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The Impact of Environmental Sustainability on Innovations in the Food Industry

An Exploration of Sustainability Oriented Innovations at Nordic Food Companies

by

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Abstract

The food industry has been receiving considerable attention due to rising environmental concerns as food consumption and production have a significant impact on the environment. In line with the sustainability movement, consumers are increasingly expecting that food companies are taking actions against climate change. With that said, it is important for researchers and practitioners to build an understanding of how the environmental sustainability movement is affecting innovations in the food industry. Moreover, it is of interest to investigate the motivations behind conducting sustainability-oriented innovations. In order to address this research purpose, a multiple case study was conducted based on 13 semi-structured interviews with Nordic companies operating in the food industry including one researcher who is an expert in the field.

The findings revealed that food companies are now increasingly incorporating sustainability into their innovation work. This is mainly due to external pressure coming from their key stakeholders, which are the consumers. As sustainability has emerged as a driving force behind innovation, conducting sustainability-oriented innovation (SOI) is gradually becoming a priority in the food industry. Hence, it can be argued that food companies are increasingly involved in radical innovation activities due to the environmental sustainability movement as SOIs are usually radical in nature. Despite open innovation being a common tool in high-tech sectors, the findings also demonstrate that open innovation has become increasingly important in low-tech sectors, such as the food industry. Furthermore, communication of environmental sustainability initiatives and being transparent towards stakeholders are fundamental for food companies to succeed with their sustainability agenda. Nevertheless, companies in the food sector can only progress on their sustainability path by acknowledging the continuous change towards the sustainability movement.

Keywords: Sustainability, Environmental Sustainability, Innovation, Sustainability Oriented Innovation, Food Industry

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Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Theoretical Background

In the last decade, many companies have acknowledged increased awareness towards sustainability issues leading to increased adoption of sustainable practices with the goal to enhance firm performance based on environmental, economic, and social dimensions (Pullman, Malon & Carter, 2009; Cassells & Lewis, 2011; Beske, Land & Seuring, 2014; Mzembe, Lindgreen, Maon & Vanhamme, 2016). In the past, sustainability matters were mainly focusing on business-as-usual factors, such as cost savings, reputation, risk management, and resource efficiency, however, leading companies now understand that new opportunities have to be seized in order to address global sustainability challenges (Woodhead, 2011). Particularly the global food industry has been receiving considerable attention due to rising environmental concerns as food consumption and production have a significant impact on the environment (Del Borghi, Gallo, Strazza & Del Borghi, 2014; Bocken, Morales & Lehner, 2020). A 2019 report from the United Nations' Intergovernmental Panel on Climate Change (IPCC, 2019) found that the global food system, including farming, transportation, packaging, and feed production, produces 37 percent of greenhouse gas emissions. Enormous progress in agricultural productivity to meet growing food demand over recent decades has come with significant costs related to the environment and society (FAO, 2013). Hence, the need for environmental sustainability initiatives has considerably increased in the food industry. Bakos, Siu, Orengo and Kasiri (2020) have defined environmental sustainability in their recent study as actions and processes related to renewing resources, limiting pollution, and removing processes that harm the environment. This study is using Bakos et al.'s (2020) definition of environmental sustainability.

Scholars suggest that sustainability issues should be dealt with by using innovation-focused approaches (Silvestre, 2015b). The adoption of innovation for sustainable practice can be seen as a newer phenomenon, which is considered to be dynamic, complex, and uncertain in comparison with other types of innovations (Seyfang & Smith, 2007). Literature states that it is

essential to use innovative approaches to enhance sustainability performance due to the requirement of adapting and modifying products, processes, and management methods (Silvestre, 2015a). Innovation can be defined broadly to include a range of typologies, such as product or process innovation, and is considered to be a means of altering an organisation in response to changes in external environment or as a precautionary action to influence the environment (Damanpour, 1996). Due to changing consumer demands and the complex nature of solving environmental issues, innovations are, therefore, playing a major role in addressing environmental concerns (Sarni & Capocuzza, 2012). In the food sector, innovation belongs to one of the most significant elements that have an impact on the competitive position of organisations in national and international markets (Grunert, Harmsen, Meulenberg, Kuiper, Ottowitz, Declerck, Traill, & Göransson, 1997; Menrad, 2004). Innovation takes place in the entire food value chain, including production, harvesting, primary and secondary processing, manufacturing and distribution (Earle, 1997). As a response to the sustainability challenges ahead, many food companies have incorporated several United Nations Sustainable Development Goals (SDGs) into their business and are innovating towards national environmental standards (Bak, Pedersen & Olander, 2019).

In line with the environmental sustainability movement, consumers are increasingly demanding more sustainable options and show a preference for food products that have a small environmental impact (Dacinia & Ruxandra, 2019). Moreover, consumers' growing interest for transparency, plant-based food, and healthier options are driving change in the global food industry (Olayanju, 2019). Bryngelsson, Wirsenius, Hedenus, and Sonesson (2016), found that reduced meat consumption and improved technologies contribute to lower environmental impact. Hence, a decrease in food-related carbon footprint can be achieved in two ways: (1) change in production and delivery technologies and (2) change in food consumption (Bryngelsson et al., 2016). Innovation has, therefore, emerged as an important tool in order to decrease carbon footprint at food companies in terms of modifying technologies or developing new food products for consumers.

There are numerous examples of studies related to environmental sustainability and innovations in the food sector (Heyder & Theuvsen, 2012; Stonehouse, 2004; García-Granero, Piedra-Muñoz & Galdeano-Gómez, 2020). In particular, environmental sustainability issues were studied mostly by looking at food value chains. Even though sustainability has already been identified as a key driver for innovations (Hansen, Grosse-Dunker & Reichwald, 2009;

Nidumolu, Prahalad & Rangaswami, 2009; Adams, Jeanrenaud, Bessant, Overy, & Denyer, 2012), it is unclear how environmental sustainability is affecting innovations in the food sector. Moreover, little research has been conducted on gaining a better understanding of "why" companies embed sustainability into their business (Pistoni, Songini & Perrone, 2016). This research gap, altogether with the lacking research on the impact of environmental sustainability on innovations in the food industry constitutes the theoretical problem of this study. The following section elaborates on the practical background of this thesis.

1.2 Practical Background

The food industry plays an essential role in achieving several United Nations SDGs and food companies are increasingly addressing a range of sustainability issues (Bak, Pedersen & Olander, 2019). Commitments made by the Paris Climate Agreement and the SDGs guide the transition towards sustainable development of the world's growing population (Wood, Gordon, Röös, Karlsson, Häyhä, & Bignet, 2019). When it comes to sustainable development, the Nordic countries are at the forefront (Backstrand & Kronsell, 2015). They have also been considered to be the European leaders of innovations for a long time (Balashova, 2015). According to the EAT-Lancet Commision Report on Healthy Diets from Sustainable Food Systems (2019), the Nordic region has the potential to make the global food system healthier and more sustainable. Furthermore, the Nordics have devoted to the SDGs and are progressing towards the 2030 Agenda (Wood et al., 2019). Comparing Nordic countries with other nations based on the SDG Index (indicates how a country performs compared to global targets), the Nordics are occupying the top four rankings globally (Sachs, Schmidt-Traub, Kroll, Lafortune, & Fuller, 2018).

However, more effort is needed in the Nordic region to achieve the goals of the 2030 Agenda as there are still many challenges pertaining to the Nordic food systems (Wood et al., 2019). For instance, despite the progress to raise environmental efficiency of Nordic food production, a great portion of national environmental effects originates from food and agriculture (Antman, Brubæk & Andersen, 2015). Moreover, the Nordics are falling short on some dietary, health, and environmental goals. For instance, diets in Sweden, Denmark, Norway and Finland are contributing both to public health issues, such as overweight and obesity, as well as to numerous environmental effects leading to climate change (EAT-Lancet Commision Report, 2019). Food

production also uses a considerable amount of resources such as energy, land, minerals, and water (Wood et al, 2019).

Nevertheless, Nordic consumption patterns are moving towards a more plant-based diet (Kirk, 2018). According to a survey by Ernst & Young (2015), 24 percent of Nordic consumers anticipate a reduction in meat consumption in the next five years, largely due to health and environmental reasons. The environmental sustainability movement combined with the ongoing shift towards plant-based food and beverages shows the important role of innovations in the Nordic food industry. Another reason for the choice of the Nordic region for this study is that the countries share similar economic, educational, cultural, and climatic conditions (Hargreaves, Kvalsund & Galton, 2009). Cultural heritage, habits, and institutional contexts play an essential role in understanding behaviours connected to innovation (Gracia & Albisu, 2001). Different cultures cause different attitudes towards food innovations (Askegaard & Madsen, 1998). Hence, the cultural circumstances surrounding the food industry has to be taken into account when the impact of environmental sustainability on innovation is investigated. The practical aim of this research study is, therefore, to build an understanding of how environmental sustainability is affecting innovations and its underlying motivations at food companies, which is based on 9 cases from the Nordic countries.

1.3 Research Questions and Purpose

The purpose of this thesis is to explore the impact of environmental sustainability on innovations in the food industry and the underlying motivations behind sustainabiltiy-oriented innovations. In order to do so, environmental sustainability and innovation practices at several food companies are investigated. The findings contribute to the understanding of the importance of implementing sustainability, in particular environmental sustainability, into the business model and into the innovation practices of food companies. Hence, the effects of environmental sustainability on the different types and degrees of innovation at food companies are highlighted. Moreover, this thesis provides an enhanced understanding of the motivations behind conducting innovations by food companies and the shift in these motivations due to the sustainability movement. Consequently, to address the purpose of this study, the research question and sub-questions are as follows:

How does environmental sustainability affect innovations in the food industry?

- *How does environmental sustainability affect the different types of innovation in the food industry?*
- *How does environmental sustainability affect the different degrees of innovation in the food industry?*
- *What are the motivations behind conducting environmental sustainability-oriented innovations by food companies and how have the motivations changed due to the environmental sustainability movement?*

To answer the above mentioned research question and sub-questions, a multiple case study on several Nordic food producing companies as well as food processing and packaging companies is conducted. This study will be supplemented by interview data collected from one researcher who is an expert in the field. Further elaboration of the chosen research design, research approach, and cases will be presented in the methodology chapter.

1.4 Delimitations

In order to narrow down the broad field of innovation, this study aims to shed light on how environmental sustainability influences the different types and degrees of innovation in the food sector. The literature review focuses on certain typologies related to innovation as they are most frequently found in prior literature. Other concepts, such as innovation strategy are not emphasised due to the scope of this thesis. Moreover, this study focuses on environmental sustainability and does not cover the other two sustainability pillars, which are social and economic sustainability as environmental issues have become increasingly important in the food sector. This thesis also assumes that environmental sustainability is driving innovation thus a reversed relationship between innovation and environmental sustainability is not the focus of this study.

Concerning the empirical aspects of this study, interview participants consisted mainly of individuals working at food companies including two food processing and packaging providers and one researcher. Hence, other significant actors in the food value chain are not taken into consideration in this research, which has narrowed down the focus area. Another empirical delimitation is the choice of conducting interviews with Nordic cases as the Nordic region is

identified as one of the leading markets in terms of both environmental sustainability and innovation. Nevertheless, the findings may be valid in other countries beyond the Nordic region as the environmental sustainability movement is considered to be a global phenomenon, which is affecting any food company worldwide (Rockwood, Stewart & Dietz, 2008).

1.5 Outline of the Thesis

This thesis is divided into six chapters. Following the first chapter consisting of the introduction, the literature review in the second chapter aims to create a common understanding of the concept of corporate sustainability and its underlying drivers before the focus is set on environmental sustainability in the food industry. Afterwards, the concept of innovation is introduced including the different types and degrees of innovation. This is followed by a section about innovation in the food industry. Subsequently, prior contributions to research in the fields of sustainability and innovation are synthesised in which findings related to sustainability's impact on innovation are presented before the concepts of sustainability-oriented innovation (SOI) and business model innovation for sustainability (BMIfS) are explained. The concepts are finally structured into a preliminary framework, which serves as a template for the data analysis. The third chapter presents the methodology that underlies this thesis. The research philosophy is first motivated followed by the research design and approach. After this, the choice of cases, the data collection and analysis method are elaborated on. The methodology chapter ends with a reflection on aspects related to reliability, validity, and ethical considerations. The fourth chapter begins with a description of the studied cases before the empirical results are presented. It provides an overview of the empirical findings from the 13 semi-structured interviews and publicly available company-related documents. The fifth chapter examines the differences and similarities between the preliminary and the final conceptual framework. In particular, the empirical results are discussed and put into perspective with existing literature. At the end of the chapter the findings are synthesised into a conceptual framework. The final chapter elaborates on the theoretical and practical implications. Moreover, the limitations of this study are laid out and possible avenues for future research are suggested.

2 Literature Review

According to Webster and Watson (2002), a review of prior contributions to literature is essential for all scholarly studies. Therefore, the subsequent review aims to provide an overview of prior studies conducted in the field of corporate sustainability, in particular environmental sustainability, and innovation. This process will lead to the creation of a theoretical foundation, which is used for the data analysis (Levy & Ellis, 2006). A synthesising method is adopted for the review as it should enable breadth and depth, which is considered to be a significant quality feature of literature reviews (Hart, 1998). Moreover, this chapter attempts to set the starting point to address the study's research purpose.

As the research problem concerns the impact of environmental sustainability on innovations in the food industry, this thesis made use of literature related to corporate sustainability and innovation. The literature was collected by using search tools of online library databases of Lund University (LUBsearch), Maastricht University (LibSearch), as well as from Google Scholar via various combinations of search terms. The selected body of literature provides a holistic view of the matter under investigation and is synthesised in a manner that attempts to contribute to the understanding of the research problem as well as to identify research gaps and place the research problem within the context of existing literature.

2.1 Corporate Sustainability

The concept of sustainability was made widely popular by the Brundtland Report, titled "Our Common Future", which was published in 1987 by the United Nations (Chandler, 2017). The most important contributions of the report were to define sustainable development and to acknowledge the significance of sustainability matters for companies (Rome, 2014). Hence, the report was a crucial point in the discussion about corporate sustainability, specifically addressing the role of companies, which is demanded by society (Baue 2007, cited in Chandler, 2017). In the report, sustainable development is defined as a 'development that meets the needs

of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987, p. 43).

The concept of corporate sustainability knows many definitions, which range from conducting environmental-friendly practices to closing production chains to avoid negative impact on the environment (Blowfield, Visser & Livesey, 2007). However, prior literature does not provide any precise meaning of the term or how it can be reached. While there are various conceptualisations of the term (Bos-Brouwers, 2010; Elkington, 1994; George, Mcgahan & Prabhu, 2012), there are also different labels deployed for different aspects of the phenomenon, including CSR, green or ecological innovation, social environmental management, and responsible innovation (Carroll & Shabana, 2010; Owen, Stilgoe, Macnaghten Gorman, Fisher, & Guston, 2013; Seebode, Jeanrenaud & Bessant, 2012). Montiel's (2008) literature review shows interesting trends in research related to corporate social responsibility (CSR), corporate social performance (CSP), environmental management (EM) and corporate sustainability (CS). His analysis established that the original focus in this literature was on CSR. Furthermore, despite the abundance of terms used in prior studies, Montiel (2008, p.257) suggests that all of the terms "rely on the… vision of [corporate sustainability] CS".

According to Elkington (1994, 2004), the term corporate sustainability encompasses three dimensions, namely, environmental, economic, and social sustainability. This perspective is usually referred to as the triple bottom line (TBL) approach, which implies that organisations need to perform actions that have a positive impact on the environment as well as on society and do not only focus on financial performance (Dao, Langella & Carbo, 2011). Moreover, Elkington (1994, 2004) claims that the three dimensions of sustainability are interrelated thus a company is not able to entirely separate its economic sustainability from social and environmental sustainability. Pagell and Wu (2009) argue that economic objectives can be compatible with environmental and social objectives. This is in line with Porter and Kramer (2006) who state that a firm's long-term profitability can be maintained by balancing it with social and environmental aims.

2.1.1 Drivers of Corporate Sustainability

Bansal (2005), Windolph, Harms and Schaltegger (2014) identified three motivations for companies to invest in sustainability practices, namely, corporate legitimacy, market success,

and internal improvement. The first motivation, corporate legitimacy, refers to a company's aspiration to be perceived as "desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 576). According to Black and Härtel (2004), firms striving for legitimacy are responding to sustainability-related laws and pressure from stakeholders as they are increasingly acknowledging sustainable development as an important value. The second motivation is market success as consumers and investors can reward companies for conducting sustainable practices by making purchase and investment decisions (Dunphy, Griffiths & Ben, 2007; Ditlev-Simonsen & Midttun, 2011). The third motivation is about internal improvement, which concerns optimising internal processes and increasing cost savings (Shrivastava, 1995; WBCSD, 2002). Other factors that drive corporate sustainability include competitive advantage, profitability, stakeholder pressure, legal requirements, reputation concerns, environmental performance and organisational improvements (Ranganathan & Willis, 1999; Daily & Walker, 2000; Van Marrewijk & Were 2002; Dunphy, Griffiths & Benn, 2003). In terms of stakeholders, organisations can proactively and voluntarily decide to pursue sustainability practices that add value to certain stakeholder groups (Freeman & McVea, 2001). In that case, a corporation's stakeholder interests are considered to be components of company values and objectives, hence, those interests can be viewed as internal drivers of sustainability. Literature usually discusses groups of stakeholders, however, the individual roles of stakeholders need to be considered as well. Goodman, Korsunova, and Halme (2017) suggest that individuals in stakeholder groups can possess multiple roles. For instance, employees of an organisation can simultaneously be consumers.

2.2 Environmental Sustainability

As suggested by Goodland (1995, p. 3), environmental sustainability "seeks to improve human welfare by protecting the sources of raw materials used for human needs and ensuring that the sinks for human wastes are not exceeded in order to prevent harm to humans". In a business context, environmental sustainability concerns actions and processes related to renewing resources, limiting pollution, and removing processes that harm the environment (Bakos et al., 2020). This thesis is using the understanding of Bakos et al.'s (2020) definition of environmental sustainability in order to address the research purpose. As mentioned earlier, environmental sustainability is one of the three pillars of corporate sustainability. This study is focusing on the environmental aspect of sustainability due to its rising importance particularly

in the food sector. Hence, the following section is dedicated to prior studies conducted on environmental sustainability in the global food industry.

2.2.1 Environmental Sustainability in the Food Industry

Food production and consumption have a major environmental impact on a global scale (Edenhofer, 2015). According to the Environmental Impact of Products (EIPRO) study, food products are responsible for 20 to 30 percent of the environmental effects of total consumption worldwide (European Commision, 2006). Agriculture and food production resulted in the biggest share of land and water usage while causing significant eutrophication and acidification (Tilman & Clark, 2014). Furthermore, the increasing rate of global food production leads to losses in biodiversity, soil degradation, and water stress (Pimental & Kounang, 1998; Pimentel & Pimentel, 2003). The environmental impact becomes bigger due to heating greenhouses, transportation, packaging and storage (Jungbluth, Tietje & Scholz, 2000; Stoessel, Juraske, Pfister & Hellweg, 2012).

Environmental performance can be measured in terms of waste reduction or source reduction practices while the latter one includes energy and water conservation as well as packaging recycling or reuse (Pullman, Maloni & Carter, 2009). According to Sabaté and Soret (2014), there are two important dimensions of environmental sustainability: (1) efficiency and (2) environmental protection. Efficiency measures how natural resources are utilised to procure foods of a given diet whereas environmental protection deals with the preservation of ecological systems, namely, the biosphere (Sabaté & Soret, 2014). Therefore, environmental sustainability can be assessed by taking into consideration the efficient use of resources and the prevention of environmental degradation in producing, preparing, and disposing food.

Consumers play a major role when it comes to the promotion of sustainable food products (Johnston, Fanzo & Cogill, 2014). In addition, food consumption and dietary choices have an impact on food production systems and their environmental sustainability (Biraj & Trakarn, 2019). Consumers driving demand for specific kinds of food, changes in diets, such as decreased meat consumption, can result in considerable environmental benefits (Biraj & Trakarn, 2019). As environmental sustainability is a major consideration for consumers when buying products, sustainability reporting has become widely used by companies starting with reducing harmful output and decreasing energy and water consumption (Gruenwald, 2009).

Nevertheless, consumers are also price-sensitive when it comes to purchasing sustainable products. According to Laroche, Bergeron, and Barbaro-Forleo (2001), consumers have different perceptions about green products and they take, for instance, price and quality into consideration. This may have an impact on consumers' consumption behaviour (Laroche, Bergeron & Barbaro-Forleo, 2001).

As food companies recognise the growing importance of taking part in solving environmental issues mainly driven by changing consumer expectations, these organisations are increasingly engaging in environmental sustainability initiatives in their business strategy (Chofreh, Goni, Shaharoun, Ismail, & Klemeš, 2014). In line with this, many scholars suggest that environmental sustainability is a means to provide a competitive advantage to an organisation (Falkenberg & Brunsæl, 2011). Hence, environmental sustainability marketing is often used as a strategic tool to position firms in the market, differentiating themselves from competitors, and building trust with environmental stakeholders (Rettie, Burchell & Barnham, 2014).

2.3 Innovation

Prior studies suggest that innovation is one of the key drivers for firm success and growth (Cefis & Marsili, 2006; Tellis, Prabhu & Chandy, 2009; Bayus, Erickson & Jacobson, 2003; Porter, 1985; Fagerberg, Mowery, & Nelson, 2004), hence, it has been an attractive subject for researchers to study for a long time. Schumpeter (1926a, p. 100n, cited in Schumpeter & Backhaus, 2003) was one of the first researchers to study innovation and defined it as: "[...] the introduction of a new good or of a new quality of a good, the introduction of a new method of production, the opening of a new market, the conquest of a new source of supply of raw materials or half-manufactured goods, as well as the carrying out of a new organisation of an industry". Even though Schumpeter (1934, cited in Schumpeter & Backhaus, 2003) was early with defining innovation, as well as it being a well-researched topic, the existing literature does not provide a widely agreed upon definition. Instead, literature offers several, although similar definitions. For instance, Menrad (2004, p. 846) defines innovations as: "[...] the production, diffusion and translation of scientific or technical knowledge into new or modified products and services as well as new production or processing techniques". Damanpour (1996, p. 694) provides a more detailed definition: "Innovation is conceived as a means of changing an organisation, either as a response to changes in the external environment or as a preemptive

action to influence the environment. Hence, innovation is here broadly defined to encompass a range of types, including new product or service, new process technology, new organization structure or administrative systems, or new plans or programs pertaining to organization members." As Damanpour's (1996) definition is exhaustive enough to capture innovation as a broad concept, this study is going to use his definition for further analysis. The following section elaborates on the different degrees and types of innovation.

2.3.1 Degrees of Innovation

Depending on the underlying change in technology and the impact of the innovation on the market, innovations can be grouped into different degree categories (Edison, bin Ali & Torkar, 2013). The main four categories can be identified as follows: (1) incremental innovation, (2) market breakthrough, (3) technological breakthrough and (4) radical innovation (Edison, bin Ali & Torkar, 2013; Cheng & Shiu, 2008; Chandy & Tellis, 1998; McMillan, 2010). Instead of the four above mentioned categories, Tuff and Nagji (2012) divide the degrees of innovation into three levels: (1) core innovation, (2) adjacent innovation, and (3) transformational innovation. According to Tuff and Nagji (2012), it is important to conduct innovations at all levels to outperform competitors. Nonetheless, it needs to be mentioned that categorising innovations into different degrees is relative as the novelty of an innovation may change over time or according to different perspectives (Schilling, 2017).

Incremental Innovation

An innovation is considered incremental when a minor change or adjustment is made to a company's already existing method or application (Schilling, 2017). This means that an incremental innovation is based on the company's prior knowledge and experience leading to, for example, new technological features, new dimensional changes, and improved product performance (Chandy and Tellis, 1998; Cheng and Shiu, 2008). This is what Tuff and Nagji (2012) have established as a core innovation, namely, to optimise the existing products by making incremental changes or incremental inroads into new markets.

Market and Technological Breakthrough

According to Chandy and Tellis (1998), market breakthroughs provide customers a considerable higher benefit compared to technological breakthroughs. Market breakthroughs are based on the firm's core technology that is similar to its current products (Chandy and Tellis,

1998; McMillan, 2010) whereas technological breakthroughs implement a distinctively different technology compared to current products (Chandy and Tellis, 1998; McMillan, 2010). Market and technological breakthroughs can be compared to Tuff and Nagji's (2012) adjacent innovation. Nonetheless, the similiarities between these three concepts may not be as clear as compared to, for instance, the similiarities between incremental and core innovation. An adjacent innovation shares characteristics with core and transformational innovations, meaning that the firm needs new insights into different market variables, such as customer needs, demand and technological trends, competitive dynamics as well as market structure in order to put existing capabilities to new use (Tuff & Nagji, 2012).

Radical Breakthrough

Radical breakthrough or radical innovation, is according to Schilling (2017), "an innovation that is very new and different from prior solutions" (p. 48). Tuff and Nagji (2012) refer to this type of innovation as transformational innovation and describes it as disruptive and game changing. They define it as creating new products and assets for new markets and new customer segments. To conduct radical innovations, firms apply a substantially different technology (Herrmann, Tomczak, & Befurt, 2006; Chandy and Tellis, 1998) in order to transform existing products, create new markets (Assink, 2006; Tuff & Nagji, 2012), and create a novel customer experience (Herrmann, Tomczak, & Befurt, 2006). Thus, radical innovations generate greater customer value compared to the previously mentioned innovations (Chandy & Tellis, 1998). A type of radical innovation is disruptive innovation, which was first coined by Christensen and Bower (1995). A disruptive innovation, according to Christensen (2020), is "a process by which a product or service initially takes root in simple applications at the bottom of a market — typically by being less expensive and more accessible — and then relentlessly moves upmarket, eventually displacing established competitors."

2.3.2 Types of Innovation

Types of innovation refers to the ways a firm can innovate (Edison, bin Ali & Torkar, 2013). Sawhney, Wolcott, and Arroniz (2006) establish four main categories that companies can innovate along: (1) offerings, (2) customers, (3) processes and (4) presence. In line with these four dimensions, prior literature usually categorises innovation as product, process, market and organisational innovation (see Edison, bin Ali & Torkar, 2013; Ettlie and Reza; 1992; OECD, 2005). Moreover, business model innovation has experienced an increasing interest by scholars

in recent years (Aspara, Hietanen & Tikkanen, 2010; Spieth, Schneckenberg & Ricart, 2014). Hence, BMI is also included as a type of innovation in this section.

Product Innovation

Product innovation is concerned with a company's offerings, namely, its products, such as goods and services (Sawhney, Wolcott & Arroniz, 2006; Amara, Landry, & Doloreux, 2009; Schilling, 2017). Geiger and Cashen (2002) state that product innovation takes place when a firm strategically creates new products in order to generate new commercial success. In addition, Herrmann, Tomczak and Befurt (2006) explain that in order for it to be a product innovation it has to bring something new to the market. This means the firm's offerings have to change, for example, by improving performance based on new technology or making changes in the features of the product (Hage, 1999; Geiger & Cashen 2002; Herrmann, Tomczak, & Befurt, 2006; Singh & Singh, 2009; Dibrell, Davis, & Craig, 2008).

Process Innovation

Process innovation regards changes in how a company produces its products and services (Jensen & Webster, 2009; Amara, Landry, & Doloreux, 2009). These changes are often concerned with finding ways to increase and improve productivity (Schilling, 2017) by redesigning the core operating processes (Sawhney, Wolcott & Arroniz, 2006). This can be done by, for instance, implementing a new technology, design or method, which changes the production (Jensen & Webster, 2009; Amara, Landry, & Doloreux, 2009; Singh & Singh, 2009).

Market Innovation

The purpose of market innovation is to identify new markets, which the firm can enter and finding new ways to serve the targeted markets (Johne, 1999). This means, for example, that the company will open up to new market opportunities by targeting different markets, change the way a product is positioned in the market by introducing it into a new context or implement a new or adjusted market strategy (Singh & Singh, 2009; Jensen & Webster 2009; Amara, Landry, & Doloreux, 2009).

Organisational Innovation

The Organisation for Economic Co-operation and Development (OECD, 2005, p. 52) defines organisational innovation as "[…] the implementation of a new organisational method in the

firm's business practices, workplace organisation or external relations". Put differently, it is about rethinking the scope of the firm's activities but also redefining employees' roles, responsibilities, and incentives (Sawhney, Wolcott & Arroniz, 2006). The purpose of organisational innovation is to increase a firm's performance by reducing administrative costs or transaction costs, improving workplace satisfaction and thereby increasing labour productivity or reducing costs of supplies (OECD, 2005).

Business Model Innovation

The term business model has been defined broadly by some authors as a representation of a firm's logic of value creation (Ghaziani & Ventresca, 2005). It depicts how a company earns its revenues by identifying where it is located in the value chain (Chesbrough & Rosenbloom, 2002) and answers managerial questions concerning the customer, the revenue model, and value creation at an appropriate cost (Magretta, 2002). Concerning the concept of business model innovation, the business model itself, rather than a certain product or service, becomes subject to innovation (George & Bock, 2011). Lindgardt, Reeves, Stalk and Deimler (2009, p. 2) define business model innovation as the following: "Innovation becomes BMI [business model innovation] when two or more elements of a business model are reinvented to deliver value in a new way."

2.3.3 Innovation in the Food Industry

In the global food industry, innovation belongs to one of the most significant factors influencing the competitive position of companies in domestic and overseas markets (Grunert et al., 1997; Menrad, 2004; Rama, 1996). Important key factors in the industry are, according to Fryer and Versteeg (2008), food safety, health and well-being, high quality, convenience, price, environment, and sustainability. The global food industry is characterised by low investments in R&D (Martinez & Briz, 2000; Grunert et al., 1997; Christensen, Rama, & von Tunzelmann, 1996; Schoen, 2017). This is due to the food industry operating under low margins, which makes the food companies unwilling to invest in new plants and processes unless a rapid payback and benefits can be achieved (Fryer & Versteeg, 2008). Another reason for the low R&D intensity is that the industry imports many of the technological innovations from outside the sector, such as equipment, ingredients, and packaging supplies (Grunert et al., 1997; Mäkimattila, Melkas, & Uotila, 2013). Due to the low research intensity, Beckeman and Skjöldebrand (2007), among other authors, have argued that relatively few innovations have

taken place in the food sector. However, other researchers have argued that the food industry is highly innovative in terms of product innovation but process innovation is much less (Menrad, 2004; Fryer & Versteeg, 2008).

The food industry used to be characterised by minimising production costs while minimal attention was given to the customer benefits (Lienhardt, 2004). However, a shift has taken place in the landscape of the food industry due to the economic and technical changes in food production and processing along with changes in consumer behaviour, lifestyle, and food consumption (Menrad, 2004; Lienhardt, 2004). Globalisation as well as the need to ensure food safety and nutritional quality are additional factors that affect the food industry's landscape (Lienhardt, 2004; Pinggali, 2007). Industry changes as well as development in biotechnology have created new opportunities for food companies and has led to changes in attitude in the industry, meaning that the food sector is more focused on creating products, which consumers demand (Lienhardt, 2004). This implies that the food industry has gone from adopting a supply-based approach to a demand-based approach (Folkerts & Koehorst, 1998; Traill & Meulenberg, 2002; Omta & Folstar, 2005). adopting a demand-based approach means that the industry is driven by the market and by changing consumer needs (Ju, 2012). Moreover, food companies have to continuously innovate in order to stay competitive on the market (Ju, 2012). Innovation is of great importance to food companies as it allows them to distinguish themselves from their competitors (Menrad, 2004; Capitanio, Coppola & Pascucci, 2009). Hence, innovation plays a crucial role in the food sector as it allows food firms to create inventions, which align with consumers' needs and wants (Menrad, 2004; Folkerts & Koehorst, 1998; Traill & Meulenberg, 2002; Omta & Folstar, 2005).

Consumers are now requesting convenience, variety, and quality (Lienhardt, 2004). In particular, during the last couple of years, new opportunities have emerged due to consumers' interest in health and wellness (Fryer & Versteeg, 2008; Ju, 2012). This along with technological and economic changes has allowed food companies to develop new functional and nutritious products (Fryer & Versteeg, 2008; Ju, 2012; Ciliberti, Bröring & Martino, 2015). Furthermore, consumers' changes in food consumption has resulted in an increasing demand for sustainable options, which have opened up business opportunities for food companies (Dacinia, Iris & Ruxandra, 2019).

Degrees and Types of Innovation

As previously mentioned, innovations can take various forms and have different impacts on the market. Earle (1997) specifies that innovation in the food industry takes place in the whole value chain, from production, to harvesting, to processing and to manufacturing and distribution. Grunert et al. (1997) identify two major perspectives on innovation in the food industry: (1) innovations which are linked to technological change with R&D as a key aspect and (2) innovations which are market-oriented and thereby fulfil consumer demands. According to Mäkimattila, Melkas and Uotila (2013), product innovation is of great importance in order for food companies to compete on the market. Additionally, product innovation plays a crucial part when it comes to fulfilling changing consumer demands and needs (Ju, 2012). Process innovation usually takes place in the form of technological innovations in the food industry (Grunert et al., 1997; Archibugi, Cesarrato & Sirilli, 1991). Additionally, Ju (2012) explains how technological innovations can have an influence on product innovation as it can assist with new product development, such as adding new ingredients and creating more notorious and healthier products as well as accelerate manufacturing processes by increasing productivity. However, these technological innovations are mainly developed by upstream industries, meaning that they mainly occur through equipment and capital goods investment (Archibugi, Cesarrato & Sirilli, 1991).

Nearly all innovations in the food industry are characterised by a low degree of impact on the market, meaning that most of the innovations are of incremental rather than radical nature (Salavou and Avlonitis, 2008; Galizzi and Venturini, 1996; Grunert et al., 1997). More specifically, the industry presents a major flow of technological innovations, especially incremental process innovations (Grunert et al., 1997). Although most innovations are incremental, the pace of product innovation is quite high due to the short product life cycles (Ciliberti, Bröring & Martino, 2015).

Drivers of Innovation in the Food Industry

Customer centricity, appropriate resources, and organisational communication are the most important drivers of innovation (Jamrog, 2006). Capitanio, Coppola and Padcucci (2009) found that depending on whether a firm conducts product or process innovation, different factors will influence the innovation process. The authors identified the following factors, which drive product innovation: (1) the quality of human capital, which is the accumulation of know-how, (2) the geographical context, which is about the development of infrastructure where the firm

is operating, and (3) the age of the firm. The authors further found that the financial structure, capital intensity, and the size of firms positively impact process innovation in the food sector.

Open Innovation in the Food Industry

Open innovation is defined as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough, 2006, p. 1). This means combining knowledge, technologies, and other resources across organisational boundaries whether you refer to it as open innovation, cross-industry collaboration, alliances or networks (Ollila and Yström, 2017). Chesbrough (2003) found that companies do not only have to rely on internal competences when pursuing innovation. Instead, by partaking in different types of collaboration with suppliers, buyers, and competitors, firms can absorb and use knowledge from outside the organisation. According to Chesbrough (2012), there are two approaches to open innovation. The first one is the outside-in open innovation, which concerns that the organisation is opening up to external inputs and contributions. Inside-out open innovation occurs when organisations allow unused and underutilised ideas to go outside the organisation for other businesses to use. In contrast to outside-in open innovation, the inside-out part is less explored both in academic research and also in industry practice (Chesbrough, 2012).

Prior literature demonstrates that open innovation has been adopted first and has been commonly used in high-tech sectors (De Wit, Dankbaar & Vissers, 2007; Gassman, Enkel & Chesbrough, 2010). However, open innovation is now increasingly used in low-tech sectors, such as the food industry, which is characterised by many chain and network ties (Bigliardi & Galati, 2013). Researchers found that collaboration between food companies and their external partners, such as suppliers, consumers and research institutes is crucial for successful innovation (Ciliberti, Bröring & Martino, 2015). This is due to the fact that open innovation provides new approaches for firms in the food industry to gain external knowledge and capabilities. More specifically, cluster organisations, networks as well as innovation systems have an essential role in the food industry as it facilitates access to external knowledge (Gellynck, Vermeire, & Viaene, 2007). Therefore, food firms rarely innovate in isolation but instead in a network of different actors (Menrad, 2004). In particular, collaboration with research institutes influences innovation positively (Ciliberti, Bröring & Martino, 2015). It is of top priority for food companies, especially for small and medium enterprises, to gain external knowledge and establish competence networks (Menrad, 2004). This is due to the changing

landscape in the industry as well as the external pressure to innovate, which have made firms aware of their resource gap (Chesbrough & Crowther, 2006). Bearing that knowledge in mind, the resource gap has encouraged firms to view the access to external knowledge as a possibility to close the competence gap (Chesbrough & Crowther, 2006; Menrad, 2004).

2.4 Sustainability and Innovation

The discussion about sustainable development considers the role of innovations in improving sustainability as one of the key areas to focus on (Silvestre & Silva Neto, 2014). As emerging innovations are continuously altering the external environment (Huisingh et al., 2013), they serve as important tools for organisations, institutions, communities, and countries to implement sustainability (Silvestre, 2015a). Prior studies suggest that sustainability issues should be dealt with by using innovation-focused approaches (Silvestre, 2015b). Hence, urgent calls have been made for further investments from organisations and governments to apply innovative approaches to the pressing sustainability challenges the world is facing today (Giannetti, Bonilla, & Almeida, 2012). Hence, the following will examine three concepts that relate to sustainability and innovation combined, which are (1) sustainability's impact on innovation, (2) sustainability-oriented innovation (SOI), and (3) business model innovation for sustainability (BMIfS).

2.4.1 Sustainability's Impact on Innovation

Many scholars have recognised that sustainability is a potentially transformational force with which new products and processes can be created that challenge existing processes (Blum-Kusterer & Hussain, 2001). Moreover, prior studies have established the growing importance of sustainability as a key driver for innovations (Hansen, Grosse-Dunker & Reichwald, 2009; Nidumolu, Prahalad & Rangaswami, 2009; Adams et al., 2012). Nidumolu, Prahalad, and Rangaswami (2009) suggest that becoming environmentally sustainable reduces costs as firms decrease the use of resources. In addition, enhancing products through this process can lead to the creation of new revenue streams or new businesses. As these are common aims of conducting innovation, companies consider sustainability as innovation's new frontier in order to achieve a competitive advantage (Day & Wensley, 1998; Hurely & Hult, 1998; Porter, 1990).

Masocha's (2018) study found that environmental sustainability practices contribute positively towards innovation as well as ecological and social performances of a firm. Moreover, Reginald's (2018) findings suggest that environmental sustainability practices have a positive impact on a firm's innovation, ecological, and social performance. Another study showed that firms conducting process innovation more than their rivals results in higher environmental sustainability engagement and thus suggests a strong link between process innovation and environmental sustainability involvement (Moyano-Fuentes, Maqueira-Marin & Bruque-Cámara, 2018).

The implementation of innovation for sustainable development is a newer phenomenon, which is considered to be dynamic, complex, and uncertain compared to other types of innovations (Seyfang & Smith, 2007). Literature suggests that innovations are necessary in order to improve sustainability performance as it requires adaptation and changes in products, processes, and management approaches (Silvestre, 2015a). The quest for sustainable development can be considered as a source of opportunities for innovation that leads to value generation, not only for the firm but also for the society as a whole (Rodriguez, Ricart & Sanchez, 2002). Therefore, it is essential for organisations to consider change when aiming to progress on their sustainability path and achieve superior sustainability performance (Silvestre & Ţîrcă, 2019).

2.4.2 Sustainability-Oriented Innovation

Since the Brundtland report in 1987, a new discussion about eco-innovation and SOIs or sustainable innovations arose, which is about integrating ecological and social aspects into products, processes, and organisational structures (Von Weizsäcker, Lovins, & Lovins, 1997; Klewitz & Hansen, 2014). SOIs can take many forms, from the development of new or enhanced products or services to the creation of new processes and business models that bring value to the environment or the society as a whole (Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2016). In particular, SOI is about modifying an organisation's philosophy and values and its products, processes or practices in order to serve the purpose of creating and capturing social and environmental value in addition to obtaining financial gains (Biondi & Iraldo, 2002; Adams et al., 2016; Plieth, Bullinger & Hansen, 2012). SOIs can be often categorised as radical or transformational in nature (Rycroft & Kash, 2000). As sustainable innovations are including economic, social, and environmental aspects into firm operations, they can be distinguished from conventional innovations (Bos-Brouwers, 2010).

Sustainable development plays a major role in the food sector as food companies can contribute by helping conserve natural resources and to enhance communities' well-being while also aiming for competitive advantage (FAO, 2013; Klewitz & Hansen, 2014; Mzembe et al., 2016). Food companies are required to be more innovative with their products and supply chain in order to become more sustainable by creating healthier and higher quality food products (León-Bravo, Caniato, & Caniato, (2019). Hence, performance is not only measured in economic terms but also takes into account environmental and social impacts (Fritz & Schiefer, 2008; Pipatprapa, Huang & Huang, 2017).

Literature suggests that innovation can be used as a winning strategy to reach sustainability in the food industry (Cassells & Lewis, 2011; Klewitz & Hansen, 2014). León-Bravo, Moretto, Cagliano and Caniato (2019) identified two innovative approaches towards sustainable development for quality and healthiness, which are (1) forward-looking innovation and (2) retro-innovation. The first one is about business model innovation for sustainability while the second one represents a restructuring of the supply chain while revisiting traditional agricultural processes. The significance of business model innovation for sustainability will be described more in detail in the next section.

Business Model Innovation for Sustainability

In recent years, business model innovation has been recognised as a potential tool to integrate sustainability into an organisation's business (Schaltegger, Lüdeke-Freund, & Hansen, 2012; Jolink & Niesten, 2015). Green business models (Sommer, 2012), triple bottom line business models (Osterwalder & Pigneur, 2010), inclusive business models (Michelini & Fiorentino, 2012) and sustainability business models (Stubbs & Cocklin, 2008) are several new business logics that contribute both to business and society. Pedersen, Gwozdz & Hvass (2018) found that firms with innovative business models are more likely to address sustainability issues and that business model innovation and sustainability are usually identified in organisations that have flexibility and discretion as their values. Nevertheless, a lack of conceptual consensus exists in the use of the terms business model innovation and sustainable business models (Osterwalder, Pigneur & Tucci, 2005; Boons & Lüdeke-Freund, 2013). The perspectives are, therefore, dispersed in the literature and there are insufficient empirical research studies conducted on these concepts.

When the notion of sustainable business model was developed, its purpose was to engage businesses in sustainability matters and provide leverage for them to integrate sustainability aspects into organisations in order for them to reach their sustainability ambitions (Rashid, Asif, Krajnik & Nicolescu, 2013; Stubbs & Cocklin, 2008; Wells, 2013). However, the concept of sustainable business models is increasingly considered to be a source of competitive advantage (Nidumolu, Prahalad & Rangaswami, 2009). According to Grant (2010), sustainable business models might displace the business model concept much like sustainable competitive advantage has superseded the notion of competitive advantage.

Prior literature suggests that definitions of the sustainable business model concept is considered to be a modification of the conventional business model concept that has particular characteristics and objectives added to it (Geissdoerfer, Vladimirova & Evans, 2018). They can (1) integrate principles or goals aiming towards sustainability or (2) integrate sustainability into the value proposition, value creation and value delivery as well as value capture mechanisms. According to Geissdoerfer, Vladimirova & Evans' (2018, p. 403), sustainable business models are defined as "business models that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders, and hold a long-term perspective".

According to Stubbs and Cocklin (2008), businesses can contribute to the transition towards sustainable development by integrating sustainability principles into the business operation and strategy. This can be achieved by creating business models for sustainability (BMfS). A BMfS generates environmental and/or social value in addition to the usual financial gains (Bohnsack, Pinkse, & Kolk, 2014; Chun & Lee, 2013). With the above information in mind, this thesis uses the terms sustainable business model and BMfS interchangeably. The creation of BMfS requires business model innovation, which is different from product or process innovation as it involves changes to the foundational values of a business. Business model innovation is, therefore, often radical or transformative in nature (Long, Looijen & Blok, 2018).

Long, Looijen, and Blok (2018, p. 83) also identified critical success factors for the transition towards BMfS, which include "collaboration, a foundation of sustainability, continuous innovation, a clear narrative and vision, a need for profitability and external events". (1) Collaboration is a success factor because businesses require the support of supply chain actors in order to create a BMfS. Moreover, customers and consumers need to be educated about novel

products produced by sustainable business models. This is often done through education but also engagement efforts, such as co-creation. (2) A foundation of sustainability entails that a BMfS requires the integration of sustainability across the entire business. Sustainability is a core principle and value, which influences all business activities and decision-making. (3) Continuous innovation is about the constant drive to improve sustainability performance through innovation and pushing the organisation to meet sustainability goals. (4) A clear narrative and vision that is consistently communicated is crucial for ensuring demand for the products of sustainable business models, for successful collaborations, and for motivating people within the company. Moreover, the narrative has to be genuine and is used to create a market and engage with consumers and customers. (5) Profitability is a success factor as businesses have to be able to survive in order to deliver environmental and social value through a sustainable business model. (6) External events related to regulation, consumer trends or serendipitous events can have an impact on the potential market for a sustainable business model.

2.5 The Preliminary Framework

The literature review yielded three focus areas in order to address the research purpose in an adequate way, namely, environmental sustainability, innovation, and the relationship between these two factors (see Figure 1). It was of great importance to create an understanding of both environmental sustainability and innovation separately before the relationship was addressed to determine what drives and impacts these two concepts individually. Within each of the three focus areas, other related concepts were identified in order to provide the reader with a holistic and thorough understanding of the matter under investigation. These established aspects act as the foundation for the framework and have been determined by combining existing literature in the field of strategic management, corporate sustainability, and innovation as well as literature related to sustainability and innovation in the food industry.

Firstly, the concept of environmental sustainability was examined. As previously mentioned in the literature review, environmental sustainability is part of corporate sustainability along with the social and economic dimensions. The motives as to why food companies are pursuing sustainability were highlighted as these drivers may contribute to the understanding of how environmental sustainability is affecting innovations. Similarly, the identification of

environmental sustainability actions of food companies was considered to be important in order to address the research purpose as environmental sustainability can implicate different practices for different companies.

Secondly, research concerning innovation was emphasised, more specifically the different types and degrees of innovation. This was necessary in order to delimit the scope of this thesis as innovation is a broad topic. Furthermore, it is important to understand the differences between the different types and the degrees of innovation in order to investigate the consequences of environmental sustainability's impact on innovation. Open innovation was identified as an increasingly common innovation approach, which was also included in the framework.

Thirdly, the relationship between environmental sustainability and innovation was highlighted. As mentioned in the literature review, environmental sustainability drives innovation, which is illustrated by the arrow in the framework. To acknowledge this relationship, the concept of SOI, the motives behind conducting SOIs, and BMIfS were addressed. It is significant to elaborate on these three aspects to be able to gain a deeper understanding of the relationship between environmental sustainability and innovation.

Again, the literature review underlines the identified research gap regarding how environmental sustainability impacts innovation in the food industry and its underlying motivations. Hence, this study assumes that environmental sustainability is driving innovation thus a reversed relationship between innovation and environmental sustainability does not represent the focus of this research. Overall, the conceptual framework was developed based on the existing literature, which will be confirmed, contradicted, and extended by the analysis of the empirical data.

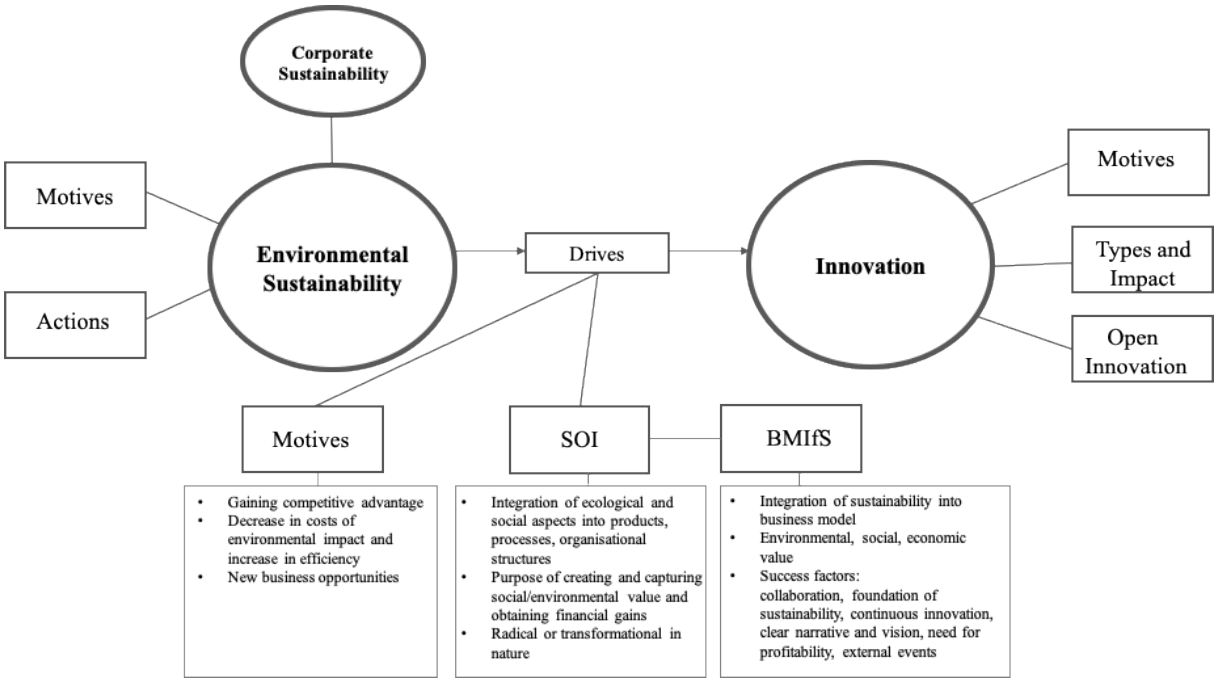

Figure 1: *The preliminary framework (created by the authors based on the literature review)*

3 Methodology

In this chapter, the chosen methodology is identified and explained in order to address the research purpose of this thesis. Firstly, the research philosophy is elaborated on followed by the research design. Secondly, the research approach is presented before the choice of data collection is explained. Thirdly, a motivation follows concerning the choice of the different cases. Fourthly, an explanation of the conducted data analysis is provided. Fifthly, the validity and reliability are elaborated on to assess the quality of this study. Finally, the ethical considerations concerning this study are mentioned along with the measures that were taken in order to counteract them.

3.1 Research Design and Approach

Saunders, Lewis, and Thornhill (2007) establish that before a research approach and design is decided upon, a research philosophy should be determined. They further explain that the research philosophy decides how the study views the world, meaning that the philosophy anchors the research strategy and affects the choice of method. With that said, a combination of interpretivism and positivism was chosen as the most adequate research philosophy for this study. An interpretivism philosophy creates an understanding of what people think and also examines the meaning behind actions (Saunders, Lewis, & Thornhill, 2007). This aligns with the purpose of this thesis, which is to explore and create an understanding of how environmental sustainability impacts innovation at food companies. This is done by interviewing employees at companies about their experiences and expertise within the food industry, which is supplemented by interview data from a researcher who is an expert in the field. Moreover, the positivism philosophy aligns with the study as the objectives and the responses from the interviewees are seen as truths.

According to Saunders, Lewis, and Thornhill (2007), the research question influences the choice of the approach and design, which is considered to be most suitable for the study. Moreover, the research approach decides if the aim of the study is to test theory and hypotheses

or to develop theory as a result of the data analysis, while the research design specifies the plan of how the research question will be addressed in the study. Therefore, the research question, which was defined in line with the purpose of this study, namely, to explore how environmental sustainability impacts innovations in the food industry, was firstly reflected upon.

To date, there is plenty of research conducted on innovation as well as on sustainability in the food industry. However, little research has been conducted on what impact environmental sustainability has on innovations in the food industry and its underlying motives. Hence, the research question was based on the identified research gap in the literature. A lack of previous research, according to Creswell and Creswell (2018), indicates a further need to explore the identified gap. The recognised gap needs to be taken into consideration when the research design is selected. Thus, a qualitative design was chosen to be able to respond to the research question in an adequate way.

A qualitative design was used, as it is according to Bryman and Bell (2011), appropriate when a dynamic social context is studied. Robson (2002) established that a qualitative design is favourable to use when the purpose is to understand the underlying factors of a phenomenon, which further motivates the use of a qualitative design for this study. In line with this, Lee (1999) affirms that a qualitative study concerns not only the understanding of the outcomes but also the means of reaching them. Hence, a qualitative design will grant a deeper knowledge and understanding of the studied phenomenon as well as the related and underlying aspects, namely, how innovations in the food industry are influenced by the environmental sustainability movement.

A qualitative design usually follows an inductive approach where the aim is to generate new theory, whereas a quantitative design often follows a deductive approach with the aim to test theory-generated hypotheses (Bryman & Bell, 2011). As neither of these approaches fit the purpose of this study, a combination of these research approaches was considered. Hence, this study pursued more of an abductive approach, including deductive and inductive features. Dubois and Gadde (2002) explain that such an approach offers flexibility to explore possible factors while at the same time, it allows to apply existing theory and literature. Kovács and Spens (2005) further state that an abductive approach can take on different forms and shapes depending on the researchers' starting point, the aim of the study, and the point in which they draw their final conclusions. With this in mind, this study firstly applied more of a deductive

approach, meaning that the starting point was to collect literature in order to construct a preliminary framework. The preliminary framework was then used to test the collected data to see if the data could be linked to or be explained by existing literature. When the findings could not be explained nor linked to existing literature or theory, an inductive reasoning was practiced. Hence, this yielded new insights and findings about the phenomenon of how environmental sustainability is affecting innovations in the food industry rather than solely developing new theory or evaluating theory.

Within the sphere of a qualitative research design, a multiple case study was selected. According to Yin (2009), a case study is preferred when a research question starts with "how" and the study is of exploratory nature. Yin (2009) further states that conducting a case study is deemed appropriate when it concerns a modern phenomenon, which the researchers cannot manipulate. Therefore, the purpose of a case study aligns with the purpose of this thesis, which is to explore the impact of environmental sustainability on innovations by studying multiple cases in the food sector.

Even though it is motivated to conduct a case study, other advantages of conducting a multiple case study should be addressed. A multiple case study is preferred compared to a single case study, as the collected data is less devoted to one particular company (Yin, 2009; Herriott & Firestone, 1983). This allows the researchers to generalise the findings to a certain extent. A multiple case study was also chosen as it allows the exploration of similarities and differences between the cases and to be able to emphasise uniqueness, patterns or generalisations (Saunders, Lewis & Thornhill, 2007).

Even though the advantages of a case study have been mentioned and argued for, it is important to elaborate on the limitations concerning a case study. One limitation of a case study originates from one of its advantages, namely, a rich data set. Miles (1979) pointed out that the researchers must carefully consider the rich data set, especially the relevance of the collected data and its associated conclusions. At the same time, this weakness is an essential part of the exploratory nature of the research as it allows for discovery of different aspects in varied areas and categories. Another limitation concerning case studies is that this method will not provide statistical generalisation (Yin, 2009; Easterby-Smith, Thorpe, & Jackson, 2015). However, as the aim of this study is not to test hypotheses or find causal relationships between variables, this critique is deemed to have little bearing on this study. Instead of achieving statistical

generalisation, analytical generalisation was accomplished. This means that analytical generalisation is based on the initially collected theories, which are either rejected, verified or modified (Yin, 2009).

Another important aspect to reflect on regarding the research design is the time-horizon (Saunders, Lewis, & Thornhill, 2007). The time-horizon is chosen based on the research question and can be either cross-sectional or longitudinal. In this study, a combination of the two time-horizons was applied. With this said, the study is mainly cross-sectional as the majority of the empirical findings provide snapshots in time, meaning that a phenomenon, which in this case is environmental sustainability's impact on innovation, is studied at a certain point in time. The study is also longitudinal to a certain degree as several of the empirical findings concern changes in time. For instance, some of the posed questions during the interviews concerned whether the interviewees had noticed a change in motivation for conducting innovation due to the environmental sustainability movement. See Appendix A, B, and C for more details regarding the interview questions.

3.2 Choice of Cases

The subjects of this thesis included various food companies located in the Nordic countries due to (1) the lack of research regarding how environmental sustainability impacts innovation within the Nordic food industry, (2) the importance of environmental sustainability and innovations in the Nordic food sector, and (3) the accessibility and practicality when conducting this study. The cases were selected based upon the following two criteria, which were set by us, in order to ensure that the cases were suitable to be able to address the research purpose in an adequate way. First, the company had to be active in the Nordic food industry, meaning that it was based in either Sweden, Denmark, Finland, Iceland or Norway. Second, the company had to have an internal or external role, meaning that it could either be a food company or a supplier to a food company. Hence, the following Nordic companies were considered particularly relevant and suitable cases for this study: Scan, Lantmännen, Valio, ICA (private labels), Paulig, Lupinta, Trensums Food and Tetra Pak. With this said, a more detailed motivation of each case company follows.

Trensums Food and Tetra Pak were deemed as suitable cases for a couple of reasons. Firstly, these two companies took on the role as a packaging and processing provider for food companies, providing an external perspective on how environmental sustainability impacts innovations in the food sector. Secondly, both companies were founded in Sweden and have operated in the Nordic food industry for many years. This means that both Tetra Pak and Trensums Food possess expertise regarding characteristics of the Nordic food industry and regarding companies operating in the industry. Moreover, they are also able to offer a long-term perspective on environmental sustainability and its implications on innovation.

Lantmännen and Lupinta were presumed to be suitable case companies for this study for a couple of reasons. First, these companies were chosen due to the fact that they offer a first-hand and internal point of view of how environmental sustainability has affected their work with innovation. Second, these two companies deemed suitable to address the research question as they have incorporated sustainability into the business model from the start. With this said,Lantmännen and Luptina offers a different perspective compared to Scan, Valio, ICA and Paulig which have incorporated sustainability over time.

Scan, Valio, ICA and Paulig were also considered as viable case companies for a few different reasons. Firstly, in line with Lantmännen and Lupinta, these four companies were chosen as they offer a first-hand and internal perspective of how innovation has been impacted by the environmental sustainability trend. Secondly, these companies were chosen as they can be considered to be more traditional, meaning that they are offering a broad category of meat products, dairy products, and dry goods. Thirdly, these companies were deemed suitable as they all have made a transition towards being more environmentally friendly.

In addition to the data collected from the companies, data was also gathered from a researcher at Lund University, which provided us with an external point of view of the studied topic. The researcher takes on a different role compared to the case companies, as he provided us with market insights from a researcher's point of view. The researcher deemed suitable due to the participant's theoretical knowledge of and expertise in the Swedish food industry.

With this information in mind, these subjects become distinctive cases, which according to Eisenhardt (1989), is desirable when conducting a case study as the purpose is to explore and further develop theory. Moreover, by interviewing multiple cases, different perspectives on the

same phenomenon were provided and thereby created a holistic view on the studied research topic. This was necessary in order to address the research purpose of how environmental sustainability impacts innovation at food companies. A more detailed description of the companies is found in the empirical results chapter.

3.3 Data Collection

The data was collected by conducting semi-structured interviews and using publicly available company documents. Semi-structured interviews were chosen as the data collection method as it offers flexibility and structure to the interview (Bryman & Bell, 2011). This was done by following an interview guide, which was based on the literature review and the preliminary framework. In total, 13 interviews were conducted, with 16 respondents. More specifically, 11 of the interviews were conducted with one participant while two of the interviews were conducted with two participants. In a group interview, there is the possibility of the respondents influencing each other and thereby impacting the results (Bryman & Bell, 2011). However, the interviewees may also trigger thoughts in each other, leading to a richer data set (Bryman & Bell, 2011). A targeted selection was used to identify interviewees in order to ensure that the participants possessed the relevant knowledge and expertise. Using a targeted selection means that the participants were not randomly chosen but hand-picked by us. There may be potential bias related to the selection of interviewees as they possess similar knowledge but within different contexts. However, this bias is not seen as an issue in this study as in order for the interviewees to answer the interview questions in an adequate way, it was necessary that the participant had experience and possessed knowledge regarding the innovation and sustainability work at the case company. See table 1 for an overview of the respondents and their respective interview.

Potential interviewees were identified through company websites and LinkedIn. Along with the predefined criteria for choosing a relevant as well as a suitable case company (see 3.2 Choice of Case Company), the following criteria was established in order to ensure that the interviewee possessed the relevant knowledge for the research study. This means that the respondent had to be involved in either the company's innovation or sustainability work. Once this was ensured, the interviewees were contacted by email, phone or direct messages on LinkedIn. Most of the interviewees were contacted at the beginning of the research process, whereas a few of the

respondents were referred to us by the employees who have been contacted by us but did not possess the correct knowledge. The referred interviewees were recommended as their position in the company ensured that they possessed the right expertise to be able to provide relevant knowledge regarding innovation and sustainability.

Three interview guides were constructed with open-ended questions based on the literature review. Furthermore, the interview guides were adjusted according to an internal or external perspective depending on the respective interviewee. See Appendix A, B and C for the interview guides. Documentation of important parts of the research process, such as including the interview guides, is crucial in order to enhance the reliability of a study (Yin, 2009). The interview guide acted as a tool and guideline during the interviews to ensure that adequate questions were asked during each interview to guarantee a rich data set. The semi-structured interviews were conducted online using Microsoft Teams and Google Hangouts Meet because of the geographical distance to the participants and the COVID-19 pandemic. According to Saunders, Lewis, and Thornhill (2007) some researchers suggest that conducting interviews online does not provide the same interactive and spontaneous communication compared to a face-to-face interview. However, other researchers have found that due to the relative anonymity of an online interview, it provides the researchers with more open and honest answers (Saunders, Lewis & Thornhill, 2007). The respondents were able to elaborate and reflect on the questions to guide the discussion in a certain direction, which according to Bryman and Bell (2011), is favourable as it generates as complete answers as possible. The interviews focused on the participants' own experiences working with innovation and sustainability at the case company. When new questions arose during the interview, they were asked in order to discover new topics of interest related to innovation and environmental sustainability. The interviews, on average, lasted for 30 to 45 minutes. Both of us were present during all the interviews. Moreover, the interviews were recorded with the respondents' permission and transcribed. The software Otter.ai was used to both record and transcribe the interviews. This was followed by a manual transcription to correct inaccurate grammar and spelling mistakes to make it as similar to the recording as possible. Once the transcripts were ready, quotes were picked from the empirical results, which were sent to the interviewees for review and approval, allowing them to suggest changes to make the answers as complete and accurate as possible.

Table 1: Overview of the conducted interviews.

Name	Organisation	Profession	Date	Duration
Anonymous	Lund University	Researcher	22.04.20	35 minutes
Lo Coucy	Scan	Business Development/ Head of Customer and Consumer services	22.04.20	40 minutes
Maria Dundeberg		Vice President Away from Home & Industry Sales/ Market Director		
Ilaria Di Meo	Lupinta	Sustainability Analyst	23.03.20	37 minutes
Jörgen Kamph	Trensums Food	Sales and Commercials	23.04.20	46 minutes
Pamela Carlstedt	Trensums Food	Project Manager	27.04.20	51 minutes
Tina Andersson		Purchase Manager		
Peter Annas	Lantmännen	Director R&D and Group Innovation	24.04.20	40 minutes
Linnea Heiskala	Lantmännen	Sustainability Project Manager	29.04.20	47 minutes
Virpi Kling	Valio	Development Manager	28.04.20	31 minutes
Soila Kananen	Valio	Innovation Manager, R&D	28.04.20	37 minutes
Julian Fox	Tetra Pak	Director, Sourcing & Manufacturing, Packaging Solutions & Commercial Operations – Sustainability	29.04.20	50 minutes
Erik Lindroth	Tetra Pak	Sustainability Director	30.04.20	30 minutes
Annika Ternevi	Paulig	Head of R&D & Flavouring	04.05.20	46 minutes
Lea Rankinen		Director, Sustainability & Public Affairs		

Sofia Olsson	ICA	Director Innovation & Concept Development, Private Label	04.05.20	54 minutes

3.4 Data Analysis

According to Creswell and Creswell (2018), data analysis plays an important role when it concerns the understanding of the collected data. Nevertheless, in order for the data to act as valuable input, relevant data was discerned to prevent including insignificant data into the results as well as discussion (Bryman & Bell, 2011). Even though Bryman and Bell (2011) point out the importance of this step, qualitative research does not have one agreed upon method of data analysis as quantitative research has.

A template approach was used in this study to analyse the data as proposed by King (2004). King (2004) further states that at the core of a template analysis is the template, which consists of different codes. A characteristic of such a template analysis is that the process starts in the earlier stages of the study instead of when the data analysis takes place. This is due to the template being established before the collection of data begins (King, 2004). In this study, the literature review acted as a starting point and offered valuable insights in order to identify possible codes for the data analysis.

King (2004, p. 257) defines a code as "a label attached to a section of text to index it as relating to a theme", which was first developed in the initial template. Furthermore, King (2004) explains that the collected data will be assigned codes and then organised after the different codes. However, King (2004) further describes that the data analysis might reveal differences compared to the already pre-defined template. With this in mind, we altered, deleted or added codes and changed the scope of the classification when it was necessary. The transcribed data served as a basis for the analysis. Quotes from each interview were selected and were assigned different codes, for example, motivation, innovation, environmental sustainability, drivers and stakeholders, depending on its content. The quotes were then categorised after the codes, for instance, all data concerning motivation behind innovation were all categorised together. After

this was done to all the hand-picked quotes, similarities, differences, and patterns were discerned in order to discover themes amongst the data.

The main reason as to why the template analysis was chosen is due to the fact that it allows for comparison of different views of various interviewees with each other (King, 2004). This is considered as the main strength of this approach and was deemed as an important characteristic for this study as data was collected from multiple cases and various interviewees with different perspectives on the subject. Saunders, Lewis and Thornhill (2007) explain that the developed template will link the research into the already existing body of knowledge and thereby create a starting point for the data analysis which will support the researchers in the process. Furthermore, King (2004) states that a template analysis combines an inductive and deductive approach to the analysis, which was deemed necessary as it aligns with the choice of method.

3.5 Validity and Reliability

According to Creswell and Creswell (2018), validity and reliability are two aspects that are important to any research design. In this study, the validity and reliability were based on the four modified criteria for a case study by Yin (2009), namely, (1) reliability, (2) construct validity, (3) internal validity and (4) external validity. However, he further states that internal validity is only necessary to comment on if the case study is of explanatory nature. In line with this, Creswell and Creswell (2018) state that internal validity does not carry the same connotation as it does in a quantitative study. Thus, reliability, construct validity and external validity were addressed.

Reliability refers to the trustworthiness of the findings and being able to ensure that similar results can be accomplished again if the same case study is replicated (Creswell & Creswell, 2018). According to Bryman and Bell (2011), the reliability needs to be taken into consideration while conducting a case study, as it is hard to pause a social context. This means that the reliability is impacted by the time period because of the evolving social context (Easterby-Smith, Thorpe, & Jackson, 2015). Therefore, it is essential to highlight that most of the findings in this study provide snapshots in time. However, to handle this critique, Yin (2009) proposes to document as many of the different steps as possible of the research process in order to help other researchers to conduct the same case study and to ensure similar results. This suggestion

was fostered in this study by giving readers insights into how this research was conducted by having a well-reported methodology where the various steps taken in the research process was elaborated on. Additionally, this was adhered to by including the various interview guides in Appendix A, B and C.

Yin (2009) states that construct validity refers to the definitions of key concepts and terms of the study. Moreover, he specifies that by defining these concepts and terms it will allow the reader to create an understanding of the most important terms and concepts in the study. In this study, the key concepts and terms are related to innovation as well as sustainability and were anchored in literature. The reader should be able to understand the concepts and judge if the applied research design was adequate to address the research purpose due to the explanation and elaboration of the key concepts.

External validity is the most discussed aspect for determining the quality of a case study and the ability to provide generalised findings (Yin, 2009). As a multiple case study was conducted, the findings are less devoted to one particular company (Herriott & Firestone, 1983), meaning that it is easier to generalise the findings and thereby enhancing the external validity. Even though external validity seems less important in a case study compared to other designs, various strategies, suggested by Creswell and Creswell (2018) were taken in order to strengthen the external validity. Triangulation and member checking are two strategies, which were pursued in order to improve the external validity of this study. Triangulation of data was adhered to by using the same interview guide and thereby asking the interviewees the same set of questions in order to ensure a rich data set with adequate responses from the participants. This was necessary to be able to discern similarities and differences in the data set. Member checking was applied as the quotes included in the empirical results were sent back to the interviewee for review and approval, in order to increase the accuracy of the findings. Furthermore, to strengthen the external validity, it is important to present a holistic image of the study's topic in order to not mislead the reader (Creswell & Creswell, 2018). Therefore, a rich narrative description of the findings in the analysis was presented in order to show a true representation of the data set to enable the reader to understand the context of the findings. In line with this, it is also important to acknowledge any personal bias from the researchers to improve the accuracy of the study (Bryman & Bell, 2011). This was done by presenting a rich data set in the analysis while the discussion part of the thesis will acknowledge the bias.

3.6 Ethical Considerations

Bryman and Bell (2011) mention four types of ethical principles, which need to be taken into consideration: (1) harm to participants, (2) lack of informed consent, (3) invasion of privacy and (4) deception. These four ethical considerations are addressed in this section along with an explanation of the different measures that were taken in order to overcome them. The first ethical issue concerns the harm to the participant, which for instance can be caused by exposure to stress or damage to a participant's career. A couple of measures were taken in order to avoid such harm. Firstly, the statements of the interviewees were sent back for review and approval in order to increase accuracy as well as to avoid harmful quotation. Secondly, in order to avoid stress for the participant, the interview was conducted according to the participant's preferences, such as their availability. The second ethical principle concerns the lack of informed consent. This was adhered to in the initial contact where the participants were informed about the context and the purpose of this study. Also, it was made clear in the initial contact that the participation in this study was completely voluntary and only after receiving a positive response from the interviewee, an interview was scheduled. The participants were reminded of the scope and purpose of this study at the beginning of the interview, enabling another chance for the interviewee to opt out. Thus, the information provided to the interviewees is considered as appropriate to avoid ethical problems concerning the lack of informed consent. The third ethical issue concerns invasion of privacy. To counteract this aspect, the participants had the choice to not answer specific questions if they did not want to. With this said, all participants chose to answer all the posed questions. The fourth ethical consideration relates to deception, which occurs when the study is presented as something other than what it is (Bryman & Bell, 2011). To respond to this, when stating information related to the study and its context, it was ensured that the information provided the participant with a holistic view of the research as well as it being anchored in the literature.

4 Empirical Results

This chapter seeks to introduce the studied cases and provide an overview of the empirical findings from the 13 semi-structured interviews and publicly available company-related documents. To provide a structured presentation of the data, the chapter is divided after themes based on the assigned code words from the thematic data analysis. With this information in mind, the cases are presented, followed by the findings related to sustainability being on top of companies' agendas. After this, findings related to what innovation is to the firms are outlined. This is followed by a description of the findings related to the reasons behind conducting innovation and sustainability practices. Subsequently, interview data concerning the positive effects of collaborations and partnerships are described. Finally, the empirical results regarding the effects of environmental sustainability on the business is elaborated on. Summarising, this chapter plays a crucial role in order to address the research purpose.

4.1 Case Descriptions

4.1.1 Lantmännen

Lantmännen (2015a) was founded in 1905 in Sweden and is an agricultural cooperative owned by 20 000 farmers. Finn Crisp, Axa, Go Green, and Kungsörnen are several of the brands that Lantmännen own which offer products like oats, beans, crisp bread, flour and pasta (Lantmännen, 2015b). Lantmännen's strategy for long term profitability and a thriving farming, is to take responsibility from field to fork (Lantmännen, 2015c). Concerning sustainable business development and strategies regarding climate, Lantmännen works with areas regarding environment, business ethics, society, social conditions, work environment, health and safety as well as products and services (Lantmännen, 2015c).

4.1.2 Paulig

Paulig (2020a) was established in 1876 in Finland and is a family owned company. Santa Maria, Risenta, Gold & Green and Poco Loco are the brands that are owned by Paulig and they offer spices, snacks, coffee, beans and plant-based products (Paulig, 2020b). Paulig (2020c) strives to develop and stay relevant but also to do good for consumers, employees, the environment and partners. This is expressed in the purpose, namely, "for a life full of flavour" which means to look for new ways to renew the business as well as find new flavours, solutions and ways of working (Paulig, 2020c).

4.1.3 ICA

ICA was established in 1917 in Sweden and operates in different market segments, for example, ICA Banken, Apotek Hjärtat (Pharmacy) and ICA Fastigheter (Real estate), where the fast-moving consumer goods is the biggest market segment of ICA (ICA Gruppen, 2020a). Being one of the biggest retailers in Sweden, ICA also has their own private labels, such as ICA I love eco, ICA Skona, ICA selection and ICA Basic (ICA, 2020a). These private labels offer cleaning products as well as food products, for example, pasta, milk, and vegetables (ICA, 2020b). One of ICA's strategies concerns sustainability where the goal is to lead the development for a more sustainable and healthy society - for a good tomorrow (ICA Gruppen, 2020b).

4.1.4 HKScan

HK Scan (2020a) was founded in 1913 in Finland and is a Nordic meat and meal company. Scan, Pärsons, Tallegg, Rakvere are a few of the brands that go under the brand HKScan, which supply poultry, pork, and beef along with meat products and meals (HKScan, 2020b). Sustainability is part of HKScan's strategy where they want to create long term value on a sustainable basis and fulfill the responsibilities towards all the stakeholders (HKScan, 2018). To achieve this, they are working with economic, social and environmental responsibility as well as animal health and welfare (HKScan, 2018).

4.1.5 Valio

The dairy company Valio (2020a), was established in 1905 in Finland and is a cooperative, owned by 4700 Finnish dairy farmers. Valio (2020b) sells dairy products, for instance, butter, milk, yoghurt and cheese. Recently, they have established a plant-based brand, Oddly Good, which offers plant-based alternatives to dairy (Valio, 2020b). To Valio, sustainability is the concrete actions taken from the dairy farmers to the dinner table. Valio takes active measures to reduce the environmental and climate impacts that are caused by their operations as well as improving animal and human welfare (Valio, 2020c), for example, environmentally friendly packaging and the replacement of fossil fuel (Valio, 2019).

4.1.6 Lupinta

Lupinta (2020) is a plant-based food start-up which produces meat alternative products and was founded in 2018 in Sweden. The goal from the start has been to provide an alternative to meat and soy bean products by offering environmentally friendly products made of locally grown Lupin bean (Lupinta, 2020). The aim is to decrease the import of the soybean from outside the EU and thereby decreasing the import that impacts the environment negatively (Lupinta, 2020).

4.1.7 Tetra Pak

Tetra Pak (2020a) was founded in 1951 in Sweden and is a food processing and packaging solutions company. Being one of the leading companies in the industry, Tetra Pak believes in responsible industry leadership and a sustainable approach to business (Tetra Pak, 2020b). This belief is reflected in their motto “Protect What’s Good”, where the vision is to make food safe and available everywhere. More specifically, the motto is about protecting the people (employees and society), food (food safety) and future (environment and customer’s business) (Tetra Pak, 2020c).

4.1.8 Trensums Food

Trensums Food (2020) is a food processing and packaging solutions company, meaning that they offer food companies and food retailers an opportunity to take the product to the market

without having to invest in their own facilities. Trensums Food (2020) was established in Sweden in 1948 and is actively involved in sustainability, in particular, reducing food and packaging waste as well as introducing environmentally friendly packaging to the market.

4.2 Sustainability is on Top of Companies' Agendas

The majority of interviewees addressed the importance of corporate sustainability and that it has become a high priority at food companies. This is highlighted by Di Meo, working at Lupinta. She pointed out that sustainability is part of the core of the business. Similarly, Heiskala stated that Lantmännen is taking responsibility from field to fork, meaning they are working with sustainable solutions throughout the whole value chain. The companies distinguished between the three pillars of sustainability including the economic, social, and environmental aspect and integrated all three of them into their business. However, environmental sustainability has emerged as the primary focus area when it comes to sustainability initiatives within food companies. When asked about the impact of environmental sustainability on the business, several interviewees mentioned that they have adapted their firm targets and introduced new ones in response to the environmental sustainability movement. This is highlighted by Coucy and Dundeberg who work at Scan:

> "We have been working with actions to limit our carbon footprint for many years actually but that has not been the focus. And now we have revised, updated and stretched our targets in accordance with governmental regulations. And we want to see other companies doing that. Additional focus is on self-sufficiency and domestic production as it becomes more important and we have a strong position to strengthen domestic production. The focus is also on the CSR aspect in product development, communications to stakeholders and marketing."

Similarly, all companies mention that their firm goals are aligned to at least several SDGs by the United Nations. Nevertheless, some companies put more emphasis on the SDGs than others. This was exemplified by Rankinen from Paulig as they have analysed which SDG goals have the strongest link to their business which are then aligned to their goals and targets.

Many of the interviewed participants acknowledge the consumers as important actors in the environmental sustainability movement, therefore, food companies feel pressured to fulfil those consumer demands. Carlstedt and Andersson provided an external view on the aforementioned findings:

> "I think all the big companies have this [environmental sustainability] on top of their agendas today. I mean, that's my feeling, especially with the companies that we work with both international and national. It comes first, it's really important because they also see that it's one of the important things for the consumers today. So I would say it's very important and has a lot of priority on the agendas."

Moreover, the majority of respondents working at a food company also claimed that environmental sustainability is at least embedded into their targets and strategies whereas several others claimed that it is a part of the business model. A few other participants considered environmental sustainability as a core value within the company. Implementing environmental sustainability into Lantmännen's business model is explained by Heiskala:

> "It's [environmental sustainability] in the business model, it's incorporated. We don't make a profit that isn't reinvested on the farms. In that way, it's incorporated into the business model. We need to focus on making farming thrive, but then of course, 20 years ago, no one looked at transports and the climate impact of transport. So, it's of course a journey with what aspects are included when we talk about sustainability. So it's incorporated and it was from the beginning. I think it's becoming more and more that we live the brand promise. The brand promise was there from the start but I think we are filling it with more and more proof that we are actually doing that."

Several interviewees mentioned that CSR has been incorporated into every aspect of the firm and has become a natural part of their decision-making process. From an external perspective, most interviewees mention that environmental sustainability is now part of almost every company's business strategy. In particular, Fox who provided an interesting perspective to the importance of environmental sustainability in the food industry:

> "I would say, at least in those food companies where sustainability is recognised, you will find typically that the sustainability strategy is implemented in their business control mechanisms, for example, their balanced scorecard."

However, Kamph from Trensums Food believes that sustainability is not incorporated into the business models as it does not change the way the food companies do business. However, he mentioned that sustainability is incorporated into food companies' strategies and policies. To summarise, sustainability is integrated into the case companies' business operations in different ways, for instance, into targets and goals, decision-making processes, business models and strategies.

4.3 Innovation is…

It became apparent from the interviews that the companies have different but similar views on innovation. In particular, all the interviewed companies had a broad perspective on what innovation is to them, meaning that innovation entails a lot of different aspects and is not only about product development. This was illustrated by Kananen:

> "We have no clear definition at the moment but innovation is something that gives some action or something that brings value. So, it means that somehow it [action/value] is usually money for Valio and it can be a product or service, a way of working or finding savings. So that by developing a new way of working, we may save time and we provide value for Valio, so it can be a really large definition".

Even though the interviewed companies did not have a fixed definition of what innovation is, they mention a few aspects of what an innovation is to the company. For example, the interviewees mentioned that an innovation has to add value to the company, by for instance creating a new revenue stream. Di Meo described that innovation for Lupinta is doing something unique by taking inspiration from other businesses and areas. She demonstrated this by saying:

> "[...] For example, what would be innovative for us is to do what was done with the soybean which means creating a wide range of products for people who don't want to eat meat. But also incorporate protein and nutrients in a new way in a product with the Lupin beans. [...] For us, that would be innovation. We are taking something that is already done but putting a twist on it."

Annas said that innovation for Lantmännen is about making new business by, for instance, spotting new business opportunities or developing products or processes. In line with this, the interviewed companies also said that innovation is an opportunity to fulfil consumer needs and demands. This was illustrated by Olsson:

> "It's [innovation] a lot about insights, the consumer insights and finding innovation opportunities and innovation opportunity areas within that. Everything is about the consumer and their needs.

Dundeberg and Coucy highlighted that innovation is not only about creating new or developing existing products but can entail innovations regarding daily work, process innovation, production development and organisational development. This is aligned with the statements from the other interviewed companies. Depending on where in the firm the employee is working, different types of innovations are conducted. This was highlighted by Olsson as she explained that different types of innovations take place in different parts of the organisation. However, in her line of work, as the director of innovation and concept development at ICA's private labels, it is mainly about product development. She further explained that product development entails improvements of flavour, recipes, and making products more sustainable. Even though innovation in the food industry can take many different forms, there is a consensus amongst the interviewed companies that the main innovation within the firm is product innovation.

The researcher mentioned that most of the innovations are incremental, meaning that innovations within food companies are mainly about improving existing products by creating new flavours, changing recipes and thereby improving the products. In line with this, the other interviewees also mentioned that it is mainly about incremental innovations. This was, for instance, expressed by Annas from Lantmännen by saying: *"Sometimes you copy paste. Use the same thing. That's the low hanging fruit, to start establishing something in a new market or bring in a new business idea*." In addition to this, Carlstedt who works at Trensums Food, explained that they have for a long time helped their customers by improving food companies' products. However, the researcher also mentioned that radical innovations occur mainly between companies and different food segments instead of within the company. In most of the case companies, a combination of radical and incremental innovation was pursued. This was, for instance, expressed by Rankinen:

> "I would say it's different in different parts of the company. We partly own Gold&Green and that is more of a higher degree of novelty, where new technology was used and a new type of protein was developed. But if you look at our bigger ranges within Santa Maria and Paulig, innovations are not as groundbreaking, but are making sure that the products are always up to date with the consumer needs and that excitement is kept within the brands."

However, a few interviewees mentioned that it is hard to tell if the innovation is incremental or radical as it depends on the perspective. For instance, Dundeberg and Coucy mentioned that it depends on how and when you look at the innovation as illustrated by this quote:

> "I think some can be new and some are building on tradition or something that we are already doing and improving and this of course comes down to what we mean by innovation. Is that being a little bit better or is it something totally new? So it's also a bit about semantics, what do we mean by that? Let's take the farmer's initiative for example, we can say that it is an innovation. But again, we have a long tradition of working very close with our farmers to become better with animal welfare, animal health and the carbon footprint but now we are doing it in a more processed way. Is that innovation or is it building upon something that we had before?"

Summarising, innovation entails many different aspects for food companies and the definition varies according to the firm's business context.

4.4 Reasons for Pursuing Sustainability and Innovation

The interviewees stated different motivations as to why they pursue environmental sustainability initiatives and innovation activities. The most frequently mentioned reasons for pursuing environmental sustainability actions included: (1) fulfilling consumer demands, (2) gaining a competitive advantage, (3) seeing a business opportunity and (4) employees wanting to take actions against climate change. Similarly, the main motivations as to why food companies engage in innovation practices are (1) changing consumer demands and (2) seeing a business opportunity, and (3) gaining a competitive advantage. Apart from these reasons, it also became apparent that the companies pursue environmental sustainability actions and

innovation due to it being financially motivated. The following themes will further explain and elaborate on the above mentioned motivations.

4.4.1 The Main Driving Force is the Consumer

The majority of the interviewees mentioned that food companies carry out innovation actions in order to fulfil changing consumer demands. Furthermore, it was explained by the interviewees that the consumers are seen as one of the driving forces behind innovation at food companies. Lindroth who works at Tetra Pak illustrated this by saying: *"If I look at our customers, the main driving force is the consumer."* Moreover, another exemplification of the consumer being the driving force behind innovation was given by Terniven and Rankinen:

> "Well the reasons for innovating are always consumer driven, we focus on consumer insights and consumer needs. So our plans are shifting with trends and with consumer insights, plans are always reviewed with this in mind."

It was also highlighted by a few of the interviewees, Di Meo in particular, who works at Lupinta, that it is important to be able to provide consumers with a nice and unique experience by offering flavoursome products with good textures, which was also seen as a driver behind innovation. Similarly, Olsson said that everything is about the consumer and their needs as well as being able to find innovation opportunities within those areas.

Similarly, to innovation, one of the main reasons for companies to pursue environmental sustainability actions was because of the consumers. From the interviews, it became evident that consumers expect companies to take actions against climate change. Annas who works at Lantmännen expressed that taking environmental sustainability actions is crucial for them as a company due to changing consumer expectations. This was further explained by Carlstedt and Andersson from Trensums Food:

> "It's demanded from the consumers. So all these companies that we work with produce consumer products. Consumers' actually demand it from the companies. It's important because if the companies want to have a long working relationship with their consumers. Then it's really important that they (food companies) also work long term with environmental sustainability."

The interviewees also expressed that due to changing consumer behaviour and diets, companies are required to look into how to make the business more environmentally friendly. This was exemplified by Kling:

> "I think the main reason for Valio, as a company, is because consumers have started using these oat milks and other kinds of products. So, we had to react. And then also, maybe that's a main reason, consumer behavior, and how it changes the market [...]"

Similarly, to Kling, Rankinen and Ternevi expressed that it does not matter if the product is perceived to be highly sustainable. If the product does not taste good, the consumer will not purchase it. In accordance with this statement, Kamph pointed out that even if consumers say that they prefer to purchase locally produced goods or sustainable products, they will not buy the products if they are expensive (compared to alternative products) as consumers have too low motivation to pay for it. The next section will elaborate on the new business opportunities, which emerged due to changing consumer demands.

4.4.2 Be the Frontrunner

Two aspects that were highlighted by the majority of the interviewees as a motivation behind food companies' innovation was taking advantage of a business opportunity in the market and gaining a competitive advantage. Annas stated that the reason for conducting innovation is simple: *"We need to innovate to be able to be on the forefront and to be able to have a good business."* Similarly, Carlstedt expressed that innovation is necessary for all food companies to conduct in order to survive on the market. Furthermore, Di Meo stated that one of the reasons for conducting innovation is to stay competitive on the market. Lindroth who works for Tetra Pak mentioned that to gain a competitive advantage in the market, the most important thing is being able to communicate your new innovations to the consumers and having them understand what you are trying to achieve with them. If you do not succeed with this, there is no room for the innovation in the market and it will not lead to a better market position. In line with this, various interviewees talked about either driving the market or being driven by the market, both when it comes to innovation as well as environmental sustainability. This was, in particular, highlighted by the participant in the expert interview. He explained that companies try to be at

the forefront and lead the market while some companies follow the market once standards have become established.

Similarly, to innovation, the majority of the interviewees mentioned that seeing a business opportunity and an opportunity to gain a competitive advantage as important reasons for pursuing environmental sustainability practices. Kananen illustrated this by mentioning how important it is to make the business operations more sustainable in order to keep offering dairy products to meet consumer demands. The researcher provided a similar perspective on how companies see business opportunities in changing consumer demands. He exemplified this by stating that consumers are reducing their consumption of meat due to environmental concerns. The entrepreneurs take advantage of this gap in the market by offering a product that fulfils the changing consumer demands. Hence, it was made clear by the majority of the interviewees that pursuing business opportunities in the market is seen as a great motivation behind incorporating environmental sustainability into the business as it can lead to a competitive advantage.

With this said, the majority of the interviewees suggested that pursuing environmental sustainability actions can be seen as a hygiene factor today in order to stay competitive in the market. This was demonstrated by Lindroth from Tetra Pak: *"I think it's about competitiveness in the market. I mean it's partly a hygiene factor if you don't work with it you will be removed from the market at some point."* In line with this, Heiskala expressed that if one does not act in a sustainable way or pursue any environmental sustainability actions, the business will not be sustainable in the long-term, meaning that the business will cease to exist in the future if sustainable measures are not taken. She further stated that the implementation of sustainability actions into the business operations is a way for Lantmännen and their owners to survive. Lindroth further explained how food companies are pursuing environmental sustainability actions due to financial reasons, namely, if you manage to reduce food waste in production you will also reduce your costs. The financial aspect of pursuing environmental sustainability initiatives was further highlighted by multiple interviewees, in particular, Coucy and Dundeberg:

> "Last but not least, of course it's also financially motivated, the CSR action. They are not costing us anything, actually we are making money. We are increasing our profits by doing these investments into new energies and so forth."

To summarise, as Lindroth mentioned, the key focus for many companies today is sustainability as it contributes to gaining a competitive advantage. Moreover, if companies do not have a sustainability story to tell, they face a tough future.

4.4.3 Employees Wanting to do Good

Several of the interviewees expressed that another reason as to why food companies practice environmental sustainability actions is due to the fact that employees want to do good. Di Meo, working for Lupinta, said that pursuing environmental sustainability actions comes from a place of doing good. More specifically, she mentioned that it is about being able to create real change in society and in how people think, act, and make choices. Kling, working at Valio, said that it comes from a place of being worried about climate change. Ternevi and Rankinen from Paulig, expressed that there is a true commitment within the company, that the employees want to do good for the people and the planet. They further stated that it is important that the motivation also comes from within in order to succeed. In line with this, Coucy and Dundeberg expressed that sustainability is incorporated into the company's core values, which was illustrated by them saying:

> "Good food today and tomorrow is not only about good, tasty and high quality food but also about food that is good for the climate. I also think that is important for our organization, our employees, for them to feel that we have that underlying value in our business. We want to have a responsibility towards the society that we are working in, sorta speak."

Similarly, Olsson from ICA said that today we do not have a choice and that we have to work with sustainability. Furthermore, she expressed the motivation: *"(...) we are very proud of what we can achieve and about the responsibility we take. It's not an option, we all stand behind it."* Kamph from Trensums Food offered a different, although similar view on food companies working with environmental sustainability. He stated that in order for a food company to pursue environmental sustainability initiatives to a hundred percent and not make a marketing stunt out of it, it is important to have a person in the leadership team, that is personally interested in the topic and can drive the company's sustainability work. As outlined above, employees wanting to take actions against climate change is a reason for food companies to pursue environmental sustainability actions.

4.5 The Positive Effects of Collaborations and Partnerships

A large number of respondents mention collaboration and partnerships as a great way to innovate towards environmental sustainability. Collaboration partners usually comprise research institutes, universities, and other companies. Ternevi and Rankinen from Paulig express the importance of partnerships at the company, which is needed in every part of the business. These partnerships bring positive effects as they can lead to greater knowledge and eventually to a launch perhaps in the near future. They also think that expertise is needed from a different company or institution which then can assist you with conducting innovation activities. Kling said that in her role as the development manager she works with different stakeholders on open innovation. In particular, she stated that climate change is a big and complex topic which is why Valio requires help from other actors to solve it. However, she expressed the concern that companies are not ready to share their new technologies with competitors, as these technologies are used to gain a competitive advantage. The view of climate change being a complex topic is also shared by Olsson:

> "[...] And that is mainly within developing the food system again like, how can we work together because this is not something that you can solve on your own. You need to collaborate and you also need to collaborate within the retail industry, because we are all in the same situation and have pretty much the same suppliers and we work with the farmers and so on. And when you can top competition when it comes to this, you really need to collaborate and that is what we are focusing on."

Fox provided an external view on the open innovation topic. Apart from acquiring a broader pool of people through open innovation and letting consumers decide on new recipes or flavours, he also questions whether open innovation practices are merely marketing stunts to push a company's brand value. This becomes evident in his quote:

> "[...] Open innovation hopefully brings in a much broader pool of people, without their experiences, especially when it comes to cross-pollination with things that have happened in other areas, other industries. These are things that are particularly productive for innovation so open innovation is great. And I have seen one or two examples of food companies inviting people to suggest new recipes, [...] so new flavors. But I'm not sure

> how much that is a marketing stunt to push your brand value, and so on. And whether it's actually key to the innovation process about food products."

Overall, the interviewees highlighted the significance of partnerships and collaborations at food companies when it comes to solving environmental issues.

4.6 Impact of Environmental Sustainability on the Business

Many respondents stated that environmental sustainability is affecting their business and has become a big part of their daily work related to innovation, which was exemplified by Ternevi and Rankinen. They mentioned that Paulig has worked for several years incorporating sustainability into the innovation practices. Annas added that it is also important to see the impact from a business perspective in order to be prepared to pay for sustainable actions concerning innovation:

> "Yeah I mean, it's really on top of our agenda, so of course, when it comes to product development and innovation and research and development and all these aspects, sustainability is always a part that works in one way or another. It can be that we develop a new oat variety, for instance. And then we ensure that we have that oat variety, we do not take up as much cadmium from the soil, as an example, and it is also sustainable in one way. [...] So I mean, that is within our company as a green circle, really. It impacts all of us, but it has to be in a business oriented way. Because we, someone needs to pay for it, or to be prepared to pay for it."

As mentioned earlier, another way of incorporating sustainability into the business is through the companies' targets and goals. Similarly, several respondents also highlight that they have more business opportunities now due to the environmental sustainability movement, which leads to innovation. This was highlighted by Heiskala, as she believes that Lantmännen has seized new business opportunities due to the sustainability movement as it is now asked for by the market and consumers. In line with this, the participant in the expert interview also mentioned that this has created a huge business opportunity for companies to enter new markets as well as creating more products. Moreover, he also explained that it has forced the legacy players to do more regarding sustainability.

Di Meo, working at Lupinta, mentioned that she does not see a significant impact of the environmental sustainability movement on Lupinta's innovation activities. Heiskala from Lantmännen only noticed a slow and gradual change towards more sustainable innovation practices to date. Other respondents expressed a visible change towards more environmentally sustainable innovation and recognised a shift in priorities in which environmental sustainability has become a major focus area. Kamph from Trensums Food exemplified this by saying that in the past, their customers wanted aluminium and glass packaging whereas today companies are asking for carton packaging instead, which are more environmentally friendly compared to glass and aluminium.

In terms of value gained from implementing environmental sustainability practices into the business model, most of the interviewed companies mention increased brand value and brand recognition. Improved efficiency or decrease in costs seem to be secondary. Several interviewees highlighted the importance of communicating the environmental sustainability work as consumers today have become more critical. Lindroth explained that it is not enough to say that the product is environmentally friendly, instead, it has to be explained how it is environmentally friendly. Furthermore, innovating towards environmental sustainability is considered as a tool to maintain competitiveness, which was highlighted by the majority of the interviewees. Dundeberg and Coucy mentioned that Scan is incorporating environmental sustainability into their innovation practices in order to differentiate from competitors and to gain a competitive advantage. This was also exemplified by Olsson as she addressed the importance of innovating towards environmental sustainability to stay competitive. To summarise, the majority of respondents agreed that there is a shift occurring towards more environmental sustainable innovation practices as firms want to gain a competitive advantage.

4.6.1 Sustainability Drives Innovation

When asked about if the interviewees had noticed a change in the motivation behind why they innovate due to the environmental sustainability movement, the majority of the respondents answered yes. The biggest change in motivation was related to sustainability, meaning that sustainability is a driving factor behind innovations. Fox from Tetra Pak said that sustainability is now a motivation behind conducting innovation along with the other factors regarding product development, such as recipe changes regarding flavours and fat content. The majority

of interviewees mentioned that they nowadays think about incorporating sustainability aspects into the innovations and the business operations. This was illustrated by Coucy and Dundeberg. Lo started by explaining that Scan does not only incorporate sustainability into the innovation practices but other factors are also considered, such as animal welfare and biodiversity. Dundeberg continued by saying:

> "When it comes to a time for a new design [on the product], we see that it's very important to use more sustainable material. As we have said many times, CSR is in everything we do, we always look for a possibility to be better in sustainability."

Furthermore, Heiskala from Lantmännen mentioned that it has become more motivating and interesting to work with sustainability as it is now demanded by consumers. She further stated that when it is demanded by consumers and this becomes evident for top management, sustainability becomes of higher priority. Moreover, she expressed that this consumer demand has opened up new doors for Lantmännen as they can offer more sustainable products today.

Kling further stated that Valio's motivations have changed when it comes to conducting innovations. Sustainability is now a big part behind conducting innovation, more specifically because more employees are now motivated to do good. She further expressed that several employees would consider quitting if Valio did not pursue environmental sustainability initiatives. However, she also mentioned that money still plays an important role. Similarly, Olsson stated that it is also about doing good for the world:

> "It is a higher purpose and I am privileged to be able to work with that every day. You make good for society and for the world, to be honest. And even if it is only a small part of it, but we need to do it as well and we are doing that. So that is a big motivation. I mean this is not only for ICA. If ICA is making money out of this, it's another purpose. We're doing this to contribute to something bigger."

Carlstedt further highlighted this as she explained that from a personal perspective, she wants to do good, for herself and what she leaves behind for future generations. She also stated:

> "So if I can have an effect on it by us innovating, better newer products that don't have a negative effect on the environment, then that also makes me feel very good and proud of myself and proud of us as a company. And I think that this is going to have a bigger

> impact in the future compared to what it has had in the past. Even if economics is one of the major issues when you want to work with this, because somebody has to pay for it somewhere, but I think somehow it will have, it will come in second place in the future because it is so important for us."

In conclusion, even though the financial aspect remains an important factor when it comes to motivation, the desire of employees wanting to do good in order to meet customer demands have become more important according to the respondents.

4.6.2 Sustainability as a Core Value

As mentioned in section 4.2, many respondents highlighted the importance of integrating environmental sustainability as a core value. When asked about what needs to be fulfilled in order to implement sustainability into the business model, a few respondents mentioned that sustainability has to be incorporated into the core of the business and strategies. Terniven and Rankinen from Paulig specifically mention that sustainability should be visible and incorporated in all the strategies, different business functions, and annual plannings. Moreover, Lindroth and Fox mentioned that sustainability initiatives should get top management support and should be considered as a central part of the strategy. This is complemented by the following quote by Fox:

> "[...] the starting point is that there should be a separate organisation that deals with sustainability matters but the desired end state is that each operational organisation will have sustainability embedded into their processes and their business culture."

Coucy and Dundeberg from Scan expressed the importance of motivated people working with sustainability at the company. They further mentioned that clear targets should be set and performance should be continuously monitored. Kananen from Valio considered transparency and openness as great success factors when implementing sustainability into the business model. Similarly, several interviewees stated that it is important to communicate the company's work to the consumers as well as teaching them about sustainability as they get exposed to many different and contradicting messages.

To summarise, success factors for implementing sustainability into the business model include regarding sustainability as a core of the business, providing transparency and openness towards consumers, incorporating it into strategies, targets, and across business functions.

4.7 Overview of Themes

Table 2: A summary of the empirical findings

Themes	**Summary of Findings**
Sustainability is on Top of Companies' Agenda	The majority of the interviewees mentioned the great importance of implementing sustainability into the business, for instance, into the goals, targets, business models and strategies. They further mentioned that the focus is on environmental sustainability even though all three pillars are integrated.
Innovation is…	For the case companies, innovation is a broad concept and entails, for instance, daily work, product, organisational and process innovation. The interviewees expressed that incremental product and process innovation was the most common innovation in the food industry.
Reasons For Pursuing Sustainability and Innovation	The respondents expressed that consumers are seen as a driving force behind conducting innovation and implementing environmental sustainability. The majority of the interviewees mentioned that gaining a competitive advantage and seeing a business opportunity is another reason behind innovation and environmental sustainability. Employees wanting to do good was also a motivation for incorporating environmental sustainability into the business.
The Positive Effects of Collaborations and Partnerships	The majority of the interviewees mentioned that they have collaborations and partnerships with external actors in order to gain and exchange new knowledge, which eventually may lead to innovations. Furthermore, several interviewees expressed that collaboration is necessary in order to address the complex nature of environmental sustainability issues.
Impact of Environmental Sustainability on the Business	Multiple participants mentioned that environmental sustainability has had an impact on the business and has become a big part of the daily work. They further expressed that by incorporating environmental sustainability, it has led to more business opportunities, increased brand value and recognition and new revenue streams. A few of the success factors for implementing sustainability into the business model, which were mentioned by the interviewees include having sustainability at the core of the business and providing transparency and openness towards consumers.

5 Analysis and Discussion

In this chapter, the empirical results are analysed and discussed. The goal of the analysis and discussion is twofold. Firstly, the results which were presented in the previous chapter are examined. Secondly, the findings will be put into perspective with previous research. To discuss the results, the focus of this chapter will be on three main aspects, namely, (1) environmental sustainability, (2) innovation, and (3) sustainability's impact on innovation, which are deemed suitable as they align with the purpose of understanding how environmental sustainability is affecting innovations in the food industry. The first section of this chapter discusses the findings related to environmental sustainability, followed by the results concerning innovation and sustainability's impact on innovation. The empirical findings are also put into perspective with previous research during the discussion. Finally, the preliminary framework is revised and a conceptual framework is created in order to present the differences and similarities between the findings of the analysis and existing research. The red box in the preliminary framework above each section should highlight the part of the framework, which the subsequent analysis is focusing on.

5.1 Environmental Sustainability

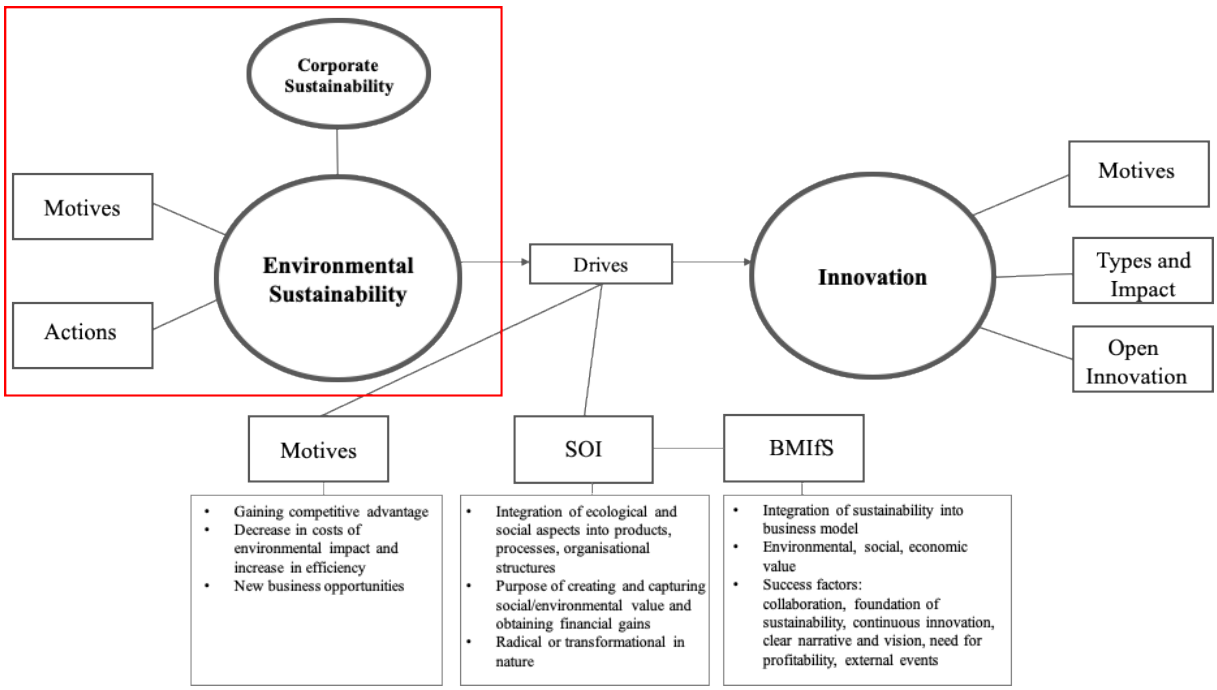

Figure 2: Analysis – focus on environmental sustainability

The first finding that needs to be discussed is the business importance of environmental sustainability. The interviews revealed that all three sustainability dimensions are distinguished but also combined by the case companies. As the case companies elaborated extensively on the three pillars of sustainability, it became evident that most of them are employing a triple bottom line (TBL) approach as they integrate all three sustainability aspects into their business. According to Dao, Langella and Carbo (2011), this implies that organisations need to perform actions that have a positive impact on the environment as well as on the society and do not solely emphasise financial performance. The findings also demonstrate that food companies require to have a holistic view of sustainability hence all three dimensions are incorporated into the business. This is aligned with literature stating that all three sustainability pillars are interrelated, therefore, a business is not able to completely separate its financial sustainability from its social or environmental sustainability (Elkington, 1994, 2004). Furthermore, integrating all three sustainability aspects leads to a business that is sustainable for the future.

Even though literature states that the three pillars are interlinked, it became apparent that the main focus of the cases is on the environmental pillar. More specifically, when the interviewees

were asked about sustainability, the emphasis was laid on the environmental actions that the companies were pursuing. There are a couple of explanations as to why this is the case. Firstly, one of the main reasons as to why food companies have shifted their focus to environmental sustainability is due to the industry's large environmental impact. Secondly, it is financially viable to conduct environmental sustainability practices as the actions usually reduce costs in the long-term. Nevertheless, the economic pillar was also emphasised by several interviewees, as it was seen as a hygiene factor in order to be able to pursue environmental sustainability actions. This is in line with theory, as Pagell and Wu (2009) argue that economic objectives can be compatible with environmental and social objectives. It was further mentioned that pursuing environmental sustainability practices can also be seen as a hygiene factor if the company wants to keep existing in the future. Therefore, environmental issues are on top of food companies' agendas and need to be addressed by various initiatives related to environmental sustainability.

In light of this, it became clear that sustainability is incorporated into the case companies' business operations in different ways. This is in line with theory as Chofreh et al. (2014) found that companies are incorporating environmental sustainability into their business strategies due to consumer expectations. The case companies explained how their firm goals and targets are aligned with several United Nations SDGs. It was also made clear by several firms that sustainability is now part of the firm's decision-making process. Moreover, the interviewees also mentioned that sustainability has been incorporated into the business' core values and strategies. Pursuing environmental sustainability actions for food companies is a way to distinguish themselves from competitors and thereby gain a competitive advantage (Falkenberg & Brunsæl, 2011). This was illustrated by the majority of interviewees as one motivation behind why food companies are pursuing environmental sustainability actions was due to gaining a competitive advantage by seizing a business opportunity in the market.

Another motivation for pursuing environmental sustainability initiatives include fulfilling consumer demands. This implies that environmental sustainability actions are demanded by the consumers and that food companies are attempting to fulfil those needs. This finding can be linked to the motivation for sustainability management found in literature, which is market success. Consumers can reward food companies for conducting sustainability practices by making purchase decisions (Dunphy, Griffiths & Ben, 2007; Ditlev-Simonsen & Midttun, 2011). Therefore, consumers have a superior role as they are a huge part of the environmental sustainability movement. This also explains why food companies are increasingly engaged in

customer efforts, such as communicating their intentions related to environmental sustainability matters and innovations towards their consumers.

The case companies expressed another motivation behind environmental sustainability initiatives, namely, that the employees want to take actions against climate change. Several of the interviewees mentioned that if the company did not pursue any environmental sustainability initiatives, they would consider quitting as they want to take responsibility. This motivation is not explicitly addressed as a driver in the literature. However, corporate legitimacy is seen as a motivation for implementing sustainability as the firm would like to be perceived as appropriate with good beliefs and values in society (Suchman, 1995). This can explain why companies pursue environmental sustainability practices as the firm wants to be perceived as proper and good by its stakeholders. However, it can be questioned whether companies would still take responsibility if consumers or their employees did not expect them to take actions.

5.2 Innovation

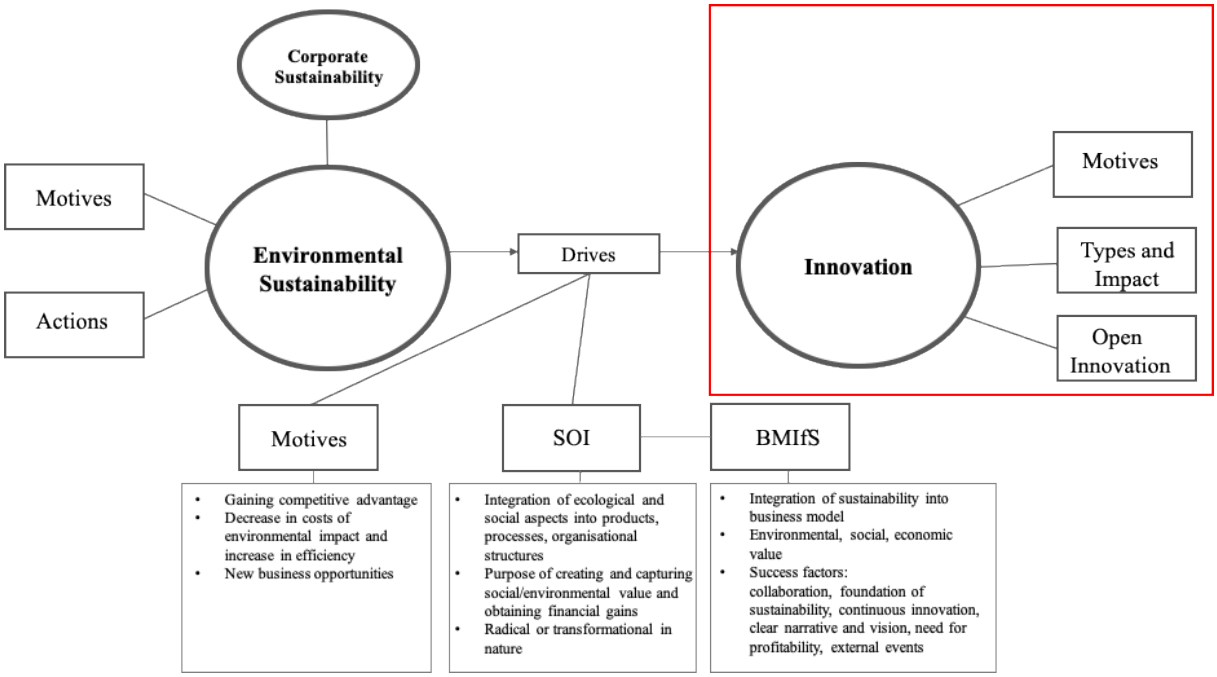

Figure 3: Analysis – focus on innovation

As mentioned in the literature review, innovation does not have one widely agreed upon definition but provides many similar although different definitions. In line with this, the case

companies provided different although similar views on what innovation was to them. More specifically, it became evident that innovation is a broad concept. An important aspect, which was highlighted by the interviewees was that an innovation should create value for the company. The most common types of innovations in the food industry is process and product innovation (Grunert et al. 1997). In line with this, the case companies stated that different types of innovations take place in the company, for instance, organisational, product, process, technological and market innovation. However, as identified by Grunert et al. (1997), the interviewees also stated that the main innovation in the food industry is product innovation followed by process innovation. According to the respondents, the innovations do not only occur within the companies but throughout the value chain. This is in accordance with Earle's (1997) statement that innovations occur across the entire value chain. The innovations in the food industry are normally characterised as incremental rather than radical (Salavou and Avlonitis, 2008; Galizzi and Venturini, 1996; Grunert et al., 1997). This is in agreement with what the interviewees have mentioned, namely, that nearly all innovations that take place within the firm are of incremental rather than of radical nature. However, the companies attempt to pursue both incremental and radical innovations. Tuff and Nagji (2012) suggest that it is important to conduct innovations of different degrees in order to stay competitive. Hence, it can be argued that despite the abundance of incremental innovations, radical innovations are also pursued by food companies with the aim to stay competitively viable.

Previous research found that innovation is a key driver for firm success and growth (Cefis & Marsili, 2006; Tellis, Prabhu & Chandy, 2009; Bayus, Erickson & Jacobson, 2003; Porter, 1985; Fagerberg, Mowery, & Nelson, 2004). According to Jamrog (2006), customer centricity, appropriate resources, and organisational communication drive innovation. Moreover, Capitanio, Coppola and Padcucci (2009) found that the quality of human capital, the geographical context and the age of the firm drives product innovation and the financial structure, capital intensity and the size of the firm drives process innovation. The interviewees did not express different drivers for the different types of innovations. They mentioned that the main motivation behind innovation was changing consumer demands, which aligns with what Jamrog (2006) found. Other drivers of innovation, which were mentioned by the case companies include the identification of a business opportunity and gaining a competitive advantage. These motivations behind innovation can all be interlinked to changing consumer behaviour as companies, for instance, want to gain a competitive advantage in order to distinguish themselves from their competitors and, thus, stand out to consumers. Similarly,

business opportunities in the market emerge due to changing consumer demands and needs, which was exemplified by a few of the case companies by offering plant-based products. This aligns with literature by Fryer and Versteeg (2008) and Ju (2012) who state that new business opportunities arise due to the progress in technology and changes in consumer behaviour. With that said, it is clear that the case companies are focusing on fulfilling consumer demands, meaning that they are driven by the market, which is in line with previous research stating that the companies have shifted to a demand-based approach (Folkerts & Koehorst, 1998; Traill & Meulenberg, 2002; Omta & Folstar, 2005). Nevertheless, several respondents mentioned that there are food companies driving the market thus setting a standard and creating demand in the food sector instead of merely adopting consumer needs. Despite this, it can be argued that consumers have become the main driving force behind conducting innovation in the food sector.

Menrad (2004) identified that companies rarely innovate in isolation but rather innovate in a network of actors. Most of the case companies revealed that they do not innovate on their own but rather in collaboration with other actors, such as research institutes and universities. The main reason for this is due to the complex nature of environmental sustainability issues that trigger new innovations. It also became apparent from the interviews that the case companies require help from external actors in order to tackle environmental challenges. This implies that outside-in open innovation is mainly used, which is about an organisation opening up to external inputs and contributions (Chesbrough, 2012). Even though the majority of the interviewees expressed that the company is conducting some kind of open innovation, it is worth questioning to what degree food companies are willing to share information. This specific dilemma was highlighted by Kling as she mentioned that companies do not share their latest innovations with each other as they have spent significant resources on it in order to gain a competitive advantage. Nevertheless, it can be argued that food companies see collaboration as a possibility to access and exchange external knowledge in order to come up with new innovations to stay competitive.

5.3 Environmental Sustainability and Innovation

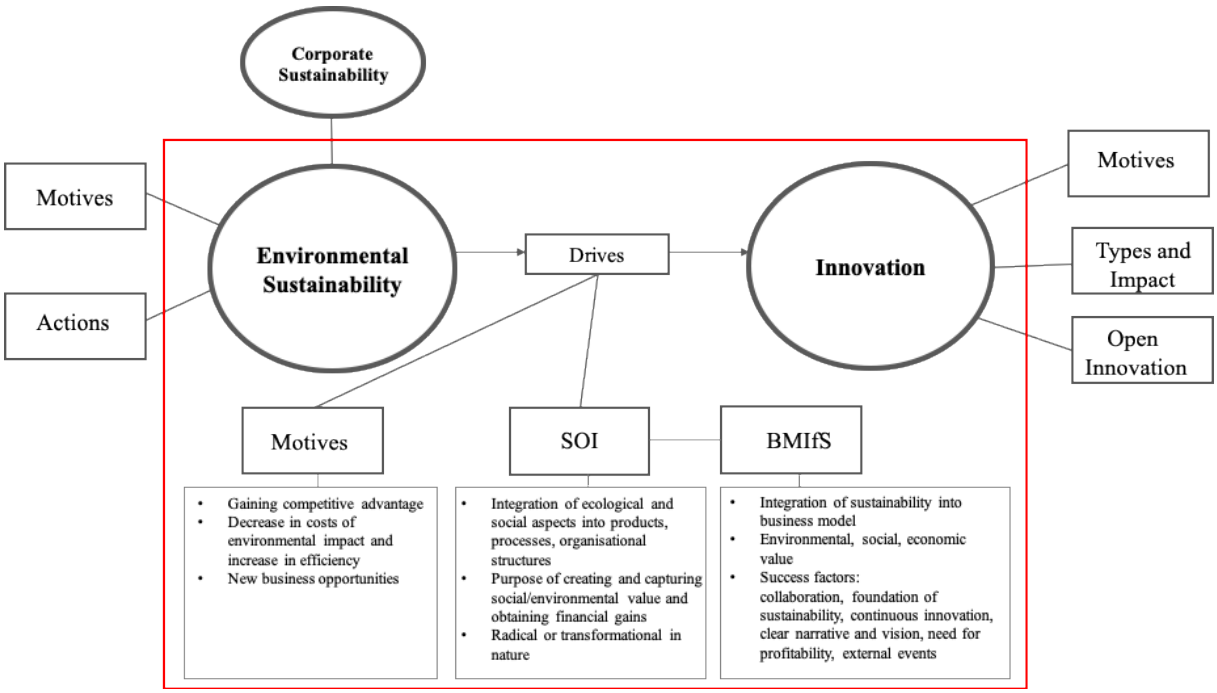

Figure 4: Analysis – focus on how environmental sustainability impacts innovation

Innovation serves as an important tool to implement sustainability into an organisation (Silvestre, 2015a). Hence, many scholars suggest an innovation approach in order to tackle the complex nature of environmental sustainability issues (Silvestre, 2015b; Almeida et al., 2013). This is why most of the respondents addressed the use of open innovation practices to obtain assistance and acquire different expertise from other actors in an attempt to solve environmental issues. As the environmental sustainability movement has become a significant driver behind food companies' innovation activities, conducting SOIs has turned into an important endeavour in the food sector. The motivations behind conducting SOIs may explain why they have become the main innovation category in the food sector.

Based on the empirical results section, findings have materialised which relate to the motives behind conducting sustainable innovations in the food industry. The interviewees expressed that sustainability has now become a motivating factor behind innovation in addition to the ones stated in previous sections. However, it became evident that the previously mentioned motivations, namely, changing consumer demands, seeing a business opportunity, and gaining a competitive advantage have become sustainability-oriented.

Several interviewees stated that it is important to consider sustainability actions from a business perspective in order to determine whether the actions are going to be profitable. If that is not the case, most of the companies expressed that there is no motivation to pursue these initiatives as no one is willing to pay for it. However, the interviewees also addressed that in order to survive in the long-term the companies are required to engage in environmental sustainability initiatives. Furthermore, innovating towards environmental sustainability serves as a tool to gain a competitive advantage, which was emphasised by the majority of interview participants. This is mostly in line with literature stating that companies consider sustainability as innovation's new frontier in order to gain a competitive advantage (Day and Wensley, 1998; Hurely & Hult, 1998; Porter, 1990). It can be argued that many food companies are adapting their innovation work to the environmental sustainability movement as those companies are expecting to become more competitive compared to other firms that do not implement any sustainability initiatives.

The interviews revealed that another important motivation for food companies to conduct SOIs is due to financial reasons. For instance, if food waste in production is managed well, this will also lead to decrease in costs. Moreover, conducting sustainability practices can lead to increase in profits. This is in accordance with Nidumolu's (2009) statement that if a firm is becoming environmentally sustainable it will result in reduction in costs as resources are better utilised. Moreover, the financial motivation behind environmental sustainable innovations can be linked to Sabaté's and Soret's (2014) efficiency dimension of environmental sustainability. Efficiency measures how natural resources are utilised for food procurement. Efficient use of resources can be translated into financial gains, hence, the environmental sustainability movement can influence innovation at food companies in such a way that more SOIs are developed in order to tackle environmental challenges related to the efficient use of resources. This will then also lead to decrease in costs. As a result, the financial aspect may play an important role when it comes to creating SOIs.

Another motive that emerged due to the environmental sustainability movement is the creation of new revenue streams and new business opportunities that lead to innovation activities. According to several interviewees, food companies identify business opportunities and develop innovations according to changing consumer needs. For instance, consumers are eating less meat in order to decrease their environmental footprint. Food companies identified this gap in

the market and innovated in order to provide food products that fulfil the change in consumer diets. This was highlighted by the interviewees from Scan who explained that they have incorporated sustainability into the business and see more opportunities for innovation now. In particular, they perceive the use of sustainable material as very important. Hence, food companies are focusing on consumers more than ever and strive for innovations that meet the demand for environmental sustainability, which also contributes positively to the environment. This finding can be linked to literature stating that sustainable development offers a source of opportunities for innovation that generates value for the firm and the society as a whole (Rodriguez, Ricart & Sanchez, 2002). More specifically, consumers are now more interested in health and wellness when it comes to food (Fryer & Versteeg, 2008; Ju, 2012). Food companies are, therefore, responding by developing new functional and nutritious products (Fryer & Versteeg, 2008; Ju, 2012; Ciliberti, Bröring & Martino, 2015). In addition, the demand for more sustainable food options by consumers provide new business opportunities for actors in the food sector (Dacinia & Ruxandra, 2019). This shows that environmental sustainability offers many new opportunities for food companies to innovate, which are aiming to respond to the current environmental sustainability movement. Nevertheless, it needs to be mentioned that individuals at different organisations have idiosyncratic motivations when it comes to conducting innovation.

As stated previously, employees wanting to do good was first only seen as a driver behind pursuing environmental sustainability practices. However, as sustainability has become one of the major motivations behind innovation, it can be argued that this is due to changing consumer expectations but also due to employees wanting to take actions against climate change. The employees can be seen as the driving force as to why sustainability has been incorporated into the business operations, in particular, the innovation practices, as the interviewees expressed that they would like to take actions against climate change. Employees being the driving force behind the implementation of sustainability into the innovation practices can also be explained by stakeholders having multiple roles. This is in accordance with Goodman, Korsunova and Halme (2017) who state that individual stakeholders can have numerous roles. In this case, it means that employees can simultaneously be the consumers of the company, meaning that the consumer expectation of companies to take actions against climate change is also inherent in the employees. This means that the interests of the employees and consumers are overlapping, which can also explain that employees are being a driver of the implementation of sustainability into the innovation practices.

The majority of interview participants mentioned that they have gained increased brand value and brand recognition from implementing environmental sustainability practices into the business model. Similarly, several interviewees addressed the importance of communicating and market new innovations to consumers. This is in line with Rettie, Burchell & Barnham (2014) stating that environmental sustainability marketing is often used as a strategic tool to position firms in the market, differentiating themselves from competitors, and building trust with environmental stakeholders. Hence, it could be argued that marketing as well as customer engagement plays an increasingly important role when it comes to developing SOIs.

As environmental sustainability has become such an important topic in the food sector, many firms are now pushed by their stakeholders to become more environmentally sustainable. This becomes evident through the interviews as several case companies mentioned that they have incorporated sustainability into the business model. The following aspects mentioned by the case companies are in accordance with the success factors for transitioning towards a BMfS by Long, Looijen, and Blok (2018). The first success factor is to have a foundation of sustainability, which is exemplified by a few respondents addressing that sustainability must be in the core of the business by incorporating it into all strategies, across different business functions, and annual plannings. According to the interviewees, the success is also determined by the degree of top management support. Moreover, a clear target setting, monitoring of performance, transparency and openness are considered to be success factors by the case companies as well. This is in line with the BMfS success factor of continuous innovation, which concerns the constant drive to improve sustainability performance through innovation and pushing the organisation to meet sustainability goals (Long, Looijen & Blok, 2018). The third success factor is about conveying a clear as well as genuine narrative and vision (Long, Looijen & Blok, 2018). The respondents revealed that transparency and openness is important, which entail that consumers are educated about innovations and the sustainability initiatives that the company is conducting. In addition, many interviewees emphasised the economic aspect of implementing sustainability into the business, hence, profitability is considered to be one of the major success drivers as well. This is in agreement with Long, Looijen and Blok (2018) stating that profitability is important in order to deliver environmental and social value through a sustainable business model. Collaborations and open innovation are mentioned by the majority of the respondents, which is also a success factor addressed by Long, Looijen, and Blok (2018). Lastly, an external event, which has an impact on the potential market for a sustainable business

model (Long, Looijen & Blok, 2018) can be linked to the changing consumer demands in the food industry, which was addressed by the participants as well.

To conclude, the majority of the case companies have adopted sustainability practices over time and have now either fully or to some extent integrated environmental sustainability into their business model. Lantmännen and Lupinta have been excluded as they have incorporated sustainability into their business from the beginning. Therefore, it can be argued that most food companies are transitioning towards a BMfS despite the food industry being rather traditional.

5.4 The Conceptual Framework

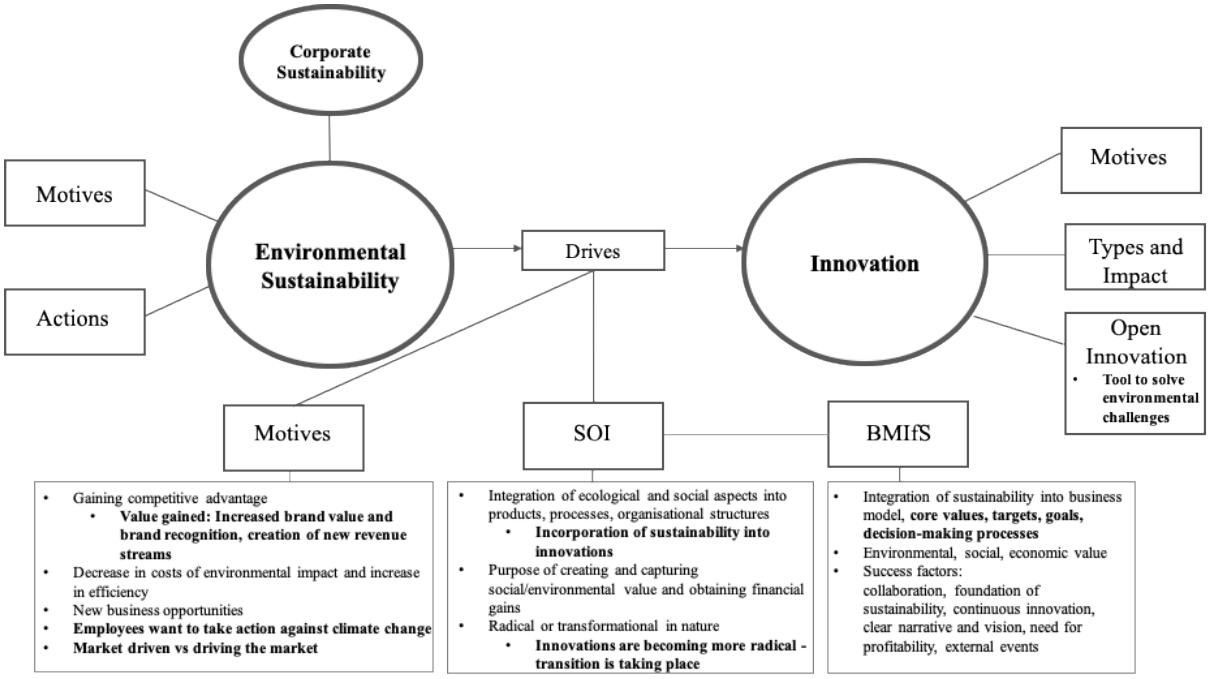

Figure 5: The revised and finalised conceptual framework

The preliminary framework has been extended with findings, which have been incorporated into the final version of the conceptual framework. To summarise, sustainability is of great importance for the case companies and has been gradually incorporated into the business, in particular, into the innovation practices. Sustainability is implemented in food companies to different degrees. Nevertheless, all the case companies expressed that they distinguish between the three pillars of sustainability and incorporate all three into their firms' business. Despite this, it became apparent that there is a clear focus on environmental sustainability. The

importance of incorporating environmental sustainability into the business became evident, when the interviewees expressed that it is a necessity in order to sustain the organisation in the future. Pursuing environmental sustainability initiatives is a way for the case companies to gain a competitive advantage. Another motivation behind environmental sustainability concerns the ambition of employees. More specifically, the employees want to do good and take actions against climate change by changing the way the firm is conducting its innovations.

Similar to the motivations behind environmental sustainability, gaining a competitive advantage and seeing a business opportunity are also motivations behind innovation as expressed by the interviewees. However, the main motivation behind innovation at the case companies was identified to be the change in consumer demands, meaning that the companies have become more customer centric. A few interviewees also talked about food companies leading the market and thereby creating consumer demands instead of solely fulfilling it. It was also made clear that the majority of innovations were product and process innovations even though other types of innovations also took place. Moreover, both incremental and radical innovations are conducted by the case companies but the majority of the innovations are incremental.

Depending on the case companies, sustainability has been incorporated into the business model, core values, targets and goals as well as strategies. In addition to the previous mentioned motivations behind innovation, sustainability has become a key driver for innovation, meaning that SOIs can be considered to be an increasingly important type of innovation in the food sector. It can be argued that employees and consumers push the companies to conduct more SOIs as they want to take actions against climate change. Hence, the motivations for conducting innovation at food companies have clearly become more sustainability-oriented. In particular, by innovating towards environmental sustainability, it provides the case companies with new business opportunities and the chance to gain a competitive advantage. Brand recognition, brand awareness, and new revenue streams are examples of what the case companies have gained from implementing environmental sustainability into the business.

6 Conclusion

The purpose of this research has been to contribute to the understanding of the impact of environmental sustainability on innovations in the food industry. Based on a multiple case study, the research question and sub-questions were addressed by identifying multiple factors that have been found within the areas of environmental sustainability, innovation, and environmental sustainability's impact on innovation. The analysis of the empirical data resulted in a conceptual framework, which is used to put the findings into perspective with the literature. The theoretical implications of this study are presented first, followed by the practical implications. This chapter concludes with the limitations and several suggestions for future research.

6.1 Theoretical Implications

The findings of this study indicate several implications to literature by addressing the initially defined research questions and sub-questions. More specifically, the implications of the impact of environmental sustainability on the different types and degrees of innovation are exhibited. From the interviews, it became evident that product and process innovations are conducted the most among food companies. This is also demonstrated by prior studies emphasising the abundance of product and process innovation in the food sector (Grunert et al., 1997; Mäkimattila, Melkas & Uotila; 2013). Similarly, this study found that the degree of food sector innovations tends to be on the incremental side. This is in accordance with literature showing that many innovations in the food industry are characterised by a low degree of impact on the market (Salavou and Avlonitis, 2008; Galizzi and Venturini, 1996; Grunert et al., 1997). Nevertheless, the analysis revealed that food companies are now increasingly incorporating sustainability into their innovation work. SOI has, therefore, become a priority in the food industry as sustainability has emerged as a driving force behind innovation. Even though innovations at food companies are mostly characterised as incremental ones in prior studies, SOIs are often considered to be radical or transformational in nature. Due to the increasing focus on SOIs in the industry, it can be argued that food companies are now more often involved

in radical or transformative innovation activities than prior to the environmental sustainability movement. Hence, the traditional landscape of the food industry may have shifted from mainly conducting incremental innovations to radical or transformative ones.

Concerning the drivers of conducting SOIs, literature drawn from corporate sustainability and innovation may be combined in order to address the motivations behind SOIs in the food sector. During the interviews, most case companies constantly mentioned their stakeholders, in particular, their customers. External drivers of sustainability include pressures from stakeholders amongst others (Ranganathan & Willis, 1999; Daily & Walker, 2000; Van Marrewijk & Were 2002; Dunphy et al., 2003). Organisations can proactively and voluntarily decide to conduct sustainability initiatives that benefit certain stakeholder groups (Freeman & McVea, 2001). The authors explain further that a firm's stakeholder interests are thus considered to be part of a company's values and objectives. As changing consumer demands are forcing food companies to be more environmentally sustainable, customer-centricity has become an essential aspect when it comes to conducting innovations. It can be argued that firms in the food sector are experiencing great pressure from one of their key stakeholders, which are their consumers. In accordance with Freeman and McVea (2001), these food companies pursue environmental sustainability objectives in a proactive manner, implying that they are mostly driven by their company's values and objectives, which include stakeholder interests. However, the price-sensitivity aspect has to be taken into consideration when it comes to the companies' the consumers. Individual consumers have different perceptions about environmentally sustainable products (Laroche, Bergeron & Barbaro-Forleo, 2001), therefore, they usually have to consider trade-offs when making a purchase decision. For instance, a price-sensitive consumer will not opt for a sustainable food product if it is much more expensive than a regular food product even if the consumer is aware of sustainability issues. Consequently, despite the increasing shift towards more sustainable food products, food companies need to consider the price-sensitivity of their consumers as not every individual is willing to pay a premium for a sustainable product. Nevertheless, it needs to be mentioned that consumers can simultaneously be employees at a company as well. The overlapping role of consumers and employees may have an impact on the individuals' purchase decisions as well as on the motivations behind conducting SOIs.

Concerning research about open innovation, prior literature established that open innovation has been traditionally used in high-tech sectors (De Wit, Dankbaar & Vissers, 2007; Gassman,

Enkel & Chesbrough, 2010). However, the findings of this study demonstrate that open innovation is also becoming increasingly important in low-tech sectors, such as the food industry. In particular, the use of outside-in open innovation has become prominent among food companies as collaborations and partnerships were frequently mentioned by the case companies in order to access and exchange external knowledge. This finding contributes to the open innovation literature and implies that its use is becoming more common in low-tech industries as well.

6.2 Practical Implications

In addition to the theoretical implications, this thesis also provides practical insights into the innovation work of food companies, which is affected by the environmental sustainability movement. From a managerial point of view, several implications can be drawn from the findings and analysis that contribute to practice. First, concerning the motivations behind conducting SOIs, respondents revealed several driving factors, such as fulfilling changing consumer demands, identifying business opportunities, and gaining a competitive advantage. The shift in motivation is mainly about employees wanting to do good thus innovations are conducted driven by individual motivations of employees at food companies. This implies that managers at food companies should consider recruiting individuals for innovation work who genuinely would like to contribute positively to the environment. If this condition is met, innovations are more likely to be sustainability-oriented.

Second, environmental sustainability should not only be embedded into the company's values, strategies, targets and goals but should also have top management support. As a result, the integration of environmental sustainability becomes easier since individuals from higher ranks are believing in sustainability and spreading it across the company. In addition, the organisation that implements sustainability practices should "walk the talk", meaning it is not only supposed to provide a clear narrative to its stakeholders but should also take genuine actions against environmental sustainability issues. Hence, communication of environmental sustainability initiatives and being transparent towards main stakeholder groups, such as the consumers, has become important requirements for food companies to succeed with their sustainability agenda.

Third, the complex nature of environmental sustainability challenges demands that food companies are required to conduct SOIs with the help of other actors in the industry. Hence,

open innovation practices should become more of a focus area as individuals conducting innovation at food companies should benefit from it by gaining new expertise and exchanging knowledge in order to address sustainability issues. Only if people come together and are willing to collaborate, challenges related to environmental sustainability can be overcome. Thus, open innovation represents a huge opportunity for any type of food company to develop and enhance their work with SOIs in order to contribute positively to the environment.

Fourth, food companies that pursue SOIs gain value mainly in terms of having a competitive advantage compared to rivals. More specifically, the findings of this study revealed that increased brand value as well as brand recognition are two of the most prominent aspects. This implies that food companies are strategically motivated by enhancing their brand in order to increase credibility on the market but also to communicate a sustainable image towards stakeholders. Hence, a good execution of a marketing strategy is suggested for food companies in order to acquire value when creating SOIs. However, food companies can only progress on their sustainability path by acknowledging the continuous change towards the sustainability movement in society.

6.3 Limitations and Future Research

This section elaborates on several important limitations of this research study. First, due to the COVID-19 pandemic it was only possible to conduct one or two interviews at each case company as the food industry was under enormous pressure. This challenge could have impacted the rigor and thoroughness of the collected data and the analysis of this thesis. In order to counteract this limitation, several individuals from higher ranks at the case companies were recruited for an interview. The position of those individuals implies that they may have a deeper expertise in either innovation or sustainability work at the specific case company compared to other individuals from lower positions. This may have neutralised the weakness of recruiting several interview participants at each case company.

Second, as this thesis applied a qualitative design it was intended to explore the impact of environmental sustainability on innovation rather than to quantitatively test any correlation between environmental sustainability and innovation. Therefore, future research should quantitatively test the relationship between environmental sustainability and innovation as well

as other identified aspects. By doing this, it may lead to a further distinction between environmental sustainability and innovation and other possible factors.

Third, this study includes data collected from Finnish and Swedish companies. Even though it has been argued previously that Nordic countries have many things in common and they are a good representation of the early implementation of sustainable innovation practices, it should be noted that data collected from companies based in two different countries could have influenced the generalisability of the outcomes of this thesis. As environmental sustainability is considered to be a global phenomenon (Rockwood, Stewart & Dietz, 2008), the findings of this research may still be applicable to other countries, despite the data being specific to the Nordic case companies. Another suggestion for future research could be to conduct a comparative analysis about environmental sustainabiltiy's impact on innovation between different Nordic countries. Such a comparative analysis can discern important similarities and differences between food sectors in different Nordic countries and contribute to the innovation and sustainability literature based in the context of the Nordic food industry.

Fourth, this thesis only uses data collected from food companies as well as food processing and packaging companies thus other actors in the food supply chain were disregarded. For instance, some of the case companies were owned by farmers, however, this important group of actors in the supply chain were not taken into consideration for this study. Future researchers could, therefore, take an entire value chain perspective for similar topics related to environmental sustainability and innovation in the food sector.

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Appendix A

Interview Guide – Expert Interview

Firstly, we will do a little introduction of who we are, what we are writing about and what we want to get out of these interviews. As you may already know, we are studying a master's programme in International Strategic Management at Lund University School of Economics and Management. Our names are Matilda and Isabella. We are from Sweden and Germany which is why we are conducting the interviews in English.

Magnus, our supervisor, told us that you have conducted a study on the food industry. We are writing about how sustainability is impacting the way companies in the Nordic food industry are innovating. From these interviews, we want to be able to get an overview, of how the food industry has changed due to the sustainability movement, with a focus on innovation. More specifically, we want to find out, from your perspective, how food and beverage companies are working with sustainability and innovation. We also want to find out what impact sustainability has on their innovation work. Are there any changes before and after the sustainability movement?

We would like to record and transcribe the interview if this is okay with you. The interview will be more of a discussion, where we ask questions which we want you to elaborate on as much as you can. However, we may interrupt you if we feel like the discussion is going in the wrong direction. One of us, will ask the questions while the other will take notes and keep track of time. We will be done at (time). Is that okay for you? We will start with a few more simple questions, before we continue with the more specific and detailed ones.

Structure of the interview guide

The description of the questions' purpose was not shown to the interviewee. The non-italics questions were asked as the main questions to the respondent and the italics questions were used as to get the respondent to further develop on the topic. The questions will be adapted and reformulated to fit the interview.

The respondent

Purpose: To create an overview of the respondent as well as their professional role

- Can you tell us a little bit about yourself and what you do in your professional role?
    - *What is your position within the company?*
    - *What are you responsible for in the company?*
    - *How does a normal working day look like for you?*
    - *How long have you worked at*

Sustainability

Sustainability practices

Purpose: To get an overview of what initiatives the food companies take in order to be sustainable and where the main focus lies

- What sustainability initiatives do companies within the food industry pursue?
    - *What criteria need to be fulfilled in order for companies to be sustainable?*
- Do food companies distinguish between environmental, social and economic sustainability? What aspect do they focus on?
- Do food companies contribute or respond to the Sustainable Development Goals? If so, how?

Environmental sustainability in the food industry

Purpose: To create an overview of the environmental sustainability trends and motivations for conducting these initiatives in the food industry

- What are current environmental sustainability trends within the Swedish food industry? Environmental sustainability referring to issues such as water scarcity, air pollution, waste or energy inefficiency, for example
- How do you think the environmental sustainability movement has changed the food industry?
- To what extent are environmental sustainability initiatives already integrated across the businesses in the food industry?
- What are food companies' motivations in pursuing environmental sustainability initiatives?
    - *Pressure from outside, stakeholders?*
    - *What do you think the companies gain by engaging in sustainable actions?*
    - *Do you think food companies look at their competitors regarding sustainability practices (competitive advantage)?*
- Who are and will be the main stakeholders in terms of environmental sustainability at food companies?
- What needs to be done, in your point of view, to tackle the sustainability challenges ahead?

Innovation

Purpose: To create an overview of how the firms within the food industry works with innovation

- What are the most important innovation practices that food companies are pursuing from a sustainability point of view?
- Do you see a change in the motivations behind why food companies are innovating? (expect them to say consumer demands have changed) If yes, what are the changes?
    - *What are food companies' motivations in pursuing innovation initiatives?*
    - *Keep position in the market, reputation, competitive advantage, differentiation*

Innovation in the food industry

Purpose: To gain insights into the company's innovation work

- What types of innovations are food companies conducting?
    - *Do you have any examples?*
- What nature do the innovations have? (degree/novelty of innovation)
- What are the factors that drive innovation in the food industry?
- Do food companies conduct open innovation? If yes, how and why?

Sustainability and innovation

Purpose: To find out how sustainability has impacted the way the food companies work with innovation

- Do you think that the sustainability movement has impacted innovation practices at food companies? If yes, how?
    - *Has it affected the types of innovation food companies generate?*
    - *What part of the value chain is impacted?*
    - *Do they come up with more innovations that are integrating sustainability aspects (SOI)? If yes, can you give a few examples?*
- Do you think food companies' motivations have changed when it comes to creating innovations due to the environmental sustainability movement?
- What have food companies gained from implementing sustainability into their innovation practices?
    - *In what way have they created value by integrating sustainability aspects into their business?*
    - *Do you think implementing sustainability into food company's innovation practices has become a standard today (competitive advantage)?*

Business Model Innovation towards Sustainability

Purpose: To gain insights into the integration of sustainability into the business model

- Are sustainability aspects incorporated into food companies' business models? If yes, in what way are they incorporating sustainability into their business model?
- In order to implement sustainability into food companies' business models successfully, what factors need to be fulfilled/achieved?

Future Outlook

- How do you see the future of the food industry?

Do you have anything else you would like to add that we did not touch upon?

Appendix B

Interview Guide – Food Company

Firstly, we will do a little introduction of who we are, what we are writing about and what we want to get out of these interviews. As you may already know, we are studying a master's programme in International Strategic Management at Lund University School of Economics and Management. Our names are Matilda and Isabella. We are from Sweden and Germany which is why we are conducting the interviews in English.

We are writing about how sustainability is affecting the way companies in the Swedish food industry are innovating. From these interviews, we want to be able to form an overview, of how the food industry has changed due to the sustainability movement, with a focus on innovation related to vegetarian and vegan options. More specifically, we want to find out, from your perspective, how (company name) is working with sustainability and innovation. We also want to find out what impact sustainability has on the work you conduct with innovation. Are there any significant changes due to the sustainability movement? We are conducting interviews at a few different food companies. With this said, we want you to anchor your answers from your experiences working at (company name).

We would like to record and transcribe the interview, if this is okay with you. The interview will be more of a discussion, where we ask questions which we want you to elaborate on as much as you can. However, we may interrupt you if we feel like the discussion is going in the wrong direction. One of us, will ask the questions while the other will take notes and keep track of time. We will start with a few general questions, before we continue with the more specific and detailed ones.

Structure of the interview guide

The description of the questions' purpose was not shown to the interviewee. The non-italics questions were asked as the main questions to the respondent and the italics questions were used as to get the respondent to develop on the topic a bit more. The questions will be adapted and reformulated to fit the interview.

The respondent

Purpose: To create an overview of the respondent as well as their professional role

- Can you tell us a little bit about yourself and what you do in your professional role?
    - *What is your position within the company?*
    - *What are you responsible for in the company?*
    - *How does a normal working day look like for you?*
    - *How long have you worked at …?*

Sustainability

Sustainability practices

Purpose: To get an overview of how the company defines sustainability and where the focus lies

- How does (company name) define sustainability?
    - *What criteria need to be fulfilled in order for (company name) to be sustainable?*
- Does (company name) distinguish between environmental, social and economic sustainability? What aspect do you focus on primarily?
- Does (company name) contribute or respond to the Sustainable Development Goals? If so, how?

Environmental sustainability in the food industry

Purpose: To create an overview of the environmental sustainability initiatives the company takes and what the drivers/motivations are

- What are current environmental sustainability trends within the Swedish food industry? Environmental sustainability referring to issues such as water scarcity, air pollution, waste or energy inefficiency, for example
- How do you think the environmental sustainability movement has changed (company name)?
    - *To what extent are environmental sustainability initiatives already integrated throughout the business?*
- What are the most important environmental sustainability practices you conduct at (company name)?
- What are your motivations in pursuing environmental sustainability initiatives?
    - *Pressure from outside, stakeholders?*
    - *What do you think the company gains by engaging in sustainable actions?*
    - *Do you look at what your competitors are doing regarding sustainability (competitive advantage)?*
- Who are and will be the main stakeholders in terms of environmental sustainability at (company name)?
    - *What needs to be done, in your point of view, to tackle the sustainability challenges ahead?*

Innovation

Purpose: To create an overview of how the company works with innovation

- How does (company name) define innovation?
- What are the most important innovation practices that (company name) is pursuing?
- Have you noticed a change in the motivations behind why you are innovating? (expect them to say consumer demands have changed) If yes, what are the changes?
    - *What are food companies' motivations in pursuing innovation initiatives?*
    - *Keep position in the market, reputation, competitive advantage, differentiation*

Innovation in the food industry

Purpose: To gain insights into the company's innovation work

- What types of innovations are you conducting?
- What nature do the innovations have? (degree/novelty of innovation)
- What are the factors that drive innovation at (company name)?
- Are you collaborating with other institutions, firms or even consumers when it comes to innovation? If yes, why?
    - *Have you noticed any differences compared to when innovating on your own in the company?*

Sustainability and innovation

Purpose: To find out how sustainability has impacted the way the company works with innovation

- Have you experienced that the sustainability movement has impacted innovation practices at Paulig? If yes, how?
    - *Has it affected the types of innovation you generate?*
    - *What part of the value chain is impacted?*
    - *Do you come up with more innovations that are integrating sustainability aspects (SOI)? If yes, can you give a few examples?*
- Have your motivations changed when it comes to creating innovations due to the environmental sustainability movement?
- What have you gained from implementing sustainability into your innovation practices?
    - *In what way have you created value by integrating sustainability aspects into your business?*
    - *Do you think by implementing sustainability into your innovation practices, you have become more competitive? Or do you think it is a standard in today's food industry? Why?*

Business Model Innovation towards Sustainability

Purpose: To gain insights into the integration of sustainability into the business model

- Are sustainability aspects incorporated into your business model? If yes, in what way are you incorporating sustainability into your business model?
- In order to implement sustainability into your business model successfully, what factors need to fulfilled/achieved?

Future outlook

- How do you see the future of the food industry?

Do you have anything else you would like to add that we did not touch upon?

Appendix C

Interview Guide – Food Processing Company (Supplier)

Firstly, we will do a little introduction of who we are, what we are writing about and what we want to get out of these interviews. As you may already know, we are studying a master's programme in International Strategic Management at Lund University School of Economics and Management. Our names are Matilda and Isabella. We are from Sweden and Germany which is why we are conducting the interviews in English.

We are writing about how sustainability is affecting the way companies in the Nordic food industry are innovating. In this study, (company name) will take on the role as a supplier of processing equipment and we are interested in how the company views the market and the actors involved especially in the vegetarian/vegan food sector. From these interviews, we want to be able to form an overview, of how the food industry has changed due to the sustainability movement, with a focus on innovation. More specifically, we want to find out, from your perspective, how food and beverage companies are working with sustainability and innovation. We also want to explore what impact sustainability has on their innovation work.

We would like to record and transcribe the interview, if this is okay with you. One of us, will ask the questions while the other one will keep track of time. We will start with a few general questions before we continue with the more specific and detailed ones.

Structure of the interview guide

The description of the questions' purpose was not shown to the interviewee. The non-italics questions were asked as the main questions to the respondent and the italics questions were used as to get the respondent to develop on the topic a bit more. The questions will be adapted and reformulated to fit the interview.

The respondent

Purpose: To create an overview of the respondent as well as their professional role

- Can you tell us a little bit about yourself and what you do in your professional role?
    - *What is your position within the company?*
    - *What are you responsible for in the company?*
    - *How does a normal working day look like for you?*
    - *How long have you worked at …? Are you thinking of changing working place?*

Sustainability

Sustainability practices

Purpose: To get an overview of what initiatives the food companies take in order to be sustainable and where the main focus lies

- What sustainability initiatives do companies within the food industry pursue?
    - *What criteria need to be fulfilled in order for companies to be sustainable?*
- Do food companies distinguish between environmental, social and economic sustainability? What aspect do they focus on?
- Do food companies contribute or respond to the Sustainable Development Goals? If so, how?

Environmental sustainability in the food industry

Purpose: To create an overview of the environmental sustainability trends and motivations for conducting these initiatives in the food industry

- What are current environmental sustainability trends within the Nordic food industry? (Environmental sustainability referring to issues such as water scarcity, air pollution, waste or energy inefficiency)
- Have you noticed a change towards environmental sustainability? If yes, how has it affected TetraPak or your line of work?
    - *How do you think the environmental sustainability movement has changed the food industry?*
- To what extent are environmental sustainability initiatives already integrated across the businesses in the food industry?
- What are food companies' motivations in pursuing environmental sustainability initiatives?
    - *Pressure from outside, stakeholders?*
    - *What do you think the companies gain by engaging in sustainable actions?*
    - *Do you think food companies look at their competitors regarding sustainability practices (competitive advantage)?*
- Who are and will be the main stakeholders in terms of environmental sustainability at food companies?

Innovation

Purpose: To create an overview of how the firms within the food industry works with innovation

- What are the most important innovation practices that food companies are pursuing?
- Do you see a change in the motivations behind why food companies are innovating? (expect them to say consumer demands have changed) If yes, what are the changes?
    - *What are food companies' motivations in pursuing innovation initiatives?*
    - *Keep position in the market, reputation, competitive advantage, differentiation*

Innovation in the food industry

Purpose: To gain insights into the company's innovation work

- What types of innovations are food companies conducting?
    - *Do you have any examples?*
- What nature do the innovations have? (degree/novelty of innovation)
- What are the factors that drive innovation in the food industry?
- Do food companies conduct open innovation? If yes, how and why?

Sustainability and innovation

Purpose: To find out how sustainability has impacted the way the food companies work with innovation

- Do you think that the sustainability movement has impacted innovation practices at food companies? If yes, how?
    - *Has it affected the types of innovation food companies generate?*
    - *What part of the value chain is impacted?*
    - *Do they come up with more innovations that are integrating sustainability aspects (SOI)? If yes, can you give a few examples?*
- Do you think food companies' motivations have changed when it comes to creating innovations due to the environmental sustainability movement?
- What have food companies gained from implementing sustainability into their innovation practices?
    - *In what way have they created value by integrating sustainability aspects into their business?*
    - *Do you think implementing sustainability into food company's innovation practices has become a standard today (competitive advantage)?*
- Have you noticed an impact on TetraPak's business due to the sustainability movement in the food industry?

Business Model Innovation towards Sustainability

Purpose: To gain insights into the integration of sustainability into the business model

- Are sustainability aspects incorporated into food companies' business models? If yes, in what way are they incorporating those aspects?
- In order to implement sustainability into food companies' business models successfully, what factors need to be fulfilled/achieved?

Future outlook

- How do you see the future of the food industry?

Do you have anything else you would like to add that we did not touch upon?