UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

MANAGING A SUSTAINABILITY-ORIENTED INNOVATION THROUGH DYNAMIC CAPABILITIES

A Multiple Case Study on Swedish companies

Angirmaa Batsaikhan

Graduate School

GM0461 V22 Master's Degree Project in Innovation and Industrial Management

Supervisor: Viktor Ström

June 2022

Managing a sustainability-oriented innovation through dynamic capabilities
A multiple case study on Swedish companies

Master of Science in Innovation and Industrial Management

School of Business, Economics and Law
Vasagatan 1, P.O Box 600, SE 45030 Gothenburg, Sweden

Contact: angirmaa.bat@gmail.com

ACKNOWLEDGEMENT

Writing this thesis has been an incredibly rewarding and challenging experience for me.

Thanks to my family and friends who have supported and motivated me throughout the process of writing this thesis. You all made it possible for me.

Furthermore, I thank all the respondents for taking the time to participate in the interviews. This thesis would not have been possible without you and your profound knowledge and experience. I would also like to express my special thanks to Per Östling at The( )Space for all the help.

Finally, I would like to thank my supervisor and fellow students who have supported, given feedback, and guided me through the entire process. Your constructive feedback and guidance helped me to improve my work even further.

Best regards,

Angirmaa Batsaikhan

ABSTRACT

This thesis aims to describe the key dynamic capabilities and critical factors that contribute to the development of sustainability-oriented innovation along with the main challenges companies face during the process of implementation. To successfully implement sustainability-oriented innovation, dynamic capabilities play an essential role in the implementation process. This thesis is based on a systematic literature review and semi-structured interviews with respondents from Swedish companies, addressing dynamic capabilities (absorptive, environmental, competence and the ability for innovation, resource integration, organisational, networking, and technological) and challenges that (managerial, regulatory, social, technical and financial) they can face during the process.

The findings from the literature review and empirical findings suggest that all the dynamic capabilities are identified to be key for implementing sustainability-oriented innovation while one factor is newly discovered in the organisational dynamic capability.

Moreover, five challenge groups were validated to be the main challenges that companies encounter when implementing sustainability-oriented innovation.

Keywords: *Sustainability-oriented innovation, Implementing Sustainability-oriented innovation, Dynamic capabilities, Key factors, Main challenges*

Abbreviations:

SOI – Sustainability-oriented innovation

DC – Dynamic capabilities

CF – Critical factors

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

This chapter begins with a background on why this research is needed and the research gap, followed by the main research question for this thesis. Thereafter, delimitations and the disposition of the thesis are presented.

1.1. BACKGROUND

The growing concern towards climate crises and social issues has been increasing recently. Business entities play a major role in the solution, as their business practices have been becoming more aligned with the global actions against environmental issues, following the UN Sustainable Development Goals and the Paris Agreement (Adams et al., 2015).

In recent years, companies have experimented with redesigning their products and services, business models, and redefining their business strategies (Singh, 2020). The process of becoming a more sustainable company takes time and is more expensive due to discrepancies in the supply chains, which results in more expensive end products, and consumers are unwilling to pay a higher price for eco-friendly products (Ibid). A global and nationally integrated regulatory system is also necessary for every industry. Additionally, while companies produce green products, they must also educate their consumers to ensure the commercialization process goes smoothly (Nidumolu et al., 2009). Even though managers face such challenges, the need for sustainable growth remains the main driver for innovation (Ibid). By viewing sustainability as a goal, companies will have more growth opportunities, competitive advantages, and competencies to forge ahead. Sustainability drives the organisational and technological innovations that generate revenues from bottom-up to top-down (Ibid). Additionally, companies that embark on initiatives to become more sustainable end up using fewer resources than before, which reduces costs. At the same time, introducing eco-friendly products to the market generates additional revenue for the company (Kiron et al., 2012).

Consequently, the business landscape is already changing and becoming more competitive. One of the reasons is that companies strive to become more sustainable by transforming their products or processes, remodelling their business models, or introducing new technologies and digitalizing their whole operation down to both streams (Singh, 2020). It is critical that they need to be innovative in all of these areas to get ahead in their sustainability journey.

1.2. PROBLEM DISCUSSION

To study how sustainability becomes the main driver for innovation, many research studies have been done around this area. A considerable amount of research is focused on the drivers and determinants of sustainable innovation. For example, Pacheco et al. (2017) identified the determinants of eco-innovation in SMEs by conducting a systematic literature review. Through descriptive and content analysis, their findings include 23 determinants, categorised into 7 groups (Pacheco et al., 2017). To name some of the determinants, there include technological advisory oriented to the environment, product and process eco-innovation methods, supplier, and customer relations as a source of innovative ideas and so on (Ibid). Hojnik & Ruzzier (2016), on the other hand, focused on the drivers of eco-innovation, using the same methodology of literature review. They particularly focused on identifying the drivers and separating them based on their relevance to different types of eco-innovations. The research highlights that regulations and market pull factors are the main drivers for product innovations whereas environmental management systems and regulations are the drivers for process innovations (Hojnik & Ruzzier, 2016).

Another research area has emphasized the different strategies that companies can take to become sustainable such as business model innovation for sustainability. Schaltegger et al. (2012) focused on the aspect by building a business case framework for companies pursuing sustainability based on business model innovation. They argue that existing business cases for sustainability can be seen as a supplement to the core business, therefore business model innovations should be the necessary criterion for building business cases for sustainability (Schaltegger et al., 2012). Compared to using business model innovation to build business cases for sustainability, Goodman et al. (2017) emphasized the collaboration effect and the roles of stakeholders in sustainability-oriented innovation. Their research was based on an analysis of empirical findings, combined with 13 companies across Europe. Their findings suggest that stakeholders act 8 different roles in sustainability-oriented innovation processes such as stimulator, initiator, mediator, concept refiner, legitimator, educator, context enabler and impact extender (Goodman et al., 2017).

To look at the academic research development on the topic of sustainability-oriented innovation over the years, literature pieces, emphasizing the implementation aspect of sustainable innovation to the business strategy is rare in the context. Therefore, this thesis aims to fill the research gap by focusing on the implementation and the successful integration of sustainable innovation into the business strategy.

1.3. PURPOSE AND RESEARCH QUESTION

As mentioned, though sustainability-oriented innovation can have many benefits to companies, there are challenges along the way in the transformation process including different government policies and protocols to comply, consumer demand, investors to convince, and resistance to change in the corporate culture and so on (Geradts & Bocken, 2018). As such companies use their unique capabilities as a strategy to implement sustainable innovation (Hofmann et al., 2012). Capabilities can be both internal and external (Ibid) and considering from both aspects, this thesis will seek to answer to the main research question, supported by two sub-research questions as follows:

How Can a Company Implement a Sustainability-Oriented Innovation?

- What dynamic capabilities and critical factors are contributed to implementing sustainability-oriented innovation?
- What are the main challenges companies face during the process of SOI[1] implementation?

Moreover, this paper aims to provide an understanding of what dynamic capabilities and critical factors are associated with the development of sustainability-oriented innovation and the main challenges they face along the process based on a qualitative analysis of findings from Swedish companies.

1.4. DELIMITATIONS

The thesis focuses on how sustainable innovation can be implemented within Swedish companies. Swedish companies refer to companies that are headquartered in Sweden. In addition, the thesis has taken a holistic extent in which, it focuses on the management's perspective to establish a strategy to develop sustainable business through innovation. The strategy can be demonstrated with the help of dynamic capabilities as well as the challenges are identified through primary and secondary data collection. The capabilities and challenges identified through primary data collection are unique to the individual organisations and therefore would not be applied as a general criterion. Moreover, the dynamic capabilities and challenges are identified by a combination of several respondents or an individual respondent on top of a literature review. Dynamic capability is defined as human, physical, and/or organisational resources that create a competitive advantage for the organisation (Eisenhardt & Martin, 2000). The dynamic capabilities and challenges that are defined in this thesis are not exclusive to creating a competitive advantage for organisations. According to Eisenhardt & Martin (2000), dynamic capabilities are

[1] SOI – Sustainability-oriented innovation

competencies that are unique and scarce to the organisation. This thesis did not study the unique and scarce resources and capabilities; therefore, the competitive advantage of the dynamic capabilities is excluded in this thesis.

1.5. DISPOSITION OF THESIS

Introduction

- The background, problem discussion, purpose and the research question of the thesis are presented.

Theoretical Framework

- A systematic literature review is done on the topics of sustainability-oriented innovation (SOI), challenges of implementing SOI and the dynamic capabilities.

Methodology

- The research design, strategy and the data collection methods are presented in this section.

Empirical findings

- Primary data findings from semi-structured interviews are presented in this section.

Analysis

- This section presents the comparison between the theoretical framework and the empirical findings and further analyzes the differences and the similarities between the theoretical literature and the empirical findings.

Conclusion

- The last section finalizes the analysis of the research and answers to the research question presented in Chapter 1. In addition, recommendations and the future research suggestions are presented along.

2. THEORETICAL FRAMEWORK

This chapter entails the literature relevant to implementing sustainability-oriented innovation in a company's strategy. First, the literature discussing the definitions of sustainability-oriented innovation is presented. Followed by the literature, it discusses the challenges a company can face when implementing sustainability-oriented innovation. The chapter ends with a literature review on dynamic capabilities and critical factors that affect the implementation of sustainability-oriented innovation.

2.1. SUSTAINABILITY-ORIENTED INNOVATION (SOI)

Sustainability-oriented innovation (SOI) is an emerging concept in academia while concepts such as sustainable development, sustainable innovation, eco-innovation, green innovation, etc have been in circulation for a while. The concepts are all in favour of one goal, one way or another for solving the environmental and/or social issues. The concept of eco-innovation or green innovation first emerged when the report called "Our Common Future" from the World Commission on Environment and Development was published in 1987 (Brundtland, 1987). The report emphasised sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their needs" which later became more mainstream in the society (Ibid). Elkington (1994) carried on the concept further and developed an approach called the Triple Bottom Line (TBL) in which businesses should follow the three Ps - profit, people, and the planet where rather than focusing only on the growth of just profit, business entities should give equivalent emphasis to people and the planet of well beings from environmental, social, and economic aspects. To contribute to this sustainable development, innovation plays a crucial part in the development of the three Ps (Hansen et al., 2009; Schaltegger & Wagner, 2011). Innovation is "the implementation of a new or significantly improved product, process, marketing method, or organisational method in business practices, workplace organisation, or external relations" (OECD, 2005: 17). The diffusion or implementation of innovations leads to economic impact, i.e., extends beyond inventing, must add value to the business and be unique to the market or the world (Ibid).

To further develop the term eco-innovation, sustainability-oriented innovation has emerged, emphasizing on all three pillars. However, an immense part of the research on the area of SOI refers to only one or two of the pillars, namely eco-innovation (Rennings, 2000), which identifies environmental issues as sources of strategic change within organisations (Aragón-Correa et al., 2008). Eco-innovations aim to reduce the negative environmental impacts through new or enhanced processes, organisational forms, or technologies (Relich, 2015). Other studies have focused on social innovation (Tucker,

2020) which is a broader term dealing with both the environmental and the social dimensions of sustainability. It can be parallel with other terms such as sustainable development innovation (Hall, 2002), sustainable innovation (Wustenhagen et al., 2008), and sustainability-driven innovation (ADL, 2005). In each of these way, businesses are encouraged in achieving economic returns (Friedman, 1970); thus, a profit dimension is already implied in the primary goal. Hence, according to Adams et al. (2015), the terms **sustainable development innovation**, **sustainable innovation**, and **sustainability-oriented innovation** comprises all three dimensions, defining sustainability-oriented innovation as

> *"…making intentional changes to an organisation's philosophy and values, as well as to its products, processes, or practices to serve the specific purpose of creating and realising social and environmental value in addition to economic returns." (Adams et al., 2015)*

In this thesis, the term sustainability-oriented innovation, in short SOI will be used.

2.2. THE CHALLENGES OF IMPLEMENTING SOI

When implementing sustainability-oriented innovation (SOI) in the strategy, many companies face obstacles from various areas and therefore often fail. Identifying the challenges are important because they enable managers to adopt appropriate strategies to overcome (D'Este et al., 2008). Much research has been done on the challenges of SOI implementation. For example, Abdullah et al. (2015) identified challenges from both internal and external perspectives, detailing problems occurring within or outside an organisation. On the other hand, Sartorius (2006) categorised the challenges in terms of the feasibility of sustainable innovation for the economy, society, and institutions. The author also highlighted the indicators of the proposed challenges and analysed whether they have positive or negative implications for certain challenges. Similarly, Brown et al. (2019) classified the challenges of SOI implementation into four groups: technical, market, social and cultural, and institutional and regulatory. The technical and market barriers come from required systems which further increase the level of complexity in the process of integration whereas social and cultural barriers focus more on organisations' ability to adapt their vision and mindset as well as develop competencies through innovation. Institutional and regulatory barriers stem from the impact of various government and non-government decisions and policies (Brown et al., 2019).

To identify the major challenges related to the implementation of the SOI, a literature review was conducted on the proposed theory in the field. Based on the literature review, a total of 19 challenges were identified, which are grouped initially by the development proposed by Brown et al. (2019) along with a new group added by the author - managerial - concerning the complexities specifically relevant to the management perspectives. The

final 5 groups of challenges are (1) social and cultural, (2) managerial, (3) institutional and regulatory, (4) technical, and (5) financial, which are presented in **Uncertainty of** returns, high administrative costs, and other financial obstacles indicate a high risk. There is also the possibility that sustainable innovations require a considerate initial investment, while returns are often seen in the long run (Hojnik & Ruzzier, 2016). Moreover, financial obstacles can also be related to other challenges, such as the ambiguity of public incentives which makes determining returns on investment a challenge (Valero-Gil et al., 2017).

Table 1. Each set of challenges is examined in greater detail as follows.

2.2.1. Social/cultural

Brown et al. (2019) defined social and cultural types of barriers as "organisational, individual and societal - mindsets, ideas, customs, values, behaviours or norms." The challenges in these criteria contain issues regarding the internal and external stakeholders. Abdullah et al. (2016) describe the attitude and perceptions of the employees and managers as negatively affecting the innovation practices toward sustainability. This can be explained by the lack of knowledge and poor communication and corporate's own strategy, resulting in employees' resistance to innovation. As such, the environmental awareness related to "natural resource syndrome" or "resource curse or paradox of plenty" is considered a barrier to sustainable innovation development (Aloise & Macke, 2017). Further, organisations can face barriers in terms of lack of customer demand due to high cost of eco-products. Silva et al. (2008) argue that organisations are reluctant to fully dedicate themselves to sustainable commitment because of the lack of customer demand and the high risk involved. To effectively implement the SOI, stakeholder engagement plays a critical role in the process, however building suitable partnerships can be also challenging, concerning intellectual properties, financing, and overall managing the innovation process (Abdullah et al., 2016). For example, a study in the fashion apparel industry by Curwen et al. (2013) shows that meeting suppliers' needs was one of the challenges in developing sustainable clothing.

2.2.2. Managerial

Managerial types of challenges concern the capability of management (Aloise & Macke, 2017) and the flexibility of a management system (Nielsen et al., 2016) for sustainable innovation development. According to Abdullah et al. (2016), prior knowledge, business practices, and how a company was established affect in a crucial way to the implementation of sustainable innovation. In retrospect, the lack of previous business practices harms innovation initiatives. Moreover, the lack of information makes it more difficult for companies to obtain public resources (Aloise & Macke, 2017). Brown et al. (2019) stress the company culture and learning environment as critical factors in the

innovation process. Businesses face a challenge in building the right environment to achieve sustainable development.

2.2.3. Institutional/regulatory

Lack of government support, regulations and incentives for organisations are one of the biggest challenges for companies when it comes to sustainable innovation (Abdullah et al., 2016; Valero-Gil et al., 2017). While funding and the support from the government negatively affect to the sustainability initiatives, Runhaar et al. (2008) highlighted the disproportion of government initiatives aimed at sustainability-aimed projects. The government and the institutions often encourage companies to become more sustainable with their rules and regulations however, asserts a compliance that happens to be more severe. In the same token, Aloise & Macke (2017) stressed on the government pressure being high, yet inconsistent i.e., insufficient funding for sustainability initiatives.

2.2.4. Technical

Low sustainable adoption is attributed to a lack of expertise in sustainable technology, resources, and operational knowledge (Abdullah et al., 2016; Nielsen et al., 2016; Brown et al. 2019). Moreover, employee skills and qualifications indicate shortcomings due to the lack of existing training curricula and education opportunities, therefore, lack of the necessary skills (Nielsen et al., 2016; Aloise & Macke, 2017). As a consequence, employees and managers often see themselves as incapable of driving the change to innovation and further, face obstacles in terms of innovation.

2.2.5. Financial

Uncertainty of returns, high administrative costs, and other financial obstacles indicate a high risk. There is also the possibility that sustainable innovations require a considerate initial investment, while returns are often seen in the long run (Hojnik & Ruzzier, 2016). Moreover, financial obstacles can also be related to other challenges, such as the ambiguity of public incentives which makes determining returns on investment a challenge (Valero-Gil et al., 2017).

Table 1. Main challenges

Challenge group	**Challenge**	**Authors**
Social/cultural	Attitude and perception; public acceptance;	Abdullah et al., 2016; Sartorius, 2006
	Absence of environmental awareness	Aloise & Macke, 2017

	Customer demand and/or customer expectation	Abdullah et al., 2016
	Asymmetry or lack of information	Abdullah et al., 2016; Sartorius, 2006; Nielsen et al., 2016; Valero-Gil et al., 2017; Aloise & Macke, 2017
	Poor external partnerships; network externalities	Abdullah et al., 2016; Sartorius, 2006; Aloise and Macke, 2017
	Meeting needs of suppliers	Curwen et al., 2013
Managerial	Business practice risk; organisational difficulties; management capacity	Abdullah et al., 2016; Valero-Gil et al., 2017; Aloise & Macke, 2017
	Lack of information	Aloise & Macke, 2017
	Co-creating company culture and environment	Brown et al. 2019
	Flexibility	Nielsen et al., 2016
Institutional/ regulatory	Lack of governmental support; government regulation complexities	Abdullah et al., 2016; Valero-Gil et al., 2017;
	Complex grant schemes, bureaucracy	Nielsen et al., 2016
	Lack of funding	Aloise & Macke, 2017
Technical	Lack of technical knowledge and incorporation, skills, and resources	Abdullah et al., 2016; Nielsen et al., 2016; Brown et al. 2019
	Integrating technologies across different sectors	Brown et al. 2019
	Lack of necessary skills; workforce qualifications	Nielsen et al., 2016; Aloise & Macke, 2017
Financial	Uncertain returns;	Valero-Gil et al., 2017
	Lack of financing; financial obstacles	Aloise & Macke, 2017
	Higher administrative costs and investment required e.g., time, money, resources to collaborate	Brown et al. 2019

2.3. DYNAMIC CAPABILITIES

Organisational capability in general is the ability of an organisation to produce and market its products and services by promoting innovation in a dynamic environment (Boscoianu et al., 2018; Teece, 2017). These capabilities can be categorised as ordinary capabilities (OCs) and dynamic capabilities (DCs). Ordinary capabilities refer to business practices on the operational level whereas dynamic capabilities are strategic (Teece, 2017, p.696). Teece et al. (1997) argue that having dynamic capabilities enable companies to "adapt, integrate and reconfigure internal and external organisational skills, resources and functional competencies to match the requirements of a changing environment." (Teece et al., 1997, p.515). Consequently, dynamic capabilities are responsible for changes by fostering innovation to meet the needs of society (Boscoianu et al., 2018; Haarhaus & Liening, 2020). To integrate SOI into the organisation, it needs to have certain requirements as dynamic capabilities to lead an effective sustainable development (Hofmann et al., 2012). Many works of literature have focused on the effect of certain dynamic capabilities on the development of sustainable innovation. For example, Melane-Lavado & Álvarez-Herranz (2020) highlighted the dynamic capability of absorptive capacity that organisations are focusing on engaging with external resources to their development of sustainable innovation. In contrast, Ketata et al. (2014) emphasised the role of internal capabilities for sustainable innovation. The authors pointed out that the training of employees for certain skills and advancing technological capabilities and R&D have great effects on sustainable innovation development (Ibid).

Moreover, to grasp certain dynamic capabilities, companies need to have critical factors that are correlated with dynamic capabilities. For example, for a company to have the absorptive capacity for its sustainable innovation development, factors such as the ability to manage the external and internal knowledge as well as the method of acquiring this knowledge are needed for such a capability (Barros Rodrigues and Gohr, 2021). In other words, critical factors are the main drivers for certain dynamic capabilities achieved.

2.3.1. Main dynamic capabilities and critical factors

A literature review has been conducted in the related field to identify the critical dynamic capabilities companies can use to boost SOI development. The main research and the foundation framework are presented by Barros Rodrigues & Gohr (2021), where the authors present a conceptual framework of seven dynamic capabilities and fourteen critical factors that constitute boosting SOIs (Ibid). According to the authors, the research for the review is a state of art and provides a solid foundation for future research on SOI as a theoretical framework. The dynamic capabilities that contribute to the overall development of SOIs are presented in **Figure 1**. The critical factors that are considered drivers of dynamic capabilities are presented in **Figure 2**. Each main dynamic capability is discussed as follows.

Absorptive capability refers to how well a corporation manages its internal resources to extract and study external sources of knowledge (Lopes et al., 2017; Pace, 2016). This dynamic capability is seen as a critical parameter for SOIs since it leverages external sources of knowledge to offset internal constraints that might be a barrier to gaining a competitive advantage (Ghisetti et al., 2015). Managing knowledge (through sharing and transfer), as well as R&D, is critical to this capability (Dangelico, 2015).

Having the right employees and sustainable strategies, **environmental capabilities** will handle restrictions related to environmental regulations (He et al., 2018). Furthermore, companies need capabilities that help them take advantage of these differences, use them to redesign problems in different ways, reconfigure skills in various ways, and co-create innovation (Watson et al., 2017). In this context, **competence and ability for innovation** assist in maintaining and adjusting resources for future innovations (Rahman et al., 2015). To achieve this level of competence, developing new skills and leveraging existing ones are necessary to achieve (Rahman et al., 2015; Van Kleef & Roome, 2007). Cagliano & Behnam (2019) assert that to develop SOIs, companies need to become more effective at integrating internal and external resources, in other words a having the capability known as **resources integration**. Positive integration of resources facilitates the detection and apprehension of other capabilities that in turn mediate resource reconfiguration and SOI (Mousavi & Bossink, 2017). However, **organisational management** should also support all these actions since organisational capabilities can make SOI more successful (Dyck & Silvestre, 2018) by mapping competencies and ensuring necessary alignment with the network (Behnam et al., 2018) and motivating the employees for their innovation efforts (Buhl et al., 2016).

The ability of a company to develop relationships with external actors to become engaged in a sustainable innovation project (Behnam et al., 2018) can be described as **networking capability**. According to the literature review, SOIs require the involvement of different actors in a network to develop dynamic capability. According to Dangelico et al. (2016), these collaborations are critical to developing SOIs because inter-organizational relations drive these innovations. Consequently, the higher the networking capabilities and diversity of the partners, the greater the probability of developing an SOI effectively (Cainelli et al., 2015; Van Kleef & Roome, 2007). It can also contribute to increase the **technological capability**. In the development of SOIs, suppliers become essential partners, contributing to technological interdependencies of knowledge, capabilities, and resources (Costa et al., 2015; De Marchi, 2012).

Dc	Definitions
Absorptive	It is responsible for systematizing and coordinating internal and external knowledge to obtain a competitive advantage. In other words, it is the ability to acquire, assimilate, transform, and explore and disseminate knowledge.
Environmental	It deals directly with the environmental issue and has environmental management to manage environmental strategies and regulations.
Competence and ability for innovation	To involve users in the innovation process, companies need a distinctive competence to identify valuable competencies and skills in innovation projects promoting integration, coordination, and knowledge flow between different areas.
Resource integration	His capability is responsible for how an organization implements and integrates its resources and external resources to improve consumption, reduce environmental damage, and improve productivity to achieve strategic objectives.
Organizational	It comprises skills and resources to combine, coordinate, raise, and reconfigure the organization's resources and capabilities to carry out SOIs.
Networking capability	It is the interaction and cooperation between multiple and different actors who benefit from differences in knowledge, resources, and ways to solve other problems. The more diverse the partnerships, the higher the variety of sectors and resource mobilization.
Technological	It is the ability to develop, integrate, and manage technologies for the development of SOIs.

Figure 1. Main dynamic capabilities to boost SOIs (Barros Rodrigues & Gohr, 2021)

DC	CF	CF Definition
Absorptive	Knowledge management	Managing acquisition, learning, and transformation of knowledge.
	R&D	Knowledge acquisition through R&D (internal and external).
Environmental	Regulations	Government or organization-specific regulations.
Competence and ability for innovation	Innovation climate	Provide a climate that encourages employees to innovate.
	Training and skills	Training that encourages employees to explore existing skills and encourage new ones. Raise awareness of the importance of dealing with environmental issues and motivate to ecological challenges.
Resource integration	Internal and external resources	The ability to integrate new materials, skills, etc.
Organizational	Autonomy	Autonomy for employees to innovate and propose changes.
	Organizational culture	Culture for innovation
	Management	Participative and innovative management
	Reward and motivation	Fair and transparent rewards, with benefits for those seeking innovation.
Networking	Interorganizational relationships	Boost innovation efforts through inter-organizational relationships complementing the internal knowledge base with skills from different actors.
	R&D	Partnerships with institutions that have structured R&D.
Technological	Technological development	Multifunctional teams, cross-functional integration, coordination, and intense flows of communication and knowledge to develop "green" technologies.
	R&D	Influence the creation and/or adoption of innovative technologies.

Figure 2. Critical factors associated with dynamic capabilities (Barros Rodrigues & Gohr, 2021)

3. METHODOLOGY

In this part, approaches chosen for research strategy and design will be presented. Moreover, the methods used for both primary and secondary data collection are discussed in sub-chapter 3.3, followed by analysing of data using the thematic analysis. The chapter ends with the criteria used for quality assessments for the thesis.

3.1. RESEARCH STRATEGY

Research strategy indicates the method and the general approach applied to the thesis project (Bell et al., 2019). The two main research strategies are quantitative and qualitative and the difference between the two research strategies is the different perspectives on theory, and how the research will further proceed (Ibid). To compare the two research strategies, the quantitative strategy carries numbers and measurements to test the hypothesis that emerged from the existing literature whereas the qualitative strategy identifies certain angles of perspectives to generate findings that establish a shape of a theory. The nature of qualitative strategy can be explained by interpretivism - philosophical assumptions of business research, underpinned by social constructionism, understanding of human behaviour, and how and why social actions happen (Bell et al., 2019). This thesis aims to understand how sustainability-oriented innovations (SOIs) can be implemented in organisations, such that for this reason, a qualitative research strategy was chosen to be most suitable in this context. Within the perspectives of the respondents, the qualitative research strategy forms an extensive exploration of how organisations can implement SOIs.

According to Bell et al. (2019), a qualitative research strategy is aligned with an inductive approach, building a new theory and/or shaping existing theories based on observations and findings. The disadvantage of an inductive approach is the fact that there can be limitations in literature such that the result of a proposed theory comes out not sufficient (Bell et al., 2019). Compared to the inductive approach, the deductive approach builds a hypothesis on existing theories and results in a revision of the theory. Though, the reliance on existing theories limits its relevance in terms of a deductive approach (Ibid). Based on both inductive and deductive approaches, an abductive approach was introduced (Ibid). The abductive approach is based on a pragmatist's perspective, where it seeks to solve the puzzling of a phenomenon (Ibid). Moreover, there is a limitation on the SOI and its implementations in the organisations, an abductive approach was chosen as the most suitable approach to follow. In this thesis, both approaches are conducted in the testing of existing literature for the literature review and gathering of primary data for the empirical findings. To use literature review as a basis for the primary data collection, the

deductive approach was used by gathering existing literature whereas an inductive approach was used to incorporate the theoretical framework to the empirical findings.

3.2. RESEARCH DESIGN

A research design provides a framework for the data collection and analysis whereas the research method refers to the technique that is used for collecting the data (Bell et al., 2019). To identify how SOI can be implemented in the organisations as well as concerning its research limitations, the exploratory research design is adopted in this study. An exploratory research design seeks to identify the phenomenon, used in studies to further develop a topic in detail (Shukla, 2008). The research surrounding SOI and its implementation lacks a prominent definition (Barros Rodrigues & Gohr, 2021) such that an exploratory research design is suitable for this study. Moreover, an explanatory research design is well-aligned with the abductive approach, both addressing to identify paradoxes.

A multiple-case study method is used as a research method in this study. Considering the nature of the research question to come up with a new theory of *how* companies can adopt SOI in their company, exploring multiple-case practices provides more reliability and in-depth exploration to the study. According to Eisenhardt (1989), the multiple-case study analyses certain variables from multiple-case studies to build generalised propositions to develop a new theory. In this research study, the same phenomena proposed by Eisenhardt (1989) will be followed as multiple-case studies to improve the validity of the study. Moreover, a multiple-case study encourages the researcher to compare different cases and gives a chance to constantly reflect on the theoretical aspects of the findings (Bell at el., 2019).

3.3. DATA COLLECTION

3.3.1. Primary data collection

The primary data collection is the empirical findings collected by the researcher (Bell et al., 2019). As stated, the research strategy in this thesis is qualitative, therefore, conducting interviews was chosen for the primary data collection. The qualitative research strategy has two approaches including unstructured and semi-structured interviews (Bell et al., 2019). Unstructured interviews are set to be an open discussion between the interviewer and the interviewee on a certain subject and do not follow any predetermined guidelines. However, semi-structured interviews follow a certain set of questions as a guideline during the interview, though additional questions and responses are encouraged according to the flow of the interview (Bell et al., 2019). In this research, a semi-structured interview is chosen to be more suitable, considering the identified research question and

the topics. The questions following the main topics are specified in the predetermined interview guide developed by the author (Appendix 1). Moreover, the semi-structured interview is chosen because it is expected to reach out to the respondents who work in the managerial position in the designed field of the study, therefore, creating more reliability in the data collection. As such, the nature of the semi-structured interview is flexible in a way that encourages both personal and professional knowledge and expertise from the respondents to the chosen topic.

3.3.1.1. Selection of respondents

Bell et al. (2019) state that the sampling method is dependent on the nature of the research questions; however, the criteria can be shifted along the process of research. The research question defined in this thesis is exploratory such that to be able to answer the research question with ease, the purposive sampling method is chosen.

To initially familiarise and obtain a holistic understanding of sustainability and sustainable innovation implementation in Swedish corporations, two experts in the related field were interviewed. The experts were chosen based on their knowledge and expertise in sustainability and in particular their experience in working with different companies on their sustainability initiatives and implementation of sustainable innovation in their businesses. The experts were given a separate Interview Guide which was intended to grasp a broader understanding of sustainable innovation implementation in Swedish companies.

The case companies were chosen based on their ability to provide expected knowledge contingent on the research question defined in this thesis. As mentioned, this thesis aims to explore the implementation process of sustainable innovation therefore, the interviewees were selected purposely based on their ability to answer the research question and have considerate background knowledge on the topic of sustainability and sustainable innovation. Therefore, the requirement for the interviewees is for them to have working experience in sustainability management or in coordinating the implementation of sustainable innovation in their companies. With this criterion in mind, the method used for inviting potential interviewees was done either by email or via LinkedIn messaging.

Another criterion was set due to the fact that implementing of sustainable innovation is an extensive process of work that is to reach out to many levels in organisations both internally and externally. Moreover, the capabilities and the challenges can be varied in SMEs and large organisations, therefore, the size of the company was considered as a criterion. According to OECD (2022), the company which have employees between 50 and 250 are considered medium-sized enterprises and 250 or more are large enterprises.

The respondents' company sizes chosen in this thesis are either medium or large-sized enterprises. The information about job positions and case companies regarding the list of respondents is shown in **Table 2**.

Table 2. List of respondents and interview data for the primary data collection

Respondent	Name	Respondent position	Company	Business sector	Company size	Duration	Date
E1	*Anonymous*					41 min	April 4
E2	Stefan Book	Director	TheVision Partner AB	–	–	34 min	May 13
R1	Robert Smolander	Head of Group Change Management & Sustainability	Embellence group	Service	Medium	49 min	April 6
R2	Elin Swedlund	Sustainability Manager	Holmen AB	Manufacturing	Large	52 min	April 22
R3	Anna Denell	Chief Sustainability Officer	Vasakronan AB	Construction & Service	Large	29 min	May 6
R4	*Anonymous - Company X*			Manufacturing	–	28 min	May 9
R5	Christer Lundberg	Global Sustainability & Quality manager	Envac AB	Service	Large	39 min	May 16
R6	*Anonymous - Company Y*			Service	–	60 min	May 17
R7	*Anonymous - Company Z*			Manufacturing	Large	40 min	May 18

3.3.1.2. Interview guide

The interview guide is a set of questions and relative topics to be covered during the interview process (Bell et al., 2019). Following the semi-structured interview method, the questions and the topics determined in the interview guide are expected to be covered during the interview with additional questions that can be raised by the interviewer. The questions and topics included in the interview guide are formulated according to the study done on the dynamic capabilities and their impact on the development of sustainable

innovation by Barros Rodrigues & Gohr (2021). Hence, the interview questions were developed accordingly based on the secondary data collection (Appendix 1).

The interview guide begins with an introduction from the interviewer with a brief explanation of what the research is about and the aim of doing this research followed by a brief introduction from the interviewee about his position at the company, main responsibilities as well as the company's objectives and a strategy on sustainable innovation development. Afterwards, the interview goes on to the discussion about main capabilities (internal and external) that can affect the process of implementation. Following that, the interview ends by asking about the main challenges that the case company has faced or is facing during the process of implementing sustainability.

3.3.1.3. Conducting the interview

The interviews were conducted mainly via Zoom or other video conferencing tools because of the geographical differences between the interviewer and the interviewees. All the interviews were conducted in separate study rooms, preventing any disturbances during the interview process. Bell et al. (2019) stressed that non-face-to-face interviews may have a lessening effect on the quality of the interview; however, they also mention that such concerns are becoming less important over the years. Besides, interviews conducted in this way have many advantages including flexible scheduling and are a convenient choice of the method when there are geographical differences. Moreover, even though the physical distancing due to the Covid-19 pandemic has been easing down in many places, the Zoom meetings can be considered as a new "normality" especially to business meetings (Arif, 2021).

As stated, the invitation for the interview to potential interviewees was sent via either email or LinkedIn messaging. After the respondents agreed to participate in the interview, a Zoom meeting link along with an Interview Guide was sent to the respondents. The Interview Guide was sent before the actual interview, ensuring that the respondent would familiarise themselves with the questions to be asked and prepare for the interview.

The interviews were all held in English and recorded accordingly. As interviewing is a new experience for the interviewer, to break the ice, the interviewer started with a short introduction about herself and explained what the project is about and what she is trying to achieve with this research project, ensuring the interviewees to be more informed and comfortable. Moreover, it is a good approach to initially build trust and create transparency in the project. To keep the data collection viable and credible and for the analysis purpose, the interviewees were asked to be recorded for the interview, to which they all agreed. The recording also helps to prevent losing any important information, especially during the stage of the analysis part of this project. Shortly after the interview

ended, the audio recordings were transcribed for data analysis, using an external web software.

3.3.2. Secondary data collection

Secondary data collection refers to the data presented by other authors (Bell et al., 2019). The secondary data collection in this study is presented in a theoretical framework (Chapter 2) through a systematic literature review. To gain transparent knowledge on the topic of SOI, conducting a systematic literature review was suitable. The review was conducted by (1) Defining the research questions, (2) Searching with predetermined keywords and (3) Analysing the literature. Bell et al. (2019) state that a systematic literature review enables researchers to accept certain biases in the data collection. Before beginning with a systematic literature review, to define the research questions, a prior search was conducted, to familiarise with the topic of sustainability-oriented innovation. The search was based on keywords: *"sustainable innovation"*, *"sustainability-oriented innovation"*, *"sustainability-oriented innovation implementation"*, and *"sustainable innovation development"*. Afterwards, the research questions were determined followed by a systematic literature review. Following the abductive approach, secondary data collection was formulated before the primary data collection to provide a foundation for the interview guide.

3.3.2.1. A systematic literature review

The secondary data collection made in this study is based on existing literature within the field of sustainability-oriented innovation and dynamic capabilities and mainly consists of books, academic journal articles, and some news articles. Several databases were used in the literature review including Google Scholar, GUPEA, ScienceDirect, MDPI, Wiley, and Emerald Insight. The term sustainability-oriented innovation has many variables and slightly different terms (**below**) are equally used in the literature keyword search, resulting in an extensive number of articles.

The keywords used in correspondence to the proposed research question were shown in **Table 3**. Concerning that terms to define SOI have different variables, combined keywords with the additional search were used in the literature search.

Table 3. Search keywords used for the secondary data collection

Keywords	**Keywords with additional words**
Sustainability-oriented innovation	Sustainability oriented innovation AND implementation
Sustainable innovation	Sustainability oriented innovation AND dynamic capabilities

Sustainable development	Sustainability oriented innovation AND challenges

3.3.2.2. Inclusion and exclusion criteria

The articles titled including the terms such as *eco-innovation*, *green innovation*, *social innovation*, or *sustainability-driven innovation* were each included in the systematic literature review regarding that each term indicated the same meaning. Moreover, sustainability-oriented innovation was defined in different ways but conveys the same meaning in different articles by different authors. Each literature included in the literature review is peer-reviewed to ensure its quality and reliability. Following the same pattern, synonym words for keyword *challenge** - *barrier** and *obstacle** were included in the article title were also included for the literature review. As such, all the literature about sustainable innovation is included apart from articles that are only about sustainability or innovation separately are excluded. The author prioritised including articles that were published after the 2000s since the term sustainability-oriented innovation has become popular in recent years.

In terms of exclusion, the criteria were mainly concerning the language of publications. As the language of this thesis is English, other literature written other than English is excluded.

3.4. DATA ANALYSIS

The approach used for the data analysis is thematic analysis (Bell et al., 2019). Thematic analysis is considered a strategy to analyse qualitative data collection, though is not systematic nor has a clear set of techniques defined. However, searching for common themes is a usual approach in qualitative data analysis. As stated, after the interview was wrapped up, the transcriptions were developed using web software. Following that, a summary consisting of the main points for each interview was developed. Afterwards, common themes were created throughout the transcripts following the methodology stated by Gioia et al. (2013) as first and second-order analysis. In the first-order analysis, the themes and codes were identified based on the perspectives of interviewees, and afterwards, the second-order analysis was developed based on the researcher's view on concepts and themes supported by the theories present in the literature review (Gioia et al., 2013).

Several criteria were present when developing the themes in the transcripts of interviews. Bell et al. (2019) provided some criteria to identify a theme such that in this thesis, repetitions of certain topics, similarities and differences between interview transcripts,

and some metaphors and analogies were recognized. However, Bell et al. (2019) also argued that searching for repetitions is the most common technique which does not always fulfil its relevance to the research question or the research focus of the project. Therefore, as Gioia et al. (2013) highlighted, during both first and second-order analysis, emerging codes and themes were constantly checked with the research question and the focus area, making sure whether these themes and concepts were adequate to explain the phenomenon.

3.5. QUALITY CRITERIA

The three most common quality criteria for evaluating business research are reliability, replicability, and validity (Bell et al., 2019). However, the nature of these criteria is that it expects the social reality to be feasible and be generalised such that it has its limitations for applying in qualitative research. Therefore, an alternative criterion was introduced by Guba and Lincoln (1994) stating that there should be alternatives to reliability and validity when assessing the quality of qualitative research. This alternative is trustworthiness comprising four sub-categories including credibility, transferability, dependability, and confirmability (Guba and Lincoln, 1994). As an additional category, authenticity is added to the trustworthiness criteria. In the following sections, each criterion is discussed and how they are assessed in this thesis.

3.5.1. Trustworthiness

3.5.1.1. Credibility

This criterion is an alternative to the internal validity of research, stressing the trustworthiness of the data collection to the study (Guba & Lincoln, 1994). There can be several possible interpretations and aspects of the social settings and the researcher is set to determine its accessibility to others. Moreover, the credibility criterion ensures that the research findings were performed in good practice and submitted to the respondents to confirm their acceptance that the findings incorporate their interpretations. To ensure credibility in this thesis, multiple sources of data were used to increase the consistency of the data sources and the credibility overall (Denzin, 1978; Patton, 1999). This thesis includes both primary and secondary data collection, the latter having data from journal articles in various times from different databases. Moreover, the primary data includes respondents from companies in different industries, ensuring the variability and credibility of this thesis.

3.5.1.2. Transferability

This alternative criterion is a substitute for external validity of research findings, assessing its applicability to other contexts (Guba and Lincoln, 1994). It stresses the question of

whether the result of the study can be generalised beyond the research context. Therefore, the sampling for the study and selection of people and organisations is crucial to this criterion (Guba and Lincoln, 1994). However, in the context of qualitative study, there are characteristics of "contextual uniqueness" in the social situation that is being studied; such that it is challenging to get transferability to the qualitative study (Bell et al., 2019). According to Lincoln and Guba (1985), to achieve transferability in the qualitative study, a detailed description of the field experiences (in this thesis project: an interview process) can help to evaluate the result in a transferable manner. In this thesis, the description of the primary data collection is explained in detail including the number of respondents, interview guidelines, the length of each interview, and the setting of the interview process in Chapter 3. By describing in detail, the findings will be explicit, which increases the transferability.

3.5.1.3. Dependability

Dependability is an alternative to a reliability criterion in the quantitative study, questioning whether the findings can be applied at other times (Guba & Lincoln, 1994). To ensure the dependability of the study, Guba & Lincoln (1994) state that materials and records of the phases of selecting the participants, interview transcripts, and data analysis decisions should be kept being assessed by peers later. The phases of selecting the participants for the empirical study have been detailed in Chapter 3, along with the decisions of research design, and the reasons for supporting those choices are presented. Moreover, to establish more dependability in this thesis, the interviews were transcribed for the data analysis, and the thematic analysis and the coding used in the data collection are presented in Appendix.

3.5.1.4. Confirmability

Confirmability serves as objectivity to the business research, ensuring that the findings are not shaped by the researcher's bias, personal opinions, or interests (Guba & Lincoln, 1994). As it is nearly impossible to ensure that the research was conducted from a completely objective perspective, Guba & Lincoln (1994) suggest that it should be apparent that the researcher shows good faith in conducting the research, in which the techniques and methods he or she used to support the objectivity can ensure the criteria. The formulation of interview questions is entirely based on the secondary data collection and is set to be open-end questions, ensuring to exclude certain external biases. When the interview was finished, an e-mail follow-up was conducted to confirmability of the interview summary from the interviewees. This ensures the confirmability of the answers given by the interviewees. Moreover, the variability and usage of different databases in the secondary data collection implicates more diversity in the research overall.

3.5.1.5. Authenticity

Trustworthiness focuses on the internal and external validity of the research study, ensuring to assess of the process of the research. In comparison, authenticity focuses on the assessment of fairness and meaningfulness of the assessment and the social and political impact of research (Shannon & Hambacher, 2015). To make sure the research was conducted authentically in this thesis, the interview guide was given to the participants before the actual interview, allowing them to arrive with a better understanding of their positionings and the topics to be discussed. This allows the researcher to grasp different viewpoints from the respondents, therefore increasing the authenticity of the research. Moreover, the methodology including the description of research design and the process of sampling as well as the transcription of interviews equally increases the authenticity of this research.

4. EMPIRICAL FINDINGS

*In this chapter, the empirical findings from primary data collection are presented. As mentioned, to increase the variation and external validity of the research and further familiarise more with the topic and particularly to the extent of the Swedish market, two experts in the related field were interviewed. The findings from the experts' views are presented in the first sub-section, followed by each case company, discussing the brief background, the dynamic capabilities discussed during the interview, and the main challenges they face during the process of sustainable development. The chapter ends with a conclusion along with **Table 4** and **Table 5**, summarising the findings of each case company.*

4.1. EXPERTS

Both experts have extensive knowledge and expertise on the topic of sustainability, especially have experience in working with different types of companies both public or private, and small or large. One expert has a background in finance, accounting, and consulting for Swedish companies for their expansion in foreign markets, providing them sustainable solutions that can be adaptable there. Another expert has a background in working with companies on their change management and sustainability-related improvements, which is known as strategic sustainability.

4.1.1. Experts' view

Both experts had agreed that sustainable innovation can be driven by many aspects including demand from consumers, investors' requirements to align the company operations to the common regulations, i.e., Paris Agreement or other regulations from NGOs or the disruption at the industry level can drive the need for sustainable innovation to the business strategy. Though most importantly it can be a combination of any of these drivers and it can be varied in different industries. Experts pointed out sustainable innovation implementation compared to small and large-sized companies. Small companies such as start-ups have great ideas, contributing to becoming more sustainable and having solutions to reinforce the circular economy, for example. They often focus on designing their business model to be more sustainable and innovative, however, it does not succeed. Large companies also focus on redesigning their business model to be more innovative and sustainable however, they often face resistance regarding their internal conflicts. In this context, small companies play an essential role, in helping to solve the issues that large companies often face. In other words, large companies work together with start-ups on the development of sustainable innovation, and this can be one of the capabilities that large companies have.

Another way to effectively manage sustainable innovation in companies, according to the experts, is communication from the top-down. Effective communication from the managers and building an innovative culture create the right environment for sustainable innovation. Moreover, not only building a culture of sustainable innovation but also creating a mechanism for measurement indicators is advantageous for the companies. Setting targets and performance measurements can show clear results on the company objectives. In addition, companies need to use systems thinking as a strategy to understand their current operations and take relevant actions within.

Experts indicated that the biggest challenge that the companies face when implementing sustainable innovation is getting everyone involved from both bottom-up and top-down on the sustainability targets. There can be resistance to change, the need for a behavioural change from employees and getting everyone aligned with the necessary knowledge on sustainability. These types of challenges are the most difficult to trickle down and a lot can be achieved through internal company culture.

4.2. EMBELLENCE GROUP

Embellence Group is a Swedish retail company in interior decoration, comprising five brand companies - Borås tapeter, Cole & Son, Wall&decò, Perswall, and Pappelina. The main products of the company are wallpaper, textiles, rugs, and other interior decoration. Embellence Group is headquartered in Borås, Sweden whereas the brand companies have different origins. Cole & Son is a British wallpaper company and Wall&decò is an Italian company specialising in contemporary wallpapers. The newest brand in the group is Perswall, a US company that focuses on producing plastic window films. Embellence Group recently was listed as a publicly-traded company, starting to focus more on its sustainability responsibilities and the implementation of sustainable solutions as a group.

4.2.1. The dynamic capabilities and critical factors

The main capability that takes part in terms of integrating sustainable innovation into the company, according to R1, is the decision-making process. Being a smaller company, the decision-making is quicker compared to a large company. The company has a total of approximately 250 employees and splits into different brand companies, and it creates an advantage where changes can happen quicker and more pragmatic.

> *"The advantage, I would say, that we have, and the capability that large companies might not have been that we are more nimble since we are small, we can make changes easier, quicker, more pragmatic - we don't have the same complexity or need of a long decision process." (Smolander, 2022)*

Moreover, the interaction between the employees who work in the sustainability initiatives is efficient because usually there is one person responsible for the whole production process and who knows the area, therefore there would not be more levels in the decision-making process.

> *"There is one person who knows everything about a specific production facility, which makes it easier in terms of interacting and conducting the change. That contributes to the ability to change more quickly." (Smolander, 2022)*

However, R1 also pointed out the challenges, regarding this aspect when implementing sustainable innovation. As a smaller company, fewer people can dedicate their time and there is usually less time to dedicate to the process of change. The respondent concluded this as "a scale of balance" in the organisation.

> *"Larger organisations have a lot more headcount and dedicated sustainability people, and with that, you can do more, work more theoretically, create frameworks, structured processes, and have this more structured approach to sustainability innovation." (Smolander, 2022)*

Another factor, the respondent highlighted that is important to sustainable development within the organisation is building a structure or a set of measurements in terms of sustainability. Because the company is relatively early on the stage of its sustainability development journey, currently the focus is on analysing the data, setting a measurement, and creating a structure overall. This can both help the employees as well as the consumers in educating them and have clear communication in terms of sustainable initiatives so that the company can move forward. Moreover, talent acquisition and retaining that talent is an important aspect of this criteria.

> *"The better you can communicate your sustainability work and progress, and the more sustainable you actually are, the better your ability will be to sell products, and even more so going forward then, of course, it's also important for companies to be sustainable to attract the right talent." (Smolander, 2022)*

4.2.2. Challenges

The main challenges that the company faces for its sustainable development, the respondent says that sustainable development is not up to the company and a lot of decisions are ought to be made beyond its value chain. As such, the respondent mentioned, for example, the Greenhouse Gas Protocol Scope 3 emissions where to target the scope level 3, much of the percentage of the carbon footprint for an organisation

happens outside the organisation's operations, and the company does not have direct control over it. Although, this creates more opportunities for the company as collaborations and partnerships can happen with the right people.

> *"The biggest challenge, but also the biggest opportunity in sustainability is that a lot of your improvement lies outside your walls, it's not necessarily what you do, it's what you buy, what your suppliers do, your transportation, it's all of that." (Smolander, 2022)*

Another challenge is in terms of investment and the financial value of sustainability. The respondent points out that quantifying the value of sustainability is often hard and is not easy to convince the investors of the sustainable developments. Therefore, educating and understanding sustainable development is needed for the top-level managers, board members, and investors.

> *"Being sustainable is more expensive than being unsustainable, and it is hard to quantify the value of a sustainability investment." "I think a big challenge is to build fair and correct business cases for sustainability investments." (Smolander, 2022)*

4.3. HOLMEN AB

Holmen AB is a Swedish forest company that was founded in 1609 as an arms factory on the island of Kvarnholmen, Sweden. The company has been in the business for 400 years and is one of the biggest forest companies in Sweden. Holmen AB owns the land, manages it in a way to produce as many wood products as possible, and takes care of the land in a sustainable way. The company has five business units including forest, wood products, paperboard, paper, and renewable energy. Moreover, the production facilities belong to the company such that it creates a unique business concept where the growth of trees transforms into the building of climate-smart buildings, renewable packaging, magazines, etc., while at the same time it generates hydro and wind power on its land.

4.3.1. The dynamic capabilities and critical factors

The R2 stated that because the company has a rich history and has been in the business for a long time, the mindset for awareness that corresponds to sustainable development is already in the core of the organisation, therefore the organisational culture for sustainable development is already established early in the company.

> *"I think realising that we as humans are part of what the environment can provide to us, and we need to be able to live with the planet and not just*

take without what's out there and that's in our core. With the people working in the forest industry, we understand that." (Swedlund, 2022)

Another capability that is unique not only in Holmen AB but also in the forest industry, is cooperation for innovation to work together to build sustainable innovation. The R2 highlighted that the companies work together to build the innovation in terms of forestry and that a lot of the research takes place in collaboration with universities. Whereas, when it comes to product innovation, the company often works with its clients and customers.

"I think we have already done a lot of innovation when it comes to paperboards. I wouldn't call it an innovation, it's a customer development, how we work with our customers and clients to ask what they need, and we develop that for them." (Swedlund, 2022)

4.3.2. Challenges

When it comes to challenges at Holmen AB when building a sustainable innovation, the R2 stressed the pressure that comes from the society, NGOs, the media, and the government concerning the environmental issues. Because environmental issues are one of the biggest problems on our planet, society is more aware of it and is more vocal about the issue.

"I know there's panic about the climate, and maybe it's rightfully so but the solution is not to let the tree stand, the solution is sustainable forest management." (Swedlund, 2022)

Moreover, there is still a lack of knowledge in society regarding environmental issues and there is still room for growth. Consequently, R2 points out that the forest industry often causes media headlines for their management of forests, though, sustainable forest management is what is needed.

"If we grow the forest, harvest, and put the trees into houses for 100 years and keep the carbon and then we plant the new trees that grow a lot, then we will constantly increase the climate benefit from the forest. That's something we are struggling with to get society to understand." (Swedlund, 2022)

4.4. VASAKRONAN AB

Vasakronan AB is the largest real estate company, owned by the four national-controlled pension funds called AP4s in Sweden. The company owns, manages, and develops office and retail properties in Stockholm, Mälmo, Gothenburg and Uppsala. Most of the

development is in the Stockholm area. The company's sustainability target has 4 pillars including reducing the energy consumption that is relevant to the existing buildings, reducing the materials and consumption that are related to developing new buildings, reducing the amount of waste that is collected from the tenants and the developing projects, and reducing the need for transportation to and from within the buildings.

4.4.1. The dynamic capabilities and critical factors

The main capability the company has is correlated with its sustainability objectives and targets towards the environment and society. The respondent explains that because the company strives for the environmental impact by reducing its resources and materials, it results in less money to spend. As such, the relationship between reducing the goal for environmental issues and the financial impact also results in more profitability for the company. Moreover, it is also correlated with the demand for tenants and other business partners, to work together toward the goal of reducing the environmental impact. All together - it is what makes the company stronger and more successful.

"When we use less, we also have to pay less." (Denell, 2022)

Another capability that is relevant to sustainable development was the company's internal culture. The respondent has stated that, alongside the construction industry, change within the company is often slower as compared to other industries. At Vasakronan, the company has been able to establish a culture, where employee innovativeness and creativity are encouraged and rewarded.

"In the technical department, we have a process where you can send in ideas, the best ideas will be promoted and realised. Another thing is that we are recognising last period's - year or month - best energy efficiency measure is taken or something like that." (Denell, 2022)

Moreover, the respondent also highlighted the relationship with their owners or the owners themselves are their strengths to the company. The company has been under the ownership of four pension funds for the last 15 years which results in more trust from the owners in the management and its operation. Additionally, because the initiative toward environmental impact takes time to see the results, it gives the company more capacity to try on new ideas.

"It may be easier for us to try new ideas to work on long term sustainability targets that will take some time to meet and fulfil." (Denell, 2022)

Besides the owners, the respondent also mentioned other stakeholders that are important to sustainable development. These stakeholders are the investors, banks, lenders,

suppliers and the Property Federation of Sweden, which cooperation for promoting an efficient real estate market in Sweden along with universities, academia, and the tenants. Tenants become important stakeholders to the company where it listens to their needs and cooperates for the collective good.

> *"An important stakeholder is tenants. You need to involve them to understand their needs and what we can make different." (Denell, 2022)*

Moreover, the Property Federation of Sweden is one of the important stakeholders of the company and it is also a collective effort to the development of sustainability. The respondent mentioned that knowledge sharing within the industry is one of the initiatives they do when it comes to sustainability. This also becomes an advantage to the company to attract new talents.

> *"In many cases, when it comes to sustainability, it even is kind of an advantage, when it comes to maybe attracting new talents and it's more important to share your knowledge to make more people and companies act on the important issues, especially climate change than to keep it internally inside our company." (Denell, 2022)*

4.4.2. Challenges

The main challenge the respondent highlighted was the correlation between being a sustainable and profitable company at the same time. The respondent stated that from a financial perspective, the real estate market has always been very profitable, though there is a growing concern about whether the new developments of buildings would be sustainable because the capacity is already there as such one could always find a space. Therefore, it becomes a challenge for the management and the decisions need to be taken at the board level.

> *"I think one could start to argue whether it is actually sustainable to develop new square metres in this part of the world because we are already so well equipped." (Denell, 2022)*

4.5. COMPANY X

Company X is a Swedish oil and gas company, with headquarters in Stockholm and operates in Norway. The company produces and develops energy through research and developments and new collaborations. The production and energy development of the company are based on sustainable solutions, which in essence include reducing the emissions from its operations by using electrification from its renewable assets. Within this objective, the company aims to reduce their emissions from operations by 50%.

Further, the company set a goal to become carbon neutral by 2023. Along with targets set for environmental impact on their sustainability goal, it also has strategies towards safe operations, climate change and strong governance where the policies are enacted.

4.5.1. Dynamic capability and critical factors

The strengths that the respondent from Company X mentioned is related to having the right people with the right knowledge in key positions and departments. It can comprise not only having the right people in the sustainability perspective, but also the business departments such as finance and operations. The respondent highlighted that having a strong team in the operation department, for example, can advise on the feasibility of projects whereas a finance team can help convince the stakeholders with business cases for all the projects.

> *"When it comes down to implementing the project, they can advise on the feasibility of how to do it. And that, of course, is a very important part of the implementation phase. So having strong operational capabilities is a key." (R4)*

In addition to having talented employees, the respondent also highlighted the corporate culture that supports innovation and creativity from employees and the environment where employees push each other's ideas forward and are encouraged to take risks. And this sort of culture is not structural and formalised but is organic and present in the organisation.

> *"That kind of forward-looking approach has helped us to keep being ahead of the curve and, it's paid back because if you look at the oil and gas companies, we have some of the best credentials in terms of operating costs, but also terms of carbon emissions." (R4)*

When it comes to working together with external stakeholders, the company takes an active role in communicating with its shareholders. The respondent stated that it is a frequent occasion that the company often explains the daily operation on its sustainability, understands common expectations, and has clear communication with their shareholders.

> *"Everything that we do as an organisation to be more sustainable, we want to make that clear to the market and to communicate it." (R4)*

In terms of technological developments, the company works with universities or external companies that are specialised in conducting research and development projects. Therefore, the research is not done in-house but is conducted by dedicated research

institutions. Company X funds various projects in a wide range including hydrogen and carbon capture technologies to robotics and data analytics.

4.5.2. Challenges

The main challenge is related to the financial aspects. The respondent argued that when it comes to sustainable development, for example, decarbonisation; it is often expensive yet uncertain on its cost payback and is required. Moreover, there is a challenge of whom to get the investment from, who is going to finance it and how it is going to work economically.

> *"Financial challenges - understanding the costs and the cost payback, decarbonisation, for example, can be very expensive but also, it's required. So, there is a challenge with respect to who's going to pay, and how do you make this economics work." (R4)*

From a managerial perspective, the challenge can often relate to decarbonisation. When the company has already done plenty in terms of reducing its carbon footprint, the respondent stated that the last steps are the last emissions are often hard to subside.

> *"The last projects become more and more difficult, more and more expensive. It's like the last few emissions that are hardest to abate." (R4)*

From an implementation perspective, as the company operates offshore, there exist limitations on implementing the projects in terms of technology, for example. The question arises concerning whether the new technology can be feasible around operation. There are also challenges around regulations and expectations from the government. When the government pushes more on its regulations and targets, it can be challenging to meet expectations considering the balance between the cost and pay.

> *"They (the government) are always pushing us to do more. And you want to do as much as you can, but it's kind of a balance for how you meet expectations." (R4)*

4.6. ENVAC AB

Envac AB is an environmental driven company that offers innovative waste collection solutions for urban development areas. The company focuses on pneumatic waste collection systems and plays a big role in shaping and maintaining smart and sustainable cities. The main business idea is instead of trucks coming and picking up the waste from various points, it is transported underground to one collection point. By doing this, the system reduces waste collection traffic and emissions by up to 90%. It also reduces the

noise and pollution associated, making the city cleaner and more sustainable. The company has four targets within its sustainable development objectives targeting the happiest users in the waste collection industry, best environmental performance, Real value for developers and building owners and the lowest operational cost for cities.

4.6.1. Dynamic capabilities and critical factors

One of the biggest capabilities that the company has established recently is its new development called Reflow. Reflow is a Digital Infrastructure in which the company can directly communicate and offers solutions to the end-user on ad-hoc matters such as how to recycle better, how to use the power grid the most efficient way and so on. With the help of artificial intelligence and big data, the system can teach itself offering solutions on how to minimise energy use or when to better collect the waste and so on. As such, with the system, the respondent highlighted connecting directly with their clients and educating them about sustainability.

> *"What we did was actually do a complete worldwide customer investigation on what is important sustainability drivers for them if we develop this digital solution. That's why it is probably the biggest R&D we have done in many years. It is about sustainability because we have asked the customers about what's important." (Lundberg, 2022)*

Another capability that the respondent highlighted was the organisational culture of the company. Innovation, creativity, and process improvement are well encouraged within the company. As the respondent pointed out, it is a bottom-up driven organisation and has a structured system for reporting continuous improvement towards its strategic roadmap. The employees work together as a cross-functional group, coming up with short-term improvements to reach the targets.

> *"Sustainability doesn't become something extra. As we connect it to the strategic targets, we get it to be part of our daily business. We have a continuous improvement system and the activation for all employees bottom to top." (Lundberg, 2022)*

Moreover, another capability that the respondent mentioned is awareness among the employees. In other words, it is the mindset that every employee at Envac has an intention of improving their process of work, making a small impact, and trying to keep the organisation up to date.

> *"The main driver for success is awareness on all levels, keeping the organisation up to date and aware of their own impact." (Lundberg, 2022)*

4.6.2. Challenges

The biggest challenge for sustainable development for the company, according to the respondent, is associated with policies and working together with the government. The company is positioned as offering a solution for urban development such that it requires regulatory support from the government. The respondent stated that the politicians play an important role in their business that more education and collaboration are needed in the future.

> *"We need to get cities to make a policy statement that for new development areas, there should be an automatic waste collection system … to understand that we need a system solution. How to do that: Talking to politicians working together with colleagues in the business - that's the most important thing." (Lundberg, 2022)*

4.7. COMPANY Y

Company Y operates in the logistics and supply chain business sector and has been in the business for almost 60 years. The company is currently in the transformation of its major change towards implementing more digitalisation and innovation in its strategies. In terms of its sustainability objectives, it has targets corresponding responsible consumption and production, clean energy, and gender equality in the workplace as well as good health and safety for its employees.

4.7.1. Dynamic capabilities and critical factors

One of the capabilities that R6 pointed out is the knowledgeable employees and expertise in their job responsibilities, which creates a more capability for the sustainable strategy objectives. To reach the common goal, having the people in the right place is very important because they are the main resources of the organisation.

> *"If you just have the ambition but not the tools to do it in terms of resources then it becomes very hard to implement." (R6)*

Moreover, another capability that was highlighted is the connection to the customers and academia. The respondent pointed out that listening to its customers is good because they always challenge them so that they would improve their work. In addition, the company always keeps a close relationship with the academia in terms of consultancy and being updated on the latest knowledge.

"Depending on the focus area from different backgrounds, the academia is helping us in terms of open-access information on the latest news and updates." (R6)

Also, the respondent mentioned networking with different associations and committees for exchanging information and knowledge on the common challenges or upcoming regulations.

4.7.2. Challenges

The biggest challenge that the company has identified is getting everyone aligned on the sustainability targets and objectives. Because the regulations and policies towards sustainability developments are changing consistently within the company, as well as that the company operates in different regions where it has different subsidiaries, it becomes a challenge to let everyone know about the importance of dealing with sustainability challenges.

"We have a matrix system of organisation so each of the regions must have the actions that are followed up." (R6)

Moreover, even though the culture for generating new ideas from employees is quite open, it often gets forgotten and not followed up afterwards. Therefore, the respondent says that it is now a challenge to implement a comprehensive structure for carrying on this innovative culture. One of the reasons for this challenge is related to the budget and lack of financing.

"The biggest challenge is coordinating initiatives when someone comes up with a new idea. But then there is no support due to the budgeting issue or where to put the investments in, of course, that ties to the fact that we [work in a] matrix organisation [and] the regions manage their budgets." (R6)

4.8. COMPANY Z

Company Z is a vehicle manufacturing company, headquartered in Sweden. The company introduced sustainability targets to its strategy around five years ago, however, the focus on addressing environmental issues has been around much longer. The company's sustainability targets now have three areas including climate action, fighting global warming by reducing its emissions, a circular economy, addressing the material and resource consumption by limiting the use of raw materials and finally a responsible business that includes transparent reporting, green financing, and responsible sourcing.

4.8.1. Dynamic capabilities and critical factors

One of the strengths and the capabilities that R7 mentioned is the company's strong vision and a clear direction toward its future objectives. Having a clear vision gives a push and support towards being more innovative in the field so that it can reach its sustainability objective goals.

"We have a strong vision that we should be sustainable, which is a key to promoting innovation." (R7)

Moreover, another capability, according to the respondent was their employees and the reputation of being an attractive employer. This capability, to a large extent, is significant to the company's core development, becoming more digital and increasing its competency in offering more digital services.

"We have a lot of engineers, a lot of good people that we become a very attractive employer both in Sweden and globally, which means a lot of people wants to work for us." (R7)

Within the perspective of skilled employees as a capability, the respondent also highlighted its supply chain network. Having innovative companies as their supply base gives more competence towards reaching the sustainability objectives. In addition, the respondent highlighted that the company operates a tech fund, where it promotes and invests in new innovative tech companies to scale and partake in the competencies of the company.

"Besides safety technologies which are very important for us; we also look for sustainability-related investment opportunities and we have made a few of those." (R7)

Lastly, the respondent stated the pressure from the investors as one of the capabilities of the company. Because people are acknowledging the impact and the awareness of environmental issues more and more, investors are also compelling more on sustainability and innovation from the companies – which leads the company to be better and more innovative in their strategies.

"Our EMT - the Executive Management Team and our board of directors believe in sustainability because they feel the pressure from the outside. That is a good thing because then it helps us internally to promote the right things and make the right decisions." (R7)

4.8.2. Challenges

In terms of challenges, as a vehicle manufacturing company, the respondent stated that it has been a challenge to manage the environmental impact it creates in terms of the level of emissions. However, the issue is not only in the production of emissions from the vehicles but also in its operations and the supply chain.

> *"We have been part of the problem for so many years because we have been producing cars that release emissions, so to the atmosphere. And even now, if we produce only bad cars, there are still emissions in the supply chain and operations." (R7)*

Moreover, the respondent also stated about the challenge in the internal organisation. The internal culture of the company is already innovative; however, it often becomes a challenge when it comes to scaling the ideas and launching them to the market. The company is not used to rolling out new ideas or services such as what the digital companies would do.

> *"We have tons of new ideas that we can make a list, there are so many innovative people, and all those ideas are there, the problem is to take an idea and make it feasible." (R7)*

Lastly, the respondent stated a challenge concerning the managing of the whole supply chain. Because the company has targets towards its responsible business objectives, it becomes a challenge when it comes to managing further down the supply chain, for example, whether the business operates ethically or not violating human rights.

> *"I think it is still the major challenge from a human perspective, a human-centric brand responsible sourcing and to make sure there are no human rights violations in our supply chain, even if it's not our company, or even our supplier, further down the value stream are upstream." (R7)*

4.9. CONCLUSION ON EMPIRICAL FINDINGS

The interviews were to find out each case company's key internal and external capabilities (known in this thesis as dynamic capabilities with key factors) which have positive impacts on their implementation of sustainability-oriented innovation. The findings on dynamic capability along with key factors, corresponding to each respondent are summarised in **Table 4.**

Table 4. Empirical findings on dynamic capabilities

Dynamic capabilities	Critical factors	R1	R2	R3	R4	R5	R6	R7
Absorptive	Knowledge management	✓					✓	✓
	R&D							
Environmental	Regulations		✓	✓	✓	✓	✓	✓
Competence and ability for innovation	Innovation climate			✓	✓	✓	✓	✓
	Training & skills	✓				✓	✓	
Resource integration	Internal and external resources					✓	✓	✓
Organisational	Autonomy							
	Organisational culture			✓		✓	✓	✓
	Management			✓	✓	✓		✓
	Reward and motivation			✓		✓		✓
Networking	Interorganizational relationships	✓	✓	✓	✓		✓	✓
	R&D				✓			✓
Technological	Technological development			✓		✓	✓	✓
	R&D				✓	✓		✓

In the same context, the interviews were also to learn about the main challenges that the case companies face when implementing a sustainability-oriented innovation. The challenges are attributed to the main category and summarised, following the findings from each respondent shown in **Table 5.**

Table 5. Empirical findings on the main challenges

Challenges	R1	R2	R3	R4	R5	R6	R7
Social/Cultural		✓			✓		
Managerial	✓		✓		✓	✓	✓

Institutional/Regulatory	✓	✓	✓		✓		
Technical	✓			✓			
Financial	✓			✓		✓	

5. DISCUSSION

In this chapter, the first part views the dynamic capabilities and critical factors from the empirical findings and how it is contrasted with the data collected via literature review. Afterwards, in the second part, the findings concerning the main challenges from primary and secondary data are discussed. The chapter concludes with a subsection on the implementation of sustainability-oriented innovation based on the findings combined from both primary and secondary data collection.

5.1. DYNAMIC CAPABILITIES AND CRITICAL FACTORS

Dynamic capabilities enable organizations to become more competitive in the changing environment and meet society's needs through their ability to develop additional or unique competencies (Boscoianu et al., 2018). When sustainable development is vitally relevant to the core of an organisation, organizations can cultivate their dynamic capabilities to serve as a base for their business strategy. In the literature review, there are seven dynamic capabilities and fourteen critical factors that support these capabilities are defined (Barros Rodrigues & Gohr, 2021). Apart from seven dynamic capabilities, all of them were identified both by the literature and the respondents whereas thirteen critical factors are identified by the respondents out of fourteen by the literature.

5.1.1. Absorptive capabilities

Absorptive capability refers to the ability to acquire and transform internal and external knowledge in the organisation (Barros Rodrigues & Gohr, 2021). The capability has factors including managing and acquiring the knowledge through R&D. The capability allows a company to systemize its internal resources and learn to acquire external ones for sustainable objectives. One respondent pointed out the capability of prioritising the data analysis and using it towards their innovation efforts and further working on change management towards sustainable developments. The respondent pointed out that data management, in particular, quantifying the data is an important aspect to grasp tangible data and spread awareness within the company for sustainable innovation development. Another respondent highlighted acquiring the knowledge through third-party institutions which are specialised in research and development. Lopes et al. (2017) and Pace (2016) suggest that the absorptive capability is mainly centred on coordinating its internal knowledge and learning to explore external sources of knowledge.

5.1.2. Environmental capabilities

According to the literature, environmental capabilities are concerned with the direct management of the environmental issue through strategies and regulations (Barros Rodrigues & Gohr, 2021). The capability is characterised by having organisation-specific regulations or government regulations. As Sweden is already in the upfront when it comes to sustainability (Mulhern, 2020) and sustainability-related regulations, these factors have been set aside and the author tried to focus on the more organisation-specific regulations from the empirical findings. One respondent highlighted this capability, arguing that it is important to set and follow the regulations since it helps the company to improve. Though, according to other respondents, environmental policies and regulations are not always integrated and lack a holistic ground among different institutional levels. It can also be concluded that the regulations' impact on different industries can be varied.

To look at the organisation-specific regulations in terms of sustainability, most respondents have specified having clear sets of goals and targets to fulfil within a timeframe. These types of regulations are mostly tied with a governmental-specific or institution-specific i.e., Paris Agreement or the Sustainability Development Goals from the UN.

5.1.3. Competence and ability for innovation

The literature highlights that to initiate the sustainable process within the organisation, it needs to prepare its competence in its areas by identifying the valuable skills, promoting the collaboration effect, and diffusing the knowledge flow between different areas (Barros Rodrigues & Gohr, 2021). The factors that correspond to this capability is the climate of innovativeness in the organisation where employees are aware of sustainability knowledge and there is a dedicated environment for them to innovate (Ibid). In addition, the environment also provides a learning space where employees improve their existing skills and learn new ones and more importantly be aware of environmental impact and prepare themselves how to tackle the challenges (Rahman et al., 2015; Van Kleef & Roome, 2007). The empirical findings show that companies either have this kind of environment already built in their organisation depending on their industry type or are in the process of creating the environment internally due to their initiatives towards becoming sustainable companies. Regardless of the reason, it can be concluded that organisations in Sweden aim for building the right environment for their employees often because of external factors of government regulations or the society.

5.1.4. Resource integration capabilities

The ability to integrate both internal and external resources to improve productivity to achieve sustainability is known as resource integration capability (Cagliano & Behnam, 2019). In other words, it can relate to the open innovation concept where the organisation extracts resources with the help of communicating directly with their clients. One respondent has highlighted this capability as using their newly developed software technology to communicate directly with its clients, work together on certain problems, get feedback, and educate them through the software app. Both literature review and the empirical findings show that the capability occurs when the organisation can integrate its resources to gain external resources and skills.

5.1.5. Organisational capabilities

Organisational capability refers to the managing of skills and resources to further promote the organisation's capabilities in the development of sustainable innovation (Behnam et al., 2018). The capability has four factors including autonomy, organisational culture, management, and reward and motivation. The literature highlights this capability as promoting innovative culture from employees by providing the right environment and abilities to grasp external knowledge through different resources. Further, it can be supported by an organisational culture where employees are proactive to make changes and get rewarded in return and management promotes those initiatives (Buhl et al., 2016). Compared to the literature, empirical findings suggest a positive correlation in terms of organisational capabilities. Respondents have suggested that they often promote the innovative culture by creating the right environment and the capacity. To do that spreading awareness and maintaining clear communication between managers and the employees is crucial. One respondent highlighted rewarding the proactive employees by recognition to further promote the innovation culture and organisational capacity.

Moreover, many respondents have stressed on having a skilled key employee is one of the main drivers for building a sustainable innovation. These employees bring in the necessary skill set to the company retaining and attracting them is also an important factor for a sustainable company.

5.1.6. Networking capabilities

Networking capabilities are cooperation between different actors and the exchange of knowledge, resources, and ways to solve other problems. The capability can be strong when the partnerships have more actors in the circle so that they are more diverse, resulting in higher variance in terms of resources (Barros Rodrigues & Gohr, 2021). The factors carrying out this capability are inter-organisational relationships and research and

development in the means of partnerships with entities that are structured in research and development. Therefore, it can be viewed as a networking effort with different organisations in the means to extract needed knowledge and skills and complement their internal resources. According to respondents, their findings show that both factors are fulfilled in the companies as a collective effort to coordinate innovation projects for sustainable development. However, it can be unique to innovation that is particular to products such that the innovation requires more technical skills and meets the needs of customers which was highlighted by one respondent. Therefore, a lot of the cooperation takes place working with the clients, listening to their needs, and providing them with the remodelled products.

5.1.7. Technological capabilities

As Barros Rodrigues & Gohr (2021) stated, technological capabilities refer to the development of technologies through dynamic teams and coordination and involve innovative technologies through research and development. A few respondents have stated that technological development and research and development are part of their business operation. As such the technological developments that they focus on are data analytics, using AI to develop software solutions for energy efficiency and effective communication through digitalisation. To look at the method the companies develop such capabilities can be either on the inside or by partnering with suppliers as a resource. For example, some respondents have stated that they have their people developing such technological advancements in the company whereas others work with external suppliers working aside from the company.

Table 6. Capabilities discovered by both literature and the respondents

Dynamic capabilities	**Critical factors**	**Discovered by both the literature review & respondents**	**Only in the literature review**	**New capabilities discovered from the respondents**
Absorptive	Knowledge Management	✓		
	R&D		✓	
Environmental	Regulations	✓		
Competence & ability for innovation	Innovation climate	✓		
	Training & skills	✓		

Resource integration	Internal & external resources	✓		
Organisational	Autonomy		✓	
	Organisational culture	✓		
	Management	✓		
	Reward & motivation	✓		
	Key employee			✓
Networking	Inter-organisational relationships	✓		
	R&D	✓		
Technological	Technological development	✓		
	R&D	✓		

5.2. THE MAIN CHALLENGES

5.2.1. Social/cultural

Social/cultural challenges refer to the lack of knowledge or awareness of employees and managers in the organisation on the knowledge of sustainability (Abdullah et al., 2016). Regarding the customers or the society, the challenge occurs when there is resistance to accept the newly developed product or services or issues concerning the mindset towards the climate crisis (Aloise & Macke, 2017). Only one respondent pointed out the challenge derived from society concerning the climate crisis. Because the climate crisis is one of the critical issues in the world, people are more aware and demonstrative toward business entities. Moreover, another reason for companies having such challenges is that there can be a lack of communication and asymmetry of information between society and the company. Furthermore, such challenges can also refer to the employees within the organisation. None of the respondents has stated such issues within the company.

The literature has also focused on the challenge regarding the lack of customer demand and market growth due to the high risk and high cost of eco-products (Silva et al., 2008). One respondent has pointed out the challenge as there needs more market growth for the service they are providing. The issue can be explained as it is correlated with another challenge on regulatory issues in which there can be more support from the government. According to Abdullah et al. (2016), such challenges can be effectively managed by engaging with key stakeholders through partnerships.

5.2.2. Managerial

Managerial challenges are related to the capacity of management, the flexibility of the management system and the ability to create the right environment for its employees for further sustainable development (Aloise & Macke, 2017; Nielsen et al., 2016). The literature has mainly focused on the management difficulties occurring internally within the company; however, respondents have generally expressed the decision making concerning the external stakeholders. R1 has pointed out the challenge of engaging with suppliers in the decision-making process. When suppliers are not part of the company, it can be challenging to influence their operation though it is crucial to the company's objective of sustainable innovation development. R3 and R5 have expressed the challenges concerning the market growth or in comparison a high market penetration. Either there still needs more growth in the market or the capacity is already full. Though it depends on what type of industry the company is operating, the decisions ought to be made at the upper management level.

5.2.3. Institutional/regulatory

The literature has indicated that regulatory or institutional challenges refer to the lack of support from the government, different regulation complexities and issues concerning the pressures from the government (Runhaar et al., 2008; Eltayeb et al., 2011; Aloise & Macke, 2017). Most of the respondents have expressed these issues related to regulatory matters. For example, R1 and R5 pointed out the different regulatory complexities between the agencies and the government and R2 and R3 stated about the pressures from the government regarding NGOs' concern towards the climate change cause more pressures pressure and the expectation from the agencies always increases such that it creates a challenge of how to balance. Moreover, as R5 stated there is a challenge concerning the lack of information for the government, causing the lack of support. Such challenges can be communicated more and worked together with the government or the NGOs to tackle the issue.

5.2.4. Technical

Technical challenges are those that are concerned with the resources and skills relevant to the technical aspects of an organisation. The literature shows that a lot of the technical challenges occur in technological shortcomings and operation and integration of the technologies, lack of capacity for training for the needed skills, and the degree of employee qualifications for innovation development (Silva et al., 2008; Aloise & Macke, 2017; Ross et al., 2012; Jalan et al., 2014). One respondent pointed out the lack of necessary skills or the workforce qualifications as their challenge due to the number of employees in total. The reason can be explained that for small or medium-sized companies, the workforce who are responsible for sustainability-induced projects is often low or they lack the certain skills needed for the development.

5.2.5. Financial

The literature has indicated that financial challenge refers to the lack of investment or investment opportunities, uncertain returns, and higher administrative costs. A lot of it has focused on the struggles of getting the sustainability centred projects financed and the high level of investment needed. Most of the respondents have agreed on sustainability is more expensive than any other objective. Moreover, the value-added or the quantifying of the value of sustainability is often difficult to convince the investors for sustainability-based projects. The reason can be explained that investors often need hard evidence or business cases to finance the project though it can be a challenge for the management to show the financial value of that big investment. Some respondents highlighted that more education in terms of sustainability is needed for not only the employees inside the company but also for the investors, government officials and the society as well. As such, the relationship and how long it has been between the company and its investors can affect the likelihood of getting a big investment. Naturally, for a relationship that has lasted for a long time, more trust has been built so that financial challenges as such can be not as big as others.

Table 7. Challenges discovered by both literature and the respondents

Challenges	**Discovered by both the literature review & respondents**	**Only in literature review**	**New challenges discovered from the respondents**
Social/cultural	✓		
Managerial	✓		
Institutional/regulatory	✓		

Technical	✓		
Financial	✓		

5.3. IMPLEMENTING SOI

Connecting the dynamic capabilities and the main challenges proposed by both the literature and the empirical findings shows that all the dynamic capabilities and the main challenges proposed are proven to be the key to implementing sustainability-oriented innovation in the company. However, two out of fifteen critical factors within the dynamic capability were not supported by the empirical findings after the analysis as such the framework for implementing the SOI is modified to exclude the two. Consequently, the critical factors including ***R&D*** corresponding to the absorptive capability and ***autonomy*** corresponding to the organisational capability are excluded from the framework since it was not highlighted by the empirical findings. Though, a new critical factor called ***key employee*** is added to the organisational capability as it was highlighted by most of the respondents.

In terms of challenges, all the challenges identified by the literature were highlighted from the empirical findings, supporting the review of the literature.

6. CONCLUSION

After analysing the empirical findings in correlation to the literature review, the dynamic capabilities with critical factors and the main challenges were proposed in sub-chapter 5.3. Based on sub-chapter 5.3, this chapter gives a conclusion by answering the research question defined in Chapter 1 along with recommendations to the case companies, followed by further research suggestions on the topic of sustainable innovation.

6.1. ANSWERING THE RESEARCH QUESTION

This thesis aimed to explore *how a company can implement a sustainability-oriented innovation* with a focus on Swedish companies by identifying the dynamic capabilities with critical factors and the main challenges they face during the implementation of sustainability-oriented innovation. In other words, this thesis is to find out how a company can implement a sustainability-oriented innovation in their business. The dynamic capabilities proposed after the literature review and discussions give a company a unique capability of competitive advantage to their business strategy. Taking these proposed

dynamic capabilities into a consideration along with defining their critical factors and using these capabilities as resources and skills to tackle the proposed main challenges, companies can implement sustainability-oriented innovation in their strategy.

The sub-questions to the main research question were formulated as:

- What dynamic capabilities and critical factors contributed to implementing sustainability-oriented innovation?
- What are the main challenges companies face during the process of SOI implementation?

Combining the findings identified from both the literature review and the empirical findings, the answers to the sub-research questions are presented as conclusions in the following sub-chapters.

6.1.1. The dynamic capabilities of the implementation of SOI

The main dynamic capabilities contributing to the implementation of SOI are attributed to ***absorptive***, ***environmental***, ***resource integration***, ***organisational***, ***networking***, and ***technological*** capabilities. The capabilities are initially identified by conducting a literature review and supported by the empirical findings collected from respondents from Swedish companies, working in different business sectors. The critical factors that define the main dynamic capabilities identified by the literature review were mostly supported by the empirical findings except for a new critical factor, ***key employees*** corresponding to the organisational capability were developed from the primary data collection and R&D factor to the absorptive capability and autonomy factor to the organisational factor were not supported by the empirical findings.

6.1.2. The main challenges to the implementation of SOI

The main challenges the companies face during the process of SOI are correlated with ***social/cultural***, ***managerial***, ***technical***, ***regulatory***, and ***financial*** obstacles. The challenges are identified from both the literature review and the empirical findings.

6.2. RECOMMENDATIONS

During the analysis process and following the answer to the research question, some recommendations can be given for the companies when implementing sustainability-oriented innovation in their strategy.

First, companies should highly focus on engaging with different stakeholders during the implementation process of SOI. This factor has been discovered by the literature review

on the networking capability and has been highlighted the most from the empirical findings as to the most important to the implementation process. Engaging with different stakeholders gives both extra skills and resources as a competitive advantage to the company but also can be a solution when there are different types of challenges such as managerial, social, and regulatory. Therefore, it is recommended to communicate with different stakeholders inside and outside of the value chain and work together as a collective to solve the common issue corresponding to sustainable innovation development.

The second recommendation is connected to the clear and effective communication within cross-functional departments or the transparency of information between the investors or clients and the company. A lot of the challenges defined from the empirical findings have a root in the lack of effective communication whether it is about spreading the awareness to the employees of their sustainable objectives, or a piece of information not being transferred to the investors and the c-level managers. In retrospect, effective communication between the investors and the clients was one of the success factors for the companies when implementing SOI in their strategy. Therefore, it is recommended that companies should have clear targets set regularly and frequent evaluations and the reporting should be conducted between the top-level managers, the clients as well as employees throughout the organisation. Setting such a culture will give an advantage that everyone is aware of common objectives and is communicated and restricted from conflicts on misinformation.

6.3. FURTHER RESEARCH

For further research, this thesis was to define the dynamic capabilities and critical factors that contribute to the implementation of sustainability-oriented innovation. Therefore, the research can further explore more factors that can correspond to the implementation process. Also, in this thesis the identification of dynamic capabilities and the main challenges were conducted separately, without each other's correspondence, therefore it could be an interesting approach to do research that focuses on identifying the main challenge and defining a capability that allows solving the challenge. Moreover, this research was focused on large-sized Swedish companies in different industries therefore, further research can explore SMEs in particular, research focusing on only one business sector or a larger scope on a comparison of same industry level companies from different countries. Within that, it can give different themes of analysis in comparison with different countries.

Further, the research was focused on the implementation of sustainable innovation in the business strategy based on the qualitative study therefore, the findings cannot be

generalised. Further research can be conducted using a different methodology to further validate its relevance to the business context. As such, research focusing on how to measure and evaluate the implementation process of sustainable innovation is worth exploring.

REFERENCES

Abdullah, M., Zailani, S., Iranmanesh, M., & Jayaraman, K. (2015). Barriers to green innovation initiatives among manufacturers: the Malaysian case. *Review of Managerial Science*, *4*, 683–709. https://doi.org/10.1007/s11846-015-0173-9

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., & Overy, P. (2015). Sustainability-oriented Innovation: A Systematic Review. *International Journal of Management Reviews*, *18*(2), 180–205. https://doi.org/10.1111/ijmr.12068

Aloise, P. G., & Macke, J. (2017). Eco-innovations in developing countries: The case of Manaus Free Trade Zone (Brazil). *Journal of Cleaner Production*, 30–38. https://doi.org/10.1016/j.jclepro.2017.08.212

Aragón-Correa, J. A., Hurtado-Torres, N., Sharma, S., & García-Morales, V. J. (2008). Environmental strategy and performance in small firms: A resource-based perspective. *Journal of Environmental Management*, *86*(1), 88–103. https://doi.org/10.1016/j.jenvman.2006.11.022

Arif, R. (2021, February 26). In The Post COVID-19 World, Zoom Is Here to Stay. Forbes. https://www.forbes.com/sites/raufarif/2021/02/26/in-the-post-covid-19-world-zoom-is-here-to-stay/?sh=1c1637fb55b5

Barros Rodrigues, B. C., & Gohr, C. F. (2021). Dynamic Capabilities and Critical Factors for Boosting Sustainability-Oriented Innovation: Systematic Literature Review and a Framework Proposal: Engineering Management Journal: Vol 0, No 0. *Engineering Management Journal*. https://doi.org/10.1080/10429247.2021.1960124

Behnam, S., Cagliano, R., & Grijalvo, M. (2018). How should firms reconcile their open innovation capabilities for incorporating external actors in innovations aimed at sustainable development? *Journal of Cleaner Production*, 950–965. https://doi.org/10.1016/j.jclepro.2017.09.168

Bell, E., Bryman, A., & Harley, B. (2019). Business Research Methods (5th ed.). Oxford University Press.

Boscoianu, M., Prelipcean, G., & Lupan, M. (2018). Innovation enterprise as a vehicle for sustainable development – A general framework for designing typical strategies based on enterprise systems engineering, dynamic capabilities, and options thinking. Journal of Cleaner Production, 3498–3507. https://doi.org/10.1016/j.jclepro.2017.06.120

Brown, P., Bocken, N., & Balkenende, R. (2019). Why Do Companies Pursue Collaborative Circular Oriented Innovation? *Sustainability*, *3*, 635. https://doi.org/10.3390/su11030635

Brundtland, G. H. (1987). Our Common Future—Call for Action. Environmental Conservation, 14(4), 291–294. http://doi.org/10.1017/S0376892900016805

Buhl, A., Blazejewski, S., & Dittmer, F. (2016). The More, the Merrier: Why and How Employee-Driven Eco-Innovation Enhances Environmental and Competitive Advantage. Sustainability, 8(9), 946. https://doi.org/10.3390/su8090946

Cagliano, R., & Behnam, S. (2019). Are innovation resources and capabilities enough to make businesses sustainable? An empirical study of leading sustainable innovative firms. *International Journal of Technology Management*, *1*, 1. https://doi.org/10.1504/ijtm.2019.10016975

Cainelli, G., De Marchi, V., & Grandinetti, R. (2015). Does the development of environmental innovation require different resources? Evidence from Spanish manufacturing firms. *Journal of Cleaner Production*, 211–220. https://doi.org/10.1016/j.jclepro.2015.02.008

Costa, C., Lages, L. F., & Hortinha, P. (2015). The bright and dark side of CSR in export markets: Its impact on innovation and performance. *International Business Review*, *5*, 749–757. https://doi.org/10.1016/j.ibusrev.2015.01.008

Curwen, L. G., Park, J., & Sarkar, A. K. (2013). Challenges and Solutions of Sustainable Apparel Product Development. *Clothing and Textiles Research Journal*, *1*, 32–47. https://doi.org/10.1177/0887302x12472724

Dangelico, R. M. (2015). Green Product Innovation: Where we are and where we are Going. *Business Strategy and the Environment*, *8*, 560–576. https://doi.org/10.1002/bse.1886

Dangelico, R. M., Pujari, D., & Pontrandolfo, P. (2016). Green Product Innovation in Manufacturing Firms: A Sustainability-Oriented Dynamic Capability Perspective. *Business Strategy and the Environment*, *4*, 490–506. https://doi.org/10.1002/bse.1932

De Marchi, V. (2012). Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms. *Research Policy*, *3*, 614–623. https://doi.org/10.1016/j.respol.2011.10.002

Dyck, B., & Silvestre, B. S. (2018). Enhancing socio-ecological value creation through sustainable innovation 2.0: Moving away from maximising financial value capture. *Journal of Cleaner Production*, 1593–1604. https://doi.org/10.1016/j.jclepro.2017.09.209

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. Academy of Management Review, 4, 532–550. https://doi.org/10.5465/amr.1989.4308385

Eisenhardt, K.M. and Martin, J.A. (2000), Dynamic capabilities: what are they? Strat. Mgmt. J., 21: 1105-1121. https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E

Elkington, J. (1994). Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development. *California Management Review*, *36*(2), 90–100. https://doi.org/10.2307/41165746

Friedman, M. (1970). The Social Responsibility of Business Is to Increase Its Profits. In Corporate Ethics and Corporate Governance (pp. 173–178). The New York Times Magazine. https://doi.org/10.1007/978-3-540-70818-6_14

Geradts, T., & Bocken, N. (2018, November 28). Driving Sustainability-Oriented Innovation. MIT Sloan Management Review. https://sloanreview.mit.edu/article/driving-sustainability-oriented-innovation/

Ghisetti, C., Marzucchi, A., & Montresor, S. (2015). The open eco-innovation mode. An empirical investigation of eleven European countries. *Research Policy*, *5*, 1080–1093. https://doi.org/10.1016/j.respol.2014.12.001

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigour in Inductive Research. Organisational Research Methods, 16(1), 15–31. https://doi.org/10.1177/1094428112452151

Goodman, J., Korsunova, A., & Halme, M. (2017). Our Collaborative Future: Activities and Roles of Stakeholders in Sustainability-Oriented Innovation. Business Strategy and the Environment, 26(6), 731–753. https://doi.org/10.1002/bse.1941

Haarhaus, T., & Liening, A. (2020). Building dynamic capabilities to cope with environmental uncertainty: The role of strategic foresight. *Technological Forecasting and Social Change*, 120033. https://doi.org/10.1016/j.techfore.2020.120033

Hall, A. (2002). Innovation systems and capacity development: An agenda for north-south research collaboration? *International Journal of Technology Management & Sustainable Development*, *1*(3), 146–152. https://doi.org/10.1386/ijtm.1.3.146

Hansen, E. G., Grosse-Dunker, F., & Reichwald, R. (2009). Sustainability Innovation Cube — A Framework to Evaluate Sustainability-Oriented Innovations. *International Journal of Innovation Management*, *13*(04), 683–713. https://doi.org/10.1142/s1363919609002479

He, F., Miao, X., Wong, C. W. Y., & Lee, S. (2018). Contemporary corporate eco-innovation research: A systematic review. *Journal of Cleaner Production*, 502–526. https://doi.org/10.1016/j.jclepro.2017.10.314

Hofmann, K. H., Theyel, G., & Wood, C. H. (2012). Identifying Firm Capabilities as Drivers of Environmental Management and Sustainability Practices - Evidence from Small and Medium-Sized Manufacturers. *Business Strategy and the Environment*, *8*, 530–545. https://doi.org/10.1002/bse.739

Hojnik, J., & Ruzzier, M. (2016). What drives eco-innovation? A review of emerging literature. Environmental Innovation and Societal Transitions, 19, 31–41. https://doi.org/10.1016/j.eist.2015.09.006

Ketata, I., Sofka, W., & Grimpe, C. (2014). The role of internal capabilities and firms' environment for sustainable innovation: evidence for Germany. *R&D Management*, *1*, 60–75. https://doi.org/10.1111/radm.12052

Kiron, D., Kruschwitz, N., Reeves, M., & Goh, E. (2012, December 18). The Benefits of Sustainability-Driven Innovation. MIT Sloan Management Review. https://sloanreview-mit-edu.ezproxy.ub.gu.se/article/the-benefits-of-sustainability-driven-innovation/

Kiron, D., Kruschwitz, N., Haanaes, K., & Velken, I. (2012). Sustainability nears a tipping point. *MIT Sloan Management Review*, *53*(2), 69.

Lincoln, YS. & Guba, EG. (1985). Naturalistic Inquiry. Newbury Park, CA: Sage Publications.

Lopes, C. M., Scavarda, A., Hofmeister, L. F., Thomé, A. M. T., & Vaccaro, G. L. R. (2017). An analysis of the interplay between organisational sustainability, knowledge management, and open innovation. *Journal of Cleaner Production*, 476–488. https://doi.org/10.1016/j.jclepro.2016.10.083

Melane-Lavado, A., & Álvarez-Herranz, A. (2020). Cooperation Networks as a Driver of Sustainability-Oriented Innovation. *Sustainability*, *7*, 2820. https://doi.org/10.3390/su12072820

Mousavi, S., & Bossink, B. A. G. (2017). Firms' capabilities for sustainable innovation: The case of biofuel for aviation. *Journal of Cleaner Production*, 1263–1275. https://doi.org/10.1016/j.jclepro.2017.07.146

Mulhern, O. (2020). Sweden - Ranked 1st in the Global Sustainability Index. Earth.org. https://earth.org/global_sustain/sweden-ranked-1st-in-the-global-sustainability-index-2/

Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009, September). Why Sustainability Is Now the Key Driver of Innovation. Harvard Business Review. https://hbr.org/2009/09/why-sustainability-is-now-the-key-driver-of-innovation

Nielsen, K. R., Reisch, L. A., & Thøgersen, J. (2016). Sustainable user innovation from a policy perspective: a systematic literature review. *Journal of Cleaner Production*, 65–77. https://doi.org/10.1016/j.jclepro.2016.05.092

OECD (2022), Enterprises by business size (indicator). DOI: 10.1787/31d5eeaf-en (Accessed on 21 April 2022)

Pace, L. A. (2016). How do tourism firms innovate for sustainable energy consumption? A capabilities perspective on the adoption of energy efficiency in tourism accommodation establishments. *Journal of Cleaner Production*, 409–420. https://doi.org/10.1016/j.jclepro.2015.01.095

Pacheco, D. A. de J., ten Caten, C. S., Jung, C. F., Ribeiro, J. L. D., Navas, H. V. G., & Cruz-Machado, V. A. (2017). Eco-innovation determinants in manufacturing SMEs: Systematic review and research directions. Journal of Cleaner Production, 142, 2277–2287. https://doi.org/10.1016/j.jclepro.2016.11.049

Rahman, M., Doroodian, M., Kamarulzaman, Y., & Muhamad, N. (2015). Designing and Validating a Model for Measuring Sustainability of Overall Innovation Capability

of Small and Medium-Sized Enterprises. *Sustainability*, *1*, 537–562. https://doi.org/10.3390/su7010537

Relich, M. (2015). Identifying Relationships Between Eco-innovation and Product Success. *Golińska, P., Kawa, A. (Eds) Technology Management for Sustainable Production and Logistics. EcoProduction*, 173–192. https://doi.org/10.1007/978-3-642-33935-6_9

Rennings, K. (2000). Redefining innovation — eco-innovation research and the contribution from ecological economics. *Ecological Economics*, *32*(2), 319–332. https://doi.org/10.1016/s0921-8009(99)00112-3

Runhaar, H., Tigchelaar, C., & Vermeulen, W. J. V. (2008). Environmental leaders: making a difference. A typology of environmental leaders and recommendations for a differentiated policy approach. Business Strategy and the Environment, 17(3), 160–178. https://doi.org/10.1002/bse.520

Sartorius, C. (2006). Second-order sustainability—conditions for the development of sustainable innovations in a dynamic environment. *Ecological Economics*, *2*, 268–286. https://doi.org/10.1016/j.ecolecon.2005.07.010

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business Strategy and the Environment*, *20*(4), 222–237. https://doi.org/10.1002/bse.682

Schaltegger, S., Freund, F. L., & Hansen, E. G. (2012). Business cases for sustainability: the role of business model innovation for corporate sustainability. International Journal of Innovation and Sustainable Development, *6*(2), 95. https://doi.org/10.1504/ijisd.2012.046944

Shannon, P., & Hambacher, E. (2015). Authenticity in Constructivist Inquiry: Assessing an Elusive Construct. The Qualitative Report, 19(26). https://doi.org/10.46743/2160-3715/2014.1418

Silva, M. J., Leitao, J., & Raposo, M. (2008). Barriers to innovation faced by manufacturing firms in Portugal: how to overcome it for fostering business excellence? International Journal of Business Excellence, 1(1/2), 92. https://doi.org/10.1504/ijbex.2008.017568

Singh, M. (2020, August 19). Sustainability in Business: Why Change is Needed Now. Entrepreneur. https://www.entrepreneur.com/article/354984

Teece, D. J. (2017). Dynamic Capabilities and (Digital) Platform Lifecycles. In *Advances in Strategic Management* (pp. 211–225). Emerald Publishing Limited. http://dx.doi.org/10.1108/S0742-332220170000037008

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *7*, 509–533. https://doi.org/10.1002/(sici)1097-0266(199708)18:7<509::aid-smj882>3.0.co;2-z

Tucker, S. (2020). Social Innovation: what it is, why it matters, how it can be accelerated, -. Retrieved from https://ictlogy.net/bibliography/reports/projects.php?idp=4189&lang=es

van Kleef, J. A. G., & Roome, N. J. (2007). Developing capabilities and competence for sustainable business management as innovation: a research agenda. Journal of Cleaner Production, 1, 38–51. https://doi.org/10.1016/j.jclepro.2005.06.002

Valero-Gil, J., Scarpellini, S., Garcés-Ayerbe, C., & Rivera-Torres, P. (2017). Environment and innovation in Spanish business: bridging the gap between academics and practitioners. *Universia Business Review*, (54), 90-109.

Watson, R., Wilson, H. N., Smart, P., & Macdonald, E. K. (2017). Harnessing Difference: A Capability-Based Framework for Stakeholder Engagement in Environmental Innovation. *Journal of Product Innovation Management*, *2*, 254–279. https://doi.org/10.1111/jpim.12394

APPENDICES

I. Interview guide

A. Company representatives

Introduction & Background

1. Would you please briefly introduce yourself?
2. Could you describe your position and responsibilities at this workplace?
3. How do you describe sustainable innovation?
4. How does your firm work with sustainable innovation? Can you describe the implementation process in general?
5. What kinds of organisational capabilities are important when implementing sustainability-oriented innovation to boost the process?

Internal capabilities

6. How do you manage the employees in terms of promoting innovation and sustainability?
7. Could you describe your internal organisational environment? Does the environment promote innovative culture? If so, how?
8. How does your company manage technology development?

External capabilities

9. Do you involve external stakeholders in sustainable innovation development? How?
10. Do you have initiatives to explore and acquire external knowledge? If yes, what are those initiatives?
11. How do government regulations on environmental issues affect the sustainable innovation process?
12. What do you think are the main challenges a firm faces in the process of implementing SOI?
13. Do you have any other questions and comments you would like to add?

B. Experts

Introduction & Background

1. Would you please briefly introduce yourself?
2. What is your current position?
3. How do you describe the sustainable innovation process in companies in Sweden?
4. What do you observe are the biggest factors boosting sustainable innovation in companies?

Internal capabilities

5. What is your thought on building the right culture to affect a sustainable innovation process in companies? How are the company doing in this matter?
6. Same question with employee engagement in the process? How are the companies doing this matter?
7. What are the main strategies for technological developments in Swedish firms?

External capabilities

8. What are the companies' external strategies for boosting sustainable innovation development?
9. How do you think government regulations (in terms of environmental & social issues) affect the sustainable innovation development in companies?
10. How do you rate networking (inter-organizational relationships, partnerships, etc.,) as a strategy to boost sustainable innovation?
11. What do you see as the biggest challenges companies are facing in the process of implementing sustainable innovation?
12. Do you have any other questions and comments you would like to add?

II. Coding for thematic analysis

A. Dynamic capabilities and critical factors

Themes		***Coding***
Absorptive	Knowledge management	- *Diffusion of knowledge; managing the internal and external knowledge*
	R&D	- *Acquiring knowledge through R&D*
Environmental	Regulations	- *Setting business objectives and having everyone to contribute to those objectives*
Competence and ability for innovation	Innovation climate	- *Environment for innovation*
	Training and skills	- *Creating awareness within the employees* - *Understanding and educating the employees*
Resource integration	Internal and external resources	- *Integrating new resources and skills (e.g., open innovation)*
Organisational	Autonomy	- *Having/giving control over changes or their own job tasks*
	Organisational culture	- *Initiatives encouraging creativity and innovation from employees*
	Management	- *Analysing the data and working on performance measurements and KPIs*
	Reward and motivation	- *Promotion for best/new ideas and initiatives*
Networking capability	Interorganizational relationships	- *Working together with the different stakeholders both inside and outside the company*
	R&D	- *Partnerships with the external institutions*
Technological	Technological development	- *New development or solution directly correlated with the sustainable objectives (developed both in-house and through external parties)*

	R&D	- *Research and development on software solutions, digitalisation*

B. The main challenges

Theme	***Coding***
Social/cultural	- *Awareness concerning the climate crisis*
Managerial	- *Decision making at different levels* - *lack of knowledge (among the employees and other stakeholders)*
Institutional/regulatory	- *Expectations and reaction from the government*
Technical	- *Limitations of having fewer people*
Financial	- *Quantifying the value of sustainable development* - *Having a business case for sustainability* - *Issues related to investment*