innovation for market entry. However, these alliances often take time to materialize as new innovative companies must first gain credibility. For this reason, the established firms might have better capabilities and competences to utilize these kinds of strategic relationships. Also, it was observed that alliances of new ventures, were rather ambiguous in the venture-creation and early internationalization phases

(Söderqvist & Chetty, 2013). Many partnerships were entered in a hurry and forming a proper understanding of the other firm's competences and strategies were often neglected. The primary reasons for this were the overly optimistic expectations of the innovation and the market. However, at the beginning of internationalization, personal relationships with e.g. expatriates can be crucial for success. Such phenomena are not industry specific and apply to most if not to all businesses.

Furthermore, as presented, the study covers a certain size range of companies only. Although the energy industry has some unique characteristics, practicing some caution, the earlier presented conclusions regarding firms' size could be stated valid in other demanding technology industries. In contrast, regarding the operational age and ownership of a company as well as entrepreneurs' experience the findings are of more general nature. The study offers evidence that both new ventures and established companies practice causation and/or effectual logic. There are no strong indications that such evidence would be industry specific. However, as discussed rather than the company age or ownerships it is the personality, experience and position of the decision-maker which are pivotal to the decisions to be made. These personal characteristics are not industry-specific thus the current findings are subject for a broader scrutinization. Undoubtedly, entrepreneurial experience, can be utilized in causative and effectual decision-making within any industry specific regulative boundaries. In a matter of fact, regardless of the industry, but depending on the type, timing and relative severity of an issue either causation or effectuation logic can be the preferred one. Furthermore, just as the external and internal requirements change over time, so can the logic.

6.2 Managerial Implications

The study confirms several literature findings that are relevant for practice. Here is a taste of those. First, effectual entrepreneurs can be vulnerable and overly trusting when pursuing potential new stakeholders, whereas causative entrepreneurs may be overly cautious and search to maximize safeguards (Appelhoff et al., 2016). Second, the benefits of planning are undermined in dynamic environments (Suikki et al., 2006), where sticking to the original plans may reduce performance (Hmieleski & Baron, 2008). Correspondingly, the more dynamic the environment, the less positive planning is possible in terms of innovation and internationalization. Third, entrepreneurs that base decisions on affordable loss might slow down the development (Read et al., 2009). Fourth, although venture capitalists use the expected rate of return as an important

criterion for decisions, they also care about the use of capital (Appelhoff et al., 2016). Fifth, replacing the head of a company impacts the level of entrepreneurial orientation, and thus also the company's innovativeness (Grühn et al., 2017). Sixth, effectuation outperforms causation in general, but when an entrepreneur can accurately predict more than 75% of his or her future decisions correctly, the results change (Welter & Sungho, 2018). However, seldom are entrepreneurs and managers such clairvoyants.

Based on the findings, there is not just one way to succeed. Nor is there only one single decision-making logic for success in SMEs' innovation and internationalization. However, one common denominator exists, namely persistence. Launching complex technical innovations requires persistence from all stakeholders, but especially from the entrepreneur. If possible, start-ups should search for (angel) investors who understand the potential for technical as well as commercial challenges. Some of the case companies' experience indicates that while the patience of public financiers, e.g. Business Finland, may run out, private investors stay put. Most obviously they want to protect their investment as long as they believe possible for future success.

Also, entrepreneurs, managers and investors should also be aware that to some extent uncertainty is normal throughout the innovation and internationalization processes as it is impossible to fully predict the future. For instance, it is not feasible to foresee all domestic or foreign partners' sudden business problems or forecast unpredictable changes in the business environment. However, due to fluctuations in the availability of foreign components, disruptions in export markets or changes in public policy, companies must maintain a certain flexibility to react.

In summary, the current world view of entrepreneurs and managers (i.e., knowledge of the industry) is a constantly challenging interaction with others. This creates a conflict with what is currently known and should be learned (Fuerst, 2017) and puts pressure on an entrepreneur's capacity to reflect and learn. This implies that the faster the ability to (critically) reflect and learn, the faster the position formation process is in the global network. Active communication with other actors leads to the creation of wisdom, which directly impacts the strategy process of the firm.

In light of the managerial implications and the goal of the dissertation, the concept presented in Figure 20 will remind and assist entrepreneurs and managers of the two alternative approaches for achieving an identified target.

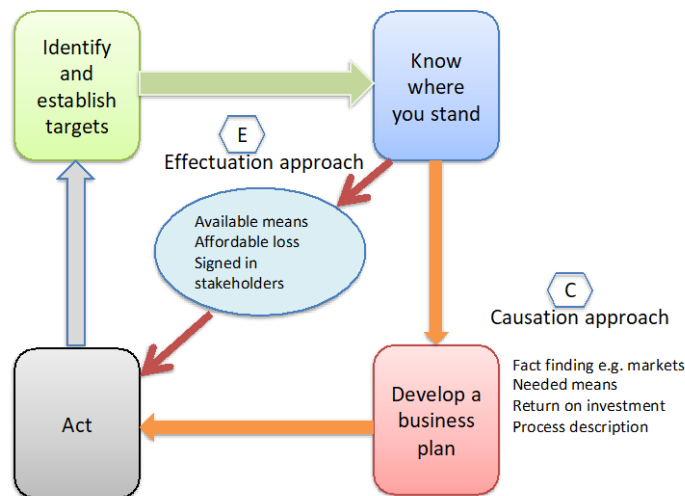


Figure 20. Basic Concept for Alternative Paths towards Set Targets

Without doubt, the most successful entrepreneurs and companies know exactly what they are capable of – and what they are not (Wathen 2015), thus they can make a clear decision to proceed according to alternative (C) causation or alternative (E) effectuation or any combination of C and E. Hence, strategic decision-making logics causation and effectuation are not mutually exclusive. Nevertheless, a suspicious mind uses intuition and finds facts to confirm or deny them. Whether he/she then works out a plan or simply acts may be semantic.

6.3 Limitations and Future Research

The limited number of cases studied and the small number of interviewees for some case companies may limit the credibility of the research analysis. On the other hand, many of the findings are the result of in-depth long-term access to the operations of the case companies and thus strengthening the credibility of the analysis. The balance of the credibility is subject to discussions and beliefs. In a matter of fact, beliefs play a significant role in both practice and theory.

The strategic issue theory claims to explain how different beliefs influence a firm's strategic situation (Parida et al., 2016). In their study, Parida et al. (2016) examined how an entrepreneur's subjective interpretation of relevant cues in the operational environment affects the likelihood of applying causation or effectuation to influence initial venture sales. The same phenomenon is present in

this study. The researcher's beliefs may have influenced his interpretation of the observations. Accordingly, the research narrative is subject to the researcher's subjectivity and this should also be borne in mind. While the study has tried to build a logical chain of evidence (Miles & Huberman, 1994) throughout the analysis, the risk of subjective bias always remains, especially where the researcher has been close to the subjects of the study (e.g., Walkerdine et al., 2002).

Furthermore, memories may not always be reliable. In light of this, the distinction between intentional and emergent strategy is, as Mintzberg (1978) originally noted, worth noting. For example, an entrepreneur may prepare a detailed plan for innovation development and required action steps for internationalization. However, the resulting approach may look different than planned due to various unexpected changes or incidents. In such cases, "reason may work in hindsight" (Poole & Van de Ven, 2004) and thus actors rearrange the process because they realize what is happening (Fuerst, 2017). In such a situation, the mind may reorganize suitable intentions and thus create a post hoc plan. In light of this, when evaluated after the fact, both causative and effectual logic are subject to obscurity when the analysis is based on recall.

One relevant way to observe new ventures' utilization of causal or effectual logic is the origin of innovations. According to the research of Villani et al. (2018), science-based ventures seem to rely more on planning than nonscience-based start-ups. They argue that the reason is not the entrepreneur's experience but rather the nature of his knowledge. Moreover, having experience of the industry through research and partnerships, and to a much lesser degree through market dynamics, encourages science-based entrepreneurs to set up goals and establish plans to concretize their intentions (Fisher, 2012). In fact, the described antecedents match with case N2 while the outcome does not. Thus, the issue is subject to further research. Moreover, internationalization process research, starting with the establishment of a company or the first external engagement, can provide partial and less in-depth explanations of, for example, the deployment of resources (Hewerdine & Welch, 2013), and alliance formation.

Furthermore, previous studies by Smolka et al. (2016) have shown a positive interaction effect between causation and effectuation on venture performance. However, Yu et al. (2018) suggest a positive interaction effect on firm performance only when environmental uncertainty is high and a negative interaction effect when uncertainty is low. They confirm Fisher's (2012) conclusion that causation and effectuation can conflict with and/or complement each other. Certainly, in light of the present study, a positive interaction between the logics is not

uncertainty-level dependent. Therefore, further research on the interaction issue is encouraged.

Furthermore, it seems that no literature has studied the permanence of the change between the logics. According to the effectuation theory, firms practice effectuation when facing sudden opportunities or obstacles. Once such an incident is resolved, both causation- and effectuation-dominated firms could return to their typical practices. On the other hand, a change from effectuation towards causation is more gradual and could be caused by some external influence. Nevertheless, the evidence of this study suggests that once a firm molds from effectuation dominance to mostly causation, the change is permanent. However, there are no long-term data to verify this. Maybe a change in the ownership or management would nullify the transformation.

A shortage of resources is a chronic challenge for SMEs. In order to deal with this dilemma, companies form partnerships and utilize networks. Decision-making logic in internationalization and networks has been sparingly researched. The results have been mixed. On the one hand, effectuation logic seems to facilitate rapid internationalization in conjunction with strong ties (Gabrielsson & Gabrielsson, 2013), with weak ties (Galkina & Chetty, 2105) or with both types of business relations (Zaefarian et al., 2106). On the other hand, causation logic with strong ties seems to speed up internationalization (Ellis, 2011). As the results of this present study on the subject matter are also inconclusive, a research gap is evident.

An entrepreneur might plan how to enter foreign markets and anticipate the various activities that will move the firm towards the goal. However, sometimes reason may operate after the fact (Poole & Van de Ven, 2004). The outcome is a rearranged process based on what actually happened (Weick, 1995). In other words, the intended plan gets adjusted due to unforeseen technical or commercial challenges. During the observation period, all case companies experienced change from deliberate to emerging strategies. Older companies suffered and had to change plan due to Covid-19, while the new ventures also had some serious "homemade" incidents to deal with. The push for strategy adjustments affected the most the two new ventures that had adopted effectual decision-making logic. They both had to rearrange their entire business logic, whereas the third start-up venture, using a causation approach, survived with minor adjustments. Was this an exception or are there some fundamental reasons that explain the data? This interesting question remains subject for future research.

In addition, intuition, although present in the study, remained on the margins. The main reason was probably the fact that the research questions did not intentionally

aim to identify characteristics of intuition. On the hand interview questions were relative open and thus intuition could have surfaced more often than it did. Because intuition, by definition, is the smooth and automatic execution of learned behavior that can short-circuit stepwise decision making it can be part of causation as well as effectuation type of decision-making logic. Indeed, the subject of the usage, the shifts and bringing together the decision-making logics and intuition offers an interesting terrain for future research.

7 SUMMARY OF THE STUDY

The study was set up to identify and understand the effects of the causation and effectuation logic of six firms, namely three Finnish new energy technology ventures and three older solidly established energy technology SMEs, on their innovation- and internationalization-related decisions. There was a particular interest in the case companies' business relations ranging from supplier agreements to formal international alliances.

Based on the fast-growing volume and variety of publications on effectuation, the research community has indicated that entrepreneurial effectuation is a viable theory. However, its relation to the traditional causation theory remains subject to discussion. Whether these two theories are opposing (Brettel et al., 2012) or independent approaches (Sarasvathy, 2008; Perry et al., 2012) is debatable. Regardless of the viewpoint, both logics are combined in a venture's strategic decision-making, rather than one logic being used exclusively (Berends et al., 2014; Maine et al., 2015; Reymen et al., 2015, 2017).

Moreover, some studies show how the use of these logics shifts over time. Effectuation is argued to be more dominant in early phases of development whereas causation is more dominant later on (Berends et al., 2014). On the other hand, the dominant decision-making logic fluctuates and may shift several times (Reymen et al., 2015), and both logics can coexist subject to the different degrees of uncertainty, e.g., in the technology, the market or the number of decision-makers involved (Nummela et al., 2014). Furthermore, previous studies, e.g., by Smolka et al. (2016), show positive interaction effects between causation and effectuation on venture performance when environmental uncertainty is low and negative interaction effects when uncertainty is high. However, the research of Yu et al. (2018) reveals the opposite, that a positive interaction effect on performance is only valid when environmental uncertainty is high. These examples illustrate the findings of the existing literature review that identified several aspects where additional research was needed.

Specifically, this study aimed to bring in new or strengthening knowledge through the following research questions:

What is the prevailing strategic decision-making logic of new technology ventures and established technology SMEs and how does it affect their innovation and internationalization processes and the solving of major challenges?

How does the prevailing strategic decision-making logic of new technology ventures and established technology SMEs affect their utilization of alliances and thus their contribution to firms' competitive advantage?

What are the influencing factors and how do they influence the decision-making logic of new technology companies and established technology SMEs?

In the literature review chapter, innovation, internationalization, alliances and decision-making logic were discussed. Specifically, innovation, internationalization and alliance motives, types and processes were defined. Prior to moving forward to the decision-making section, potential challenges for the subject matter phenomena were identified and discussed. Thereafter, causation and effectuation principles were defined. Also, intuition and the decision-making process were introduced. At the end, the literature chapter contained some practical real-life examples of SMEs' business relations-related challenges.

In order to achieve the research objectives, qualitative research was defined as the most suitable type of research. Furthermore, because both deductive and inductive approaches have their shortcomings, this study used an abductive approach, including elements of action research. In the data collection, the so-called "critical incident technique" (CIT) was applied. The main data were collected and identified in semi-structured interviews with the management of the case companies. The sample size matched the recommendations for exploratory research (Corbin & Strauss, 2015). Following purposive sampling (Eisenhardt & Graebner, 2007), the case firms and the interviewees were chosen. The starting point and foundation for the round of interviews were constructed on the literature findings, input from regional development companies and the researcher's 30 years of international management experience. Representatives of all case companies were interviewed two or three times within a period of nearly three years. Additional data were based on observations and workshops and collected from open sources such as home pages and published reports.

The dissertation confirmed that contrary to Roach et al. (2016), causation and effectuation are not polar opposites but rather two independent logics that can coexist in a variety of forms (e.g., Harms & Schiele, 2012; Perry et al., 2012). However, several decisions made in the case companies contained elements of both logics and thus justified the graphical presentation used in the study. Also, the data challenge the suggestion of, for example, Reymen et al. (2015) of a gradual transformation from effectuation towards causation over time. Instead, the data support the argument of, among others, Smolka et al. (2016) that the logics are intertwined, are interchangeable regardless of the scope (e.g., Pfeffer & Khan, 2018) and are constantly moving. Hence, the variation between causation and

effectuation resembles a line drawn on water, or rather a lively moon bridge on the water surface, as illustrated in Figure 21.

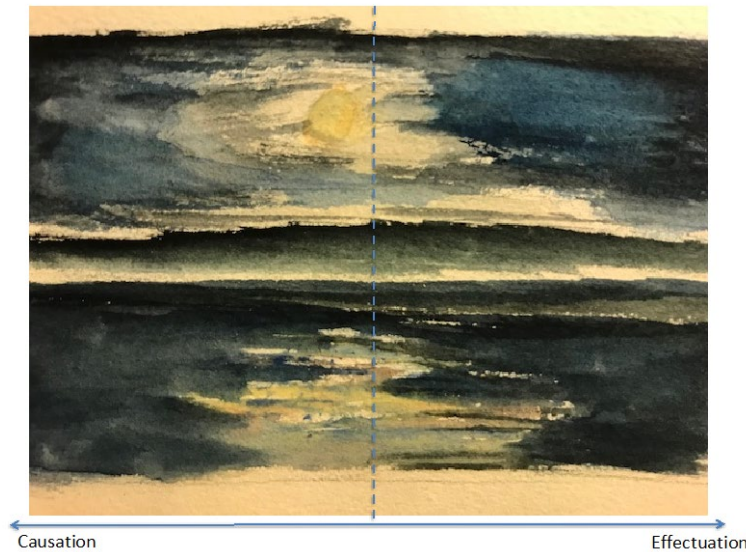


Figure 21. The Fuzzy Interaction of Causation and Effectuation Decision-making Logics (on picture of Wathen, 1915)

This dissertation makes a unique contribution to international entrepreneur and international business literatures by providing in-depth insights into the relation between causation and effectuation antecedents, usage and changes, and general development over time. In addition, the conceptual contribution of this dissertation corrects notions of effectuation theory, strengthens notions of causation theory and provides evidence that small companies adopt a combination of causation and effectuation logic in dealing with their innovation, internationalization, alliance and operations in general. The main results, compared with literature extracts, are presented below in Table 14.

Table 14. Summarized Research Findings in Comparison to Literature

Variable	Literature	Empirical	Comments
Company size	In large organizations causation and effectuation exist in parallel. Majority of SMEs combine the logics. Absolute C or E is negligible.	The evidence suggests concurrent usage of causation and effectuation. The company size has a marginal effect on the logic within the SME framework.	The newest and fastest-growing firm was primarily causative. The largest case SME was effectual.
Company age	Initial effectuation molds towards causation, or logics are intertwined at all times.	Logics are intertwined but no evidence of transformation over time just due to a firm's age.	The majority of new and established firms were more effectual.
Ownership	Entrepreneurs could favor effectuation or causation. Venture capitalists favor causation, angel investors may settle for effectuation.	In line and in agreement with the literature. The ownership type does not define but can affect the logic.	Family-owned case companies were clearly effectual.
Expertise and experience	Unclear of the logic experts favor, evidence is shown of causative, effectual or both being favoured.	Mixed results and thus in line with the literature. Relevant experience is beneficial under both logics.	Technical know-how is not enough, one has to be able to market and sell innovations.
Innovation	Radical innovations and high innovativeness suggest effectuation. Incremental innovations and low innovativeness suggest causation. A combination of C&E being the best.	Radical innovations imply high innovativeness but both causal and effectual logics can lead to radical innovations. Also, effectuation can lead to incremental innovation.	Clearly, the dominant logic was not a decisive factor for the type of innovations.
Internationalization	In early internationalization effectuation is dominant. In a later stage a mixture of logics prevails.	Predominant logic depends on several issues. Both new and older SMEs are subject to the same stage-wise international processes.	One only company had initially made a plan for internationalization.

Variable	Literature	Empirical	Comments
Alliances	Effectual approach favors collaboration with all those who can and will contribute. Causative approach calls for a selection based on identified needs.	The dissertation provides no evidence as to whether carefully planned partnerships or fortuitous alliances are more successful.	All case companies relied on partners and thus resource-based view would be a feasible method for observations.
Opportunities and obstacles	Effectual logic makes companies less vulnerable to sudden disturbances, but in stable circumstances causative approach is more innovative.	Dominant logic is not a prerequisite of opportunity recognition. The nature of an obstacle defines which logic is preferred.	All case companies seized opportunities and had to tackle obstacles.
Events and incidents	Causative approach suggests exploitation of knowledge, effectual approach suggests exploitation of contingencies.	No robust evidence of more effective decision-making logic. Regardless of the logic small companies look first inside when searching for solutions whether in question is an event or an incident.	Certainty comes at the expense of performance.

During the observation period, all case companies experienced change from deliberate to emerging strategies. Older companies suffered and had to change plans due to Covid-19, while the new ventures also had some serious “homemade” or partner-caused incidents to deal with. The push for strategy adjustments affected the most two of the new ventures that had primarily adopted effectual decision-making logic. They had to rearrange their entire business logic, whereas the third, new venture, using primarily a causation approach, survived with minor adjustments. To conclude all six case firms used both causal and effectual approaches but with different depth and intensity. Moreover, despite the limited number of cases studied and the small number of interviewees for some case companies, process conditions and variables being in line with those observed, the study suggests with reasonable certainty that the results can be generalized a) among new energy technology ventures, b) among Finnish energy technology SMEs and c) among technology SMEs in certain other regulated industries.

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