Sustainable business model innovation in agri-firms

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Cover picture: The farm Stensered, Drängsred, outside Torup, Hylte, Sweden. My ancestors have been living on the farm since at least 1680 and probably before that. Thanks to their stewardship over the centuries, 11 generations later their descendants are still there – and so is the cattle, protecting the open beautiful landscape, developing biodiversity, and keeping the struggles of the ancestors visible.
Abstract

**Background** The focus of the research in the thesis is the development of sustainable business model innovation in Swedish agri-firms. There are needs on global and national levels for sustainable business model innovation in the agri-sector. More food must be produced to feed the growing world population. Simultaneously, agriculture must become more sustainable even when the sector raises production. Hence, the firms in the agri-sector must become more sustainable even if they are raising production. In order to raise production, the agri-firms need to be profitable. Consequently, this generates the practical relevance and problem: How can agri-firms develop sustainable (economically, socially and environmentally) business model innovation?

**Purpose** The neglect of theoretical research regarding sustainable business model innovation in the agri-sector is partly depending on the limited empirical research regarding this phenomenon. Sustainable business model innovation in the agri-sector has not been closely studied, which constitutes an empirical problem. Against this background, the overall purpose of the thesis is to contribute to theorizing regarding the application and use of sustainable business model innovation in agri-firms.

To fulfill the overall purpose, two research questions have been formulated. Since the previous research regarding business models and business model innovation in the agri-sector is scarce, recent, and fragmented, there is a need to systematize research within the field. This leads to the first research question: What is the state-of-art research on sustainable business model innovation in the agri-sector? Further, previous research has neglected empirical studies of sustainable business model innovation in the agri-sector. This research strives to contribute to change and empirical studies of sustainable business model innovation in the agri-sector will be conducted. This leads to the second research question: How do agri-firms apply sustainable business model innovation practices?

**Methodology** In order to understand and generate knowledge regarding sustainable business model innovation in agri-firms, different mixed methods assessed suitable for the focus of the research have been used. The research process started with systematic literature reviews, followed by the conceptual development of a theoretical framework regarding sustainable business model innovation in agri-firms. Following, qualitative semi-structured interviews with agri-entrepreneurs were conducted. A smaller quantitative survey was also carried out. After that, a large quantitative telephone survey of agri-firms was conducted. Finally, eight qualitative cases are conducted based on interviews, financial reports and documentation in different media.

**Findings and conclusions** The value intention of the agri-entrepreneur has been identified as the starting point for development of sustainable business model innovation. Value intention has been added to the three previous building blocks of a sustainable business model; value proposition, value creation and delivery, and value capture. The building block value intention makes it possible to include the actor, the agri-entrepreneur, in the business model construct. Further, sustainability aspects have been added to all four building blocks of a sustainable business model.
Stewardship has been identified as a concept which can be used to understand the value intention of agri-entrepreneurs striving for economic, social, and environmental goals. Stewardship can be understood from the interdependency between agriculture and environmental, human and physical resources. The definition of stewardship in this thesis is in contrast with the sustainable business model archetypes framework, where stewardship is one of the eight archetypes. In the thesis, stewardship is a concept of a higher order, a driver of sustainable business model innovation.

Stewardship theory is a relevant theory when studying sustainable business model innovation in agri-firms. The manager of an agri-firm is often the owner of the firm, which means that a formal contractual relationship is not at hand. However, the manager/owner has commitments towards family, value chain actors, farm and land. This is especially valid when the agri-firm is conducting sustainable business model innovation, which contains considerations regarding society as well as environment, which can be regarded as the principals.

A dichotomization in farmer-producer and farmer-entrepreneur has been conducted. The dichotomization has implications in several dimensions. The dimensions which are elaborated upon are; main focus, value chain position, profit strategy, economics focus, size, logic, environmental and animal welfare laws and regulations, sustainability, innovation, and digitalization.

**Implications** Based on the conclusions of the research presented in this thesis, the farmers ought to regard themselves as entrepreneurs and ascend along the value chain. A practical implication for agri-entrepreneurs is to involve sustainability aspects in all four building blocks more explicitly (i) value intention, (ii) value proposition, (iii) value creation and delivery and (iv) value capture. A practical implication for advisory organisations is that they should not focus on entrepreneur’s knowledge, what the entrepreneur should know. Instead, the focus should be mindsets, strategies for thought patterns and strategies for behaviours, what the entrepreneur should be able to do. For future research, the inclusion of value intention of the owner-manager and the importance of stewardship in further theory building regarding sustainable business models could generate important insights into potential trade-offs and barriers based on social, environmental, and economic aspects. This is important not only for research, but for practice in all sectors of industry due to the current and future societal challenges.

**Keywords:** agri-entrepreneur, sustainable business model innovation, business model building blocks, value intention, stewardship.
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This doctoral thesis is based on four papers and one book chapter listed below and included in Appendix.


1. Introduction

This thesis focuses on sustainable business model innovation in agri-firms. This chapter starts with an introduction describing the focus and relevance of the study, from the global level to the individual level. Previous research regarding sustainability, business models, and business model innovation in the agri-sector and in general will be briefly presented, and the research gaps will be identified. The overall purpose of the thesis and the research questions will be formulated. Some central concepts will be highlighted and explained. Finally, the outline of the thesis will be described.

1.1 Background – the focus and relevance of the study

This study focuses on sustainable business model innovation in the agri-sector. The United Nations has in the Report of the World Commission on Environment and Development: Our Common Future (often called The Brundtland report) defined sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” (Brundtland, 198, p.16). Sustainable development is generally regarded as being based on the three pillars of sustainability; environmental, social, and economic (Purvis et al., 2018; Barbier, 1987).

A business model is often defined as the value proposition, the value creation and delivery, and the value capture developed by a firm in order to make consumers appreciate and pay for the product or service (Richardson, 2008; Osterwalder et al., 2005). Business model innovation is about renewing and innovating these building blocks (Bocken and Gerhardt, 2020; Baden-Fuller and Morgan, 2010; Teece, 2010). Sustainable business models and sustainable business model innovation incorporate social and environmental considerations together with the firm’s financial goals (Massa et al., 2017; United Nations, 2015; Bocken et al., 2014).

The agri-sector has a critical role to play in the sustainable development of society because of its broad economic, social, and environmental impacts (Testa et al., 2022). These impacts can be negative, but they have also potential to deliver strong environmental, social, and economic contributions. Agriculture is facing growing global demands for enhanced sustainability and farmers are both required and supported by policymakers and influenced by pressure groups to adopt more environmentally friendly practices (Gittins et al., 2022; Sher et al., 2019).

However, sustainability aspects have historically often been disregarded in the agri-sector, which has been, and still is, categorized by a “productivist” paradigm (Salavisa et al., 2020). The agri-sector has grown more input- and capital-intensive over the last century, due to technological and agrichemical knowledge development (Fairbairn and Kish, 2023). The sector is usually highly specialized, often concentrating on a single product, with strong mechanization and focused on increasing efficiency and productivity.
Further, research on innovation often considers agricultural firms as innovation adopters rather than innovation creators (Bjerke and Johansson, 2022). Hence, it is essential for both society and individual firms to focus on expanding the knowledge of innovation and sustainable business models in the agri-sector (Campos, 2021).

On the global level, agriculture must become more sustainable while increasing food production (Donnan, 2021; De Olde and Valentinov, 2019). In 2050, the human population on our planet will grow to nearly 10 billion, and the demand for food, feed, fibre and biofuels will rise substantially (Steenisland and Zeigler, 2021). It is estimated that global food production will have to increase by 70% or more by the year 2050 due to a growing world population with growing economic resources (Van Dijk et al., 2021; Dobermann and Nelson, 2013; FAO, 2009). Simultaneously, environmental, and societal concerns over issues such as animal welfare, labour conditions, greenhouse gas emissions, soil quality and biodiversity loss are growing (De Olde and Valentinov, 2019).

In 2015, the United Nations formulated the 2030 Agenda for Sustainable Development (United Nations, 2015). The 2030 Agenda provides a plan for peace and prosperity for people and the planet, now and into the future. Adopting the 2030 Agenda represents a paradigm change in the international policies on development cooperation. The UN member countries recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests (United Nations, 2015).

In the 2030 Agenda, the UN has formulated 17 Sustainable Development Goals (SDGs), which are a call for action by all developed and developing countries in a global partnership. Many of the SDGs are closely connected to the agri-sector and if it can become more sustainable it can contribute to many of the SDGs: (i) SDG 1 aims to end poverty, (ii) SDG 2 aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture, (iii) SDG 3 aims to ensure healthy lives and promote well-being for all at all ages, (iv) SDG 6 aims to ensure availability and sustainable management of water and sanitation for all, (v) SDG 8 aims to promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, (vi) SDG 10 aims to reduce inequality (vii) SDG 12 aims to ensure sustainable consumption and production patterns, (viii) SDG 13 aims to take urgent action to combat climate change and its impacts, and (ix) SDG 15 aims to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss. Hence, the agri-sector has a central and crucial role to play if the 2030 Agenda shall be able to reach the SDG:s (Shahmohamadloo et al., 2022; Laurett et al., 2021; United Nations, 2015). The Intergovernmental Panel on Climate Change (IPCC) is the United Nation’s body for assessing the science related to climate change. IPCC published in 2019 the Special Report on Climate Change and Land, which highlights the interconnection between climate change and the agri-sector, including forestry. The IPCC report also identifies that climate change threatens the agri-sector (IPCC, 2019).
**On the European level**, food and farming are considered “a vital, unique and strategic sector for supporting a sustainable Europe” (Bas-Defossez et al., 2018, p. 1). They state that the farming sector, besides food production, plays a crucial role in sustaining rural livelihoods and preserving the diversity of cultural landscapes and wildlife. The European Union is the largest global exporter and importer of agri-food products, with a turnover of €424.7 billion in 2022. The total value of the EU agricultural sector was EUR 536.7 billion in 2022, which represents a significant part of the EU economy. The sector has 12 million farmers of different sizes and in various contexts and the European food value chain employs more than 47 million people (Eurostat, 2023; Bas-Defossez et al., 2018).

The EU, as well as the UN, have concluded that food security and sustainable agriculture are priority areas for research and innovation-related activities (United Nations, 2015; Griggs et al., 2013; European Commission, 2011). In order to strengthen sustainable agriculture, The European Commission has developed the Farm to Fork Strategy, which addresses the challenges of sustainable food value chains from primary producer to end-consumer (Wesseler 2022; European Commission, 2020). Further, the EU’s common agricultural policy (CAP), which was started in 1962, is a partnership between agriculture and society, and between Europe and its farmers. One of the objectives of the new CAP for 2023-2027 is to foster a smart, resilient, and diversified agricultural sector ensuring food security (Barral et al., 2023; European Commission, 2021).

**On the national level**, the Swedish agricultural sector has generally been focusing raised production and efficiency as the keys to increased profitability (Fernqvist et al., 2022: The Agriculture Barometer, 2023). Knowledge development and innovations have prioritized production-related issues rather than market developments (Spendrup and Fernqvist, 2019). According to OECD (2018) the innovation degree in Swedish agriculture and food processing is estimated to be lower than in other parts of the national economy. In the same report, OECD also states that research is not well connected with the needs of the agriculture and food sector.

At the same time, the sector is coping with low profitability, which risks to lead to diminished production (The Agricultural Barometer, 2023; KSLA, 2022). One explanation for this is the competition in the international market for agricultural products. In many countries, production costs are lower due to more allowing legal standards, lower taxes, and lower labour costs. Further, agri-firms in Sweden and other countries have historically acted on regulated markets with controlled distribution channels (Lindgreen et al., 2012). The market situation has further strengthened the production perspective. This is in line with one of the conclusions of the last evaluation of the EU Rural Development Program in Sweden (in which the author of this thesis was one of the evaluators), stressing the need for more focus on innovation in the agriculture sector (Johansson et al., 2016). To meet these challenges, the Swedish government (2023, 2019, 2017) has formulated, and renewed, a national food strategy to develop a competitive food chain where total food production increases and relevant national environmental goals are reached, and sustainable growth and employment are created throughout the country.
On the firm level, many agri-firms are limited to primary production and commodity-oriented, with a focus on efficiency, homogenous products, and economies of scale (Cucagnaa and Goldsmith, 2018; Grunert et al., 2005). The number of firms in the sector has diminished over the last decades. Still, many of the remaining firms have grown in size and turnover through internal growth and/or mergers and acquisitions. However, the majority of firms in the sector is still small family-owned firms (The Swedish Board of Agriculture, 2021).

The food value chain is dominated by some large firms, often refiners and retailers, closer to the end consumers (Riandita, 2022). These firms have a strong influence on producers and consumers. This situation constitutes a challenge for smaller firms at the start of the value chain (Kotzab et al., 2011). The power asymmetry in the value chain makes it harder for the smaller producer to identify and satisfy consumer needs at the beginning of the value chain. Many smaller firms have been forced into subcontractor roles with diminished managerial influence on production goals and activities.

The structural changes in the agri-food sector have resulted in more cost-effective production and distribution systems, focusing on profit rather than social and environmental issues. Some larger firms in higher positions in the food value chain may not share the smaller firms’ interest in social and environmentally sustainable innovation (Ulvenblad et al., 2016). Even when such sustainable innovation (sometimes in response to consumer pressure) improves a product’s quality, these larger firms may be disinclined to adopt the innovations for use in their production activities, delivery systems, and product portfolios. Many hesitate because they fear greater logistics complexity and higher costs (Kor et al., 2017).

Consequently, activities that focus the consumer, such as refining the products, focusing on sustainability, increasing direct sales, or developing a new business segment, are scarcer than activities focusing increase and efficiency of production (The Agricultural Barometer, 2023). This focus may lead to the sub-optimization of resources (Schulze-Ehlers et al., 2014; Benton and Malone, 2005).

On the individual level, farmers often operate in a tightly constrained and regulated environment, which can act as a significant barrier to entrepreneurial activity. Hence, agricultural entrepreneurship is often viewed as being difficult or even impossible to implement (Martinho, 2020). Many of these farmers focus on adapting to traditional norms and regard themselves as producers and construct their identity to achieve profitability within the boundaries of the accepted ways of operating a farm (Stenholm and Hytti, 2014). They can be categorized as farmers-producers who focus on production efficiency rather than generating value for the end consumer. These farmers do not adopt an entrepreneurial approach and do not develop from producer to entrepreneur (Niska et al., 2012; Vesala and Vesala, 2010). Gittins et al. (2022) have identified one group of farmers as traditionalist farmers, which do not view the farm as a business, rather it is seen as a lifestyle choice. These farmers are often very difficult to engage with and very often they don’t want to take any steps to change the farming business. These situations can be defined as examples of ‘constrained entrepreneurship’ (McElwee and Smith, 2012).
Overall, this situation constitutes a barrier to sustainable business model innovation, since the societal needs of sustainable agriculture and food production are large and growing. Consumer demand is growing for differentiated, safe, high quality, and sustainable products. More food must be produced and distributed at the same time all aspects of sustainability (environmental, social and economic) must considered (Shahmohamadloo et al., 2022; Testa et al., 2022).

This societal challenge is also the base for new possibilities for farmers. The identification and exploitation of opportunities - opportunity recognition - is an important part of entrepreneurship (Salimi, 2021a, 2021b; Hanohov and Baldacchino, 2017). Farmers need to develop from producer to entrepreneur and be more innovative to meet the new challenges and take advantage of the opportunities with the changed consumer demand (Stenholm and Hytti, 2014). The attitudes and underlying visions of the farmers are crucial when transforming the firm towards sustainability (Dagevos and de Lauwere, 2021). If the farmers are able to identify and exploit new opportunities on the market, they can raise profitability by focusing on value creation rather than production efficiency (Lu and Dudensing, 2015).

1.2 Previous research

Most research regarding the agri-sector has been conducted with focus on life science or technology perspectives and with focus on productivity (Viaggi, 2015). Further, research regarding innovation in agriculture has mostly focused innovation systems, local milieus, and public policy on innovation at the level of industries, clusters, or regions, even though innovation generally takes place at the firm level (Bjerke and Johansson, 2022). Hence, there is a need for more research regarding the agri-sector from a business perspective, which focuses on the value-generating aspects, the high end of the value chain and not only production efficiency.

Even though some research focuses on agricultural business development and innovation on the firm level (e.g., Jafari-Sadeghi et al., 2022; McElwee, 2006), the central part of the studies has been focusing the production and efficiency perspectives (Alston and Pardey, 2021; Alston 2018; Viaggi, 2015). This focus has enhanced the picture of the farmer as a producer at the start of the value chain and not as an entrepreneur (Stenholm and Hytti, 2014). Further, Vesala and Vesala (2014) have shown that farmers that identify themselves more as producers than entrepreneurs often do more of the same, e.g., conventional farms. In contrast, farmers that regard themselves as entrepreneurs tend to develop their businesses, e.g., diversified farms (Gittins et al., 2022).

This constitutes a challenge since the agricultural sector is developing to be more competitive and entrepreneurial with a raised focus on environmental issues (Janker et al., 2021), where the farmers should develop into smart business owners capable of competing in the global food market (Stenholm and Hytti, 2014).
1.2.1 Sustainability in the agri-food sector

Research regarding sustainability and sustainable development in general has developed fast over the last 15-20 years (Coad and Pritchard, 2017), and there is growing interest in academic and policy literature (Ozili, 2022). Sustainability and sustainable development have become innovation’s new frontier, and sustainability is a driver of organizational and technological innovations that yield both bottom-line (net-profit) and top-line (total income) returns (Nidumolu et al., 2009). Most businesses are now aware of the importance of sustainability, even though it is a challenge in many aspects. The challenges include not only products, processes and technologies but also human dimensions associated with cognitive, motivational and organizational challenges (Sharma, 2017).

The agri-food sector is central in discussions about sustainable development because of its broad economic, social, and environmental impacts (Testa, 2022). It is also important since the agri-food sector is a large sector representing a significant part of the world economy. However, the agri-food sector is different compared with other industries for several reasons, which has implications for sustainable development in the sector. Food from animals and plants must meet specific (and various) welfare, health and safety requirements. Production, and often distribution, is generally connected to a specific geographic area, where nature and climate have impacts on production (Salavisa and Ferreiro, 2020). Rueda et al. (2017) argue that a particular focus on the agri-food industry and its associated supply chains is motivated by its many unique attributes compared with other industries. These differences include: i) the fragmented and seasonal nature of agricultural production (e.g., processors and retailers must ultimately source from a large number of producers, in many cases smallholders, from a wide diversity of climates), ii) the high levels of market concentration at the food trading node of the supply chain, and iii) the extent to which production processes can influence the quality and safety of the product.

Many businesses in the agri-food sector, often small family-owned businesses with primary production as the dominating part of the business, need new ideas and approaches to become more profitable at the same time as they are exposed to external and internal pressure to become more sustainable (Zaridis et al., 2021). External pressure can be increased competition and pressure from special groups and government regulation-legislation. Internal pressure can come from management, shareholders and employees to build a business on sustainable values. The impact from internal and external actors can enforce the transition towards sustainability, but the effect can also be the opposite. Loss-making investors and credit providers, dissatisfied neighbours and environmental activists, dissatisfied consumers and overacting regulators, who all perceive their actions as sustainable, can force agri-firms into unsustainable strategies (Bernhard et al., 2014).

Research has identified three integrated challenges for sustainable development in the agri-food sector (Cagliano et al., 2016). First, the interdependency between food production and environmental, human and physical resources. Second, the critical role – sustainability and health aspects – of food for humans. Third, the unique characteristics of the food supply chain, with firms of different size and different sustainability focus.
Other research has identified and categorized barriers to the development of sustainability in the agri-food sector; (i) globalization that results in increased agri-food imports and exports, (ii) consumer changes in consumption, resulting in more significant demand for food products, often out of season, that are processed at longer distances, (iii) concentration of the sector has resulted in an ever-increased power imbalance in favour of retailers, (iv) significant changes in delivery patterns with most goods now routed through supermarket regional distribution centres using larger heavy goods vehicles (Stearns, 2020; Hansen, 2019; Fritz and Matopoulos, 2008).

Despite the pressure to raise efficiency and lower costs from strong actors in the food value chain, many agri-food firms strive to conduct sustainable business from social and ecological perspectives and an economic perspective. The conscience of the owners and/or the managers of the agri-firm can be an essential factor in the development of sustainability-oriented innovation (Cagliano et al., 2016.) Walker has identified this as a values-based driver (Walker, 2014, 2012).

Taken together, businesses in the agri-food sector face difficult barriers and complex challenges – but have also unique opportunities to develop sustainable business model innovation that creates value in ways other than low-cost production. However, when agri-firms focus on raised and low-cost production and efficiency, it is hard for the firms to focus on sustainability. Rather, if the agri-firms focus on creating value for end consumers, sustainability can be a value-adding aspect, which raises the incentives for these firms to become sustainable.

Since the research regarding the value-adding aspects of agri-firms is underdeveloped, especially from a sustainability perspective, there is a need for intensified research regarding sustainability as a value-adding aspect.

1.2.2 Sustainable business models and business model innovation

Research shows an increasing interest in business models and business model innovation since the start of the internet-based firms in 1990s (Geissdoerfer et al., 2018). Early empirical research on business models was predominantly conducted in the media, information technology, and biotechnology sectors (Lambert and Davidson, 2013) but has later been conducted in many other fields (e.g., Mignon and Bankel, 2022). Most research on business models and business model innovation has been conducted in the United States, the United Kingdom, and China (Nosratabadi et al., 2019).

Business models can be regarded as descriptions and analytical constructs of how firms create value by exploiting business opportunities (Rosca et al., 2017). The research deals with activities such as supplier selection, value propositions, consumer relationships, and revenue models (Breuer et al., 2018; Zott et al., 2011; Osterwalder and Pigneur, 2010).

For practice, business models and business model innovation are essential for a firm’s competitiveness, renewal, and growth (e.g., Lambert and Davidson, 2012; Johnson, 2010; Teece, 2010; Chesbrough and Rosenbloom, 2002), but barriers have been identified that
complicate and hinder the development of business model innovation. Chesbrough (2007, p. 16) describes the "business model innovation leadership gap" and argues that leaders lack the necessary innovative capability and are disinclined to support it in others.

Many researchers have argued that the business model concept is a productive way to study the creation and use of sustainable innovation and called for more studies (Breuer et al., 2018; Boons and Lüdeke-Freund, 2013; Stubbs and Cocklin, 2008). The sustainable business model is a useful analytical tool for examining how organizations can create environmental, social, and economic value in various settings – from the single firm to the entire value network (Lambert and Davidsson, 2013; Zott et al., 2011).

Bocken et al. (2014) have developed a conceptual framework for sustainable business models based on the three building blocks of business models developed by Richardson: value proposition, value creation and delivery, and value capture (Richardson, 2008; Osterwalder et al., 2005). The framework consists of eight archetypes of sustainable business model innovations: three technological, two social and two organizational. Their categorization of eight business model archetypes provides an approach for linking the theoretical concept of business model innovation to the practical transformation mechanisms emerging for delivering industrial sustainability. Bocken et al. (2014), who declare that they have a theoretical as well as a normative aim, claim that "the archetypes have the potential to embed sustainability into business purpose and processes, increase the ambition of innovations, accelerate their introduction and reduce risks of implementation through providing exemplars from practice. The purpose of this categorization is not only to reduce social and environmental negatives but also to assist in fundamentally reconceiving the business model to deliver sustainability". (p. 54).

The advantages of sustainable business models (Nidumolu et al., 2009; Porter and Kramer, 2011) will eventually make the business models that do not relate to sustainability obsolete (Geissdorfer et al., 2018). Porter and Kramer (2011) discuss the principle of shared value, which involves creating economic value that also creates value for society by addressing its needs and challenges. Almost 15 years ago, Nidumolu et al. (2009) claimed that; “The current economic system has placed enormous pressure on the planet while catering to the needs of only about a quarter of the people on it, but over the next decade twice that number will become consumers and producers. Traditional approaches to business will collapse, and firms will have to develop innovative solutions. That will happen only when executives recognize a simple truth: Sustainability = Innovation”. (p. 12).

However, even though the field of business model research is growing and in a consolidation phase, it contains research gaps and thus offers possibilities for future research, not least regarding sustainable business models (Wirtz et al., 2016). There is a broad consensus among researchers and other actors about the importance of sustainability and sustainable business models, but academic studies on how firms develop to sustainable organizations is still blurred (Ferlito and Faraci, 2023) and the implementing of sustainable business models remain unclear (Lemus-Aguilar et al., 2019).
1.2.3 Shortcomings of sustainable business model research

Research regarding sustainable business models and innovation has mainly been conducted in industries other than the agri-sector (Nosratabadi et al., 2019). Further, innovation studies that focused the agri-food sector often focused limited parts of the world (Aíbar-Guzman, 2022). This neglect implies that there is a potential for further development of research regarding sustainable business model innovation in the agri-sector.

This is important for several reasons. Firstly, it should also be noted that the agri-food sector is different from other industries for several reasons and conceptualizing sustainable business model innovation poses several challenges. In the case of the agri-food sector, it is necessary to take the sector’s specificities into account, namely the strong interdependence of human animal-nature elements, the connection with different territories and geographic aspects, and unique characteristics of the food supply chain (e.g., the very different size and sustainability focus of firms) (Salavisa and Ferreiro, 2020; Caglio et al., 2016). These conditions ought to be considered when conducting studies in the agri-sector.

Secondly, the research on business models for sustainability, in general, is recent and fragmented (Lüdeke-Freund and Dembek, 2017). Preghenella and Battistella (2021) conclude that there is a lack of both clarity and an academic shared vision on the business model for the sustainability construct itself. They suggest that more conceptual development is needed to merge and adapt the dimensions, elements and characteristics of sustainable business models.

This is especially valid for the agri-sector since research studying the agri-sector has not focused on sustainable business models. Empirical studies of business models in the agri-sector have often been conducted in developing countries rather than developed countries (Masenya, 2023; Beuchelt and Zeller, 2013). A recent systematic literature review (Donner and de Vries, 2023) shows that only one review on sustainable business models in the agri-food sector has been conducted, which focuses on the internal business model innovation in the agri-firm. The study is one of the papers in this thesis, paper II (Barth, Ulvenblad and Ulvenblad, 2017). Hence, there is a need to systematize research within the field to accumulate and further develop the research knowledge regarding business models in the agri-firms.

Thirdly, research has often treated innovation and sustainability dichotomously - sustainable or not sustainable. This perspective has been criticized by Adams et al. (2016), who argue that firms strive towards sustainability, but it is very hard to be fully sustainable. Adams et al. (2016) have developed a model comprising three steps of sustainability-oriented innovation (SOI); (i) operational optimization: doing more with less, (ii) organizational transformation: doing good by doing new things and (iii) systems building: doing good by doing new things with others. In line with this reasoning of Adams et al. (2016) there is a need to regard sustainability as a strive towards a goal rather than a state of being fully sustainable.

Fourthly and finally, research regarding both business models in general and sustainable business models in particular are often applied in a normative way without inclusion of the actor. Geissdoerfer et al. (2018) state that their sustainable business model innovation framework could guide firms through their innovation process by mapping activities,
challenges and tools. Another example, one of many, is the following: “the proposed framework can serve as a guideline for a reorganization that aspires to increase the level of sustainability within an organization. It can help managers and consultants: (1) to experiment, orient, test and implement the business model transformation and the consequent organizational change and (2) to analyze and correct transformation processes that have already started. Moreover, the study provides an essential feature of the sustainable innovation process, which is helpful for practitioners: they can initially analyze the identified elements in a sequence and then follow an iterative process that assumes continuous questioning of the business model until it achieves complete coherence between all parties” (Ferlito and Faraci, 2022, p. 233).

It implies that one critical element is missing in the business model constructs: the actor, (the decision maker, the owner, the manager, the entrepreneur or the farmer). For example, de Lauwere et al. (2022) have shown that attitude, intrinsic and extrinsic motivation, injunctive norms, behavioural beliefs and perceived risk and uncertainty, and subjective knowledge are critical behavioural factors that influence farmers’ decision-making when developing a sustainable business. Cagliano et al. (2016) found that the owner’s or manager’s conscience is an important factor when improving the degree of sustainability in a business. Walker (2014, 2012) defines it as values-based drivers for sustainability. My previous research regarding entrepreneurial finance, focused on bank finance of SMEs, has shown that the individual, the entrepreneur, is very important and has to be focused and assessed in conjunction with the business plan, or business model (Svensson and Ulvenblad, 2019/2000). A well-spread saying among bank officers is: “a true entrepreneur can make gold out of a bad project while a bad entrepreneur can ruin a good project” (Ulvenblad and Ulvenblad, 2012, p. 15). Hence, it is hard to fully understand a firm’s business model without understanding the “will and skill” of the entrepreneur (Mattsson, 2009).

To conclude, the argumentation above suggests a need for deepened empirical and theoretical understanding regarding the development of sustainable business models, where the actor behind the sustainable business model is included. The need is especially valid for the agri-sector since it is an industry at the center of sustainability transitions. The agri-industry has the potential to meet many societal challenges but also has many own obstacles to overcome. Few research studies on agri-firms have been conducted with a focus on sustainable business models. Instead, most studies have been undertaken from efficiency and productivity perspectives where agri-firms are regarded as production units and not value-creating business entities. Consequently, there is a need for more research and further developed theories regarding sustainable business model innovation within the agri-sector.

It can be argued that the agri-sector has the potential to be a frontrunner in the development of sustainable business models, since the agri-sector is depending on natural resources, such as land, air and water. These natural resources must be kept in good shape or even improved in order to develop the business over time, since the business cannot easily move to another place. If research can develop knowledge and understanding of sustainable business model innovation in the agri-sector, other branches of industry will benefit as well – and knowledge regarding sustainable business model innovation is important for all branches of industry since “the global sustainability challenges and requirements present unique, new business opportunities, but at
the same time, they also challenge the existing structures of firms and the way value is created, captured and measured in businesses today” (Agaard, 2019, p. 361).

1.3 The purpose and research questions

The agricultural sector, and the agri-firms, are facing complex and conflicting challenges. The sector must produce and distribute more food in order to feed a growing world population. Simultaneously, the sector must become more sustainable, from environmental as well as social and economic perspectives, if the societal challenges shall be met and the sustainable development goals (SDG:s) reached.

The situation is complicated by the current status of the agri-sector, where many firms, as primary producers, are positioned in the beginning of the value chain and struggling with low profitability. If the firm has a production perspective, it often aims for economics of scale and to produce more in an effective way. However, if the perceived competitive advantage of the agri-firm is low production costs it will be difficult to meet social and environmental requirements of sustainability. From a position as primary producer in the start of the value chain, the agri-firm will only be able to capture a small portion of the aggregated value in the value chain. Hence, it will also be hard for the agri-firm to reach the economic goals.

A shift from an efficiency and production perspective to a sustainable business perspective is needed to meet the challenges of society, as well as the financial needs of the individual agri-firms. To facilitate and strengthen this shift from agri-producer to agri-entrepreneur more knowledge regarding the development of sustainable businesses and sustainable business model innovation is needed.

However, and as shown above, research has not prioritized theorizing regarding sustainable business model innovation in the agri-sector. This is a theoretical problem since the agri-sector has distinguishing characteristics in comparison with other industrial sectors. Some of the characteristics of the agri-sector is the close connection to a place, the dealing with living animals and plants, the importance of nutrition and health aspects. Many agri-firms are owned by the same family for several generations. Further, the firms in general of the agri-sector are struggling with low profitability at the same time as they face societal, and consumer demands regarding raised sustainable food production.

Previous research has regarded the agri-firm as a producer in the start of the value chain and mostly studied productivity and efficiency aspects. Research has neglected to regard the agri-firm from a sustainable business model innovation perspective. Hence, the situation, where the agri-firm is regarded as not only a producer, striving for economics of scale, but a business entity, striving for economics of scope through diversification and with a potential to move upstream in the value chain, is not well understood. The questions that remain to be solved is why and how agri-firms develop sustainable business model innovation encompassing combined financial, social and environmental goals.

The neglect of theoretical research regarding sustainable business model innovation in the agri-sector is partly depending on the limited empirical research regarding this phenomenon.
Sustainable business model innovation in the agri-sector has not been closely studied, which constitutes an empirical problem. Against this background, the overall purpose of the thesis is to contribute to theorizing regarding the application and use of sustainable business model innovation in agri-firms.

To fulfil the overall purpose, two research questions have been created. Since the previous research regarding business models and business model innovation in the agri-sector is scarce, as well as recent and fragmented, there is a need to systematize research within the field. Then it will be possible to accumulate and further develop the research knowledge regarding business model innovation in the agri-sector. This leads to the first research question: What is the state-of-art research on sustainable business model innovation in the agri-sector? Systematic literature reviews have been conducted to answer this research question regarding business models and business model innovation in the agri-food sector.

Previous research has neglected empirical studies of business model innovation in the agri-sector. This thesis strives to contribute to change and empirical studies of business model innovation in the agri-sector will be conducted. This leads to the second research question: How do agri-firms apply sustainable business model innovation practices? This research question will be answered based on qualitative and quantitative empirical research.

1.4 Contributions

As shown above, the needs of sustainable development in society are imminent and large. If a sustainable society shall be developed, the agricultural sector must become sustainable, which means that enough food to feed the world population must be produced – and it must be produced with social, environmental, and economic considerations. There is a risk that the agricultural sector has a negative impact on social and environmental issues, but the sector also has the potential to contribute to social and environmental sustainability. However, in order for agri-firms to be sustainable socially and environmentally, they also have to be financially sound, e.g., economically sustainable. The research presented in this thesis is intended to contribute to the development of sustainable agriculture in all three dimensions.

The research will contribute to the empirical field since few studies of agri-firms have been conducted form a business model perspective. As shown above, research regarding agri-firms have mainly been conducted from technological or life science perspective. Studies conducted from a business perspective have in general focused productivity and efficiency in order to lower costs. Few studies have focused value-adding aspects that raise the consumer value such as reduced or positive climate impact, animal health/welfare, healthier food etc. The research presented here, using both qualitative and quantitative methods, will uncover the development of sustainable business model innovation in the agricultural sector.

The research presented in this thesis will also contribute to theory development regarding sustainable business model innovation in the agri-sector. This is important since previous research regarding sustainable business model and innovation has almost neglected the agri-
sector. By including the actor, the agri-entrepreneur, behind the sustainable business model innovation in the research, it will contribute to a deeper theoretical understanding of sustainable business model innovation in the agri-sector. The research presented here will have analytical generalization implications for research and theory development regarding sustainable business model innovation in other industry sectors as well.

The research also strives to contribute to practice in the agri-sector since focus in the agri-sector historically has been on production and efficiency. There are significant and urgent needs in the agri-sector for sustainable business model innovation and the sector will benefit from research conducted with a business perspective and with a focus on value creation.

Other industry sectors are also facing growing global competition and raised societal demands regarding all aspects of sustainability. The agri-sector is dependent on land and natural resources and the agri-entrepreneurs know that they must preserve, even develop, resources like soil, water and air if they should be able to keep up their business. This perspective has become important in other industries as well, due to the growing societal challenges. Hence, the research presented here can also contribute to practice in other industry sectors.

1.5 Central concepts

Innovation: In this thesis, the concept of innovation is used according to Schumpeter’s (1934, 1942) definition. He regards innovation from a broad perspective, as a product, a process and as organizational change. The innovation does not have to be based on a new scientific discovery. Instead, it could also combine existing solutions in a new context. Schumpeter identified different types of innovation: the introduction of new products, new methods of production, opening of new markets, development of new sources of supply for raw materials or other inputs and also the creation of new market structures in an industry.

Sustainability: The Brundtland Report defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987, p. 41). Sustainability is based on three fundamental pillars: social, economic and environmental. The thesis will use this definition of sustainability in line with research within the field (e.g., Broccardo and Zicari, 2020).

Business model: Business models are regarded as representations of how businesses create economic value for a firm through the creation of value for its consumers (Lüdeke-Freund et al., 2019). The creation of value is central in a business model, and it has traditionally been divided into three main building blocks; value proposition, value creation and delivery and value capture (Richardson, 2008). In this thesis, a fourth building block will be developed; value intention.

Business model innovation: Business model innovation is defined as the conscious change of an existing business model or the creation of a new business model that improves its functions and satisfies consumer needs better than the current business models (Edwards-Schachter, 2018). It is a set of deliberate acts that managers and entrepreneurs perform over time to change
the business model components and architecture in a consistent and innovative way (Foss and Saebi, 2017).

*Sustainable business models and sustainable business model innovation:* Sustainable business models and sustainable business model innovation considers social and environmental values in combination with the economic goals (Brundtland, 1987) in all building blocks; value proposition, value creation and delivery and value capture (Richardson, 2008).

1.6 Outline of the thesis

In this first chapter, an introduction to the research of this thesis is provided. The focus of the thesis has been identified; sustainable business model innovation in agri-firms. Previous research, as well as the shortcomings of prior research, have been presented and briefly discussed. This discussion leads to the research gap, overall purpose, and research questions. Further, central concepts of the thesis are high-lighted and defined.

In chapter 2, the literature review and theoretical framework are presented. The framework is built on theories connected to Innovation studies and to research regarding sustainability, with a focus on sustainability in the agri-sector. It is mainly built on research regarding (i) the three building blocks of business models developed by Richardson (2008) based on previous research (e.g., Chesbrough and Rosenbloom, 2002; Dubosson-Torbay et al., 2002), (ii) sustainable business models and business model innovation archetypes in line with Bocken et al. (2014), and (iii) sustainability-oriented innovation (SOI) as defined by Adams et al. (2016).

Following in chapter 3, my background is presented. My previous experiences are also presented and discussed, together with my ontological and epistemological views. The research of this thesis is influenced by pragmatism, where the studied problem area has been in focus. The context of the research, the research design and the research methods are presented and discussed. In order to understand and generate knowledge regarding sustainable business model innovation in agri-firms, different mixed methods assessed suitable for the focus of the study have been used. The research process started with systematic literature reviews, followed by the conceptual development of a theoretical framework regarding sustainable business model innovation in agri-firms. Following, qualitative semi-structured interviews with agri-entrepreneurs were conducted. A smaller quantitative survey was also carried out. After that, a large quantitative telephone survey of agri-firms was conducted. Further, eight qualitative cases are presented based on interviews, financial reports and documentation in different media. Finally, trustworthiness and generalization possibilities but also limitations and potential weaknesses are discussed.

In chapter 4, summaries of the five papers in the thesis are presented. The first paper focuses on previous research regarding sustainable business model innovation in agri-sector and the empirical data is based on a broad systematic literature review. The second paper is a conceptual paper, where the first steps towards a conceptual framework regarding sustainable business
model innovation in the agri-sector are taken. The conceptual development is based on a more focused systematic literature review regarding sustainable business model innovation. The third paper focuses barriers and challenges regarding agri-business development and compares two government-sponsored educational programs for agricultural entrepreneurs, a leadership program and a lean program. The paper is based on qualitative semi-structured interviews with, and a quantitative survey sent to, agricultural entrepreneurs. The fourth paper is based on a quantitative telephone survey of the entire population of agri-firms in Sweden with a turnover of 1,000,000 SEK (approx. 100,000 Euro) or more. The aim was to map and develop an understanding of different categories of sustainable business model innovation in the agri-food industry; technological, social and organizational. The fifth and last paper is qualitative and contains eight narratives of agri-firms that have developed sustainable business model innovation in different ways. It is built on a combined theoretical framework based on the three building blocks of business models (Richardson, 2008), eight business model archetypes (Bocken et al., 2014) and on sustainability-oriented innovation (Adams et al., 2016) Further, author statements regarding the papers in the thesis are presented. Finally, the contributions of the papers to the thesis are presented and discussed.

Chapter 5 presents a discussion regarding the main findings of the research. Firstly, the findings of previous research is discussed, followed by the empirical findings and contributions. After mapping sustainable business models of agricultural firms, the importance of the agri-entrepreneur when developing sustainable business models is identified. The theoretical contributions are presented. Research regarding the building blocks of business models, the sustainable business model archetypes, sustainability-oriented innovation and stewardship theory have been integrated into a common framework. The conceptual development in the thesis identifies ‘value intention’, a fourth building block in the development of sustainable business model innovation in the agri-food industry and other industries. The conceptual development also adds sustainability to the other three business model building blocks. ‘Stewardship’ is identified and recognized as an explaining factor and critical driver for the value intention of sustainable business models. Further, a dichotomization farmer-producer – farmer-entrepreneur is elaborated upon.

In the concluding chapter 6 the conclusions and implications are presented and discussed. The gaps in previous research are discussed, followed by the empirical and theoretical conclusions. Implications for practice and different stakeholders, such as agri-entrepreneurs, advisory organisations and policy makers are formulated, followed by theoretical implications and suggestions for future research. The chapter, and thesis, ends with the concluding remarks. They highlight the need for other industries to adopt a stewardship perspective as well. Considering the current societal challenges, planet Earth is the farm that we all have to take care of.
2. Literature review and theoretical framework

In this chapter, the theoretical framework of the thesis will be presented. The chapter starts with a brief conceptualization of innovation and a presentation of innovation studies as a research field. Following is a section discussing sustainability and innovation. Thereafter, the two next sections focus on sustainable business models and sustainable business model innovation. A significant part of the theoretical framework of this thesis builds on the three building blocks of business models developed by Richardson (2008), sustainable business model archetypes developed by Bocken et al. (2014), and the sustainability-oriented (SOI) framework developed by Adams et al. (2016). Sustainability and sustainable business models in the agri-sector are discussed. The chapter ends with some reflections regarding previous research.

2.1 Innovation

The concept of innovation has been discussed and defined by several authors. Schumpeter (1942, 1934) regards innovation from a broad perspective - as a product, a process and as organizational change. The innovation does not have to be based on a new scientific discovery. Instead, it could combine existing solutions in a new context. Many researchers have built upon his definition (e.g., Edwards-Schachter, 2018; Drucker and Mazariello, 2014; Fagerberg et al., 2005). In this thesis, the concept of innovation will be used according to Schumpeter’s definition. Schumpeter identified five types of innovation:

- The introduction of new products
- The introduction of new methods of production
- The opening of new markets
- The development of new sources of supply for raw materials or other inputs
- The creation of new market structures in an industry

Innovation is closely connected to entrepreneurship. In his early research, Schumpeter (1912) identified the entrepreneur as the driver of innovations. He highlighted that entrepreneurship is both a unique factor of production and the rare social input that makes the economy evolve (Śledzik, 2013). Drucker (in Drucker and Mazariello, 2014) built on Schumpeter’s notion and regarded innovation as the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service.

Later research has included societal needs in the definition of innovation. Free enterprises should be good not only for businesses but also society. The starting and running of a business must be done from a humanistic perspective (Drucker and Mazariello, 2014). Management must practice social justice as it simultaneously runs the business and uses its innovation ability to turn social problems into wealth-creating opportunities (Kiessling and Richey, 2004). Edwards-Schachter (2018) regards it as a complex socio-cultural process involving diverse actors and sources of knowledge. She writes, “innovation is not only about improving and sustaining the
competitive advantage of firms and organizations but also about addressing the major social challenges of the 21st century. In doing so, the nature of innovation is evolving from innovation for economic productivity to innovation for sustainability, from risky innovation to socially responsible innovation” (p. 76).

2.2 Innovation studies

Innovation studies are often defined as the scholarly study of how innovation takes place, and of the critical explanatory factors and economic and social consequences (Fagerberg et al., 2013). The research field builds on Schumpeter’s definition of innovation, shown above. In his later works, Schumpeter (1942) focused more on innovation as such and less on the individual entrepreneur. Two lasting contributions of Schumpeter’s research, which have contributed to the research field of Innovation studies, are the well-established definition of innovation and the observation of the entrepreneurial economic function in society, which complements the capitalist and managerial functions (Callegari and Nybakk, 2022).

Even though the Innovation studies field has developed over time and the number of publications in scientific journals has grown fast (Fagerberg and Verspagen, 2009), research has criticized Innovation studies from different perspectives. One criticism is that Innovation studies have shown a relative lack of attention to changing patterns in traditional sectors and to a “high-tech bias” in innovation studies. It is argued that the reason for this is the fast development of radically new technologies like microchips, software, bioengineering, and nanotechnology, which has led to an emphasis on innovation research on the importance of ICTs, pharmaceuticals, and other high-tech industries (Lundvall et al., 2005).

Another strand of criticism is that Innovation studies have not been able to keep pace with the fast-changing world, not least regarding the growing need for sustainability (Martin, 2016); “the focus of our empirical studies has not always kept pace with a fast-changing world, in particular the shift from manufacturing to services and the growing need for sustainability and enhanced wellbeing rather than just economic growth. Indeed, the very way we conceptualize, define, operationalize and analyze ‘innovation’ may be too rooted in the past, leaving us unable to grapple with other, less visible or ‘dark’ forms of innovation, whether in the area of services or in organizational or other non-technological forms” (p. 28).

The research of the thesis will contribute to Innovation sciences in different ways. Research regarding business models has developed to be an essential part of Innovation sciences. Still, it is rarely empirically applied to the agri-sector, which is not a traditional high-tech sector. Further, the research presented also contributes to meeting Martin's (2016) request above for more studies of sustainable innovations regarding organizational or other non-technological aspects. It will also contribute by theorizing regarding sustainable business models and innovation, not least regarding the building blocks of sustainable business models.

In addition, the research will also contribute by emphasizing the importance of the actor, the entrepreneur, when studying development of sustainable business model innovation, which is in line with the perspectives of the early Schumpeter (1912) and Drucker (Drucker and
Mazariello, 2014), who both emphasized the importance of the entrepreneur for the development of innovations.

2.3 Sustainability and innovation

The societal interest in social and environmental sustainability was growing during the 1980s. A starting point was the report “World Conservation Strategy” published in 1980 by the International Union for Conservation of Nature (World Wildlife Fund, 1980).

The development got momentum, and in 1987 The UN’s World Commission for Environment and Development published the report “Our Common Future” (Brundtland, 1987). The Commission was chaired by former Norwegian Prime Minister Gro Harlem Brundtland, and the report is commonly known as “the Brundtland Report”. Influenced by the report “World Conservation Strategy” from 1980, the Brundtland Report called for sustainable development and defined it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987, p. 41). The thesis will use this definition of sustainability in line with research within the field (e.g., Broccardo and Zicari, 2020).

Around the turn of the millennium, sustainability became innovation’s new frontier and “sustainability is a mother lode of organizational and technological innovations that yield both bottom-line and top-line returns” (Nidumolu et al., 2009, p.1). This development escalated during the following decades. Since then, the young discipline has grown and developed in size and scope (Coad and Pritchard, 2017).

Most businesses are now aware of the importance of sustainability, even though it is still a challenge in many aspects. The challenges include not only products, processes, technologies and business models, but also the more abstract dimensions like; cognitive, psychological and organizational challenges (Sharma, 2017). Many researchers argue that more leadership is needed around the issue of social and environmental sustainability (e.g., Kurucz et al., 2017).

Several studies have focused on the effects of innovation on sustainability. Sustainable innovations have been regarded as the development of something new, which could focus on technological changes but also on operational procedures, business processes, systems, and models that can develop economic, social, and environmental aspects of sustainability (Vasist and Krishnan, 2023; Kneipp et al., 2019). Research has identified innovation as an essential enabler for sustainability (Nidumolu et al., 2009). Kuzma et al. (2020) have conducted an extensive literature review of published papers on innovation and sustainability to analyse the effects of innovation on the performance of organizational sustainability and the environmental, economic and social dimensions. They conclude that innovation positively impacts all three dimensions of sustainability (Kuzma et al., 2020).
Despite previous research, the link between innovation and sustainability is not well-developed. In the existing literature, there is a lot of uncertainty regarding what sustainability means and how it can be achieved (Neutzling et al., 2018). Further, there is a limited number of empirical studies regarding sustainability as a driver for innovation (Broccardo and Zicari, 2020; Geissdoerfer et al., 2018).

To conclude, there is a need for more and deeper research studies, empirical as well as theoretical, in order to uncover and understand the connection between sustainability and innovation.

2.4 Business models and business model innovation

Since the mid-1990s, theoretical and empirical research on business models has steadily increased (Geissdoerfer et al., 2018; Osterwalder and Pigneur, 2010; Osterwalder et al., 2005). Most of this research addresses the importance of business models for firms’ competitiveness, renewal, and growth (Massa et al., 2017; Lambert and Davidson, 2013; Johnson, 2010; Teece, 2010; Chesbrough and Rosenbloom, 2002).

Researchers have also used a variety of business model definitions and settings (Zott et al., 2011; Johnson, 2010; Osterwalder and Pigneur, 2010). The importance of competitiveness, development, and growth in business models is a central issue in all this research (Lambert and Davidson, 2013; Johnson, 2010; Teece, 2010; Chesbrough and Rosenbloom, 2002). Various researchers have noted that firms may follow multiple business models (e.g., Aspara et al., 2013; Casadesus-Masanell and Tarzijan, 2012). For example, firms may focus different consumer segments, compete in different markets, or produce/sell various products.

On a general level, a business model is a description of an organization and how that organization functions in achieving its goals (e.g., profitability, growth, social impact) (Massa et al., 2017). Business models are regarded as representations of how businesses create economic value for a firm through the creation of value for its consumers (Lüdeke-Freund et al., 2018).

The creation of value is central in a business model, and it can be divided into three main building blocks; ‘value proposition, value creation and delivery and value capture’, (figure 2.1). The value-focused building blocks were developed by Richardson (2008) who suggested that his business model framework could be used as a normative tool for strategy execution, since the building blocks “reflect the logic of strategic thinking of value. The essence of strategy is to create superior value for consumers and capture a greater amount of that value than competitors.” (p. 138).

Value proposition is typically concerned with the product and service offering to generate an economic return (Boons and Lüdeke-Freund, 2013; Richardson, 2008). Value creation and delivery is at the center of any business model; how the firm use resources and capabilities to
create value and deliver that value to its consumers based on the firm’s position in the value network (suppliers, partners and consumers, etc.) (Beltramello et al., 2013; Teece, 2010; Richardson 2008). Value capture is about how to earn revenues (i.e., capture value) from the provision of goods, services or information to users and consumers (Teece, 2010; Richardson, 2008). See figure 2.1.

<table>
<thead>
<tr>
<th>Value proposition</th>
<th>Value creation and delivery</th>
<th>Value capture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/service, consumer segments and relationships</td>
<td>Key activities, resources, channels, partners, technology</td>
<td>Cost structure and revenue streams</td>
</tr>
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Figure 2.1 Conceptual business model framework (Richardson, 2008; Bocken et al., 2014; Osterwalder et al., 2005).

The three building blocks have been a starting-point for many other researchers conducting business model studies (e.g., Lüdeke-Freund et al., 2018; Geissdoerfer et al., 2018; Yip et al., 2018; Bocken et al., 2014; Osterwalder and Pigneur, 2010). This definition developed by Richardson (2008), regarding a business model from a value perspective and consisting of the three building blocks; value proposition, value creation and delivery, and value capture will also be used and elaborated upon in this thesis.

Business model innovation has received substantial attention in literature and industry, and it is increasingly suggested that business model innovation is a key to business success (Zott et al., 2011; Chesbrough, 2010; Lüdeke-Freund, 2010). Business model innovation can be defined as the conscious change of an existing business model or the creation of a new business model that improves its functions and satisfies consumer needs better than the current business models (Edwards-Schachter, 2018).

The innovation of a business model can take the form of creating a new business model or diversifying, acquiring, or transforming an existing business model (Pieroni et al., 2019; Geissdoerfer et al., 2018). Foss and Saebi (2017) regard business model innovation as a set of deliberate acts that managers and entrepreneurs perform over time to change the business model components and architecture in a consistent and innovative way. It is about innovating the value creation, value delivery, and value capture mechanisms of firms’ business models to make consumers willing to pay for the generated value (Bocken and Geradts, 2020; Baden-Fuller and Morgan, 2010; Teece, 2010). The ultimate goal is to gain a strategic advantage (Amit and Zott, 2015).
Business model innovation research can be divided into four streams (Foss and Saebi, 2017). The first one is the conceptualizing of business model innovation. It focuses on the phenomenon and contributes with definitions and conceptualisations (e.g., Amit and Zott, 2012; Teece, 2010). The second stream regards business model innovation as an organizational change process. This stream focuses on the required capabilities, leadership, and learning mechanisms when developing business model innovation (e.g., Frankenberger et al., 2013; Achtenhagen et al., 2013). The third stream regards business model innovation as an outcome and often focuses on a specific industry (e.g., Karimi and Walter, 2016; Richter, 2013). The final, fourth stream focuses on the organizational performance or innovation implications of business model innovation (Zott and Amit, 2008; Wei et al., 2014).

However, Foss and Saebi (2017) find that the four streams hardly contribute to knowledge accumulation since the streams do not support each other. Consequently, the researchers conclude that business model innovation research suffers from conceptual ambiguity. Andreini et al. (2022) share this view and state that the meaning of business model innovation process varies across studies and the nature of the construct is still fragmented and ambiguous.

2.5 Sustainable business models and sustainable business model innovation

The development of sustainable firms can be regarded as a business model challenge (Rohrbeck et al., 2013). Research is showing a growing interest in business models, sustainability and innovation and have proposed sustainable business models as alternatives to the traditional business model, focusing on maximising growth and revenues and minimising costs (Breuer et al., 2018). Sustainable business models do not solely focus on delivering economic revenue to owners but also consider other forms of value for a broader range of stakeholders. The value proposition of a sustainable business model provides measurable ecological and/or social value in concert with economic value (Boons and Lüdeke-Freund, 2013). Schaltegger et al., (2016) state that: “The business model perspective is particularly interesting in the context of sustainability because it highlights the value creation logic of an organization and its effects and potentially allows (and calls) for new governance forms such as cooperatives, public-private partnerships, or social businesses, thus helping transcend narrow for-profit and profit-maximizing models (p. 5). A narrow focus on profitability without more attention paid to social and environmental sustainability can also limit a firm’s achievement of its economic goals (Schaltegger et al., 2016; Kiron et al., 2013).

Early research on sustainable business models was conducted by Stubbs and Cooklin (2008), who developed a set of propositions regarding the development of a sustainable business model, which (i) draws on economic, environmental and social aspects of sustainability in defining an organization’s purpose, (ii) uses a triple bottom line approach to measuring performance, (iii) considers the needs of all stakeholders rather than giving priority to shareholders’ expectations, (iv) treats nature as a stakeholder and promotes environmental stewardship, and, v) encompasses the systems perspective as well as the firm-level perspective. Their analysis shows
that organizations adopting a sustainable business model must develop internal structural and cultural capabilities to achieve firm-level sustainability. Stubbs and Cocklin (2008) argued that sustainability leaders must drive the cultural and structural changes necessary to implement sustainability.

Boons and Lüdeke-Freund (2013) found that research on sustainable innovation was hampered by a lack of conceptual consensus. They suggested the following four elements of a generic business model concept: (i) value proposition: what value is embedded in the product/service offered by the firm, (ii) supply chain: how upstream relationships with suppliers are structured and managed, (iii) consumer interface: how downstream relationships with consumers are structured and managed, and (iv) financial model: costs and benefits from the first three elements and their distribution across business model stakeholders. When combined with a social and environmental sustainability perspective, these four business model elements describe the sustainable business model. The value proposition of a sustainable business model provides measurable ecological and/or social value in concert with economic value. Organizations committed to sustainability integrate their social, environmental, and economic activities to create value for their consumers and society (Boons and Lüdeke-Freund, 2013).

Many definitions of sustainable business models regard them as a modification of the conventional business model concept, with certain characteristics and goals added to it; and they either i) incorporate concepts, principles, or goals that aim at sustainability; or ii) integrate sustainability into their value proposition, value creation and delivery activities, and/or value capture mechanisms (Geissdoerfer, 2018). One example of an often-used definition of a business model for sustainability is developed by Schaltegger et al. (2016) who build their model on the business model building blocks developed by Richardson (2008). Schaltegger et al. (2016) state that “A business model for sustainability helps describing, analyzing, managing, and communicating (i) a firm’s sustainable value proposition to its consumers, and all other stakeholders, (ii) how it creates and delivers this value, (iii) and how it captures economic value while maintaining or regenerating natural, social, and economic capital beyond its organizational boundaries” (p. 6). Alternative models are sustainable business models based on the network approach (Boons and Lüdeke-Freund, 2013; Breuer et al., 2018; Lawson et al., 2008), the value-net approach (Kähkönen, 2012) and the business model canvas (Osterwalder and Pigneur, 2012). The business model canvas is a frequently used framework, which has been developed for firms to envision and implement sustainable business models in practice (Upward and Jones, 2016).

Collaboration between firms and other key stakeholders is becoming more critical with the growing global sustainability challenges (UN, 2015; Lowitt, 2013). Value is no longer created by firms acting autonomously but by working together with parties external to the firm through informal arrangements or formal alliances (Beattie and Smith, 2013). The firm collaborates with key stakeholders to achieve sustainability for the system that an organization is a part of (Stubbs and Cocklin, 2008). The sustainable business model may be viewed as a new unit of analysis in business, which takes into account these collaborative ties (Zott et al., 2011; Beattie
and Smith, 2013). It creates a competitive advantage through superior consumer value while contributing to the firm's and society's sustainable development (Lüdeke-Freund, 2010).

A business model perspective can be expected to contribute to sustainable business model innovation if used as a holistic and systemic concept by opening up new approaches to overcoming internal and external barriers (Aagaard, 2019; Baden-Fuller and Morgan, 2010). Sustainable business model innovation has been defined as innovation to create significant positive impacts and significantly reduced negative impacts for the environment and society through changes in the way the organization and its value network create, deliver and capture value or change their value propositions (Bocken and Geradts, 2020; Bocken et al., 2014). Because of the increased focus on social and environmental sustainability, firms worldwide have taken a greater interest in sequential business model innovation in which they refine an existing business model towards sustainability or launch a new one. One of the tools promoted for this work is the strongly sustainable business model canvas (Jones and Upward, 2014; Upward and Jones, 2016).

However, Pan et al. (2023) have shown that research on sustainable business model innovation started to develop much later than research on traditional business model innovation (without consideration of sustainability) and found it is still unexplored. Research has focused on drivers of sustainable business model innovation (Arcese et al., 2020). Business models, dynamic capabilities and organization design are regarded as interlinked (Bocken and Geradts, 2020; Fjelstad and Snow, 2018), and an expanded theoretical model for organization design should include management philosophy. The owners' and/or shareholders' vision has been proposed as a driver for sustainability (Bocken et al., 2019; Kraaijenhagen et al., 2016). This vision can be externally observed if communicated as a value proposition regarding sustainability (Dyck and Silvestre, 2018; Manninen et al., 2018).

Sustainable business model innovation is still a subfield to business models, but this will change over time (Shakell et al., 2020). Organizations are currently incorporating sustainability agenda into its practice not only for the sake of the environment and social issues but also for its economic reasons (Shakell et al., 2020). The growing importance of sustainability and the development of sustainable business model innovation research will undermine the concepts of business models and business model innovation. This is in line with Geissdoerfer et al. (2018) who argue that the societal needs and opportunities will make the concept of non-sustainable business models obsolete and sustainable business models will eventually supersede the notion of business models, analogue to competitive advantage and sustainable competitive advantage.

However, many researchers call for more studies on sustainable business models and innovation in order to develop integrative theories (Breuer et al., 2018; Boons and Lüdeke-Freund, 2013; Boons et al., 2013; Stubbs and Cocklin, 2008; Upward and Jones, 2016). Schaltegger et al. (2016) ask for research on different levels; the organizational level (e.g., dynamic capabilities, ambidextrous organization and disruptive innovation), the individual level (e.g., responsible leadership and entrepreneurship) or both levels (e.g., structuration theory, organizational learning, organizational change, and organizational culture). They also call for research on how
business models for sustainability coevolve, leading to industry transformations, both via market interaction alone or through system transitions. Further, they ask which management instruments enable the management of or transition to business models for sustainability (Schaltegger et al., 2016).

Research has been criticized for not providing a sufficiently holistic picture of business and interdependent relationships with the external environment (Biloslavo et al., 2018). The researchers suggest that future research ought to study how the language within the business model frameworks shapes management decisions how it may prevent holistic understanding of the business environment. Pan et al. (2023) suggest that future research should pay more attention to internal factors, including strategic drivers, sustainability-oriented leadership, and cognitions of social responsibility.

2.6 Sustainable business model archetypes

The research framework in this thesis is partly based on the eight sustainable business model archetypes. These original eight sustainable business model archetypes were developed based on the manufacturing industry (Bocken et al., 2014). In following research, Yip and Bocken (2018) conducted a study regarding business models for sustainability in the banking sector. In the latter study, the business model archetypes were revised and adapted to the banking industry since it is a service industry different from manufacturing.

The agricultural sector, which is the focus of this thesis, has several common denominators with the manufacturing industry. Both sectors focus on products, not services, and have developed into increasingly high-tech, machine-intensive operations with high levels of productivity but relatively few workers (Walden, 2014). Hence, in this thesis the original eight archetypes of Bocken et al. (2014) will be used, and not the latter version adapted to the banking industry by Yip and Bocken (2018).

Bocken et al. (2014) build their archetypes on the three value-focusing building blocks of a business model (Richardson, 2008) and of the nine business model parts of the business model canvas (Osterwalder and Pigneur; 2012), which also Boons and Lüdeke-Freund (2013) reference. Building on this tool for analysing business models, Bocken et al. (2014) add sustainable social and environmental activities.

Table 2.1 presents the eight sustainable business model archetypes (Bocken et al., 2014). These archetypes help identify patterns and attributes that facilitate the categorization of the business model innovations for social and environmental sustainability and, as they explain, for “developing a common language that can be used to accelerate the development of sustainable business models in research and practice” (p. 42).
Table 2.1. Eight sustainable business models archetypes (Bocken et al., 2014)

<table>
<thead>
<tr>
<th>Sustainable Business Model Archetypes</th>
<th>Description and Operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maximise material and energy efficiency</td>
<td>Do more with fewer resources, generating less waste, fewer emissions, and fewer pollutants.</td>
</tr>
<tr>
<td>2. Create value from waste</td>
<td>Eliminate “waste” by turning waste into useful and valuable input in other production activities, making better use of under-utilized capacity.</td>
</tr>
<tr>
<td>3. Substitute with renewables and natural processes</td>
<td>Reduce the environmental impact and increase business resilience by addressing resource constraints associated with renewable resources and man-made artificial production systems.</td>
</tr>
<tr>
<td>4. Deliver functionality rather than ownership</td>
<td>Provide services that satisfy the users’ needs without owning the physical products.</td>
</tr>
<tr>
<td>5. Adopt a stewardship role</td>
<td>Proactively engage with all stakeholders to promote their long-term health and well-being.</td>
</tr>
<tr>
<td>6. Encourage sufficiency</td>
<td>Identify solutions that will reduce consumption and production.</td>
</tr>
<tr>
<td>7. Re-purpose the business for society/environment</td>
<td>Prioritize the delivery of social and environmental benefits rather than economic benefits (i.e., shareholder value) through close integration between the firm, local communities, and other stakeholder groups. Recognize that the traditional business model in which the consumer is the primary beneficiary may shift.</td>
</tr>
<tr>
<td>8. Develop scale-up solutions</td>
<td>Deliver sustainable solutions on a large scale to maximise benefits for society and the environment.</td>
</tr>
</tbody>
</table>

2.7 Sustainability-oriented innovation

In this thesis, sustainability-oriented innovation (SOI) is understood according to the definition by Adams et al. (2016) as consisting of “intentional changes to an organization’s philosophy and values, as well as to its products, processes or practices, to serve the specific purpose of creating and realizing social and environmental value in addition to economic returns.” (p. 181).

Adams et al. (2016) developed the framework after a systematic literature review of scientific research published between 1992-2012. They divide their framework into three dimensions, from diminishingly unsustainable to increasingly sustainable. The first dimension, technical/people, is about a movement in the literature from focusing on technology, i.e., “set of tools,” to a recent focus on people-centered innovation. The second dimension, stand-alone/integrated, is internal and describes how “innovation for sustainable manufacturing has moved from end-of-pipe, stand-alone solutions to modes of practice that require sustainability to be more deeply embedded in the culture of the firm” (p. 183). The third dimension,
insular/systemic, reflects the firm’s view concerning a broader socio-economic system beyond the firm’s immediate boundaries and stakeholders.

These three dimensions then constitute three sustainability-oriented approaches on the journey to a sustainable business; (i) Operational optimization, (ii) Organizational transformation and (iii) System building, that a firm can have when it comes to innovation objectives, outcomes, and relationships, defining the sustainability of the business (table 2.2).

Operational optimization focus on “doing the same things better”. The strategy is to comply with regulations or pursue efficiency gains. The process focuses on internal and incremental innovation facilitated by using tools. In this dimension, the innovative organization exploits existing innovation capabilities.

Organizational transformation strives to “do good by doing new things”. The strategy is to embed sustainability as a profound cultural and strategic norm. The process focuses on adopting new values, platforms, and ideation practices. If successful, the organization embed a sustainability-oriented culture through the organization.

Table 2.2 A simplified model of sustainability-oriented innovation (SOI) (Ulvenblad et al., 2019, based on Adams et al., 2016).

<table>
<thead>
<tr>
<th>Approach</th>
<th>Operational optimization: doing more with less</th>
<th>Organizational transformation: doing good By doing new things</th>
<th>System building: doing good by doing new things with others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation objective</td>
<td>Compliance, efficiency, “doing the same things better”</td>
<td>Novel products, services or business models “doing good by doing new things”</td>
<td>Novel products, services or business models that are impossible to achieve alone “doing good by doing new things with others”</td>
</tr>
<tr>
<td>Innovation outcome</td>
<td>Reduce harm</td>
<td>Creates shared value</td>
<td>Creates a net positive impact</td>
</tr>
<tr>
<td>Innovation’s relationship to the firm</td>
<td>Incremental improvements to business as usual</td>
<td>A fundamental shift in firm purpose</td>
<td>Extends beyond the firm to drive institutional change</td>
</tr>
</tbody>
</table>
System building is the highest level, and the ambition is “doing good by doing new things with others”. The strategy contains a logic of broad collaborations and investing in systems solutions to derive new, co-created value propositions. The innovation process can help the adoption of new business paradigms.

Further, Adams et al. (2016) write, “previous work tends to treat sustainability dichotomously (sustainable/not sustainable), rather than embedding sustainability-oriented innovations as a dynamic, unfolding process that is achieved over time” (p, 181). With this perspective, the researchers regard sustainability as a strive towards a goal, and organisational change happens over time, which creates an interesting possibility to map the orientation of the sustainability innovation practices and processes. It also stresses the importance of intentional changes to the philosophy and values of the organization (Adams et al., 2016).

Testa et al. (2022), who focus sustainability-oriented innovation in the agri-food system, state that since sustainability-oriented innovation is regarded as change and development, it is important to identify which “factors play the greatest role in driving organizations to focus on sustainability challenges in the first place” (p. 16). They suggest that future research should focus on identifying the specific internal and/or external factors that first lead firms to take on sustainability challenges. The research presented in the thesis will contribute to this field of knowledge.

2.8 Sustainable business models and sustainability-oriented innovation in the agri-sector

As discussed above, the agri-sector is very important if the sustainable development goals (SDGs) (UN, 2015) shall be reached. The agri-sector represents a substantial part of the EU economy as well as the global economy (Eurostat, 2023). The development of sustainable business models in the agri-sector has potential to contribute substantially to a sustainable society.

However, if new sustainable business models shall be successful and prevail, they have to overcome barriers to the development of sustainability in the agri-sector; (i) globalization that results in increased agri-food imports and exports, (ii) consumer changes in consumption, resulting in more significant demand for food products, often out of season, that are processed at longer distances, (iii) concentration of the sector has resulted in an ever-increased power imbalance in favor of retailers, (iv) significant changes in delivery patterns with most goods now routed through supermarket regional distribution center’s using larger heavy goods vehicles (Stearns, 2020; Hansen, 2019; Fritz and Matopoulos, 2008). Cagliano et al. (2016) have identified three main integrated challenges for sustainability in the agri-food sector. First, the interdependency between food production and environmental, human and physical resources. Second, the critical role – sustainability and health aspects - of food for humans. Third, the unique characteristics of the food supply chain, with firms of different size and different sustainability focus.
Researchers have shown a growing interest in sustainable business models in the agri-food sector over the last five years. Nosratabadi et al. (2019) have conducted a review of published papers regarding sustainable business models and identified four main approaches regarding the design of a sustainable business model; (i) sustainable value proposition, (ii) sustainable value creation, (iii) sustainable value delivering, and (iv) sustainable partnership networks for creating and delivering such sustainable value which can meet the social, environmental, and economic benefits at the same time. Nosratabadi et al. (2019) highlighted four papers in the agri-food sector, see table 2.3. Franceschelli et al. (2018) built on a business model canvas to design an innovative sustainable business model for food start-ups. Lee and Slocum (2015) studied a sustainable business model applied by event organizers who plan events for food and beverage providers and have shown a willingness to pay a price premium for local products. They also identified the need for enhancing consumers’ knowledge of sustainability.

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Year</th>
<th>Contribution</th>
<th>Method</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barth et al.</td>
<td>2017</td>
<td>Framework</td>
<td>Qualitative</td>
<td>Systematic literature review</td>
</tr>
<tr>
<td>Franceschelli et al.</td>
<td>2018</td>
<td>Theoretical Evidence</td>
<td>Qualitative</td>
<td>Case study, secondary data, and interviews</td>
</tr>
<tr>
<td>Lee and Slocum</td>
<td>2015</td>
<td>Empirical Evidence</td>
<td>Quantitative</td>
<td>Questionnaire</td>
</tr>
<tr>
<td>Robinson et al.</td>
<td>2017</td>
<td>Empirical Evidence</td>
<td>Qualitative</td>
<td>Interview and GIS landscape analysis</td>
</tr>
</tbody>
</table>

Robinson et al. (2017) prove that landscaping enterprises in the food value chain have increased their competitive advantage through sustainable business models with a greater range of value propositions and revenue streams. Finally, Nosratabadi et al. (2019) also highlight Barth, Ulvenblad, and Ulvenblad (2017), who have proposed a conceptual framework for sustainable business model innovation in the agri-food sector which can meet the challenges encountered when taking a sustainability perspective by conducting a systematic literature review. This paper is included in this thesis as paper no. 2.

Testa et al. (2022) have conducted a literature review covering 2007-2021 regarding sustainability-oriented innovation (SOI) in the agri-food context. Their results show that the literature is increasing. Since 2016, research has changed from a technology focus at the start of the value chain towards a broader set of innovations along the value chain. Based on their review, Testa et al. (2022) suggest three areas which are most relevant for research regarding sustainable innovation in the agri-sector; (i) the drivers of sustainability-oriented innovation; (ii) the influence of different actors on sustainability-oriented innovation along the agri-food supply chain; and (iii) the role of behavioural, cultural, and social factors in the adoption of sustainability-oriented innovations. They conclude that future research should thus focus on identifying the specific internal and/or external factors that first lead firms to take on sustainability challenges. They also recognize a need for observational studies of actual behaviour and conduct longitudinal studies to measure adoption rates and ascertain the factors that support the adoption of sustainability-oriented innovations on a larger scale.
Despite the pressure to raise efficiency and lower costs from strong actors in the food value chain, many agri-food firms strive to conduct sustainable business from social and ecological perspectives and from an economic perspective. The conscience of the owners and/or the managers of the agri-firm can be an essential factor in the development of sustainability-oriented innovation (Cagliano et al., 2016.) Sadovska (2023) found that an important factor for farmers to conduct their business in a more sustainable way, were their individual motivations and beliefs to do good for community, animals, soil and environment. Walker has identified this as a values-based driver (Walker, 2014, 2012). Further, Barth, Ulvenblad and Ulvenblad (2017) have also suggested that many agri-food producers have a strong value intention to conduct their agri-business sustainably. Explanations for this could be that many agri-firms are family businesses, rooted in their communities and strongly connected to the land of the ancestors. The owners/managers have experienced the effect of their actions on their land and production. They have accepted responsibility for coming generations (Barth, Ulvenblad and Ulvenblad, 2017).

Taken together, the agri-food sector businesses face complex challenges – but also have unique opportunities to develop sustainability-oriented innovation and sustainable business models that create value in ways other than low-cost production (Testa, 2022; Campos, 2021). The behavioral drivers behind the development of sustainable innovation have been observed by several researchers and categorized with the different concepts; e.g., conscience (Cagliano, 2016; values-based drivers (Walker, 2014; 2012), motivations and beliefs (Sadovska, 2023), and value intention (Barth, Ulvenblad and Ulvenblad, 2017).

Miranda et al. (2023) recently conducted a literature review of the development of agri-food business models, including sustainable business models. They suggested that it is interesting from a research perspective to deepen the understanding of the owner-manager’s “value intention” in relation to business model innovation in the agro-industrial sector and that more empirical research is needed that builds on the theories and frameworks developed in this area.

The researchers (Miranda et al., 2023) also identified the researchers at Halmstad University as leading authors in the field; “The most prolific authors, with 5 publications, are Professors Per-Ola Ulvenblad and Pia Ulvenblad (Halmstad University, Sweden). They are followed by Professors Henrik Barth and Maya Hoveskog (Halmstad University, Sweden) with 4 records, and Professor Mechthild Donner (University of Montpellier, France) with 3 articles” (p. 6). (My comment; I am not a professor).

If research, others and our, can contribute to uncover the behavioral drivers behind sustainable innovation in the agri-sector, it will contribute to overcoming the challenges and meeting the sustainable development goals. In this thesis, stewardship emerges as an important perspective to understand the development of sustainable business model innovation in the agri-sector.
2.9 Stewardship and stewardship theory

The stewardship perspective is common in sustainability science and conservation biology studies (e.g., Turnbull et al., 2021; Mathevet et al., 2018). The stewardship perspective has also been applied in business studies, not least in research regarding corporate governance (Kavadiis and Thomsen, 2022), corporate sustainability (Rezaee, 2016) and family firm entrepreneurship (Chrisman, 2019). Research conducted within organizational change has shown that corporations with a stewardship orientation develop different dynamic managerial capabilities underlying sustainability performance than those with a more instrumental orientation (Nijhof et al., 2019). Within sustainable business model research, Stubbs and Cocklin (2008) discuss environmental stewardship, in which nature is treated as a stakeholder.

Bocken et al. (2014) has identified stewardship as one of their eight sustainable business model archetypes. They define it as proactively engaging with all stakeholders to ensure their long-term health and well-being and state: This archetype seeks to maximise the positive societal and environmental impacts of the firm on society by ensuring long-term health and wellbeing of stakeholders (including society and the environment). Through their business models, firms actively seek to contribute to sustaining and developing the well-being of their value networks (p. 51).

Salami (2022a, 2022b) has applied the eight sustainable business model archetypes on a study of milk farmers in the Netherlands. She found that the archetypes, “adopt a stewardship role,” “repurpose the business for society/environment,” and “maximize material productivity and energy efficiency” are the most important ones. Her results also indicate that the two latter archetypes are already exploited. However, “adopt a stewardship role,” has high importance and still relatively unexploited possibilities. She regards this as a possibility to opportunity recognition since stewardship can provide entrepreneurs with a relevant opportunity, implying a great chance of success.

Several researchers have suggested that stewardship theory have large potential when studying sustainable business models and the transition towards sustainable businesses. Luo and Quo (2023) claim that stewardship theory helps explain why some managers, and hence the firm, are prepared to consider and value sustainability aspects. Wei et al. (2021) argue that stewardship theory can be used to understand the development of sustainability since individuals in the workplace are stewards who assume the responsibility of taking care of resources.

Stewardship theory was developed by Donaldson and Davis (1991, 1989) as a contrasting theory, or at least complementary theory, to agency theory. Agency theory was developed in the context of corporate governance (Alchian and Demsetz, 1972). Man is in agency theory regarded as an opportunistic rational actor who strives for maximal individual utility, rather than utility of the principal. The theory explains contractual relationships where the principal, often the owner, and the agent, often the hired manager, have different individual interests. Agency theory claims to offer solutions to this dilemma by monitoring and compensation systems (Jensen and Meckling, 1999, 1976).
The two perspectives agency and stewardship are often regarded as opposites, but they can also be regarded as relative, rather than opposing approaches (Dibrell and Craig, 2005). In stewardship theory man is regarded a more altruistic steward, motivated to act in the best interest of the organization. The steward will not substitute or trade self-serving behaviors for cooperative behaviors (Davis et al., 1997). The implication is that a steward should be given autonomy, since he/she can be trusted and will act in line with the goals of the organization (Davis et al., 1997).

To conclude, stewardship theory seems to be a relevant theory when studying the development of sustainable business models in agri-firms. The manager of an agri-firm is often also the owner of the firm, which means that a formal contractual relationship is not at hand. However, the manager/owner has commitments towards family, value chain actors, farm and land. This is especially valid when the agri-firm is conducting sustainable business model innovation, which contains considerations regarding society as well as environment, which can be regarded as the principals.

2.10 Reflections regarding previous research

Sustainability is under development to become an integrated part of innovation research. This is in line with Edwards-Schachter (2018), who states that: “Research regarding innovation has over time evolved from being focused on strengthening the competitive advantage of firms. It is not only about improving and sustaining the organizations but also about addressing the major social challenges of the 21st century. In doing so, the nature of innovation is evolving from innovation for economic productivity to innovation for sustainability, from risky innovation to socially responsible innovation, from narrow conceptualizations to broadening the socio-techno-cultural perspectives of innovations” (p. 76).

However, even if Innovation studies have had a positive impact, it has failed to meet the increasingly urgent need for sustainability (Martins, 2016). The challenge for Innovation studies researchers is to respond to the pressing world need for more equitable development, working with others on development studies and sustainability to ensure that we have the conceptual, methodological and analytical tools needed to facilitate this shift to innovation for sustainable development through appropriate policies (Martin, 2016).

Innovation often tends to cluster in specific industries (Fagerberg et al., 2102). This will lead to structural changes in production and demand in these industries. Eventually, it will lead to organizational and institutional change. The significant societal challenges and needs regarding both raised food production and reduced climate impact, e.g., higher degrees of sustainability, are likely a strong driving force for innovation development in the agri-sector.

There is a potential for further development of research regarding sustainable business model innovation in the agri-sector, since research has mainly been conducted in industries other than the agri-sector (Nosratabadi et al., 2019) or in limited parts of the world (Aibar-Guzman, 2022). Empirical studies of business models in the agri-sector have often been conducted in developing countries rather than developed countries (Masenya, 2023; Beuchelt and Zeller, 2013). When
conducting research regarding the agri-food sector, it is necessary to take the sector’s specificities into account, namely the strong interdependence of human animal-nature elements, the connection with different territories and geographic aspects, and unique characteristics of the food supply chain (e.g., the very different size and sustainability focus of firms) (Salavisa and Ferreiro, 2020; Cagliano et al. 2016).

Research has often treated innovation and sustainability dichotomously - sustainable or not sustainable. This perspective has been criticized by Adams et al. (2016), who argue that firms strive towards sustainability, but it is very hard to be fully sustainable. In line with this reasoning of Adams et al. (2016), the perspective of the research presented in this thesis, is that there is a need to regard sustainability as a strive towards a goal rather than a state of being fully sustainable. Testa et al. (2022) have stressed both the gravity of the challenges connected to agri-sector and the relevance of research regarding sustainability, business models and innovation in the agri-sector from a sustainability-oriented innovation perspective.

Further, research regarding both business models and business model innovation in general and sustainable business model and business model innovation are often applied in a normative way without including the actor. It implies that one critical element is missing in the business model constructs: the decision maker (the owner, the manager, the entrepreneur or the farmer). However, the perspective in this thesis is that it is very hard to understand a business model without considering the actor, the agri-entrepreneur and her/his will and skill (Mattsson, 2009) behind it.

To conclude, if research can contribute to uncover the behavioral drivers behind sustainable innovation in the agri-sector, it will contribute to overcoming the challenges and meeting the sustainable development goals. In this thesis, stewardship emerges as an important perspective to understand the development of sustainable business model innovation in the agri-sector.

2.11 The theoretical framework of the thesis

To deepen the understanding of the development of sustainable business model innovation in the agri-sector, the research framework of this thesis applies a stewardship perspective and is built on a combination of the three value-focused building blocks of business models (Richardson, 2008), the eight sustainable business model archetypes developed by Bocken et al. (2014), and the sustainability-oriented innovation framework developed by Adams et al. (2016).

In stewardship theory man is regarded a more altruistic steward motivated to act in the best interest of the organization. The steward will not substitute or trade self-serving behaviors for cooperative behaviors (Davis et al., 1997). The implication is that a steward should be given autonomy, since he/she can be trusted and will act in line with the goals of the organization (Davis et al., 1997).

The value-focused building blocks of a business model were developed by Richardson (2008), who defined three main building blocks; ‘value proposition, value creation and delivery' and
‘value capture’, figure 2.1. The “value proposition” is concerned with the product and service offering to generate an economic return (Boons and Lüdeke-Freund, 2013; Richardson, 2008). Value creation and delivery is at the center of any business model; how the firm use resources and capabilities to create value and deliver that value to its consumers based on the firm’s position in the value network (suppliers, partners and consumers, etc.) (Beltramello et al., 2013; Teece, 2010; Richardson 2008). Value capture is about how to earn revenues from the provision of goods, services or information to users and consumers (Teece, 2010; Richardson, 2008).

Bocken et al. (2014) built their archetypes on the nine business model parts of the business model canvas (Osterwalder and Pigneur, 2012; Boons and Lüdeke-Freund, 2013). The parts most relevant to this study are value propositions, key activities, key partnerships, and revenue streams. Building on this crucial tool for analysing business models, Bocken et al. (2013) add sustainable social and environmental activities. The eight sustainable business model archetypes have been presented above in figure 2.1. These archetypes can be used to identify patterns and attributes that facilitate categorising business model innovations for social and environmental sustainability. The archetypes can constitute a base for creating a common language for developing sustainable business models in research and practice.

Table 2.4 A combined theoretical framework (Ulvenblad, 2021; Ulvenblad et al., 2019, based on Bocken et al., 2014 and Adams et al., 2016).

<table>
<thead>
<tr>
<th>Approach</th>
<th>Operational optimization: doing more with less</th>
<th>Organizational transformation: doing good by doing new things</th>
<th>System building: doing good by doing new things with others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Business Model Archetypes</td>
<td>1. Maximise material and energy efficiency</td>
<td>4. Deliver functionality rather than ownership</td>
<td>2. Create value from waste</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Adopt a stewardship role</td>
<td>3. Substitute with renewables and natural processes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Encourage sufficiency</td>
<td>7. Re-purpose the business for society/environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Develop scale-up solutions</td>
</tr>
</tbody>
</table>

Adams et al. (2016) claim that “previous work tends to treat sustainability dichotomously (sustainable/not sustainable), rather than embedding sustainability-oriented innovations as a dynamic, unfolding process that is achieved over time” (p. 181). Taking this perspective that sustainability is a journey, and that organizational change happens over time creates an exciting possibility to map the orientation of the sustainability innovation practices and processes. In the sustainability-oriented innovation framework by Adams et al. (2016), the authors, after
reviewing scientific literature published from 1992–2012, divide their framework into three dimensions (from diminishingly unsustainable to increasing sustainable). The first dimension, *technical/people*, is about a movement in the literature from focusing on technology, a set of tools, to a recent emphasis on people-centered innovation. The second dimension, *stand-alone/integrated*, is internal. It describes “how innovation for sustainable manufacturing has moved from end-of-pipe, stand-alone solutions to modes of practice that require sustainability to be more deeply embedded in the culture of the firm” (p. 183). The third dimension, *insular/systemic*, reflects the firm’s view of itself concerning a broader socioeconomic system beyond the firm’s immediate boundaries and stakeholders.

These three dimensions then constitute three sustainability-oriented approaches on the journey to a sustainable business: operational optimization, organizational transformation and system building that a firm can have when it comes to innovation objectives, outcomes and relationships, defining the sustainability of the business.

The idea behind combining these two frameworks is to categorize the business model innovations and study the organizational change (the orientation of the sustainability innovation practices and processes) in firms (Ulvenblad, 2021; Ulvenblad et al., 2019). Bocken et al. (2014) categorize and define sustainable business model archetypes. When these archetypes are combined with the dynamic perspective in sustainability-oriented innovation, the change to more sustainable business models is focused. See table 2.4 above. Further, sustainability-oriented innovation concentrates not only on the firm’s products, processes, or practices to become more sustainable but also on making intentional changes to an organization’s philosophy and values (Adams et al., 2016). The combined framework is applied in paper 4 and in the concluding chapter of this thesis.
3. Research methods

In this chapter the research process and methods are presented. First, I will start with a presentation of my background and experience. My ontological and epistemological perspectives are discussed. Next, I will present and reflect on the research process, including the development of the theoretical framework. The empirical data and the data analysis are presented. The contributions of the papers and book chapter in the thesis are reflected upon. The chapter ends with a discussion regarding the research process, the multiple methods approach, the reliability and validity of the studies and the generalization possibilities.

3.1 My background and experience

Before working in academia, I worked in the banking sector as a lawyer. As a banking lawyer, you are expected to interpret and apply the law to solve practical problems and reach the best solution for the clients, depending on their needs. I also have some experience in military service. When conducting military operations, it is paramount to take decisions and act to achieve the desired goal (Swedish Armed Forces, 1962). Further, conventional military wisdom also states that uncomplicated plans that are carried out with vigor is the best way to reach the goal (e.g., Clausewitz, 1834/2003).

Later, at the university, I worked as dean of an academic school for 13 years. Having a leadership role at a university, I noticed the difference between being right and getting right. I concluded that it was not enough to think I had a solution. I had to convince other actors – or make them realize - that I did.

In all these situations, the banking lawyer, the officer, and the dean, you can build your arguments and actions in different ways (as long as they are within accepted boundaries and with high moral and ethical standards) and lead to the desired goal. You must choose your strategy depending on the circumstances in the specific situation, and the strategy could vary from one situation to another.

Early on at the university, I conducted research regarding banks’ financing of firms, primarily small and medium-sized enterprises, where I concluded that the banks are not interested in what product or service the firm provide but rather how well the business is developing (Svensson and Ulvenblad, 2000/2019, 1994; Ulvenblad and Ulvenblad, 2012). This is logical since the banks want to get their money back. The bank officers gather and assess quantitative and qualitative data to assess the situation. They conduct structured analyzes, but they also conduct holistic or even intuitive assessments. They adapt their decision process and focus on different aspects depending on the specific situation, but the goal is clear; lend money to firms which are expected to be pay back, do not lend money to other firms.

Some years ago, I participated in a development and research project called Renewable Forms in Healthcare. My role as a researcher was to contribute to the project as a participator but also to conduct a formative evaluation. The goal of the project was to develop products made of a renewable wood-based material, Durapulp, which could replace the use of oil-based plastics in
hospitals. The project group included representatives from several regional authorities, an innovation development firm, forest firms and two researchers. Different development and testing methods were used during the project and eventually several products were developed. The project was funded by Bioinnovation, a strategic program for research and innovation for sustainable development, led by Vinnova, The Swedish Board of Innovation. The project received the award Sustainable Healthcare Innovation 2018 by the Nordic Center for Sustainable Healthcare, which is a cross-sectoral network involving firms, hospitals, regions, universities, NGOs, expertise and other stakeholders in the area of sustainable healthcare, working towards a more sustainable healthcare sector.

3.2 My ontological and epistemological perspectives

These experiences, both from my practice as bank lawyer, officer and dean, as well as from research and development projects have influenced my perspective on knowledge and how knowledge can be developed. Knowledge can be developed in different ways in different situations and is connected to an outcome, a result. This experienced-based and outcome-focused view means that I have a pragmatic perspective (Maarouf, 2019; Morgan, 2014) on knowledge and the use of scientific methods when conducting research. In line with Kausik and Walsh (2019) I regard pragmatism as a research paradigm “which is based on the proposition that researchers should use the philosophical and/or methodological approach that works best for the particular research problem that is being investigated” (p. 2). A mix of suitable methods are preferable if they can generate new knowledge regarding a studied empirical phenomenon (Kelly and Cordeiro, 2020), which in this study is sustainable business model innovation in agri-firms.

My view on ontology and epistemology are also in line with pragmatism. I regard reality as existing apart from human experience. However, this reality is not static, it changes as a consequence of actions (Kausik and Walsh, 2019). Further, this reality is grounded in the environment and can only be encountered through human experience. Knowledge is not about an abstract relationship between the knower and the known; instead, there is an active process of inquiry that creates a continual back-and-forth movement between beliefs and actions (Morgan, 2014).

3.3 The research process

My pragmatic perspective described above led me to apply an emergent multimethod research design, with a focus on the empirical data, the analysis of it and my continuous learning along the process (Busetto et al., 2017).

I regarded this unfolding research process as relevant and appropriate when studying and analyzing sustainable business model innovation in agri-firms. I used a combination of different methods; literature reviews, interviews, surveys and case studies. When an emergent research
design is used, the preliminary findings from one data collection can be the basis for the next data collection or as a framework for its analysis.

The research presented here started with a practical problem - how can agricultural firms, especially farms, be profitable, enhance their business development and become entrepreneurs in a market? The problem was identified through our research group’s cooperation with extension services focusing on the agricultural sector. Hence, identifying the practical relevance and problem was empirically driven and can be categorized as an inductive phase.

Early in the research, it was concluded that many individuals owning or leading agricultural firms regarded themselves as farmers as primary producers. However, successful agri-firms were often led by individuals who defined themselves as business owners and as agri-entrepreneurs.

The identified practical problem led to the focus on the importance of leadership for business development in the agricultural sector. In 2014, our research group wrote an application under the KK foundation regarding Lean Innovation in the agricultural sector. The application was approved and came to be the starting point for this thesis and for all the following research and externally funded projects our research group has been leading or participating in since then.

The research application was developed into a paper (Ulvenblad et al., 2014), which was presented by me and one colleague at the DRUID society conference in Copenhagen in 2014. In the paper, self-leadership and lean innovation are proposed to enhance the possibilities for business model innovation in food production. One aim was to present a framework containing self-leadership and lean innovation and discuss how these theoretical approaches can facilitate and shape business model innovation in the agricultural sector.

The following step of the research process was deductive and consisted of systematic literature reviews. To frame the research area and to systemizte and compile the research regarding business model innovation in the agri-sector, the first systematic literature review was conducted (Tell et al., 2016) (paper I). Another literature review focused on external and internal barriers to business model innovation and was partly inspired by the DRUID paper. This second paper is not included in this thesis.

In 2016, I was part of a multi-discipline research group from Halmstad University appointed by The Swedish Board of Agriculture to conduct a synthesis evaluation as part of the final evaluation of the EU Rural Development Program 2007-2013 in Sweden. The evaluation was published by the Swedish Board of Agriculture in 2017 (Johansson et al., 2017), and our research group identified the importance of business model innovation in the agricultural sector. According to the evaluation report, the program supported the renewal of production capacity rather than the development of new sustainable business models, even though the latter could create more value for firms and their consumers. This result is in line with the focus of the whole agricultural sector; public organizations, extension services, farmers and research have focused on decreasing production costs rather than increasing consumer value. The research presented here implies that value-generating aspects should be in focus rather than production efficiency aspects.
The following step was an important crossroad for the research of this thesis. At this time, the research presented in this thesis began focusing the significant societal needs of sustainable agriculture and sustainable food value chains. One reason for this was that me and a colleague conducted a study of the agri-food value chain in the Region of Halland. We conducted 20 interviews with different actors along the value chain (producer, processor, wholesale, retail, restaurant/meal and consumers) regarding how they perceived opportunities and challenges including sustainability. The study was presented at 7th Annual George Washington Global Entrepreneurship Research and Policy Conference, in Washington D.C (Ulvenblad and Ulvenblad, 2016). The study is not included in the thesis but provided important perspectives for the following research process.

Another reason was the growing discussion in society regarding the sustainability challenges as well as the importance for the individual agri-firms, both as a barrier and an opportunity. The study, presented in paper II (Barth, Ulvenblad and Ulvenblad, 2017) contains the start of developing a theoretical framework for sustainable business models in the agricultural sector. It introduces value intention as a fourth building block of sustainable business models, added to the previous three building blocks value proposition, value creation and delivery, and value capture (Richardson, 2008). This step contains a shift in the theoretical foundations of the research since it developed to include sustainability aspects in the research. In this sense, this research phase had an element of abduction.

The next step was a multi-method study focusing on identifying and understanding barriers to agricultural business development and how the barriers can be overcome. The empirical data consisted of a quantitative survey and qualitative semi-structured interviews (Ulvenblad et al., 2018) (paper III). The findings showed that barriers and challenges are mainly connected to internal factors, although previous research mainly had focused external factors. The lack of focus on internal factors in previous research was identified as problematic, since it is generally hard, or even impossible, for the agri-entrepreneur to change the external factors. The agri-entrepreneur has larger possibilities to influence the internal factors, even if this can be hard as well.

The following step was an extensive survey of all agricultural firms in Sweden with a turnover of over 1 000 000 SEK (approx. 100 000 Euro). It was a deductive study and contained empirical testing the eight sustainable business model archetypes framework (Bocken et al., 2014). As such, it was probably the first large-scale testing of their framework. Further, it was probably also the first empirical mapping of Sweden's total population of agri-firms from a sustainable business model perspective (Barth et al., 2021) (paper IV).

The final step, where I conducted eight-case studies (Ulvenblad, 2021) (paper V), was based on the systematization of previous research and all the accumulated research conducted so forth. It was a qualitative study intended to deepen the understanding of the studied empirical phenomena and to test further, synthesize and combine previous research, especially sustainability-oriented innovation (Adams et al., 2016), the sustainable business model archetypes (Bocken et al., 2014). The study also elaborated on the business model building block value intention (Barth et al., 2017) and the stewardship perspective (Ulvenblad, 2021).
The importance of sustainability in the value intention could be understood and explained from a stewardship perspective.

3.4 The development of the framework

The focus of this thesis has developed over time. The starting area of interest was on business model innovation in the agricultural sector, with a focus on the impact of leadership and lean thinking on business model innovation in the agricultural sector.

However, I soon observed the large societal need for sustainable food value chains. I also noticed that sustainability could be regarded both as a barrier and an opportunity for agricultural firms. Hence, the area of the research changed to sustainable business model innovation, with a focus on barriers to sustainable business model innovation. The findings showed that the external barriers had been prioritized in previous research, although the agricultural firm has a more significant potential to impact the internal barriers.

The following step focused on business models and the building blocks of a business model. The systematic literature reviews showed that few published papers had focused on sustainable business models in the agricultural sector. Further, most studies regarding business models focused on the what; business models as an existing entity constituted of different parts. The studies did not focus on or explain the why; or the reasoning behind the sustainable business model.

To understand sustainable business model innovation, it was not enough to only add the sustainability aspect to the previously defined building blocks of a business model; (i) value creation, (ii) value proposition and delivery and (iii) value capture. Instead, there was a need to add the will and purpose of the individual who was the driving force behind the sustainable business model innovation. Only then can the driving forces and development of a sustainable business model be captured and understood. This reasoning led to adding a new building block to the business model concept. The building block is value intention and contains the entrepreneur's mindset and purpose.

With a financial grant from the Foundation for Agricultural Research, me and my research colleagues got the opportunity to map and categorize the sustainable business models of all agricultural firms over a certain size. The study, which was based on the eight business model archetypes formulated by Bocken et al. (2014), showed that there are significant differences between geographical regions concerning the organisational innovation component, which is based on two sustainable business model archetypes, namely, repurpose for society/environment and develop scale up solutions. North Sweden had more organisational innovation than the south and east Sweden. The reason for this could be the larger environmental, economic, and organizational challenges in northern Sweden compared to the rest of the country, strengthening the need for innovation. From an individual owner’s perspective, sustainability could be a means, a goal, or something else that enhances or limits the business model. Hence, the study confirmed that it could be of interest to focus on ‘value
intention’ in future studies, since the concept focuses on the mindset of the owner (and manager) of an agri-food firm, including her/his attitude to change and innovation (Barth et al., 2017).

The last step in the research process included the development of a combined theoretical framework consisting of theory regarding the building blocks of business models (Richardson, 2008) sustainability-oriented innovation (SOI) (Adams et al., 2016) and the business model archetypes (Bocken et al., 2014). The framework was used when conducting eight qualitative case studies of eight successful agri-firms. The importance of ‘value intention’ was focused on formulating the firms’ sustainable business models. The ‘stewardship’ perspective was identified as an explanation for the value intention of the entrepreneurs.

3.5 Empirical data

In this thesis, a variety of empirical data has been used. Literature reviews, quantitative surveys, interviews, and case studies have been conducted.

At the beginning of the research process, systematic literature reviews were conducted regarding business models, business model innovation and sustainability. More than 500 potential articles were identified and analyzed in the systematic literature reviews.

Two quantitative surveys are included in the thesis. Early in the research process, the initial, smaller structured survey was sent to 109 entrepreneurs: 37 in the Leader Practice program, 35 in the Lean Agricultural program, and 37 in a control group. The latter had not participated in either program. The control group was randomly selected from Statistics Sweden, based on a sample that included agricultural entrepreneurs working full-time with at least 1 million SEK (∼100,000 Euro) in turnover. Twelve entrepreneurs participated in both programs. The survey was answered by 62 out of 109 entrepreneurs, which generates a response rate of 66%.

Built upon the previous literature and empirical studies, a second extensive quantitative survey regarding sustainable business model archetypes was pointed towards the entire population (not a sample) of full-time agri-entrepreneurs in Sweden with a yearly turnover of 1,000,000 SEK (approx. 100,000 Euro) or more in Sweden. The survey mapped and categorized the sustainable business models used by the sector. The primary data were collected through a telephone survey. The agricultural entrepreneurs were identified from the Agricultural Register issued by Statistics Sweden. The goal was to capture the entire population, but it was impossible to establish contact with some entrepreneurs, and some declined to participate. Eventually, the telephone survey was conducted with 1,143 agricultural entrepreneurs out of 4,064 (28% response rate). The secondary data from Statistics Sweden provided the following facts: firm location (county), production (crops, dairy, etc.), annual turnover, land area, and contact information.

Two qualitative studies are also included in this thesis. Following the literature studies, qualitative semi-structured interviews were conducted early in the research process with 54 agri-entrepreneurs who had participated in the Leader Practice or Lean Agriculture education. The semi-structured interviews were conducted by me and one colleague by telephone with
entrepreneurs who had participated in one or both programs. The interviews lasted 20–30 minutes each and addressed various themes – the participants' background, expectations, goals, farm activities; challenges in the agricultural sector; leadership; and learning outcomes.

Finally, eight qualitative in-debt cases with successful agri-firms were conducted. The study included primary and secondary empirical data, such as interviews, document studies, web pages and financial reports. The cases illustrate sustainable business model innovation archetypes and constitute the foundation (together with the other studies in the thesis) for the theory developed in the thesis.

3.6 Data collection and analysis

Since different data-gathering methods have been used, several methods for data analysis, both qualitative and quantitative, have also been used.

The literature reviews, which have been conducted and analyzed in a systematic and structured way, were inspired by the work of several researchers, e.g., Hörte et al. (2008) and Collin et al. (1996). Figure 3.1 is an overview of the working process.

![Figure 3.1. Overview of the working process in systematic literature reviews, source: created by the authors.](image)

The first decision concerned the selection of databases for the primary data collection. The following two criteria were used in selecting the databases: first, most often used by researchers in the social sciences and available in the authors’ university library; and second, a mix of database types (e.g., citation databases, publisher databases, and subject area databases). Ten databases were chosen: Web of Science, Scopus, ABI/Inform, Emerald, Science Direct, Academic Search, Springer-Link, Jstor, Sage, and Agricola. Agricola specializes in research on...
the agri-food sector. Following the methodology of Crossan and Apaydin (2010) in their literature review on organizational innovation, the search was limited to peer-reviewed journals with the highest impact factor in their area.

The second decision concerned the selection of publications. The selection criteria were the following: peer-reviewed journal article in English; mention of business model and/or business model innovation; and use of agri-food, agriculture and/or agribusiness and/or food processing sector/industry in the title, essential word list, abstract and/or full text. A web-based search may produce irrelevant hits and omit relevant hits. Therefore, the next step was to establish the value of each article in terms of the current research. The articles that did not meet the three criteria and duplicates were eliminated. At this point, the initial search consisted of 570 articles. The search terms were; business models/business model innovation/agribusiness/ agri-food/food processing industry.

After this initial screening of the articles, the full texts of the remaining articles were mapped by the following categories: keywords; the unit of analysis; country of data collection (i.e., settings); methodology (empirical vs conceptual approach); and use of theory. Where possible, the number of citations (both ISI and Scopus citations and Altmetric score) and the impact factor of the journals were noted. Ultimately, 505 articles that met the inclusion criteria were analysed. The author of this thesis was one out of three researchers who each read and categorized one third of the papers.

The second systematic literature review was based on the previous comprehensive review of business model innovation, but this review focused on sustainability aspects. Eight relevant themes were identified: (i) business model and business model innovation, (ii) supply chain/value chain, (iii) sustainability, (iv) innovation, (v) strategy, (vi) marketing, (vii) networks, and (viii) miscellaneous. For this second review, the themes of ‘business model and business model innovation’ were chosen to understand the maturity and complexity of the business models the articles described. The following evaluation process focused on the contribution of each paper and was matched concerning business models and building blocks, degree of innovation, and contribution to sustainability aspects. In total, only 21 articles added value to these dimensions. The author of this thesis, together with two research colleagues, conducted the second literature review, and each of the steps was discussed before and compared after to increase inter-rater reliability during the literature analysis. Validity was aimed at sampling articles based on established guidelines and constructs from previously published literature reviews were compared within and outside the research field.

Two quantitative surveys were conducted. The first, minor, quantitative survey was sent to 109 entrepreneurs; 37 in the Leader Practice program, 35 in the Lean Agriculture program, and 37 in a control group who had not participated in either program. The survey was structured around questions on the barriers in the agricultural sector. A six-point Likert scale ranging from ‘not at all’ to ‘very much’ was employed as it has been proven to increase response rate and response quality. Data collected from the survey were analyzed using the Statistical Package for the Social Sciences (SPSS). An independent sample t-test was used to analyze the differences in
scores. The t-test compared the mean scores among the Leader Practice participants, the Lean Agriculture participants, and the control group participants.

The main quantitative survey study of full-time agri-entrepreneurs in Sweden was analyzed through statistical analyses in the Statistical Package for Social Sciences (SPSS). The population of the primary survey was classified using NUTS (Nomenclature of Territorial Units for Statistics). The survey had one question about the county and 24 questions on the eight sustainable business model archetypes. Each business model archetype had three questions with the following focus: (a) what value is delivered, (b) how value is delivered, and (c) how the firm earn money and captures other values. A Likert scale (1-5) was used for all 24 questions: 1) agree, 2) partially agree, 3) neutral, 4) partially disagree, and 5) do not agree. Consequently, the lower the Likert scale value is for every question, the higher the degree of the respondent’s agreement.

Using SPSS, a reliability test was conducted to determine the scales’ internal consistency, i.e., how free of errors each scale was, meaning that Cronbach’s alpha tests to see if multiple-question Likert scale surveys are reliable. Following Nunnally's (1978) recommendation, a minimum level of 0.7 of Cronbach’s quotient  for each scale was needed to validate its reliability and include it in the subsequent analysis (Pallant, 2005). This quotient shows the average correlation among all questions that form the scale (i.e., the extent to which each question measures the variable [attribute] set). Performing a reliability test in our study was necessary since no survey instrument on the previously validated sustainable business model archetypes existed. Therefore, through Cronbach , we could ensure that the items (questions) included in each set are closely related as a group.

Reliability tests were initially performed for the eight sustainable business model archetypes, each consisting of three items/questions. However, only two archetypes (Maximize material and energy efficiency and Substitute with renewable and natural processes) had proven internal reliability and compatibility with values of Cronbach’s quotient  over 0.7. They can be claimed as reliable scales (parameters) with the sample surveyed.

The same test was performed for the higher-order groupings (technical, social, and organizational). Technological and Social sustainable business model archetypes have proven internal reliability and compatibility with values of Cronbach’s quotient  over 0.7, thus showing that the items are closely related as a group. Organisational sustainable business model archetypes showed a slightly lower value of Cronbach’s quotient . Nevertheless, as Pallant (2005) points out, the importance of Cronbach’s quotient  is influenced by the number of questions included in the scale. These values tend to reveal lower outcomes when fewer than ten questions exist.

After completing these tests and analyses, the indexes were prepared by calculating the mean values of all questions forming one principal component (question), thus creating three essential variables. The results reflected the higher-order groupings of sustainable business model innovation (components of Technological, Social, and Organizational innovation).

The qualitative semi-structured interviews were conducted with 54 agri-entrepreneurs who had participated in the Leader Practice or Lean Agriculture education. I, together with one research
colleague, conducted the semi-structured interviews via telephone with entrepreneurs who had participated in one or both programs. The interviews were structured into relevant themes – the participants' background, expectations, goals, and farm activities; challenges in the agricultural sector; leadership; and learning outcomes. The analysis was carried out through content analysis, which was used to interpret and categorize the interview responses. Central quotes were also identified and presented in the paper.

Finally, eight qualitative in-debt cases with successful agri-firms were conducted. The study included primary and secondary empirical data, such as interviews, document studies, web pages and financial reports. The cases illustrate sustainable business model innovation archetypes and constitute the foundation (together with the other studies in the thesis) for the theory developed in the thesis.

The empirical data consists of primary and secondary data collected using different methods. The primary data consists mainly of interviews with owners/managers or other representatives of the firms and visits to the farm/farm. Initially, the respondents were asked to tell their stories of the firms in their own words. A semi-structured interview guide with open-ended questions was also used. It covered firm history, past and current business activities, consumers, partnerships, networks, goals, culture, values, sustainability, innovation and business models.

The secondary data has been gathered through document studies (official economic records, printed material and web pages). This multi-method approach has been used in previous research on business models (Täuscher and Laudien, 2018; Zott and Amit, 2008). In the study presented in this chapter, multiple methods have been used for each case, but not all methods have been used for all cases. The collected data, including the interviews, have been analysed through categorizations and content analysis (Täuscher and Laudien, 2018).

3.7 The papers’ contribution to the thesis

The first paper’s purpose was to develop an understanding of the research on business models and business model innovation in the agri-food sector. It was done through a systematic literature review of published papers and journal articles that contained a combination of business model or business model innovation with agriculture-related and food-related terms (e.g., "agri-food sector"). The contribution to the thesis is that the study showed that research within the field is emergent and growing. The theory is not yet well developed. More qualitative research from the firm/owner perspective is needed. Case studies on cognitive barriers to business model innovation in the agri-sector promise research avenues.

The second paper’s purpose was to understand the research on sustainable business model innovation and to develop a conceptual framework for sustainable business model innovation in the agri-food sector. The contribution to the thesis is developing a conceptual framework for sustainable business model innovation by adding a new building element to the business model framework, value intention. Further, the study also showed that few articles focus on sustainable business model innovation in the sector.
The third paper’s purpose was to contribute to previous research by comparing the findings from the two educations programs for agricultural entrepreneurs. The ambition was also to suggest possible ways to continue the development of business model innovation in the agricultural industry. The contribution to the thesis is the conclusion that barriers and challenges are mainly connected to internal factors. Future research should focus on overcoming internal barriers and challenges related to thought patterns and changing existing mindsets and cognitive factors.

The fourth paper aimed to map and develop an understanding of different categories of sustainable business model innovation in the agri-food industry. The aim was also to increase knowledge of the relationship between different geographical regions and sustainable business model innovation. The contribution to the thesis is the empirical use/testing of business model archetypes. Further, the analysis shows that Northern Sweden had a higher degree of sustainable organizational innovation than the other parts of Sweden. An explanation could be that the more significant challenges, the greater need for innovation. The analysis also highlighted the need for studies regarding value intention.

The fifth and final paper’s purpose was to illustrate, map, categorize and analyze the development of sustainable business models and the orientation of sustainability innovation practices and processes. It was also to research and analyze the importance of value intention and stewardship. The contribution to the thesis is identifying the importance of stewardship and the connection to value intention. Further, the study also identifies strategic factors for success in sustainable business model innovation in the sector; (i) regarding themselves as entrepreneurs, not only producers, (ii) ascending the value chain, (iii) diversification of business model. Finally, the societal need to diffuse to other industries is identified.
### Table 3.1 The contributions of the papers

<table>
<thead>
<tr>
<th>Paper</th>
<th>Overall purpose</th>
<th>Research questions</th>
<th>Theoretical framework</th>
<th>Methods</th>
<th>Conclusions and contribution to the thesis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paper I</strong>&lt;br&gt;Business model innovation in the agri-food sector: a literature review&lt;br&gt;Teil, Hoveskog, Ulvenblad, Ulvenblad, Barth and Ståhl&lt;br&gt;Published 2016 British Food Journal&lt;br&gt;Vol. 118 No. 6, pp. 1462-1476&lt;br&gt;1 on the Norwegian list&lt;br&gt;Funded by the KK-foundation</td>
<td>To develop an understanding of the research on BMs and BMI in the agri-food sector.</td>
<td>Where, when, and how have business models and business model innovation been applied in agri-food research?</td>
<td>Research regarding business models and business model innovation</td>
<td>A systematic literature review of peer-reviewed journal articles that contained a combination of “BM” or “BMI” with agriculture-related and food-related terms (e.g., “agri-food sector”). 505 articles were identified for further analysis.</td>
<td>Research is emergent and growing.&lt;br&gt;The theory is not yet well developed.&lt;br&gt;More qualitative research from the firm/owner perspective is needed.&lt;br&gt;Case studies on cognitive barriers to BMI in the agri-sector are promising research avenues.</td>
</tr>
<tr>
<td><strong>Paper II</strong>&lt;br&gt;Towards a Conceptual Framework of Sustainable Business Model Innovation in the Agri-Food Sector: A Systematic Literature&lt;br&gt;Barth, Ulvenblad, Ulvenblad&lt;br&gt;Published 2017 in Sustainability, 9(9), 1620&lt;br&gt;1 on the Norwegian list&lt;br&gt;Funded by the KK-foundation</td>
<td>To develop an understanding of the research on sustainable business model innovation (BMI) in the agri-food sector. To develop a conceptual framework of Sustainable Business Model Innovation in the agri-food sector.</td>
<td>Where, when, and how have sustainable business models and sustainable business model innovation been applied in agri-food research?</td>
<td>Research regarding business models, business model innovation and sustainability. Building elements of business models (e.g. Bocken et al., 2014; Richardson, 2008; Osterwalder and Pigneur, 2005).</td>
<td>Development of a conceptual framework regarding sustainable business model innovation. Based on a systematic literature review of 500+ journal articles on business models and business model innovation connected to the agri-sector.</td>
<td>Development of a conceptual framework for sustainable business model innovation by adding a new building element to the business model framework: value intention Few articles focus on sustainable business model innovation.</td>
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<td>Paper III</td>
<td>Overcoming barriers in agri-business development: two education programs for entrepreneurs in the Swedish agricultural sector</td>
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<th>Paper IV</th>
<th>Unpacking sustainable business models in the Swedish Agri-food Context – the challenges of technological, social and organizational innovation</th>
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<td>Barth, Ulvenblad, Ulvenblad, Hoveskog</td>
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<td><strong>Published 2021 in Journal of Cleaner Production, 304, 127004</strong></td>
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<td>Funded by Stiftelsen Lantbruksforskning (The Foundation for Agricultural Research)</td>
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<td>The aim is to map and develop an understanding of different categories of sustainable business model innovation (SBMI) in the agri-food industry.</td>
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<td>The aim is also to increase knowledge of the relationship between different geographical regions and sustainable business model innovation.</td>
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<td>The focus of this paper is to map different sustainable business model archetypes in the agri-food industry in terms of technological-, social- and organisational- innovation components (Bocken et al., 2014)</td>
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<td>Sustainable business model archetypes (Bocken et al., 2014)</td>
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<td>The empirical data come from a quantitative telephone survey of all (4 064) agri-firms with a turnover over 1 MSEK. Response rate 28% (1 143 firms)</td>
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<td><strong>Empirical use/testing of business model archetypes.</strong></td>
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<td><strong>Northern Sweden had a higher degree of sustainable organizational innovation than the other parts of Sweden.</strong></td>
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<td><strong>An explanation could be that the more significant challenges, the greater need for innovation.</strong></td>
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<td><strong>Need for studies regarding value intention.</strong></td>
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### Paper V
Development of sustainable business models for innovation in the Swedish Agri-sector. Resource-effective producer or stewardship-based entrepreneur?

**Ulvenblad**

*Published 2021 in Campos (ed) The revolution in Agriculture. A road map to value creation, pp. 117-145, Springer*

More than 108,000 downloads (September, 2023)

Funded by Bill and Melinda Gates foundation

| To illustrate, map, categorize and analyze the development of sustainable business models and the orientation of the sustainability innovation practices and processes. | The research questions are: (i) “How do Swedish agri-firms apply sustainable innovation practices?”, (ii) “Which sustainable business models do Swedish agri-firms use?” and (iii) “How can these innovation practices and sustainable business models be understood?” | A conceptual sustainable business model framework including value intention (Barth et al., 2017) added to the three previous building elements. A combined sustainability-oriented innovation (SOI) (Adams et al., 2016) and sustainable business model archetypes framework (Bocken et al., 2014) | Qualitative case study

*Eight cases: successful SMBI agri-firms*

The importance of stewardship and the connection to value intention. Strategy for success:

(i) Regarding themselves as entrepreneurs, not only producers,

(ii) *Ascending the value chain,*

(iii) *Diversification of business model*

*Societal needs to diffuse to other industries*
3.8 Trustworthiness and generalization possibilities

In this thesis, I have applied both quantitative and several qualitative methods, which can be categorized as between-methods or across-methods, which means several studies with different methods have been conducted (Fusch et al., 2018). Denzin (2010) states that this is an application with many strengths. It takes the best of the different methods used to understand the studied phenomena in-depth. It can generate rich data and comprehensive results but has a higher degree of complexity (Green et al., 2015).

Several researchers (e.g., Denzin, 2010; Fusch et al., 2018;) have argued that triangulation can enhance the quality of social research in terms of objectivity, truth, depth and validity. The discussion regarding triangulation has influenced this thesis's methodological and theoretical choices, although the concept of triangulation has not been applied per se.

The methods used in this thesis started with systematic literature reviews in papers 1 and 2 described above. It was followed by conceptual development in paper 2. In paper 3, both qualitative interviews and a survey were conducted. In paper 4, an extensive survey was sent to the entire population (over 4 000) of full-time agri-firms in Sweden with a turnover of not less than 1 000 000 SEK. Finally, in paper 5, eight case studies of agri-firm with a sustainable business model were carried out. The case studies are based on interviews, newspaper articles, web pages and financial data.

Data triangulation refers to different data regarding the same studied phenomena (Denzin, 2010), not to different methods. In papers 2 and 5, different kinds of data were gathered within each of the studies. In paper 2, qualitative data was collected through semi-structured interviews, and quantitative data was gathered through a structured survey. In paper 5, the data consisted of interview responses, web pages, newspaper articles and financial statements. Hence the findings can be corroborated, and any weaknesses in the data can be compensated for by the strengths of other data, thereby increasing the validity and reliability of the results (Maarouf, 2019).

Further, several different methods have been used in the studies in the entity of the thesis. The combination of systematic literature reviews, one minor and one larger quantitative study, 57 interviews and eight case studies have strengthened the research generalization possibilities. The issue is also if the results can be generalized to other industries as well. This is an issue concerning analytic generalization, not statistical generalization (Yin, 2009). Since the agri-sector is a sector with a strong historical identity, an analytical generalization to other industries must be conducted with caution. However, since the focus on sustainability and value-generating relations with end consumers is growing in society, it can be assumed that results generated in the agri-sector will also grow in importance in other sectors. Further, the developed building block of business models, value intention, is of generic importance in all business models independent of industry. It can also be applied to other business models and business model innovation than those aiming towards sustainability. However, in these cases it cannot be explained from at stewardship perspective.
3.9 Ethical considerations

Ethical considerations have been conducted along the research process. As a researcher, my obligation is to conduct reliable and honest research that provides value and does not generate risk or harm to individuals, firms and society. I have identified and focused a research area which has the potential to be beneficial for participating individuals as well as society. From a research perspective, there has not been a need to conduct research on any sensitive aspects of participating individuals and firms.

Research with high ethical standards should be conducted by reliability, honesty, respect, and responsibility (The European Code of Conduct for Research Integrity – Revised Edition 2023.). Throughout the research process I have strived to conduct research which is categorized by reliability in ensuring the quality of research. The quality shall be reflected in the design, method and analysis of the research. The research presented here has been presented at scientific conferences and published in peer-reviewed journals and book chapter. I have been honest during the research process, which means I have developed, conducted, reported and informed about research in an open, fair, complete and objective manner. I have also showed respect for individuals and firms which constitute the empirical base in the research. I have shown the same respect for colleagues and other research participants as well as society, ecosystems, cultural heritage and the environment. Further, I take responsibility for the research from idea to publication, for management and organization, for training, supervision and mentoring as well as for its further consequences.

I have also applied the four established principles of research ethics regarding the use of empirical data; (i) information, (ii) consent, (iii) confidentiality and (iv) use of data regarding individuals (The Swedish Research Council, 2022). All participating individuals and firms have been informed about the research. They have not only consented to participate in the research, but they have also been very positive to the research area and on the focus on their sector. All participants, survey respondents, interviewees, and others have been informed about confidentiality. They have also been informed that the information will only be used in the research project and not elsewhere.
4. Summary of the appended papers

In this chapter, summaries of the four papers and the book chapter included in the thesis are presented. The titles, authors and publication are reported, and the credit author statements are declared. The findings, originality/value and the contributions to the thesis are also presented.

4.1 Paper I

Title
Business model innovation in the agri-food sector: a literature review

Authors
Joakim Tell, Maya Hoveskog, Pia Ulvenblad, Per-Ola Ulvenblad, Henrik Barth and Jenny Ståhl

Credit author statement
I participated in and had an active role in all steps of the research process. I was one of three authors who read the articles (about 170 articles each) and analyzed their theoretical perspectives. Further, I and the other two authors who read and analyzed the articles also developed the main part of the conclusions.

Publication

Keywords
Innovation, literature review, business model, agri-food sector

Background
The agri-food sector, the combined agricultural and food sector, is an important part of the European Union’s economy. It accounts for 19.2 million jobs (9 per cent of total employment) and for 4.3 percent of GDP in the EU-27. The European Commission (2007) defines the agri-food sector as the combination of the primary sector (agriculture, hunting, and forestry) and the food industry (production of food products, beverages, and tobacco). According to Leis et al. (2011), most firms in the EU agri-food sector are micro-sized enterprises with fewer than ten
employees and an annual turnover of €2 million or less. Many small firms in the agri-food sector, particularly in the EU, operate in a business environment of increasing competition because of greater globalization, the reduction of trade barriers, and the consolidation of food retailers (Brinkmann et al., 2014). As a result, many of these firms struggle to meet food retailers’ demands for more reliable supply, greater bulk, higher hygienic standards, and other quality requirements.

New EU laws and regulations, fiercer international competition, and the growing presence of powerful players in the value chain partly explain the fact that large-scale production economics today influence the development of the agri-food sector in many EU countries. This combination of factors has increased the pressure on small and medium-sized agri-food firms to be more innovative. Thus, many such firms need a new or an adapted business model if they are to become more productive and competitive.

Research since the mid-1990s reveals an increasing interest by academics and practitioners in business model innovation and in the use of business models as descriptive and analytical constructs. Some research claims that a business model and business model innovation are essential for a firm’s competitiveness, renewal, and growth (e.g., Campbell et al., 2013; Chesbrough and Rosenbloom, 2002; Johnson, 2010; Lambert and Davidson, 2012; Teece, 2010). However, as Lambert and Davidson (2012) point out, empirical research on BMs between 1996 and 2010 in Europe is predominantly based in the media, information technology, and biotechnology sectors. Limited research attention has been paid to BMs and to BMI in the agri-food sector (Ulvenblad et al., 2014). (Some notable exceptions to this trend are Beuchelt and Zeller, 2013; Markowska et al., 2011; Short et al., 2014; Teece, 2010.)

**Purpose**

Because the business model is a fairly new concept, research is lacking on business model innovation in certain industry sectors. One such sector is the agri-food sector. Using a systematic literature review of peer-reviewed journal articles published from 1990 to 2014, the purpose of this paper is to examine the where, when, and how of the use of business models and business model innovation in the agri-food sector.

**Design/methodology/approach**

A web-based search was conducted to identify peer-reviewed journal articles that contained a combination of “business model” or “business model innovation” with agriculture-related and food related terms (e.g., “agri-food sector”). After winnowing out irrelevant and duplicate articles, 505 articles were chosen for analysis.

**Findings**

Using categories, the paper analyses various data about the selected articles. The categories include research settings, units of analysis, methodologies, and theories. Based on this analysis, the paper finds that these agri-food sector articles are primarily qualitative, empirical studies that focus on one or a few firms (i.e., case studies). The paper also finds that theory is not yet well-developed in the research on the agri-food sector.
Originality/value

Systematic literature reviews of various concepts, theories, and models are common in many fields (e.g., information/software technology, healthcare, and organizational management). However, no such review is available for the agri-food sector, in particular in its use of business models and business model innovation. This paper addresses that gap with its review of relevant articles published in more than 300 journals in recent years. Based on this review, the paper draws conclusions about business model innovation in the agri-food sector and offers suggestions for future research.

Contribution to the dissertation

Over 50% of the reviewed articles have no, or very limited, explicit foundation in theories linked to business models, business model innovation, or the agri-food sector. Further, many different theoretical approaches are used in the reviewed articles.

The research methodology/setting most used in the articles is the qualitative, empirical case study conducted at the firm level. Many of these studies are narrations of one or a few firms. As the theoretical approaches of the articles are rather scattered and somewhat weakly applied, it appears that the area of business models and business model innovation in the agri-food sector is too new to have developed a comprehensive theoretical framework.

Consistent with the discussion by Baregheh et al. (2014), this review suggests that the research in the agri-food sector would benefit from further development of its theoretical foundations. More qualitative research into the uses and effects of business models and business model innovation from the firm/owner perspective is also recommended. Case studies on the cognitive barriers to business model innovation, as described by Chesbrough (2010) in the agri-food sector are promising research avenues.

The contributions to the thesis can be summarized in the following points; (i) research is emergent and growing, (ii) theory is not yet well developed, (iii) more qualitative research from the firm/owner perspective is needed, and (iv) case studies on cognitive barriers to business model innovation in the agri-sector are promising research avenues.

Funding

The KK-foundation (The Knowledge Foundation).
4.2 Paper II

Title
Towards a Conceptual Framework of Sustainable Business Model Innovation in the Agri-Food Sector: A Systematic Literature review

Authors
Henrik Barth, Per-Ola Ulvenblad and Pia Ulvenblad

Credit author statement
I participated in and had an active role in all steps of the research process including the development of the theoretical and practical contributions of the paper.

Publication

Keywords
Business model innovation; agri-food; farmers; systematic literature review; entrepreneurship; sustainability

Background
It is important to conduct research in general in the agri-industry due to the following arguments; a need for increased food production in the world combined with a need for raised degrees of sustainability in the food value chain. However, almost all research regarding the agri-industry has focused on the production aspects and the first links of the food value chain. Since studies regarding business model innovation have focused on other industries than the agri-industry, it is even more important to focus specific research on sustainable business model innovation in the agri-industry and the latter links of the food value chain.

Further, it is also important to conduct research in the agri-industry since it has characteristics that differ from many other industries. Many firms in the agri-industry are owner-managed family businesses that are rooted in their communities. The owners regard themselves as stewards or custodians of the firm, the property, and the environment, with a responsibility for living and non-living things. They expect that their firms are going to be there for the indefinite future and the owners are not solely concerned with growth and revenues. Some other differences compared with other industries are: (i) the nature of agricultural production, which is diffuse and seasonal. It means that there are many small primary producers, depending on a diversity of climates, who sell and deliver products to processors and retailers; (ii) the market concentration at the end of the supply chain; and (iii) the close connection between production processes and the quality and safety of the product. Beside this, it is also claimed that
sustainable agricultural development can enhance the nutritional quality of food and thereby produce positive health effects.

**Purpose**

To fill the gap in the research on sustainable business model innovation in the agri-food sector, the aim of this paper is to increase our understanding of sustainable business model innovation in the agri-food sector in terms of its theoretical and practical approaches for sustainability. The paper also aims to increase our knowledge of how previous research has treated the relationship between business models and sustainability in the agri-food sector. Altogether, this serves as a first step towards a conceptual framework in which business model innovation is the main concept.

**Methods**

Development of a conceptual framework regarding sustainable business model innovation, which is based on a systematic literature review of 570 journal articles on business models and business model innovation.

**Findings**

The paper proposes a conceptual framework for sustainable business model innovation in the agri-food sector that can be used to meet the challenges encountered in taking a sustainability perspective. Only 21 of the published papers in the systematic literature review have business model innovation as their main focus. The review shows that research interest in the agri-food sector has increased in these years.

**Originality/value**

The paper proposes a conceptual framework for sustainable business model innovation, which adds a fourth building block, ‘value intention’, to the three previous building blocks developed by Richardson (2008).

**Contribution to the dissertation**

The conceptual framework for sustainable business model innovation presented and proposed in this paper gives practical as well as theoretical guidelines for the development of sustainable innovations. Based on the literature review, the conceptual framework also highlights the need to include sustainability in business model innovation. From a research perspective, it is also of interest to deepen the understanding of the ‘value intention’ of the owner-manager in connection with business model innovation in the agri-industry sector. However, in order to develop this field further, more empirical research is needed that builds upon developed theories and frameworks in the field. Only then will our knowledge of underlying mechanisms grow, which in the long run will lead to the development of a solid theoretical ground.

The contributions to the thesis can be summarized in the following points; (i) development of conceptual framework for sustainable business model innovation by adding a new building element to the business model framework: value intention, (ii) including sustainability in every
aspect of business model innovation – in every building block and (iii) few articles focus sustainable business model innovation.

**Funding**

The KK-foundation (The Knowledge Foundation).

4.3 Paper III

**Title**

Overcoming barriers in agri-business development: two education programs for entrepreneurs in the Swedish agricultural sector

**Authors**

Pia Ulvenblad, Henrik Barth, Per-Ola Ulvenblad, Jenny Ståhl and Jennie Cederholm Björklund

**Credit author statement**

I participated in and had an active role in all steps of the research process. I was one of two authors who conducted the interviews.

**Publication**


2 on Norwegian list.

**Keywords**

Self-leadership; leadership; agricultural advisors; management education programs; agricultural leadership; barrier

**Background**

The literature on the barriers to growth and innovation, especially among small and young firms, is extensive (e.g., Pellegrino, 2018; Sandberg and Aarikka-Stenroos, 2014; Barth, 2004; Barber et al.,1989). Entrepreneurs in the agricultural sector face many of these same barriers. However, research on barriers to agricultural business development is less extensive.

Barriers are in many cases related to the context, market structure and maturity of the industry (Pellegrino 2018). Especially the agricultural sector has experienced many challenges due to increased global competition and environmental challenges. A systematic literature review of business model innovation in the agri-food sector by Ulvenblad et al. (2018) identified several
barriers to growth and development. The internal barriers identified at the organizational level in the review mainly concern lack of resources such as shortages of internal financing, managerial and leadership skills and experience. Furthermore, external barriers to business model innovation include undeveloped networks and ecosystems, followed by unsupportive government and inappropriate infrastructure (Ulvenblad et al., 2018). The authors state that little attention has been paid to individual barriers and resources such as mind-set, perceptions, values and behaviour in previous research (Ulvenblad et al., 2018) although an inflexible mind set has been shown to be one of the main barriers to innovation (Chesbrough, 2010).

**Purpose**

The paper compares two government-sponsored education programs for agricultural entrepreneurs: a Leadership program and a Lean program.

**Methods**

The paper takes both a qualitative and a quantitative approach in its collection and analysis of data from 54 semi-structured interviews and from a survey with 109 participants.

**Findings**

The main challenges to business and personal development are time pressure and the need for better communications. The Leadership program participants emphasize the effect of internal barriers such as fixed mind-sets. The Lean program participants emphasize the effect of external barriers such as financing. Both groups emphasize personal and business growth more than the control group.

**Originality/value**

The paper contributes to the literature about educations for entrepreneurs in the agricultural sector with its examination of agricultural entrepreneurs’ reflections on barriers and challenges in business development and their linkage to overcoming barriers focused on a resource-based perspective with different types of resources. A practical implication of the study is that Entrepreneur education programs can help participants, program developers, and advisory organizations identify and manage business challenges and barriers.

**Contribution to the dissertation**

This paper has focused two education programs for developing entrepreneurs in the Swedish agriculture – Leader Practice (LP) and Lean Agriculture (LA). The aim has been to compare the two education efforts related to outcomes in terms of barriers and challenges in the business development process and link these to resources which could help the entrepreneurs in the further development. The barriers and challenges focus mainly internal factors like changing mind-set, acting as a leader, time management and lack of resources. To think in new ways is something that the participating entrepreneurs have experienced. Since Chesbrough (2010) emphasizes that the existing mindset is a main barrier when it comes to business model innovation a change in mind-set from the educational programs is promising when it comes to changes in both attitudes and behaviors.
Furthermore, objective aspects of contextual factors should also be addressed in coming studies to give a broader understanding of the local and regional aspects that stimulate/prevent agri-business development. In addition, it should be mentioned that the control group has been randomly selected based on financial measures and not based on other matching criteria. To evaluate and control for other explanations, it would be of interest to include non-financial aspects such as resources and strategies applied, and the infrastructure in the local and regional setting, in the selection process of the control group. Finally, future research avenues should also focus on how to overcome barriers and challenges related to thought patterns, changing existing mind-sets and cognitive factors. There is a need for knowledge development regarding different aspects of leadership in agricultural firms. This is valid for leadership in relation to the employees and in relation to the business. However, the crucial aspect is the self-leadership, or the leading of oneself (Manz and Neck 2013; Manz, 1986).

The contributions to the thesis can be summarized in the following points; (i) the barriers and challenges are mainly connected to internal factors, and (ii) future research should focus on how to overcome internal barriers and challenges related to thought patterns, changing existing mind-sets and cognitive factors.

**Funding**

The KK-foundation (The Knowledge Foundation).

### 4.4 Paper IV

**Title**

Unpacking sustainable business models in the Swedish Agri-food Context – the challenges of technological, social, and organizational innovation

**Authors**

Henrik Barth, Pia Ulvenblad, Per-Ola Ulvenblad, Maya Hoveskog

**Credit author statement**

I participated in and had an active role in all steps of the research process, except conducting of the phone survey. I was main contributor regarding the discussion and conclusions of the paper.

**Publication**


2 on Norwegian list.
Background

Many global challenges are linked to social, environmental, and economic sustainability in food production. Research shows that by 2050, worldwide food production must increase by 70% (Dobermann and Nelson, 2013; FAO, 2009; Öborn, 2011). Other research shows that sustainable development efforts in the agri-food sector, which improve the nutritional quality of our diets, can have positive effects on our health (Średnicka-Tober et al., 2016; Benbrook et al., 2013). The European Union’s Research and Innovation Programme “Horizon 2020” (European Commission, 2011) and the United Nations’ sustainable development goals (United Nations, 2015; Griggs et al., 2013) call attention to the need for more research and innovation on food security and sustainable agriculture. There is also considerable research on the need to improve agricultural adaptation to climate change, especially in food-insecure human populations (e.g., Lobell et al., 2008).

Purpose

The purpose is to examine how Swedish food producers use sustainable business models to innovate their business activities. We will map, categorize and further our understanding of the development of sustainable business models and the orientation of the sustainability innovation practices and processes. The research questions are; (i), which sustainable business models archetypes do Swedish food producers use?, (ii), how do they prioritize among these archetypes?, and (iii), how do they measure business success?

Methods

Both primary and secondary data are used in this research. The primary data were collected through a telephone survey of all Swedish full-time agricultural entrepreneurs with at least an annual firm turnover of 1 million SEK (approx. 100 000 Euro). All 4,064 agricultural entrepreneurs were identified from the Agricultural Register issued by Statistics Sweden. The goal was to conduct interviews with the entire population, but it was not possible to establish contact with some entrepreneurs and some declined to participate. Eventually, the telephone survey was conducted with 1,143 agricultural entrepreneurs, which is a 28% response rate.

The secondary data (from Statistics Sweden) provided the following facts: firm location (county), firm characteristics (crops, dairy, etc.), annual turnover, land area, and contact information.

Findings

No major differences were found with respect to technical or social innovation components in the three regions: East, South, and North Sweden. However, significant differences were found between the regions with respect to organizational innovation components. North Sweden had a higher value for organizational innovation than both east and south Sweden. Two sustainable business model archetypes explain this result, namely, “repurpose for society/environment” and “develop scale up solutions”.

Overall, the results show that agri-food firms in North Sweden prioritize social and environmental benefits over economic profit maximization more than the firms in east Sweden,
and even more so than the firms in south Sweden. Similar conclusions can be drawn for the SBM archetype “develop scale up solutions”; for this archetype, firms in north Sweden are more likely to deliver sustainable solutions on a large scale to maximize benefits for society and the environment than firms in south Sweden, and even more likely than firms in east Sweden.

The paper provides empirical evidence on the various options for sustainable business models that Swedish agri-food firms use. The paper also suggests new areas for researchers and practical avenues for stakeholders in the agri-food industry and other industries to translate social and environmental value creation into economic profit and competitive advantage.

**Originality/value**

To my knowledge, this is the first study to use sustainable business model archetypes in an empirical setting in the agri-food sector.

**Contribution to the dissertation**

The contributions to the thesis can be summarized in the following points; (i) empirical use/testing of the business model archetypes, (ii) theoretical insights regarding the relationship between regional context, infrastructure and the development of sustainable business models with different points of focus, (iii) the paper unpacks the various sustainable business models of the Swedish agri-food industry and specifically the challenges of the technological, social and organisational innovation components of those business models, (iv) Northern Sweden had a higher degree of sustainable organizational innovation than the other parts of Sweden. An explanation could be that the larger challenges, the greater need for innovation, and (v) need for studies regarding “value intention”.

**Funding**

The Foundation for Agricultural Research (Stiftelsen Lantbruksforskning).

4.5 Paper V

**Title**

Development of Sustainable business models for innovation in the Swedish Agri-sector. Resource-effective producer or stewardship-based entrepreneur?

**Author**

Per-Ola Ulvenblad

**Credit author statement**

I am the sole author and researcher.
Publication

More than 108 000 downloads (September, 2023).

Key words
Agri-sector, sustainable business model, innovation, value intention, stewardship

Background
This chapter focuses on the development of sustainable business models for innovation in the Swedish agri-sector. This is important for several reasons. Many of society’s challenges are linked to social, environmental, and economical aspects of agriculture, and numerous agri-firms have been reduced to sub-contractors with little influence and are struggling with low profitability.

Purpose
Previous research regarding agri-firms have mainly focused on production and cost-efficiency aspects. Research regarding sustainable innovation and sustainable business models in the agri-sector is limited to date. To fill this gap, the aim of this chapter is to illustrate and analyze how Swedish agri-firms develop sustainable business models.

Methods
Eight different agri-firms/-cooperatives connected to agriculture in Sweden were presented, discussed and analysed. Since forestry is an integrated part of agri-firms of Sweden, and often an important part from cash flow and solidity perspectives, I have also studied one firm, and a large cooperative from the forestry sector.

The empirical data consists of both primary and secondary data, which have been collected by a set of different methods. The primary data consists mainly of interviews with owners/managers or other representatives of the firms and visits on the firm/farm. Initially, the respondents were asked to tell their story of the firms in their own words. A semi-structured interview guide with open-ended questions was also used. It covered subjects like firm history, past and current business activities, consumers, partnerships, networks, goals, culture, values, sustainability, innovation and business models.

The secondary data has been gathered through document studies (official economic records, printed material and internet pages). This multi method approach has been used in previous research on business models (Täuscher and Laudien, 2018, Zott and Amit, 2008). In the study presented in this chapter, multiple methods have been used for each case, but not all methods have been used for all cases. The collected data, including the interviews, have been analysed through categorizations and content analysis (Täuscher and Laudien, 2018).
Findings

Swedish agri-firms focus not only on optimization, but also on their organizational transformation and systems building when developing sustainable innovation. They have developed diversified business models. A common, important factor is to adopt stewardship roles. Further, the value intention of agri-entrepreneurs is a relevant factor when developing sustainable business models.

Originality/value

The analysis of the eight agri-firms in the study deepens the knowledge regarding why agri-entrepreneurs develop the sustainability aspects of their business model. This study shows that many agri-entrepreneurs have a stewardship intention and want to develop and preserve their firm, relationships and environment for the future and coming generations. Some agri-entrepreneurs applied the values of sustainability even before the concept was used in literature and discourse. The agri-entrepreneur who strive for sustainability are often ahead of, or even in conflict with, legislation and policy when they develop their sustainable business models.

The frequent use of adopting a stewardship role can be explained by the unique characteristics of the agri-sector. As Cagliano et al. (2016) have shown, there is a clear interdependency between agriculture and environmental, human and physical resources. Walker (2014, 2012) has shown the importance of the values of the entrepreneur as a driver for sustainable business models. Ulvenblad et al., (2016) and Barth et al., (2017) have elaborated on this relationship. The owners/managers regard themselves as stewards or custodians of the firm, the property, and the environment, with a responsibility for individuals, animals and growing things. The firm is often based on a farm, which have been owned by the ancestors before. The firm is depending on the resources of the land and it is going to stay where it is. Relations to neighbors and other firms are also important and have to be managed and maintained. The stewardship perspective is important when developing sustainable business models in the agri-sector.

The research presented in this thesis suggests that when studying the development of sustainable business models, the building block ‘value intention’ should be added to previously developed building elements of the conceptual business model framework, (i) value proposition, (ii) value creation and delivery, and (iii) value capture (Bocken et al., 2014; Richardson, 2008; Osterwalder and Pigneur, 2005). Sustainability-oriented research also underlines the philosophy and values of the organization (Adams et al., 2016). Based on the cases presented in this chapter, the value intention is an important base for a sustainable business model in the agri-sector. Hence, it seems relevant to include the value intention element into the conceptual business model framework as well. Including the value intention of the owner-manager in the future theory building could present important insights of potential trade-offs and barriers when addressing growth ambitions based on social, environmental, and economic aspects.
Contribution to the dissertation

In paper V, eight case studies of Swedish agri-firms are conducted. In the study, the prospects for developing sustainable business models within the agri-sector is studied. Its prerequisites can be divided into three different levels: (i) the individual / entrepreneur, (ii) the firm / farm / site and (iii) the area / region. The individual's / entrepreneur's attitudes, perspectives, skills and abilities affect whether a situation is considered an obstacle or an opportunity. It is essential that the individual regards herself/himself as an entrepreneur in the first instance (and not a producer). The firm/farm/site has often been taken over by previous generations and provides housing for the entrepreneur and the family. It increases the willingness to conduct a steady corporate governance (stewardship). The area / region is of great importance, as proximity to larger population centers and thus end consumers, decision makers and government officials increases the opportunities for collaboration between firms, organizations and individuals, which increases the ability to develop sustainable business models. The paper deepens the knowledge regarding the importance of value intention and stewardship when developing sustainable business model innovation in the agri-firms.

The contributions to the thesis can be summarized in the following points: Firstly, identifying and focusing the importance of stewardship and the connection to value intention. Secondly, identifying important success factors for agri-entrepreneurs; (i) regarding themselves as entrepreneurs and not only producers, (ii) ascending the value chain, and (iii) diversification of the business model. Thirdly, the study also highlights the potential to diffuse stewardship and value intention to other industries as well. The societal needs are large, and if the concept of stewardship is spread to other industries, the sustainable development goals in Agenda 2030 can be achieved faster.

Funding

Funded by Bill and Melissa Gates Foundation.
5. Discussion

In this chapter, the findings and contributions of the research will be presented and discussed. The combined theoretical framework consisting of the business model building blocks, the sustainable business model archetypes and sustainability-oriented innovation (SOI) will be discussed. The developed fourth building block of sustainable business models, value intention, will be presented and discussed. A sustainability perspective will be applied on all four building blocks of sustainable business models. Further, the value intention building block will be understood and explained from a stewardship perspective. Finally, the dichotomization farmer-producer – farmer-entrepreneur and its implications will be discussed.

5.1 Findings regarding previous research

Research regarding the agricultural sector has dominantly focused technological aspects in order to raise productivity and efficiency (e.g., Alston and Pardey, 2021; Alston, 2018; Viaggi, 2015). Further, the literature reviews conducted at the start of the research process and presented in this thesis, paper I and III, as well as the theoretical framework discussion in chapter 2 of the thesis, show that research regarding sustainable business model innovation in the agri-sector is limited, even though it is emergent and growing.

The overall purpose of the first paper in this thesis was to develop an understanding of research on business models and business model innovation in the agri-food sector. The findings of the first paper show that agri-food sector articles are primarily qualitative, empirical studies that focus on one or a few firms (i.e., case studies). Very few articles focused on the individual level. The literature review also showed that the articles had been published in over 300 journals. Many are published in journals connected to the agri-sector, not to innovation and business models. A conclusion is that theory regarding business model innovation is emergent and growing but not yet well-developed. Based on the findings, a need for more qualitative studies from the manager/owner perspective, especially regarding cognitive barriers business model innovation.

In the second paper in the thesis, the focus of the study was sustainable business model innovation in the agri-food sector. The literature review showed that a small minority of papers (only 21 of 570 papers) had sustainability and business model innovation as their primary focus. However, the review also showed that research interest in the agri-food sector has increased over time.

Further, a third systematic literature review regarding internal and external barriers to sustainable business model innovation has also been conducted (Ulvenblad et al., 2018). The paper is not included in this thesis but constitutes a base for the focus on and analysis of barriers to sustainable business model innovation. The analysis showed that previous theoretical research had focused external barriers and paid little attention to internal individual barriers.
(mindset, perceptions, values, and behaviour), even though previous empirical studies show the importance of internal barriers. Hence, future research should examine internal individual barriers (mindset, perceptions, values, and behaviour) using quantitative as well as qualitative methods.

To summarize, the literature reviews presented in the papers show that research regarding sustainable business model innovation in the agri-sector is limited, even though it is emergent and growing. The research on barriers has focused on external barriers, even though empirical studies show the importance of internal barriers. The theoretical approaches are scattered and weakly applied - business models and business model innovation literature, especially in combination with sustainability, are too new to have developed into a comprehensive theoretical framework.

Further, the literature review presented in chapter 2 showed that sustainability is developing to be an integrated part of innovation research. Sustainability-related issues have become a significant driver in innovation research (Avila-Robinson et al., 2022). The core of innovation is evolving from innovation for economic productivity to innovation for sustainability (Edwards-Schachter, 2018). However, even if innovation studies have had a positive impact, it has not yet met the increasingly urgent need for sustainability (Martin, 2016). The challenge for innovation studies researchers is to respond to the pressing world need for more sustainable development regarding economic as well as social and environmental matters. The researchers conducting innovation studies have to work with other researchers on development studies and sustainability to ensure that the conceptual, methodological and analytical tools needed to facilitate this shift to innovation for sustainable development through appropriate policies are developed (Martin, 2016).

Innovation often tends to cluster in specific industries (Fagerberg et al., 2013). The significant societal challenges and needs regarding both raised food production and reduced climate impact, e.g., higher degrees of sustainability, are a strong driving force for innovation development in the agri-sector. Testa et al. (2022) have stressed both the gravity of the challenges connected to agri-sector and the relevance of research regarding sustainability, business models and innovation in the agri-sector from a sustainability-oriented innovation perspective. However, there is a potential for further development of research regarding sustainable business model innovation in the agri-sector, since research has mainly been conducted in industries other than the agri-sector (Nosratabadi et al., 2019) or in limited parts of the world (Masenya, 2023; Aibar-Guzman, 2022).

Research has often treated innovation and sustainability dichotomously - sustainable or not sustainable. This perspective has been criticized by Adams et al. (2016), who argue that firms strive towards sustainability, but it is very hard to be fully sustainable. In line with this reasoning of Adams et al. (2016), the perspective of the research presented in this thesis, is that there is a need to regard sustainability as a strive towards a goal rather than a state of being fully sustainable.

Further, research regarding both business models in general and sustainable business models are often applied in a normative way without including the actor in the business model
construct. It implies that one critical element is missing in the business model constructs: the decision maker (the owner, the manager, the entrepreneur, the farmer). However, the perspective in this thesis is that it is very hard to understand a business model without considering the actor, the agri-entrepreneur and her/his will and skill (Mattsson, 2009).

5.2 Empirical findings and contributions

In this thesis, several empirical studies (papers III, IV and V), using different methods, have been conducted to map and analyse sustainable business model innovation in agri-firms. The empirical studies have identified the importance of the agri-entrepreneur when developing sustainable business model innovation.

Semi-structured interviews with 54 agricultural entrepreneurs who participated in two education programs have been carried out. A survey of these agricultural entrepreneurs and a control group of agricultural entrepreneurs not participating in the training programs was also conducted. The survey was answered by a total of 109 agricultural entrepreneurs (paper III). The interviews and the survey showed that barriers and challenges are mainly connected to internal factors like mindset, perceptions, values, and behaviour. These empirical findings are interesting, considering that previous theoretical research has focused external barriers and paid little attention to internal individual barriers.

An extensive survey focusing all 4,064 agricultural firms in Sweden with full-time activity and a turnover of at least 1 million SEK, firms, was also conducted (paper IV). The survey was answered by 1,143 firms, which gives a response rate of over 28%. The purpose was to examine how Swedish agri-entrepreneurs use sustainable business models to innovate their business activities. The primary type of sustainable business model innovation has been mapped, focusing on technological, social, and organizational-oriented innovations. The most common business model archetype was Maximise material and energy efficiency, which is in line with the dominating production and efficiency perspective.

The survey revealed that Northern Sweden had a higher degree of sustainable organizational innovation regarding the business model archetypes Repurpose for society/environment and Develop scale up solutions than the other parts of Sweden. An explanation could be that larger challenges regarding climate, communications, population density and other factors in northern Sweden imply a greater need for innovation. The study empirically tested the eight sustainable business model archetypes framework (Bocken et al., 2014). To my knowledge, this is the first study which maps the sustainable business model applied by the Swedish agricultural sector. The study is also the first to use sustainable business model archetypes in an empirical setting in the agricultural sector.

Finally, eight qualitative case studies of agricultural firms were also conducted (paper V). The empirical data of the cases consists of both primary and secondary data collected by a set of different methods. The primary data consists mainly of interviews with owners/managers or other representatives of the firms and visits to the firm/farm. The secondary data has been gathered through document studies (official economic records, printed material and internet
The cases showed that sustainability in sustainable business model innovation is not a state, but rather an ongoing process from unsustainability towards higher levels of sustainability, which is in line with the sustainability-oriented innovation perspective (Adams et al., 2016).

The cases also showed the importance of the individual behind the business model. The analysis deepens the knowledge regarding why agri-entrepreneurs develop the sustainability aspects of their business model. This study shows that many agri-entrepreneurs have a holistic perspective and want to develop and preserve their firm, relationships and environment for future generations. Some agri-entrepreneurs applied the values of sustainability even before the concept was used in literature and discourse. The agri-entrepreneur who strive for sustainability are often ahead of, or even in conflict with, legislation and policy when they develop their sustainable business models.

To summarize, the empirical studies uncovered the sustainable business models of the agri-firms in Sweden. Further, the empirical studies identified and highlighted the importance of the individual behind the sustainable business model. They showed that barriers to sustainable business model innovation are mainly connected to internal factors like changing mindset, acting as a leader, time management and lack of resources.

5.3 Theoretical contributions - conceptual development

The research presented in this thesis builds on and adds to previous research regarding three main theoretical areas; (i) the value-oriented building blocks of business models (Richardson, 2008); (ii) business models archetypes (Bocken et al., 2014) and (iii) sustainability-oriented innovation (Adams et al., 2016). The combined framework was developed as a model for empirical data collection and analysis.

Firstly, the building block value intention has been added to the previous building blocks of sustainable business models. Secondly, stewardship has been identified as an essential driver for sustainable business model innovation, which can explain the business model building block value intention. Thirdly, sustainability has been included in all aspects, all building blocks, of sustainable business model innovation. Fourthly, a dichotomization of farmers into two groups, farmer-producer and farmer-entrepreneur has been developed and its implications for sustainable business model innovation has been elaborated upon.

5.3.1 A combined theoretical framework

To deepen the understanding of sustainable business model innovation development in the agri-sector, several theoretical frameworks have been combined in the thesis - the three value-oriented business model building blocks (Richardson, 2008), the business model archetypes developed by Bocken et al. (2014) and sustainability-oriented innovation (SOI) (Adams et al., 2016).
Richardson (2008) proposes a value-focused business model framework in order to link the firm’s theory about how to compete to its execution. The framework, which builds on previous research and ideas about business models, is organised in a logical structure that reflects thinking in strategy. Richardson (2008) states that the framework is a useful tool for the strategist, for teaching, and for research.

Bocken et al. (2014) build their archetypes on the nine business model parts of the business model canvas (Boons and Lüdeke-Freund, 2013; Osterwalder and Pigneur, 2012). The blocks most relevant to this study are value propositions, key activities, key partnerships, and revenue streams. Building on this crucial tool for analysing business models, Bocken et al. (2014) add sustainable social and environmental activities. The eight sustainable business model archetypes have been presented above in figure 2.1. These archetypes can be used to identify patterns and attributes that facilitate categorising business model innovations for social and environmental sustainability. The archetypes can constitute a base for developing a common language for developing sustainable business models in research and practice (Bocken et al., 2014).

Adams et al. (2016) regard sustainability as a journey, and that organizational change happens over time, which creates a possibility to map the orientation of the sustainability innovation practices and processes. In the sustainability-oriented innovation framework developed by Adams et al. (2016), they divide their it into three dimensions from diminishingly unsustainable to increasing sustainable. The first dimension, technical/people, is about a growing focus on people-centered innovation rather than focus on technology-based innovation. The second dimension, stand-alone/integrated, describes how ‘innovation for sustainable manufacturing has developed from isolated technological solutions towards modes of practice where sustainability is embedded in the culture of the firm. The third dimension, insular/systemic, reflects the firm’s view of itself in a broader socio-economic system beyond the firm’s immediate boundaries and stakeholders (Adams, et al., 2016).

These three dimensions then constitute three sustainability-oriented innovation approaches on the journey to a sustainable business: Operational optimization, Organizational transformation and System building that a firm can have when it comes to innovation objectives, outcome and relationship, defining the sustainability of the business. The simplified model of sustainability-oriented innovation has been presented in table 2.2 above.

The idea behind combining these frameworks is to categorize the business model innovations and study the organizational change, the orientation of the sustainability innovation practices, in firms. Bocken et al. (2014) categorize and define sustainable business model archetypes. When these archetypes are combined with the dynamic perspective in sustainability-oriented innovation (SOI), the change to more sustainable business models is focused. See table 5.1 below. Further, sustainability-oriented innovation concentrates not only on the firm’s products, processes, or practices to become more sustainable but also on making intentional changes to an organization’s philosophy and values (Adams et al., 2016).
Table 5.1 A combined sustainable business model framework (Ulvenblad, 2021; Ulvenblad et al., 2019 based on Adams et al, 2016; Bocken et al., 2014).

<table>
<thead>
<tr>
<th>Approach</th>
<th>Operational optimization: doing more with less</th>
<th>Organizational transformation: doing good by doing new things</th>
<th>System building: doing good by doing new things with others</th>
</tr>
</thead>
</table>

5.3.2 Value intention - the fourth building block of sustainable business models

Based on the findings of the research presented in this thesis, a fourth building block of sustainable business models is developed - *value intention* – adding to the three previous building blocks developed by Richardson (2008); value proposition, value creation and delivery, and value capture.

To understand the development of sustainable business models in the agricultural sector, it was observed that it was important to consider different aspects regarding the intentions and goals of the agri-entrepreneur. During the subsequent studies focused on the building blocks of sustainable business models, the conclusion was that a significant part was missing. To understand the development of sustainable business models, the researcher needs to include the entrepreneur in the equation. Based on the literature reviews and empirical studies, a fourth building block, value intention, was added to the building blocks or building elements of the sustainable business model (Barth, Ulvenblad and Ulvenblad, 2017), figure 5.1 and table 5.4.

To convert a business model in theory into action in practice, the business model needs to have an individual as the driving force behind it. My previous research, e.g., Svensson and Ulvenblad (2019/2000) regarding small business finance and bank’s decision-making regarding loans to entrepreneurial firms clearly showed that the entrepreneur and her/his "will and skill" (Mattsson, 1999) must be considered when assessing the potential of a firm’s business model. As bank officers know, the entrepreneur is more important than the business model. A proverb among bank officers is that "a true entrepreneur can make gold out of a bad project while a bad entrepreneur can ruin a good project" (Ulvenblad and Ulvenblad, 2012, p. 15).
Further, the entrepreneur and the business model have to match. Hence, the value intention of the entrepreneur is of decisive importance when developing business models, especially sustainable business models.

When analysing the empirical observations, the value intention of the agricultural entrepreneurs was identified as an essential building block; “Firms in the agri-industry have unique characteristics as described above; owner-managed family business and rooted in their communities. The owners expect that their firms are going to be there for the indefinite future, and the owners are not solely concerned with growth and revenues. The owners regard themselves as stewards or custodians of the firm, the property, and the environment, with a responsibility for living and non-living things. To include value intention of the owner-manager in the conceptual framework, could present important insights of potential trade-offs and barriers when addressing growth ambitions based on social, environmental, and economic aspects.” (Barth, Ulvenblad and Ulvenblad, 2017, p.7).

As described above, firms in the agri-industry have unique characteristics: owner-managed family businesses rooted in their communities. The owners expect that their firms are going to be there for the indefinite future, and the owners are not solely concerned with growth and revenues. The owners regard themselves as responsible for the well-being and continuous exiting of the firm, the property, and the environment, with a responsibility for living and non-
living things. Including value intention of the owner-manager in the conceptual framework, could present important insights into potential trade-offs and barriers when addressing growth ambitions based on social, environmental, and economic aspects.

The building block value intention was developed and presented in the second paper (Barth, Ulvenblad and Ulvenblad, 2017) in this thesis. The building block has been added to and integrated with the previous three business model blocks (Bocken et al., 2014; Richardson, 2008; Osterwalder et al., 2005).

Several researchers have found the conceptual development in this thesis valid and with explanatory value when studying development of sustainable business models and sustainable business model innovation. They have built their research studies on our framework with four business model building blocks. Their analyses have shown the importance of the building block value intention. Some examples of researchers who have based their studies on our framework are Sincovics et al., (2021), Preghenella (2022) and Attanasio et al. (2022).

Sincovics et al. (2021) also focus on value intention based on the framework presented in this thesis and state that sustainable innovation in value intention occurs when there is a change in owner-managers attitudes towards sustainability. According to Sincovics et al. (2021) the attitudes of decision-makers are crucial when creating an organisational culture that fosters sustainability-oriented innovation.

Preghenella (2022) studied the entire value flow when developing business model for sustainability and found it consisting of value intention (Barth, Ulvenblad and Ulvenblad, 2017), value proposition, value creation, value delivery, and value capture (Richardson, 2008; Bocken et al., 2014; Short et al., 2014). Preghenella (2022) states that "the value intention of the entrepreneur is key in the business model for sustainability because he or she want to pursue purposes of common benefit to defend the environment, resolve common social issues or like to enable the organization to reach beyond generations” (p.137), and she concludes that value proposition is the direct consequence of the value intention that takes the form of a promise to offer value not only to the consumer but to a wider group of stakeholders.

Attanasio et al. (2022) conducted case studies of eight firms in industries other than agriculture. The researchers state: “We consider value intention as the initial and fundamental dimension to reach sustainable impact. From the case studies, it emerges that the sustainable vision, together with the entrepreneur’s intentionality is key element to adopt a business model for sustainability. For this reason, in the stakeholder value flow model, we have positioned the value intention as first ideal dimension” (p. 870).

Further, Miranda et al. (2023) recently conducted a literature review of the development of agri-food business models. They suggest that "from a research point of view, it is also interesting to deepen the understanding of the owner-manager’s “value intention” in relation to business model innovation in the agro-industrial sector” (p. 14). They also state that more empirical research is needed that builds on the theories and frameworks developed in this area.
5.3.3 Sustainability and the building blocks of business model innovation

In this thesis, it is suggested that a conceptual framework for sustainable business model innovation should include the sustainability aspects in every building block of sustainable business model innovation, see Table 5.2 below.

Table 5.2 A conceptual business model framework for sustainable business model innovation (Barth, Ulvenblad and Ulvenblad, 2017).

<table>
<thead>
<tr>
<th>Building blocks</th>
<th>Description</th>
<th>Degree of innovation</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value intention</strong></td>
<td>Mind-set of owner/manager</td>
<td>Attitudes to change and innovation</td>
<td>Is sustainability a means, a goal, or something else? Is sustainability enhancing or limiting the BM?</td>
</tr>
<tr>
<td><strong>Value proposition</strong></td>
<td>Product/service Consumer segments and relationships</td>
<td>Offers more of the same or something new to the firm/world? Existing markets or new markets?</td>
<td>Do the product/service, consumer segments, and relationships enhance sustainability? For example, traceability for products and standards for safety and quality?</td>
</tr>
<tr>
<td><strong>Value creation and delivery</strong></td>
<td>Key activities, resources, channels, partners, and technologies</td>
<td>Improvements of existing channels or new relationships? Familiar (fixed) networks or new (dynamic) networks (e.g., alliances, joint ventures)? Improvements of existing technologies or new, emerging technologies?</td>
<td>Do key activities, resources, channels, partners, and technologies focus on sustainability aspects? Awareness of food-related ethics? Ethical consumption? For example, ecological sustainability, social justice, and animal welfare.</td>
</tr>
<tr>
<td><strong>Value capture</strong></td>
<td>Cost structure and revenue streams</td>
<td>Incremental cost-cutting in existing processes or new processes that generate revenues?</td>
<td>Do cost structures and revenue streams include sustainability considerations? E.g., sustainable food systems based on environmental, social, and economic aspects.</td>
</tr>
</tbody>
</table>
When an agri-entrepreneur has the (i) ‘value intention’ to develop a sustainable business model, the sustainability considerations are more explicitly formulated in the other three business model building blocks. For ‘value proposition’ and concerns about the product/service, consumer segments, and relationships that enhance sustainability, it is also relevant to consider, for example, traceability for products and standards for safety and quality. For ‘value creation and delivery’, there are benefits to include not only if the key activities, resources, channels, partners, and technologies focus on sustainability aspects but also awareness of food-related ethics and ethical consumption —for example, ecological sustainability, social justice, and animal welfare. For ‘value capture’, it is essential to not solely focus on if cost structures and revenue streams include sustainability considerations but also include, for example, sustainable food systems based on environmental, social, and economic aspects.

5.3.4 Stewardship

This thesis shows that many agri-entrepreneurs have a stewardship perspective and want to develop and preserve their firm, relationships and environment for future generations. Hence, stewardship is an essential driver and explaining factor for sustainable business model innovation. The analysis based on the eight cases presented in paper five in this thesis deepens the knowledge regarding why agri-entrepreneurs develop the sustainability aspects of their business model. Some agri-entrepreneurs applied the values of sustainability even before the concept was used in literature and discourse. The agri-entrepreneurs who strive for sustainability are often ahead of, or even if conflict with, legislation and policy when they develop their sustainable business models.

The unique characteristics of the agri-sector can explain the frequent use of adopting a stewardship perspective. As Cagliano et al. (2016) have shown, there is a clear interdependency between agriculture and environmental, human and physical resources. Walker (2014, 2012) has also pointed out the awareness of the entrepreneur as a value-based driver for sustainable business models. Ulvenblad et al. (2016) and Barth et al. (2017) have elaborated on this relationship. The owners/managers regard themselves as stewards or custodians of the firm, the property, and the environment, with a responsibility for individuals, animals and growing things. The firm is often based on a farm, which has been owned by the ancestors before. The firm depends on the land's resources and will stay where it is. Relations with neighbours and other firms are also essential and must be managed and maintained. To conclude, the stewardship perspective is vital to developing sustainable business models in the agri-sector.

The aim of the eight sustainable business model archetypes developed by Bocken et al. (2014) is to “develop a common language that can be used to accelerate the development of sustainable business models in research and practice” (p. 42). Accordingly, the stewardship archetype seeks to “maximize the positive societal and environmental impacts of the firm on society by ensuring long-term health and wellbeing of stakeholders (including society and the
The researchers state that the stewardship archetype can preferably be used in combination with other archetypes.

Based on the findings presented in this thesis, the stewardship role is of paramount importance. The identification of the importance of stewardship is in line with Salimi (2021a) who conducted a study of Dutch dairy farmers. Her results show that the business model archetype stewardship (Bocken, et al., 2014) is regarded as very important by experienced experts from both academy and dairy firms in the Netherlands. The results also show that the stewardship needs to be improved, which means it constitutes a base for entrepreneurial opportunity recognition (Hanohov and Baldacchino, 2018).

However, it could be argued that stewardship should not be regarded as a business model archetype. Instead, it is an explanation or an incentive for developing sustainable business models. I suggest that stewardship is a concept of a higher order – it constitutes an explanatory factor regarding the value intention, the missing piece in the business model puzzle.

Stewardship theory (Donaldson and Davis, 1989, 1991) has been introduced and elaborated upon as an alternative, or rather a complement, to agency theory (Davis et al., 1997). The logic behind agency theory is that individuals are rational actors who strive to maximize utility, often defined as economic rewards (Jensen and Meckling, 1976). The consequence is that the agent will prioritize actions that reward the individual rather than the goals of the owners or organization. According to stewardship theory, managers (and others) are not motivated solely by individual goals but rather by stewards whose intentions and actions align with their principals' objectives (David et al., 2007).

Management research regards stewardship theory as applicable to sustainable development in firms, because it views managers' strategic decision making and actions as “considering the long-term interests of a variety of stakeholders rather than its own self-serving and short-term opportunistic behavior under agency theory” (Rezaee, 2016, p.54). The long-term orientation and the protection of interest of all stakeholders, are typical characteristics of stewardship theory and drivers of corporate sustainability in firms (Hernandez, 2012).

To conclude, stewardship theory seems to be a relevant theory when studying the development of sustainable business models in agr-firms. The manager of an agri-firm is often also the owner of the firm, which means that a formal contractual relationship is not at hand. However, the manager/owner has long-term commitments towards a variety of stakeholders, such as family, value chain actors, farm and land. This is especially valid when the agri-firm is conducting sustainable business model innovation, which contains considerations regarding society as well as environment, which can be regarded as the principals.

5.3.5 Dichotomization; Farmer-producer or farmer-entrepreneur

The different perspectives of the farmer (farmer-producer and farmer-entrepreneur) have implications in several dimensions. In order to illustrate these implications, I have developed a dichotomization; farmer-producer and farmer-entrepreneur. In reality, it is rather a situation
with continuous values. Some farmers are regarding themselves as mainly producers, and some as mainly entrepreneurs, but no one can hardly be categorized only as a producer or only as an entrepreneur. Every farmer has a mix of producer/entrepreneur focus.

Table 5.3 Dichotomization; farmer-producer and farmer-entrepreneur (Ulvenblad, 2023).

<table>
<thead>
<tr>
<th>Identity</th>
<th>Farmer-producer</th>
<th>Farmer-entrepreneur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main focus</td>
<td>Production; how to produce in a cost and resource effective way</td>
<td>Business; how to create value for consumers</td>
</tr>
<tr>
<td>Value chain position</td>
<td>In the start of the value chain</td>
<td>Ascending the value chain</td>
</tr>
<tr>
<td>Profit strategy</td>
<td>Raised production, cost reduction and efficiency</td>
<td>Generate added end consumer value</td>
</tr>
<tr>
<td>Economics focus</td>
<td>Economics of scale</td>
<td>Economics of scope</td>
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<tr>
<td>Size</td>
<td>Larger units</td>
<td>Diversified units</td>
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<tr>
<td>Logic</td>
<td>Resource based</td>
<td>Circularity</td>
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<tr>
<td>Environmental and animal welfare laws and regulations</td>
<td>Restrictions</td>
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<td>Sustainability</td>
<td>A business model barrier</td>
<td>A business model opportunity</td>
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<td>Innovation</td>
<td>Result</td>
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<td>Technological</td>
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<td>Digitalisation</td>
<td>How to measure quality</td>
<td>How to communicate quality</td>
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The main focus of a producer is to generate financial revenues through cost-effective production and low price, while the entrepreneur's focus is to generate financial revenues by adding other values than a low price to the consumer, e.g., environmental sustainability, animal health and welfare, nutrition and health aspects. The producer is firmly positioned at the start of the value chain, while the entrepreneur tries to move upstream the value chain, or even shortening the value chain. The higher the agri-firm can move in the value chain, the larger share of the value generated will be captured by the agri-firm. The producer gets a low share of generated value, while the entrepreneur gets a larger share. See table 5.3.

The profit strategy of the producer is to focus on raised production, cost reduction and growing efficiency, while the entrepreneur focuses on generating added end consumer value. The producer focuses on economics of scale, while the entrepreneur focuses on economics of scope. The producer strives to develop larger units, while the entrepreneur strives to develop diversified units. The logic of the producer can be described as resource-based, while the logic of the entrepreneur is categorized by circularity.

There is a tendency that environmental and animal welfare regulations are regarded as restrictions if the farmer has a production focus, but as an opportunity if the farmer has a
business focus. Further, sustainability risks to be regarded a barrier to the development of the business model for producer while it can be an opportunity for the entrepreneur. Innovation is often regarded as a technical development which can improve production for the producer, while it is a social or organizational development for the entrepreneur, which can generate more added value to product or service offered to the consumer.

The producer regards digitalization as a possibility to improve internal processes, e.g., improving production or quality, while the entrepreneur regards digitalization as a possibility to shorten the value chain, communicate the value proposition to consumers and increase traceability.

Both many producers and entrepreneurs have a stewardship perspective on their business, while others have more of a traditional management perspective. In fact, it can be argued that the stewardship perspective has much longer history than the production vs business focuses. Since back in time, the farmers have regarded themselves as producers who take care of land, plants, animals and humans, which mean that they act according to stewardship. The development of the last decades, with deregulation, market orientation and global competition in the agricultural markets have led to the development of farmers as entrepreneurs.

When an agri-entrepreneur or a primary producer strives to develop a sustainable business model it is often based on a stewardship perspective. The value intention, not least regarding sustainability, becomes important when the sustainable business model of the agri-firm is developed and sustainability considerations are integrated into the sustainable business model building blocks; the value proposition, the value creation and delivery, and the value capture of the firm, according to table 5.3 above. The primary producer focuses mainly on the effective and sustainable production, while the agri-entrepreneur focus on all building blocks of the sustainable business model.
6. Conclusions and implications

In this last chapter of the thesis, the conclusions of the research; (i) gaps in previous research, (ii) empirical conclusions and (iii) theoretical conclusions will be presented. Further, practical implications for agri-entrepreneurs, advisory organizations and policymakers will be presented. Limitations and implications for future research will also be discussed. In the concluding remarks, the importance of sustainable business model innovation for society and environment are discussed.

6.1 Conclusions

The conclusions of the thesis will be presented in this section. Initially, the gaps in previous research will be presented, followed by the empirical and theoretical conclusions.

6.1.1 Gaps in previous research

Research on sustainable business models and business model innovation is still recent and fragmented. There is a lack of both clarity and an academic shared vision on the business model for the sustainability construct itself. More conceptual development is needed to merge and adapt the dimensions, elements and characteristics of sustainable business models and business model innovation.

Research on sustainable business models and business model innovation in the agri-sector is very limited. Most research regarding the agri-sector has been conducted from technology or life science perspectives. The conducted economics research has mainly focused productivity and efficiency, while only a minor part has been conducted from a business perspective, where shortened value chains and added value for end consumers are in focus.

Research in the field is, with few exemptions, focused on the three building blocks of the business model (or the nine of the business model canvas), applied in a normative way without including the actor in the theoretical constructs. The reason is that the business model construct often is intended to be an instruction to managers how to develop their business, – 'conduct your business according to this model and you will be successful'. However, if research shall be able to build understanding of the development of sustainable business models and business model innovation, research must consider the subject and driving force behind the business model as well – the individual, the manager, the entrepreneur.

Finally, research has mostly focused external barriers to sustainable business model innovation, although research show the great importance of internal barriers. Further, external barriers are often not possible to change, while the agri-entrepreneur has larger possibilities to overcome the internal barriers.
6.1.2 Empirical conclusions

In this section the empirical conclusions in the thesis will be summarized.

- The importance of the individual, the agri-entrepreneur, when developing sustainable business model innovation has been identified. Many agri-entrepreneurs strive to conduct their business with economic as well as social and environmental considerations. The thesis deepens the knowledge regarding why and how agri-entrepreneurs develop the sustainability aspects of their business model. This study shows that many agri-entrepreneurs have a holistic perspective and want to develop and preserve their firm, relationships and environment for future generations, and for earth itself.

- Barriers and challenges that restricts agri-entrepreneurs are often connected to internal factors like mindset, perceptions, values, and behaviour, not external factors. This is interesting since both practice and research often put focus on external barriers, which in many cases are hard for the agri-entrepreneurs to change and overcome. However, the agri-entrepreneurs has possibilities to influence and change internal factors.

- The thesis reveals how Swedish agri-entrepreneurs use sustainable business models to innovate their business activities. The primary type of business model innovation has been mapped, focusing on technological, social, and organizational-oriented innovations. The most common business model archetype is Maximise material and energy efficiency, which is in line with the dominating production and efficiency perspective.

- Agri-entrepreneurs in northern parts of the country show a higher degree of sustainable organizational innovation regarding the business model archetypes Repurpose for society/environment and Develop scale up solutions than agri-entrepreneurs in other parts. The reason could be that larger challenges regarding e.g., climate, communications, and low population density imply a greater need for and focus on innovation.

6.1.3 Theoretical conclusions

In this section the theoretical conclusions in the thesis will be summarized.

- Value intention has been identified as the starting point for development of sustainable business model innovation. Value intention has been added to the three previous building blocks, value proposition, value creation and delivery, and value capture of a business model. The building block value intention makes it possible to include the actor, the agri-entrepreneur, in the business model construct. This is crucial since a
business model cannot be developed without an actor, in this thesis an agri-entrepreneur, behind it as the driving force. It is argued that future studies of sustainable business model innovation will be deeper and create more understanding if the value intention, and consequently, the entrepreneur is included in the business model construct.

- Sustainability aspects have been added to all four building blocks of a sustainable business model. A conceptual framework for sustainable business model innovation should include the sustainability aspects in all building blocks of sustainable business model innovation. Further, sustainability is in this thesis not regarded as an achieved state, but a continuous process where higher levels of sustainability is developed and achieved over time, which is in line with the sustainability-oriented framework.

- Stewardship has been identified as a concept which can be used to understand the value intention of agri-entrepreneurs striving for economic, social, and environmental goals. Stewardship can be understood from the interdependency between agriculture and environmental, human and physical resources. Stewardship corresponds with the sustainability-oriented framework in which the philosophy and values of the organization, is identified as the starting point for the development of sustainability-oriented innovation. The definition of stewardship in this thesis is in contrast with the sustainable business model archetypes framework, where stewardship is regarded as one of eight sustainable business model archetypes. In the thesis, stewardship is a concept of a higher order. It is a driver for sustainable business model innovation.

- Stewardship theory is a relevant theory when studying sustainable business model innovation in agri-firms. The manager of an agri-firm is often the owner of the firm, which means that a formal contractual relationship is not at hand. However, the manager/owner has commitments towards family, value chain actors, farm and land. This is especially valid when the agri-firm is conducting sustainable business model innovation, which contains considerations regarding society as well as environment, which can be regarded as the principals.

- A dichotomization in farmer-producer and farmer-entrepreneur has been conducted. The dichotomization has implications in several dimensions. The dimensions which are elaborated upon are; main focus, value chain position, profit strategy, economics focus, size, logic, environmental and animal welfare laws and regulations, sustainability, innovation, and digitalization.

6.2 Implications for practice

If a sustainable society, with sustainable firms and other organizations, shall be developed, academic research needs to be implemented in practice. Richardson (2008), who developed the three value-centered building blocks of business models formulated it as: “armed with a good
theory, the strategist must put it to the test through implementation or execution” (p.134). In this section, implications for practice will be formulated and discussed.

6.2.1 Implications for agri-entrepreneurs

Since many farmers are food producers positioned at the beginning of the value chain, their historical identity as primary producers is strong. In their strive to be competitive, the focus has been on cost reduction and increased productivity. However, the primary producers’ influence in the value chain is generally weak and profitability at the start of the value chain is often low.

Based on the conclusions of the research presented in this thesis, the farmers must regard themselves as entrepreneurs and not only producers – the banks are not interested in their specific production; they focus on the cash flow of the business. Suppose the farmers regard themselves as agri-entrepreneurs and concentrate on an added value higher up in the value chain rather than only on efficiency at the inception of the value chain - in that case, it will be natural to emphasize the importance of agri-businesses for a sustainable society. Instead of a focus on the negative climate and environmental impact of production, focus can be put on creating added value from climate and environmental perspectives.

Growing awareness and understanding of these values increase the opportunities for agri-firms to obtain higher prices for their products and/or services. Agri-firms can then focus more on how sustainable innovations is developed. The climate and environmental perspectives will become an opportunity and not a limitation for agri-firms.

Further, agricultural entrepreneurs that want to develop technological, social and organisational innovation should focus on social/environmental goals. An explanation for this outcome could be that these agricultural entrepreneurs concentrate on producing, distributing, and selling high-value products rather than on effective and low-cost production. If so, one strategy could be to produce and deliver products with a high degree of innovation and sustainability. These products will probably be appreciated by the end consumers and consequently generate a higher degree of value capture, i.e., revenues. To put it another way, the innovation and sustainability factors are drivers of improved financial revenues of the firm. It could be regarded as “doing well by doing good”.

A practical implication for agri-entrepreneurs is to involve sustainability aspects in the three building blocks more explicitly (i) value proposition, (ii) value creation and delivery and (iii) value capture. For ‘value proposition’ and concerns about the product/service, consumer segments, and relationships that enhance sustainability, it is also relevant to consider traceability for products and standards for safety and quality. For ‘value creation and delivery’, there are benefits to include not only if the key activities, resources, channels, partners, and technologies focus on sustainability aspects but also awareness of food-related ethics and ethical consumption - ecological sustainability, social justice, and animal welfare etc.. For
‘value capture’, it is essential to not solely focus on if cost structures and revenue streams include sustainability considerations, but also include sustainable food systems based on environmental, social, and economic aspects.

Consequently, there are also practical implications regarding self-leadership for agricultural entrepreneurs. The entrepreneur her-/himself is very important for the success of the agricultural firm. The results indicate that personal motivation is an important starting point for business development for agri-entrepreneurs. It underlines the importance of the entrepreneur and her/his will and skill when developing the firm. Hence, developing self-leadership is crucial for business model innovation in the agricultural sector and an important practical implication for agricultural entrepreneurs.

6.2.2 Implications for advisory organisations

The advisory organizations and extension services, as well as teaching on different levels, should reinforce the concept of agri-entrepreneurs as entrepreneurs instead of only producers. The efforts should focus on new, sustainable business models that encompass more links in the value chain than primary production. This means that education and counselling for businesses should concentrate on self-leadership, leadership, business development, and innovation.

The focus should not be the development of the entrepreneur’s knowledge – *what the entrepreneur should know*. Instead, the focus should be mindsets, strategies for thought patterns and strategies for behaviours – *what the entrepreneur should be able to do*. Hence, this requires that traditional counselling – where the counsellor informs the entrepreneur of the best solution – is developed into coaching, where the coach, (the former adviser) focuses on developing the entrepreneur’s leadership abilities to lead her/himself and others. If entrepreneurial aspects and value-generating production and refinement are focused on competence development, sustainability and revenues will likely develop positively.

6.2.3 Implications for policymakers

Implications for policymakers are that policy and legislation should focus on the farmer as an entrepreneur and not only as a producer. Policy and legislation should focus on diversification rather than the economics of scale. It should not steer the agricultural sector towards larger units with an efficiency focus but rather towards many diversified units. The latter will provide better conditions for diversification, resilience, biodiversity, food safety and security, and other sustainability aspects as well as profitability in the long run.

The legislature could also develop conditions for public procurement in this direction. If public procurement prioritizes the lowest price over quality, sustainability and short transports it constitutes a severe barrier to developing a sustainable and resilient agricultural sector.
6.3 Limitations and implications for future research

In this thesis sustainable business model innovation in agri-firms has been studied from the agri-firm perspective. Even though the agri-food value chain is very important from this perspective, the value chain has not been the main focus in the thesis. Future studies could generate new important knowledge if focusing on sustainable business model innovation from a value chain perspective.

Another possible theoretical base for further studies of the value intention of the agri-entrepreneurs, which has not been exploited in this thesis, is the theory of planned behaviour developed by Ajzen (1985), which in turn was a development of the theory of reasoned action developed by Ajzen and Fishbein (1977). According to the theory, managers’ decisions originate from their intentions, which are influenced by three constructs: attitude, subjective norm and perceived behavioural control (Senger et al., 2017). The theory of planned behaviour has been applied in some research regarding farmers’ decisions and behaviours (Senger et al., 2017; 2015; Hansson et al., 2012). However, the theory has not yet been used in connection with the development of sustainable business models in the agri-sector. This is an opportunity for future research.

For future research, the inclusion of the value intention of the owner-manager in further theory building regarding the development of sustainable business models could present important insights into potential trade-offs and barriers based on social, environmental, and economic aspects. Further, to understand the value intention when developing sustainable business models, the research presented here highlights the stewardship perspective as having substantial explanatory value regarding the value intention.

It is argued in this thesis that stewardship theory is a relevant theory when studying the value intention of agri-entrepreneurs and the development of sustainable business models. The manager of an agri-firm is often also the owner of the firm, which means that a formal contractual relationship is not at hand. However, the manager/owner has commitments towards family, value chain actors, farm and land. This is especially valid when the agri-firm is conducting sustainable business model innovation, which contains considerations regarding society as well as environment, which can be regarded as the principals. It is suggested that future research should continue to explore the potential of stewardship theory connected to development of sustainable business in the agri-sector as well as other sectors.

Many firms in other industries can get inspiration and learn from the agri-sector since the results in this thesis show that agri-entrepreneurs develop sustainable business model innovation. Many agri-entrepreneurs focus on the organizational transformation or system building and they often adopt a stewardship perspective. Hence, many firms in other industries can gain inspiration, insights and experiences and learn from the agri-sector. Our society faces many, different and growing societal challenges and the United Nations has formulated the 17 sustainable development goals. Applying the framework developed in this thesis would also be
relevant when conducting research on sustainable business model innovation in other industries. It would benefit both firms and society.

6.4 Concluding remarks

It is essential for sustainable development to further emphasize the importance of innovations in the agri-sector, not only for the agri-firms themselves but also as a response to many of the societal challenges. Societal development has benefited cities and urban centers during several decades. However, rural areas and agri-firms have substantial opportunities and resources to contribute to the solutions to many of our current considerable societal challenges. These social challenges apply to several major and comprehensive issues such as (i) climate and environment, (ii) integration, diversity, and gender equality, (iii) labor and employment, (iv) access to housing, and (v) the degree of self-sufficiency of food in society.

Agri-firms and agri-entrepreneurs are often situated in rural areas. They can provide solutions to these challenges. Their owners are aware that their firms are connected to a place, a village, a farm. They are aware - sometimes intuitively - that the family, the farm, the place and the firm will exist in the future - even after they have left their business. They are also aware of their influence and impact on the land and water, on animals and plants, on their farms. They realize that they are depending on good relations with family, neighbors, and actors along the value chain, not least the consumers. Therefore, they have every reason to take care of relationships, neighbors, firms, land, animals, and plants. Agri-entrepreneurs are aware of their responsibility for future generations and have opportunities to contribute to environmental and climate solutions, which are some of today's major issues. These agri-entrepreneurs are stewards in the best sense of the word.

For many years, their perspective on their businesses as an entity that should be taken care of and not just exploited has been regarded as outdated and old-fashioned. Some agri-entrepreneurs applied the values of sustainability even before the concept was used in literature and discourse. The agri-entrepreneurs who strive for sustainability have historically often been ahead of, or even in conflict with, legislation and policy when they develop their sustainable business models.

The agri-entrepreneur is the steward, and the principal is the place with farm consisting of humans, living animal and plants, land, air and water. However, the development in the world during the last decade has been characterized by globalization, the climate crisis, migration, food shortages, a pandemic and rising political tensions, even wars. This development makes the stewardship perspective of the agri-entrepreneurs both much more relevant and needed.

“
A century ago, stewards were responsible for managing estates or for keeping order at public events. Today, the Earth is one global estate, and improved stewardship is vital for maintaining social order and for preserving life on Earth” (Stuart Chapin III et al, 2011, p. 44)
The mind-sets and value intentions of the agri-entrepreneurs ought to be spread in society in general. The place is not only the farm, but also our common place, planet Earth.
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Business model innovation in the agri-food sector: a literature review

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Abstract
Purpose – Because the business model (BM) is a fairly new concept, research is lacking on business model innovation (BMI) in certain industry sectors. One such sector is the agri-food sector. Using a systematic literature review (SLR) of peer-reviewed journal articles published from 1990 to 2014, the purpose of this paper is to examine the where, when, and how of the use of BMs and BMI in the agri-food sector.
Design/methodology/approach – A web-based search was conducted to identify peer-reviewed journal articles that contained a combination of "BM" or "BMI" with agriculture-related and food-related terms (e.g. "agri-food sector"). After winnowing out irrelevant and duplicate articles, 505 articles were chosen for analysis.
Findings – Using categories, the paper analyses various data about the selected articles. The categories include research settings, units of analysis, methodologies, and theories. Based on this analysis, the paper finds that these agri-food sector articles are primarily qualitative, empirical studies that focus on one or a few companies (i.e. case studies). The paper also finds that theory is not yet well-developed in the research on the agri-food sector.
Originality/value – SLRs of various concepts, theories, and models are common in many fields (e.g. information/software technology, healthcare, and organizational management). However, no such review is available for the agri-food sector, in particular in its use of BMs and BMI. This paper addresses that gap with its review of relevant articles published in more than 300 journals in recent years. Based on this review, the paper draws conclusions about BMI in the agri-food sector and offers suggestions for future research.
Keywords Innovation, Literature review, Business model, Agri-food sector

Introduction
The agri-food sector[1], the combined agricultural and food sector, is an important part of the European Union’s economy. It accounts for 19.2 million jobs (9 per cent of total employment) and for 4.3 per cent of GDP in the EU-27. The European Commission (2007) defines the agri-food sector as the combination of the primary sector (agriculture, hunting, and forestry) and the food industry (production of food products, beverages, and tobacco). According to Leis et al. (2011), most firms in the EU agri-food sector are micro-sized enterprises with fewer than ten employees and an annual turnover of €2 million or less.

Many small firms in the agri-food sector, particularly in the EU, operate in a business environment of increasing competition because of greater globalization, the reduction of trade barriers, and the consolidation of food retailers (Brinkmann et al., 2014). As a result, many of these firms struggle to meet food retailers’ demands for more reliable supply, greater bulk, higher hygienic standards, and other quality requirements.

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New EU laws and regulations, fiercer international competition, and the growing presence of powerful players in the value chain partly explain the fact that large-scale production economics today influence the development of the agri-food sector in many EU countries. This combination of factors has increased the pressure on small and medium-sized agri-food firms to be more innovative. Thus, many such firms need a new or an adapted business model (BM) if they are to become more productive and competitive.

Scozzi et al. (2005) claim small firm size, combined with a deficiency of management skills, limits the innovative capability of many agri-food firms. Owners/managers of these firms, who often lack a clear vision of how to develop their business strategically, tend to act as producers and suppliers rather than as contractors, product developers, and/or entrepreneurs. Thus, because they are unable to find employees with management expertise and experience who understand production as a whole and are familiar with the regulations, owners/managers of small and medium-sized agri-food firms typically must be "all-rounders" (Brinkmann et al., 2014). As generalists, they lack the specialist's focus on growth and innovation. Therefore, they require a new outlook if they are to develop and implement new ways of creating, delivering, and capturing value.

The agri-food entrepreneurs who have developed a more specialized managerial outlook usually have adopted new BMs based on the network approach (Brinkmann et al., 2014; Lawson et al., 2008). In Sweden, for instance, networks of agri-food entrepreneurs have replaced the large primary producers in the agri-food sector. These strategic networks assume responsibility for resource mobilization and use. (An example of such network in Sweden is Gröna gårdar; in English, Green Farms.) According to Brinkmann et al. the network approach allows agri-food firms to overcome their size-related disadvantages while still retaining the advantages of small producer independency. In addition, these agri-food networks, with their focus on environmental sustainability and community involvement, support the position of the individual entrepreneurs as integrated members of society. BMs based in such value systems can contribute to agri-food firms' long-term profitability.

The hybrid organization is another BM that has appeared in the agri-food sector in recent years. Such organizations lie somewhere in-between the for-profit sector and the non-profit sector (Boyd et al., 2009). Typically, hybrid organizations pursue the social and environmental goals that are characteristic of non-profit entities while still focusing on revenue generation that is characteristic of for-profit entities.

Research since the mid-1990s reveals an increasing interest by academics and practitioners in business model innovation (BMI) and in the use of BMs as descriptive and analytical constructs. Some research claims that a BM and BMI are essential for a company’s competitiveness, renewal, and growth (e.g. Campbell et al., 2013; Chesbrough and Rosenbloom, 2002; Johnson, 2010; Lambert and Davidson, 2012; Teece, 2010). However, as Lambert and Davidson point out, empirical research on BMs between 1996 and 2010 in Europe is predominantly based in the media, information technology, and biotechnology sectors. Limited research attention has been paid to BMs and to BMI in the agri-food sector (Ulvenblad et al., 2014). (Some notable exceptions, however, to this trend are Beuchelt and Zeller, 2013; Markowska et al., 2011; Short et al., 2014; Teece, 2010.)

This paper provides a systematic literature review (SLR) of BMs and BMI in the agri-food sector. As Boell and Ceeez-Kecmanovic (2015) state, such literature reviews are appropriate and useful for identifying and summarizing evidence from earlier research. Therefore, the protocol for this paper is as follows: research setting; research...
The BM concept, which is multifaceted, focuses on the systems level with its holistic approach to describing how companies do business. The concept can communicate strategic choices, explain how companies create, deliver, and capture value, and facilitate identification of competitors within a complex system of interrelated activities (Lambert and Davidson, 2012; Zott et al., 2011). The BM, as Doganova and Eyquem-Renault (2009, p. 1559) state, is a specific device that "embodies the uncertain and distributed nature of innovation".

The literature distinguishes among three main views of the BM – the essentialist, the functionalist, and the pragmatic. According to Doganova and Eyquem-Renault (2009, p. 1560), the essentialist view of the BM reflects a relatively large amount of the research that agrees “the business model is a description, or representation, of reality that exists beyond it” (i.e. beyond the firm). Osterwalder and Pigneur (2010, p. 15) also represent this view with their definition of the BM as "an abstract conceptual model that represents the business and money earning logic of a company". Zott and Amit (2010, p. 217) state that the "overall objective of a BM is to exploit business opportunities and create value for the parties involved". Thus, in the essentialist view, the BM builds on a system of interdependent organization activities centred on the focal company and its partners, vendors, customers, etc.

The functionalist view of the BM is concerned with business creation when there is no describable objective reality (i.e. of the firm). As Doganova and Eyquem-Renault (2009) explain, the BM is part of the planning activity for a new venture and its possible value creation logic. Therefore, it is important to articulate the value creation, deliverance, and capture in combination with an explanation of the explicative and predictive power of the venture.

The pragmatic view focuses on the BM as a market device used in contexts of uncertainty. This view reflects the interrelationships between people and tools that spark collective action. Thus, the BM is a circular device that represents and evaluates established businesses or entrepreneurial projects (Demil and Lecocq, 2014; Doganova and Eyquem-Renault, 2009). Such devices, which are addressed to diverse actor groups such as investors, potential or existing customers, government representatives, partners, journalists, management students, and academics, allow for adaptation over time and space (e.g. Chesbrough and Rosenbloom, 2002; Doganova and Eyquem-Renault, 2009). Entrepreneurs "tell the stories" of their BMs to those groups in order to conceptualize their ideas as they innovate their BMs in the expectation of achieving certain outcomes. As Magretta (2002) and Doganova and Eyquem-Renault (2009) explain, stories have a calculative dimension because they describe how their narrators capture value (or intend to capture value).

When researchers and practitioners view the BM as a market device that represents how value is created, delivered, and captured, the assumption is the BM consists of various building blocks. Thus, articulating and circulating a BM story means specifying the content (i.e. the defining hypothesis) of the building blocks and testing...
them as they circulate. This explanation is consistent with Baden-Fuller and Morgan’s (2010) commentary on the BM as a frequently used tool in the identification of taxonomies, typologies, and ideal types.

According to Klang et al. (2014), most practitioners use Osterwalder and Pigneur’s (2010) business model canvas (BMC) when they attempt to innovate their BMs. Practitioners find the BMC useful for understanding and communicating the key building blocks that together represent a BM. The nine building blocks that Osterwalder and Pigneur identify are the following: first, customer segments that the organization wants to serve; second, value proposition(s) that solves customer problems and satisfy customer needs; third, channels that are used to communicate and deliver the value propositions to customers through communication, distribution, and sales channels; fourth, customer relationships that are established and maintained with each customer segment; fifth, revenue streams which result from each value proposition offered to each customer segment; sixth, key resources required to offer and deliver the value propositions to each customer segment; seventh, key activities needed to perform and support the creation and deliverance of the value proposition(s); eighth, key partnerships that are required to perform and support the creation and deliverance of the value proposition(s); and ninth, cost structure stemming from all activities and resources performed for creating and delivering the value proposition(s).

Firms must innovate to be competitive. A firm’s change in one or more building blocks in the BMC is defined as BMI (Björkdahl and Holmén, 2013). Some research clearly supports the idea that product and service innovation may be insufficient for increased revenue generation, and thus must be complemented with BMI. Chesbrough (2010), for example, found that even inferior technology commercialized by good BMI has a greater chance of success than excellent technology commercialized by poor BMI.

When innovating a BM, managers experiment by formulating and testing their ideas/hypothesis on how the firm can create, deliver, and capture value in the same way that architects work (e.g. Osterwalder and Pigneur, 2010). From a planning perspective, firms plan a new business idea from its conceptualization to its implementation. For this purpose, Frankenberger et al. (2013) describe four process phases of BMI (within their “41– framework”) that consist of the following: the initiation phase to discover the need for innovation; the ideation phase to generate possible solutions and alternatives; the integration phase to elaborate and develop the promising possibilities identified in the previous phase; and the implementation phase to bring the solution to the market.

As Chesbrough and Rosenbloom (2002) explain, BM innovators use an existing BM as a mental map that mediates how new ideas are perceived; such new ideas obviate the identification of a substantially different BM. Therefore, when innovating a BM, it is essential to construct maps of an existing BM in order to use these maps in trial-and-error experiments. As Demil and Lecocq (2014, p. X) explain, entrepreneurs and managers scan “the environment, giving sense to own and other’s experience and making decisions accordingly”. Thus, the innovation of a BM is never an individual act; rather, it is a complex, collective, cyclical social process that emphasizes active and social experimentation and learning through repeated changes in the BM components. Demil and Lecocq explain that the creation of artefacts (e.g. the BMC) supports the transition to the new BM within or beyond the firm’s boundaries. In the interaction among these artefacts, managers create a BM map and then test its credibility against assembled data through collective action.

The socio-cognitive dynamics of BMI at the core of the functionalist and pragmatic views of the BM require the articulation and circulation of ideas in contexts of uncertainty.
For example, BM innovators must determine the elements of a successful BM and why a previously successful BM no longer succeeds (Ancona, 2012; Demil and Lecocq, 2014; Doganova and Eyquem-Renault, 2009).

**Methodological approach**

This paper, as a review of empirical and conceptual articles, was inspired by the work of several researchers. Among those researchers are the following: Collin et al. (1996), Hart (2001), Fagerberg et al. (2012), and Hörte et al. (2008). Figure 1 is an overview of the working process in this paper.

The first decision concerned the selection of databases for the primary data collection. Databases differ as far as content and available functionality (e.g. presentation of basic bibliographic information, abstracts, full texts, citations, etc.). Additionally, databases have various options for searching, filtering, and sorting as well as specific search techniques such as quotation marks, defining operators, and parentheses.

Ten databases were chosen: Web of Science, Scopus, ABI/Inform, Emerald, Science Direct, Academic Search, Springer-Link, Jstor, Sage, and Agricola. Agricola specializes in research on the agri-food sector. The following two criteria were used in the selection of the databases: first, most often used by researchers in the social sciences and available in the authors’ university library; and second, a mix of database types (e.g. citation databases, publisher databases, and subject area databases). Following the methodology of Crossan and Apaydin (2010) in their literature review on organizational innovation, this search was limited to peer-reviewed journals with the highest impact factor in their area. Table I presents the profiles of the selected databases.

This mix of database types facilitated building a comprehensive list of relevant articles. A publisher database lists its scientific, peer-reviewed publications. However, the search in such a database, which uses a subject word (if available) that is often author name, is not controlled. Furthermore, the search is often performed in full text, which does not always produce sufficient results (hits). In contrast, subject area(s) databases such as ABI/Inform and Academic Search include subject(s)-focused collections of peer-reviewed articles and other materials from various publishers. Searches among such databases are easier because of their sets of subject headings (a thesaurus) that describe the database content.

The second decision concerned the selection of publications. The selection criteria were the following: peer-reviewed journal article in English; mention of BM and/or BMI; and use of agri-food, agriculture and/or agribusiness and/or food processing sector/industry in the title, key word list, abstract and/or full text. Each article selected had to meet all three criteria.

![Figure 1. Overview of the working process](source: Created by the authors)
Journal article selection ended with articles published before January 2015.

As Watson (2015) observes, a web-based search may produce irrelevant hits as well as omit relevant hits. Therefore, the next step was to establish the value of each article in terms of the current research. The articles that did not meet the three criteria as well as duplicates were eliminated. At this point, the initial search consisted of 570 articles published in the period 1990-2014. Table II presents more detailed information about the search.

The search terms were: business models/business model innovation/agribusiness/agri-food/food processing industry. However, it must be noted that each database has its own search logic, and in some cases (e.g. Academic Search), only predefined search terms can be used. Thus, adaptation of the search terms is required to include related/close to BMI in some databases. In Academic Search, because keywords can be specified as subordinate to the topic word “BMIs”, they were included in the search. Six researchers (the authors of this paper) were involved in the selection process.

<table>
<thead>
<tr>
<th>No.</th>
<th>Database name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Web of Science</td>
<td>Citation database</td>
<td>Scientific citation indexing service for citation search of papers from peer-reviewed journals. Primarily used in bibliometric calculations. From Thomsson/Reuter</td>
</tr>
<tr>
<td>2</td>
<td>Scopus</td>
<td>Citation database</td>
<td>Scientific citation indexing service for citation search of papers from peer-reviewed journals. Primarily used in bibliometric calculations. From Elsevier</td>
</tr>
<tr>
<td>3</td>
<td>ABI/Inform</td>
<td>Subject area(s)</td>
<td>Primary focus on business administration and related subjects within the social sciences. Covers c. 2,500 scientific journals and industry publications. From Proquest</td>
</tr>
<tr>
<td>4</td>
<td>Emerald</td>
<td>Subject area</td>
<td>Covers c. 250 journals, primarily in management. Emerald Publishing group with MCB University Press as one of the main publishers</td>
</tr>
<tr>
<td>5</td>
<td>Science Direct</td>
<td>Publisher database</td>
<td>Offers own scientific journals in full text. Covers most disciplines but with focus on science, technology, and social sciences. From Elsevier and related publishers</td>
</tr>
<tr>
<td>6</td>
<td>Academic Search</td>
<td>Subject area(s)</td>
<td>Covers articles from various subject areas and includes c. 3,400 scientific journals as well as popular magazines. From EBSCO</td>
</tr>
<tr>
<td>7</td>
<td>Springer-Link</td>
<td>Publisher database</td>
<td>Offers own scientific journals in full text from most areas. The database is especially useful in the areas of biomedicine, environmental science, and engineering. Business and economics are also covered. From Springer plus journals from the publisher Kluwer</td>
</tr>
<tr>
<td>8</td>
<td>JSTOR</td>
<td>Subject area(s)</td>
<td>Covers older articles in full text from various subject areas including business and management. Scientific journals in full text are stored from the first year they are issued with a delay of the last 2-5 years for most recent numbers. From JSTOR</td>
</tr>
<tr>
<td>9</td>
<td>Sage</td>
<td>Publisher database</td>
<td>Offers its own scientific journals in full text with a focus on the social sciences, humanities, and the natural sciences. From SAGE</td>
</tr>
<tr>
<td>10</td>
<td>Agricola</td>
<td>Subject area(s)</td>
<td>Primary focus on agriculture. Covers various types of materials such as papers, books, and book chapters. From American National Agricultural Library</td>
</tr>
</tbody>
</table>

Source: Created by the authors

BMI in the agri-food sector

Table I. Profiles of the selected databases
The search strategy was to retrieve as many (relevant) documents as possible for the literature review. However, the degree of selection accuracy varied. Thus, our initial article selection was assessed for relevance by a review of article titles and abstracts. As a result of this review, 65 articles were eliminated because they included the search words:

<table>
<thead>
<tr>
<th>Database</th>
<th>Date</th>
<th>Topic/search words</th>
<th>No. of hits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web of Science</td>
<td>20 January 2015</td>
<td>(&quot;business models&quot; OR &quot;business model&quot; OR innovation) AND (agribusiness OR agri-food)) AND (agribusiness OR agri-food OR agri-food) AND LIMIT-TO (DOCTYPE, &quot;ar&quot;) OR LIMIT-TO (DOCTYPE, &quot;re&quot;)</td>
<td>82</td>
</tr>
<tr>
<td>Scopus</td>
<td>4 December 2014</td>
<td>(&quot;business model&quot; AND (agri-food OR agribusiness)) AND LIMIT-TO (DOCTYPE, &quot;ar&quot;) OR LIMIT-TO (DOCTYPE, &quot;re&quot;)</td>
<td>20</td>
</tr>
<tr>
<td>AIB/Inform</td>
<td>4 December 2014</td>
<td>(&quot;Business models&quot;) AND cc:8610: Food processing industry</td>
<td>24</td>
</tr>
</tbody>
</table>

**Notes:**
- The first AIB/Inform search used the exact topic word (SU. EXACT) and a ABI-code for industries.
- The second AIB/Inform search used only the exact topic word (SU. EXACT) and a ABI-code for industries.

**Source:** Created by the authors
terms but lacked an empirical discussion of BM and/or BMI as their main focus. However, as Boell and Cecez-Kecmanovic (2015) note, because articles titles and abstracts do not always convey the content of articles, there is also the risk that relevant articles may be omitted in a literature search when titles and abstracts are not completely indicative of actual content.

After this initial screening of the articles, the full texts of the remaining articles were mapped by the following categories: key words; unit of analysis; country of data collection (i.e. settings); methodology (empirical vs conceptual approach); and use of theory. Where possible, the number of citations (both ISI and Scopus citations and Altmetric score) and the impact factor of the journals were noted. Ultimately, 505 articles that met the inclusion criteria were analysed.

Findings
As far as publication dates, two facts are observable. First, around 2005 the number of article increased when research in the agri-food sector became a significant research area. More than 50 articles, or about 10 per cent of the articles in the review, appeared in publications in 2005. Second, research in the agri-food sector is a relatively new research area. More than 50 per cent of the articles in the review were published in the years between 2010 and 2014. Table III presents the distribution of the reviewed articles from 1990 to 2014.

As far as the diversity of journals that publish articles related to BMs and BMI in the agri-food sector, two facts are noteworthy. First, almost 300 journals publish articles on this sector with no premier journal or journals yet identified. This is also evidence that this research area is still emerging. Second, the analysis of the 20 journals that have published the most articles on the agri-food sector reveals their main focuses are food, ethics, finance/economics, management, and technology (see Table IV for a list of these 20 journals).

Research on BMs and BMI in the agri-food sector is mostly set in the USA, the UK, or Australia. Canada and the Netherlands rank fourth and fifth. Table V presents the number of articles with research settings in these five countries.

The globalization of markets in the agri-food sector may explain the dominance of the research from these five developed countries where large, transnational

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of articles</th>
<th>Percentage of distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990-1999</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>2000-2004</td>
<td>41</td>
<td>8</td>
</tr>
<tr>
<td>2005</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>2006</td>
<td>46</td>
<td>9</td>
</tr>
<tr>
<td>2007</td>
<td>22</td>
<td>4</td>
</tr>
<tr>
<td>2008</td>
<td>34</td>
<td>7</td>
</tr>
<tr>
<td>2009</td>
<td>37</td>
<td>7</td>
</tr>
<tr>
<td>2010</td>
<td>47</td>
<td>9</td>
</tr>
<tr>
<td>2011</td>
<td>51</td>
<td>10</td>
</tr>
<tr>
<td>2012</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>2013</td>
<td>95</td>
<td>19</td>
</tr>
<tr>
<td>2014</td>
<td>62</td>
<td>12</td>
</tr>
<tr>
<td>Total number</td>
<td>505</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Created by the authors

Table III. Number of articles published from 1990 to 2014 on BMs and BMI in the agri-food sector
corporations exert a powerful influence on research funding and research interests at the national level (Caiazza et al., 2014). Such corporations set the parameters and ground rules for innovation that small and medium-sized firms in the agri-food sector must observe and follow if they want to be competitive. Few studies have looked at how these factors influence innovation in the agri-food chain that includes such firms (see also Caiazza, 2015). However, some research has taken a more pragmatic view of BMs as market devices used to achieve competitive advantage (Doganova and Eyquem-Renault, 2009).

Table IV.
Total of 20 journals that have published the most articles on BMs and BMI in the agri-food sector

<table>
<thead>
<tr>
<th>Number</th>
<th>Journal name</th>
<th>Number of articles</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>British Food Journal</td>
<td>31</td>
<td>Food</td>
</tr>
<tr>
<td>2</td>
<td>International Food and Agribusiness Management Review</td>
<td>15</td>
<td>Food</td>
</tr>
<tr>
<td>3</td>
<td>Journal of Business Ethics</td>
<td>12</td>
<td>Ethics</td>
</tr>
<tr>
<td>4</td>
<td>American Journal of Agricultural Economics</td>
<td>8</td>
<td>Economics</td>
</tr>
<tr>
<td>5</td>
<td>Agricultural Finance Review</td>
<td>8</td>
<td>Finance</td>
</tr>
<tr>
<td>6</td>
<td>Review of Agricultural Economics</td>
<td>7</td>
<td>Economics</td>
</tr>
<tr>
<td>7</td>
<td>Agribusiness</td>
<td>7</td>
<td>Economics</td>
</tr>
<tr>
<td>8</td>
<td>Computers and Electronics in Agriculture</td>
<td>7</td>
<td>Technology</td>
</tr>
<tr>
<td>9</td>
<td>Economic and Political Weekly</td>
<td>7</td>
<td>Economics</td>
</tr>
<tr>
<td>10</td>
<td>Development in Practice</td>
<td>6</td>
<td>Technology</td>
</tr>
<tr>
<td>11</td>
<td>Agriculture and Human Values</td>
<td>5</td>
<td>Ethics</td>
</tr>
<tr>
<td>12</td>
<td>Enterprise &amp; Society</td>
<td>5</td>
<td>Management</td>
</tr>
<tr>
<td>13</td>
<td>Food Policy</td>
<td>5</td>
<td>Food</td>
</tr>
<tr>
<td>14</td>
<td>Journal of Agricultural and Resource Economics</td>
<td>5</td>
<td>Economics</td>
</tr>
<tr>
<td>15</td>
<td>Strategy &amp; Leadership</td>
<td>5</td>
<td>Management</td>
</tr>
<tr>
<td>16</td>
<td>Supply Chain Management: An International Journal</td>
<td>5</td>
<td>Technology</td>
</tr>
<tr>
<td>17</td>
<td>Journal of Cleaner Production</td>
<td>4</td>
<td>Technology</td>
</tr>
<tr>
<td>18</td>
<td>Trends in Food Science &amp; Technology</td>
<td>4</td>
<td>Food</td>
</tr>
<tr>
<td>19</td>
<td>Journal of Food Engineering</td>
<td>4</td>
<td>Food</td>
</tr>
<tr>
<td>20</td>
<td>Research-Technology Management</td>
<td>4</td>
<td>Technology</td>
</tr>
</tbody>
</table>

Source: Created by the authors

Table V.
The five research settings where the most articles on BMs and BMI in the agri-food sector have been published

<table>
<thead>
<tr>
<th>Number</th>
<th>Country</th>
<th>Number of articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USA</td>
<td>150</td>
</tr>
<tr>
<td>2</td>
<td>UK</td>
<td>55</td>
</tr>
<tr>
<td>3</td>
<td>Australia</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>Canada</td>
<td>34</td>
</tr>
<tr>
<td>5</td>
<td>The Netherlands</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: Created by the authors

corporations exert a powerful influence on research funding and research interests at the national level (Caiazza et al., 2014). Such corporations set the parameters and ground rules for innovation that small and medium-sized firms in the agri-food sector must observe and follow if they want to be competitive. Few studies have looked at how these factors influence innovation in the agri-food chain that includes such firms (see also Caiazza, 2015). However, some research has taken a more pragmatic view of BMs as market devices used to achieve competitive advantage (Doganova and Eyquem-Renault, 2009).

Most cited articles
Table VI lists the most cited articles from our review. Most of these articles were published in the last seven years. It is also evident that the articles have appeared in journals that focus on disparate subjects (e.g. politics, legislation, ethics, social entrepreneurship, and technology). The agri-food sector has broad appeal and is relevant in many social, political, and business areas (Caiazza et al., 2014).
Five analytical units related to BMs and BMI are observable in the reviewed articles: the individual level, the company level, the regional level, the national level, and the global level. The most common unit of analysis is the company level. Table VII presents the distribution of the units of analysis. (Only 308 articles are listed because of the inability to categorize some articles because of limited access to content.)
As far as the unit of analysis, 80 per cent of the categorized articles discuss BMs and BMI at the company level. When this fact is considered in combination with the results presented in Table V (research settings), it is understandable that a significant amount of the research on BMs and BMI has been conducted at large, transnational corporations in the USA, the UK, Australia, Canada, and the Netherlands. However, there is space for much more research that deals with BMs and BMI at levels other than the company level.

Methodology of the articles
Of the 403 articles that could be categorized by methodology, 283 (around 70 per cent) take an empirical approach. The remaining 120 articles (around 30 per cent) take a conceptual approach. The empirical articles use scientific data for explorative, descriptive, or explanatory purposes. The conceptual articles, which focus on a concept or theory, do not present scientific data. Table VIII presents these categories.

Of the 283 empirical articles, 199 articles (around 70 per cent) are qualitative studies, and 99 articles (around 30 per cent) are quantitative studies. The case study is the most used research design among the qualitative studies. Many of the cases are BM “stories” that present challenges intended to spark collective action. For example, the case studies describe how to create value in a specific region, how to overcome growth barriers, how to deal with underlying economic logic, etc. As such, these case studies take a pragmatic and functionalistic view of BMs that Doganova and Eyquem-Renault (2009) describe.

Theory in the articles
Of the 505 articles reviewed, 251 articles have no, or very limited, foundation in theories linked to BMs, BMI, or the agri-food sector. Table IX presents the seven main theoretical approaches in the 254 articles that use theory to a larger extent.

The most frequently used theory relates to BM/BMI. Of the 254 theoretically based articles, 43 articles (around 17 per cent) address these topics. However, in general, theory in research on the agri-food sector is used rather superficially. When used as theory in the reviewed articles, BMs and BMI are associated with concepts such as firm performance, supply chain, value chain, open innovation, strategy,
stakeholder, market, and financial issues. The use of “chains” seems particularly relevant from the researcher perspective as the word “chains” appears in various connections in a number of articles, often linked to BMs and BMI. For example, supply chain and value chain often appear in the articles although these terms were not in the search strings. Related terms are commodity chains, food chains, and milk chains. Furthermore, the actors’ quoted comments in the articles reveal that “chains” is a frequently used word in business.

The concept of sustainability, in both a research and a business context, also appears frequently in the articles. The concept is used in reference to corporate social responsibility, business sustainability, sustainable agriculture, food security and safety, and eco-system services.

The concept of innovation is used with BMs as well as with other concepts such as transparency, adaption theory, networks/clusters, value chain, organization, information asymmetry, entrepreneurship, strategy, process, marketing, and growth.

The concepts of strategy, marketing, and networks appear less often. Miscellaneous concepts include principal-agent theory, systems approach, public choice economics, political economy, technology management, business intelligence, and the resource-based view.

Conclusions
The intention of this SLR is to analyse the research on BMs and BMI in the agri-food sector. Of the 503 peer-reviewed articles (identified in a web-based search) that were published in more than 300 different journals in the years between 1990 and 2014, some 50 per cent appeared between 2010 and 2014. The review addresses the where, when, and how this research was conducted. It is both an author-centred and a concept-centred analysis. Thus, the review reports on the articles’ research setting and journal of publication as well as examines the articles’ research methodology, use of theory, and unit of analysis.

In general, the articles take the functionalist and pragmatic view of BMs and BMI in their analysis of how value is created, delivered, and captured. Many articles describe the importance of the value chain, of BMs, and of BMI in the context of the challenges the agri-food sector faces given the increasing globalization of its markets. The research methodology/settting most used in the articles is the qualitative, empirical case study conducted at the company level. Many of these studies are narrations of one or a few companies. As the theoretical approaches of the articles are rather scattered and somewhat weakly applied, it appears that the area of BMs and BMI in the agri-food sector is still too new to have developed a comprehensive theoretical framework.
Implications for future research

Consistent with the discussion by Baregheh et al. (2014), this review suggests that the research in the agri-food sector would benefit from further development of its theoretical foundations. Given the importance of the sector, particularly with respect to the many small and medium-sized firms in the EU, more attention should be given to how such firms can use BMs and BMI to compete in world markets. It is an important issue for society as well. Thus, more research is needed into how the agri-food sector can benefit by investigations of its unique identity. For example, researchers could study the relevant agricultural value chains such as milk chains, food chains, supply chains, and marketing chains. More research into the use of networks and clusters in the agri-food sector is also needed.

More qualitative research into the uses and effects of BMs and BMI from the company/owner perspective is also recommended. Case studies on the cognitive barriers to BMI (as described by Chesbrough, 2010) in the agri-food sector are promising research avenues. Sector-based research, such as the research Pavitt (1990) conducted on the strategic management of technology, can lead to increased innovation as well as strategic advances in the agri-food sector.

Boell and Cecez-Kecmanovic (2015), in their review of IS literature, conclude that future literature reviews can expand beyond specific journals and databases by exploring the so-called grey literature (e.g. popular publications, specialized sector magazines/newspapers, and foreign language publications). Analysis of the agri-food literature from these sources may provide new ideas and new experiences, in particular those ideas and experiences that originate with the people actually engaged in agri-food activities. And, as Watson (2015) recommends, literature reviews need to move beyond just “being systematic”. There is an ample room for new approaches to literature reviews.

Note

1. The term “agri-food sector” is more commonly used in research and industry than the term “agricultural sector” because of the limited amount of available regional statistical data for the agricultural sector (European Commission, 2007). Therefore, the broader term “agri-food sector” was used to ensure that as many relevant scientific articles were identified as possible.

References


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Article II
Towards a Conceptual Framework of Sustainable Business Model Innovation in the Agri-Food Sector: A Systematic Literature Review

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Abstract: This paper aims to increase our understanding of sustainable business model innovation in the agri-food sector in terms of its theoretical and practical approaches for sustainability and their degree of complexity and maturity. The paper is based on a systematic literature review of 570 journal articles on business models and business model innovation published between 1990 and 2014. Of these articles, only 21 have business model innovation as their main focus. The review shows that research interest in the agri-food sector has increased in these years. The paper proposes a conceptual framework for sustainable business model innovation in the agri-food sector that can be used to meet the challenges encountered in taking a sustainability perspective.

Keywords: business model innovation; agri-food; farmers; systematic literature review; entrepreneurship; sustainability

1. Introduction

This paper aims to increase our understanding of sustainable business model innovation (BMI) in the agri-food sector in terms of its theoretical and practical approaches for sustainability and their degree of complexity and maturity. As a systematic literature review, the paper also aims to increase our knowledge of how previous research has treated the relationship between business models (BM) and sustainability in the agri-food sector and by this take a step towards a conceptual framework of sustainable business model innovation.

The area of focus is important globally since a crucial part of the societal challenges of the future are linked with agricultural sustainability and food production. According to various sources, food production will have to increase 70% by 2050 [1–3]. The European Union’s Research and Innovation program “Horizon 2020” [4] and the United Nations’ sustainable development goals [5,6] prioritize research and innovation on food security and sustainable agriculture and [1] (p. 2) conclude from recent stakeholder discussions: “The world’s agriculture and food systems must become more productive, more resource-efficient, more resilient, and less wasteful”. It is also claimed that sustainable agricultural development can enhance the nutritional quality of food and thereby produce positive health effects [7,8].

These are important issues also at the firm level because of increased worldwide competition and advanced technological developments in the agri-food sector. With the resulting general trend in the agri-food sector toward fewer and larger farms [9,10], we may ask whether the global goals of sustainable agricultural development can be met. When increased productivity and greater profitability in the sector become necessities, agri-food entrepreneurs must take a more strategic and innovative perspective as they engage in BMI that focuses on sustainability. Food SMEs that have successfully managed these challenges by differentiating their business activities have usually developed new
BM research has traditionally focused on profit, but the past two decades have seen a significant shift towards sustainability. Researchers have called for BMs that address sustainable development and that include aspects of social and environmental factors. This shift is due to the recognition that BMs need to adapt to the changing environment and that businesses need to consider the impact of their operations on society and the environment.

Previous research shows that, since the mid-1990s, interest in BMI has increased from both a practical perspective and a theoretical perspective. A variety of BMI definitions and settings appear in this research—from the single company to the entire value network. A consensus exists that BMI is essential for successful organizational performance. For example, the BM canvas developed by Osterwalder seems useful for practitioners who are trying to develop and innovate their BMs.

In the research, BMI is generally interpreted as a process or as an outcome. For example, BMI as a process may include experimentation and testing that takes a discovery-based approach while BMI as an outcome may relate to some form of BMI typology.

In the 1990s, the BMI literature also began increasingly to emphasize business innovation and management. The roots of this interest can be traced back in time. For example, the focus on value chains and development blocks has been highlighted in various sources. Recent research has shown that BMs have evolved and are now being used in a diverse range of industries, including the agri-food sector.

Various BMs have been proposed that consist of different elements and different building blocks. Practitioners and researchers often use a BM model which includes nine building blocks: (i) customer segments; (ii) the value proposition; (iii) value channels (e.g., activities needed to develop, produce, and deliver the firm’s products/services); (iv) customer relationships; (v) revenue streams; (vi) resources; (vii) activities; (viii) partnership; and (ix) cost structure. Based on this original model, a more concentrated framework has been suggested with only three elements: (i) the value proposition; (ii) the value creation and delivery system; and (iii) the value capture system. This developed framework has also been used when discussing sustainable business model archetypes.

Empirical research on BMs has predominantly focused in the media, information technology, and biotechnology sectors. Research about BMs and BMI in the agri-food sector has generally received little attention. The research conducted often relates to developmental areas in the world. However, we can also find early examples of the 19th century in the Swift Company in America, which managed to decrease the shipping time for cattle shipped live by using local slaughters, railways, and the new refrigerated solutions. Further, research about entrepreneurship in the rural environment has focused on business models in the food-production sector.

Researchers have also called for studies of BMs that address sustainable development and that take a value-added approach. In a review of 681 articles on BMs, the development of BM research was focused, including various definitions, perspectives, and components. Nevertheless, we still lack in-depth research on sustainability as far as the social, environmental, and economic (financial) factors. Although this comprehensive literature review focuses on the importance of change and evolution in BM research, they do not relate such research to the social and environmental aspects of sustainability.

If business model innovation intends to include sustainability aspects, it is necessary to look beyond the entity of the firm. Sustainability has to do with both social and environmental factors as well as economic factors—financial performance and therefore several stakeholders such as customers, suppliers, shareholders etc. are involved in the development. Furthermore, the focus is on changing the way you do business instead of focusing on processes and products—what you do.
perspectives: (i) a technology orientation, (ii) an organizational orientation, and (iii) a strategy orientation. By contrast, BMs that focus on sustainability are concerned with social, technical, and environmental innovation [36,42]. Such BMs also emphasize the importance of integrating sustainability related factors into the components and core processes rather than simply superimposing sustainability factors on the original model [43].

Researchers have worked with the integration of sustainability factors into BMI in different ways. For example, the work of [36] applied an integrated approach in their development of eight sustainable business model archetypes. These archetypes derive from questions on ‘value proposition’, ‘value creation and delivery’, and ‘value capture’. They categorize these archetypes as technological, social, and organizational. Technological archetypes (i) maximize material and energy efficiency, (ii) create value from waste, and (iii) use renewable substitutes and natural processes. Social archetypes (iv) deliver functionality rather than ownership, (v) adopt a stewardship role, and (vi) encourage sufficiency. Organizational archetypes (vii) repurpose society/environment and (viii) develop scale-up solutions. Together, these archetypes represent a comprehensive view of sustainable BMs. Further, based on an original BM model, researchers [47] have developed a model [21] by adding questions highlighting strong sustainable business model (SSBM); conception, boundaries and validation of a SSBM, necessary financial viability of a BM, modelling social benefits and environmental regeneration.

Although this research is a great step in modelling sustainability in general related to BM we still lack models that especially focus the agri-industry.

To summarize, it is important to conduct research in general in the agri-industry due to the arguments stated above; a need for increased food production in the world combined with a need for raised degrees of sustainability in the food value chain. However, almost all research regarding the agri-industry has focused on the production aspects and the first links of the food value chain. Since studies regarding business model innovation have focused on other industries than the agri-industry, it is even more important to focus specific research on sustainable business model innovation in the agri-industry and the latter links of the food value chain [11].

Further, it is also important to conduct research in the agri-industry since it has characteristics that differ from many other industries [11]. Many companies in the agri-industry are owner-managed family businesses that are rooted in their communities. The owners regard themselves as stewards or custodians of the company, the property, and the environment, with a responsibility for living and non-living things. They expect that their companies are going to be there for the indefinite future and the owners are not solely concerned with growth and revenues. Some other differences compared with other industries are: (i) the nature of agricultural production, which is diffuse and seasonal. It means that there are many small primary producers, depending on a diversity of climates, who sell and deliver products to processors and retailers; (ii) the market concentration at the end of the supply chain; and (iii) the close connection between production processes and the quality and safety of the product [48]. Beside this, it is also claimed that sustainable agricultural development can enhance the nutritional quality of food and thereby produce positive health effects [7,8].

To fill the gap in the research on sustainable BMI in the agri-food sector, the aim of this paper is to increase our understanding of sustainable business model innovation (BMI) in the agri-food sector in terms of its theoretical and practical approaches for sustainability. The paper also aims to increase our knowledge of how previous research has treated the relationship between business models (BM) and sustainability in the agri-food sector. Altogether, this serves as a first step towards a conceptual framework in which BMI is the main concept.

The rest of the paper is structured as follows. First, we present the methodological approach with argument for the choices in the process of conducting a structured literature review. After this, we present the results of the literature review together with a discussion about the first step towards a conceptual framework of sustainable business model innovation. Finally, we discuss conclusions, implications, and avenues for future research.
2. Materials and Methods

This systematic literature review is based on a previous comprehensive review of BMI in the agri-food sector [49], in which the three authors of this paper read and analyzed more than 500 articles included in the review. We also followed recommended steps for doing a literature review [50]: (i) identification of sources of information, (ii) identification of articles, and (iii) identification of reviews of items.

We began with the selection of 10 databases: Web of Science, Scopus, ABI/Inform, Science Direct, Academic Search, Springer-Link, Jstor, Sage, and Agricola. Agricola specializes in research on the agri-food sector. For this selection, we had three criteria: (i) researchers in the social sciences use these databases most frequently; (ii) the databases can be accessed at the library at the author’s university; (iii) a mix of database types (e.g., citation databases, publisher databases, and subject area databases) was required. Following the methodology of a literature review on organizational innovation [51], we limited our search to peer-reviewed journals with the highest impact factor in their area.

This mix of database types allowed us to assemble a comprehensive list of relevant articles. Publisher databases list their scientific, peer-reviewed publications by a subject word (if available, which is often the author name), but searches are not controlled. Furthermore, searches are often conducted in full text, which does not always produce sufficient results (‘hits’). In contrast, subject area(s) databases such as ABI/Inform and Academic Search include subject(s)-focused collections of peer-reviewed articles and other materials from various publishers. Searches among such databases are easier because of their sets of subject headings (a thesaurus) that describe the database content.

Second, we selected the articles for our systematic literature review. We had the following criteria: (i) articles must be published in peer-reviewed journal, in English; (ii) articles must mention BM or BMI; and (iii) articles must use agri-food, agriculture, or agribusiness or the food processing sector/industry in the title, keyword list, abstract, or full text. Articles had to meet all three criteria.

Following these criteria, we identified 570 articles published between 1990 and 2014. We categorized all the articles in the following five categories: (i) key words; (ii) unit of analysis; (iii) country of data collection (i.e., settings); (iv) methodology (conceptual vs. empirical); and (v) use of theory.

Third, we screened the articles by focusing on their content relevance from reading their abstracts and, in some cases, from reading the articles. We established that 316 of the 570 articles had no or very little basis in theory and/or little discussion of BMs, BMI, or the agri-food sector. We classified the remaining 254 articles based on their content. In the examination of the articles, we also looked for connections among the articles. Classification is a necessary step in the analytical stage of a literature search as it provides a descriptive and systematic foundation for future evaluation of themes [50]. After this evaluation, we identified eight relevant themes: (i) business model and business model innovation, (ii) supply chain/value chain, (iii) sustainability, (iv) innovation, (v) strategy, (vi) marketing, (vii) networks, and (viii) miscellaneous.

Fourth, for this paper we chose the theme of ‘business model and business model innovation’ in order to acquire a deeper understanding of the maturity and complexity of the BMs the articles described. The last evaluation process focused on the contribution of each paper, and was matched in relation to business models and building blocks, degree of innovation, and contribution to sustainability aspects. In total, 21 articles added value to these dimensions and are presented in more detail in the Appendix A.

During the last two decades, systematic reviews have become widely accepted formats to present focused reviews of existing literature [52]. However, the systematic literature review process places strong emphasis on quality assessment, which commonly refers to high level of validity and reliability.

In this literature review, reliability was aimed for by addressing procedural steps of doing a literature review presented by Hart [50]. The literature review was conducted by three researchers and each of the steps were discussed before and compared after in order to increase inter-rater reliability during the literature analysis [53]. Validity was aimed for by means of sampling articles based on
established guidelines [50], and constructs from previous published literature reviews were compared, within as well as from outside the research field [54–56]. Furthermore, the on-going research work on this review has also been presented at conferences and seminars, enabling other researchers to comment on work-in-progress.

3. Results and Discussion

The literature review has been focusing on the business model, with the purpose of developing our knowledge of the maturity and complexity of business models in the agri-food sector. 21 articles have been analyzed and evaluated. The articles are presented in Appendix A. The analysis based on these articles reveals a broad set of studies, including theoretical, empirical, and practical contributions. Based on the systematic literature review, we have identified some patterns and links between the articles, but also some areas where additional research is needed. Three specific aspects have been focused on here.

First, the concept of business model have been studied for several decades as discussed in the introduction, but the concept seems to be fairly new in relation to the agri-food sector. Nine of the 21 articles took a practice-oriented approach to BM. For example, the emergence of eBusiness models is defined as “doing business that would not have been possible in the past and is based on the use of eBusiness technology” [57] (p. 705). The concept can also be used in a setting with other elements, like [58] coming from a market-based approach with a social mission, viewing the implementation in relation to aspects of the business model. Another example addresses ethical consumption and new business models [59]. These articles focus primarily on other topics, where the business model concept is used for practical reasons.

The contributions that address the theoretical concept of business models span over several areas. One of the more developed articles uses a business model framework when studying the relationship between business model innovation and industrial ecology [41]. The framework presented is used with a sustainability perspective, building on previous contributions in the field. Overall, the articles analyzed do in general have rich empirical data, but surprisingly few address the theoretical aspect with a framework in the field, even though the concept is central in their arguments.

Second, the view of business model can take many different forms. Most of the articles view the business model as an output, but some articles include a process-related approach, here discussed as either static or dynamic perspective on business models. Classifying firms according to their business model from a static perspective provides alternative views of an industry or group of firms. For example, one article addresses biotechnology firms and describes the organization and innovation process, and identifies business models adopted by these firms [60]. In this study, five different business models are identified. On the other hand, we can find articles that address a more dynamic perspective, arguing that business model development is an initial experiment followed by changes based on trial-and-error learning. One article argues that the relationship between business models and time is little discussed in the literature, and that our knowledge is limited regarding the underlying mechanisms to build a solid theoretical ground [61]. They present two phases of the business model; (i) exploration phase, focusing on the initial business model design and testing; and (ii) exploitation phase, focusing on business model development. The static and dynamic perspectives are two complementing perspectives to understand the maturity and complexity of the business model in agri-food sector. While the static perspective address the output and final business model at a given time, the dynamic perspectives give us an understanding of the complexity of coming up with a sustainable business model. The dynamic perspective seems to contribute to a deeper understanding in the start-up phase or when the firm focus a new market. The initial phase indicates in some cases that the surge of the ‘right’ business model is explored and different solutions are tested, which have not been stated from the beginning. In our review, we can identify articles that have either a static or dynamic perspective, but few articles seem to combine these perspectives, an area that could generate deeper knowledge of the complexity of business model innovation and its outcome.
Third, surprisingly few of the selected articles treat sustainability theoretically, see Table 1. Only four articles \cite{41,62-64} of the 21 articles apply a theoretical perspective on sustainability. The four articles are all based on case studies. One article presents business models for sustainability archetypes \cite{41} when studying the case of British Sugar; maximize material and energy efficiency, create value from waste, substitute with renewables and natural processes, deliver functionality rather than ownership, adopt a stewardship role, encourage sufficiency, repurpose for society/environment, and develop scale-up solutions. In the second article \cite{62} conclusions are drawn that bioplastic companies manufacturing—e.g., food containers—can develop successful business models when they mobilize their “dynamic capabilities” around sustainability. Therefore, a business model for sustainability needs to communicate to societies the ways in which the products can improve in the future, regarding e.g., greater renewable content or better biodegradability, recycling systems or agricultural practices, or a combination of these. The third article \cite{63} includes the case of Eataly and their business model innovation in a complex market for food; many customers want cheap food produced in an efficient way and other customers have an increased focus on food safety and quality and increased awareness of food-related ethics (e.g., ecological sustainability, social justice, and animal welfare.). These three articles address both business model and sustainability theoretically.

<table>
<thead>
<tr>
<th>Theoretical Sustainability</th>
<th>Practical Sustainability</th>
<th>No Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical business model</td>
<td>\cite{41,62,63}</td>
<td>\cite{67}</td>
</tr>
<tr>
<td>Practical business model</td>
<td>\cite{64}</td>
<td>\cite{57,58,59,65,68,69}</td>
</tr>
</tbody>
</table>

Further, the last of the articles that apply a theoretical perspective on sustainability, deals with business models practically but not theoretically \cite{64}. They discuss sustainable food systems from environmental, social, and economic perspectives when studying urban farming. They conclude that “urban farming holds promise as an economically sustainable solution to a number of the problems of the conventional food system” \cite{64} (p. 143). This means that only 3 out of 21 papers apply a theoretical perspective on business model as well as sustainability.

A third of the selected articles address issues of or related to sustainability even though it is done without using the concept sustainability. In these articles, the sustainability perspective is used in a limited and narrow way, without any theoretical depth. For example, one article address the UK pig meat supply chain and discusses food security and continuous employment, but does not elaborate on the concept of sustainability \cite{65}.

Many of the articles do not mention sustainability at all, even though the business model concept is treated in a theoretical way in almost all of these articles. One example is an article \cite{66} that address the plurality of co-existing business models within New Zealand Wine industry firms, with a focus in the degree of internalization/externalization of the business models.

The fact that just 4 out of 21 papers apply a theoretical perspective to business model clearly indicates that the business model concept is treated in a rather operational way and that there is a need for further theoretical development and application of the business model concept. This is especially valid when it comes to the sustainability aspect of business models. All in all, there are 12 articles which apply a theoretical perspective on business model, but 8 of them do not apply a sustainability perspective at all.

Although that the previous comprehensive review \cite{49} covered articles published between 1990 and 2014, the 21 articles described in this paper were published between 2005 and 2014. Furthermore, the articles with theoretical perspectives on both BMs and sustainability were published between 2011 and 2014.

We call attention to these facts to illustrate that the theoretical research on BMs and BMI, especially with a theoretical sustainability perspective, is a young and developing, even immature,
field. Much remains to be investigated and developed. Our quest in this paper is to suggest a path towards the development of a conceptual framework for sustainable business model innovation.

Based on previous studies and on the literature review in this paper, we suggest that a conceptual framework for sustainable business model innovation ought to include explicitly the sustainability aspects of the building blocks of sustainable BMI, see Table 2. It highlights the need to include sustainability aspects in every building block in business model innovation. When it comes to value proposition and concerns about the product/service, customer segments, and relationships that enhance sustainability it is also relevant to take into account for example, traceability for products and standards for safety and quality. ‘Value creation and delivery’ will benefit from including not only if the key activities, resources, channels, partners, and technologies focus on sustainability aspects, but also awareness of food-related ethics, ethical consumption. For example, ecological sustainability, social justice, and animal welfare. The building block of ‘value capture’ should not solely focus on if cost structures and revenue streams include sustainability considerations but also include for example, sustainable food systems based on environmental, social, and economic aspects.

Table 2. A conceptual framework for sustainable business model innovation. Based on previous research and structured literature review.

<table>
<thead>
<tr>
<th>Building Blocks</th>
<th>Description</th>
<th>Degree of Innovation</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value proposition</td>
<td>Product/Service, customer segments, and relationships</td>
<td>Offers 'more of the same' or something new to the firm/world? Existing markets or new markets?</td>
<td>Do the product/services, customer segments, and relationships enhance sustainability? For example, traceability for products and standards for safety and quality?</td>
</tr>
<tr>
<td>Value creation and delivery</td>
<td>Key activities, resources, channels, partners, and technologies</td>
<td>Improvements of existing channels or new relationships? Familiar (fixed) networks or new (dynamic) networks (e.g., alliances, joint ventures)? Improvements of existing technologies or new, emerging technologies?</td>
<td>Do key activities, resources, channels, partners, and technologies focus on sustainability aspects? Awareness of food-related ethics? Ethical consumption? For example, ecological sustainability, social justice, and animal welfare.</td>
</tr>
<tr>
<td>Value capture</td>
<td>Cost structure and revenue streams</td>
<td>Incremental cost cutting in existing processes or new processes that generate revenues?</td>
<td>Do cost structures and revenue streams include sustainability considerations? For example, sustainable food systems based on environmental, social, and economic aspects.</td>
</tr>
<tr>
<td>Value intention</td>
<td>Mind-set of owner-manager</td>
<td>Attitudes to change and innovation</td>
<td>Is sustainability a means, a goal, or something else? Is sustainability enhancing or limiting the BMI?</td>
</tr>
</tbody>
</table>

Further, it could be argued that ‘value intention’ is an important building block in the development of sustainable business model innovation in the agri-food industry, see Table 2. Companies in the agri-industry have unique characteristics as described above; owner-managed family business and rooted in their communities. The owners expect that their companies are going to be there for the indefinite future and the owners are not solely concerned with growth and revenues. The owners regard themselves as stewards or custodians of the company, the property, and the environment, with a responsibility for living and non-living things. To include value intention of the owner-manager in the conceptual framework, could present important insights of potential trade-offs and barriers when addressing growth ambitions based on social, environmental, and economic aspects.

4. Conclusions and Implications

A sustainable perspective—theoretical or practical—seems still to be rare in the published articles, even though around half of the articles discuss issues which could be regarded as part of the sustainability field. This is remarkable, since we would argue that it will be hard, or rather close to impossible, to develop business models without sustainability aspects in the future.

Similar conclusions can be drawn based on some of the previous literature reviews on business models [37,45], which reveal many interesting insights on the development of business models, but often lack a discussion about sustainability and sustainable business models. The focus on increased profitability can be viewed as a necessity in the short run, but from a strategic perspective, agri-food entrepreneurs also have to be innovative and create BMI that focus on sustainability.
As discussed in the previous section, research has also revealed limits in business models only focusing on profit [14–16,43]. We argue that it is important to consider sustainability in business model innovation—it could generate a competitive advantage.

To summarize, the complexity and maturity of business model innovation has been addressed in this paper, focusing on the practical and theoretical contributions of business model and sustainability. Many studies reveal insights about the challenges and possibilities firms in the agri-food sector face, but due to an increasing complexity in the field there is a need to develop more systematic approaches that include both innovation and sustainability. The degree of maturity, especially focusing on the sustainability aspect, is in its early phase. As several papers do not even consider sustainability aspects, we argue that awareness has to be developed regarding the value of integrated approaches in order to present sustainable innovations as a competitive advantage for the future.

The conceptual framework for sustainable business model innovation presented and proposed in this paper gives practical as well as theoretical guidelines for the development of sustainable innovations. Based on the literature review, the conceptual framework also highlights the need to include sustainability in business model innovation.

A practical contribution for managers to develop sustainable business models is to more explicitly involve sustainability aspects in the three building blocks (i) value proposition, (ii) value creation and delivery and (iii) value capture. For ‘value proposition’ and concerns about the product/service, customer segments, and relationships that enhance sustainability it is also relevant to take into account for example, traceability for products and standards for safety and quality. For ‘value creation and delivery’ there are benefits to include not only if the key activities, resources, channels, partners, and technologies focus on sustainability aspects, but also awareness of food-related ethics, ethical consumption. For example, ecological sustainability, social justice, and animal welfare.

For ‘value capture’ it is important to not solely focus on if cost structures and revenue streams include sustainability considerations but also include for example, sustainable food systems based on environmental, social, and economic aspects. Another practical contribution relates to the mind-set of the owner-manager including attitudes, perceptions, and intentions to determine level of engagement of social, environmental, and economic aspects.

From a research perspective, it is also of interest to deepen the understanding of the ‘value intention’ of the owner-manager in connection with business model innovation in the agri-industry sector. However, in order to develop this field further, more empirical research is needed that builds upon developed theories and frameworks in the field. Only then will our knowledge of underlying mechanisms grow, which in the long run will lead to the development of a solid theoretical ground.

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Author Contributions: Henrik Barth, Per-Ola Ulvenblad, and Pia Ulvenblad (authors of this paper) designed and developed the conceptual framework for sustainable business model innovation that is based on previous research. These authors prepared the theoretical and practical contributions of the paper, and wrote the paper.

Conflicts of Interest: The authors declare no conflicts of interest.
### Appendix A

<table>
<thead>
<tr>
<th>Article</th>
<th>Business Model and Primary Building Blocks</th>
<th>Business Model Innovation</th>
<th>Sustainability Aspect</th>
<th>Empirical/Conceptual Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>[39]</td>
<td>Practical business model concept. Primary building blocks—value proposition, value creation and delivery, and value capture.</td>
<td>Technological investments, partnerships with non-profit organizations, and development of value chains through partnerships with suppliers.</td>
<td>Practical sustainability concept addressing the design of social businesses.</td>
<td>Empirical—seven cases.</td>
</tr>
<tr>
<td>[38]</td>
<td>Theoretical business model concept. The definition used: the value creation priorities of the firm with respect to the use of both internal and external resources to create value for and with customers. Primary building block—value creation and delivery.</td>
<td>Initial hypotheses for BM for (i) new firms, (ii) integrated firms, (iii) integrated firms that sell products to other firms, (iv) firms that carry out industrial development in addition to production and commercialization, and (v) firms that produce and sell services.</td>
<td>N/A</td>
<td>Empirical—100 biotechnology firms (food industry, agriculture, etc.).</td>
</tr>
<tr>
<td>[36]</td>
<td>Theoretical business model concept with a dynamic perspective that focuses on the evolution of the business model over time. Primary building blocks—value proposition, value creation and delivery, and value capture.</td>
<td>Learning perspective on business model innovation exploration phase (initial design and testing) and exploitation phase (scaling up the refined business model).</td>
<td>N/A</td>
<td>Empirical—Naturhouse Case.</td>
</tr>
<tr>
<td>[35]</td>
<td>Theoretical business model concept. Firms can produce business models for sustainability by (1) creating a higher strategic decision-making process, and by (2) mobilizing their dynamic capabilities around sustainability outcomes specifically. Primary building block—value proposition.</td>
<td>Business models are in focus. Development of innovative business models helps on an sustainable value proposition through the use of dynamic capabilities that engage society in defining ecological and social value.</td>
<td>Theoretical sustainability concept. Business model for sustainable innovation.</td>
<td>Empirical—three cases.</td>
</tr>
<tr>
<td>[34]</td>
<td>Theoretical business model concept. Primary building blocks—value proposition, value creation and delivery, and value capture.</td>
<td>In order to gain a new and effective way of competing in a given sector, innovation in all components of the business model are necessary.</td>
<td>Theoretical sustainability concept. Sustainability is focused: increased awareness of food-related ethics (e.g., ecological sustainability, social justice, and animal welfare) creates a shift to higher quality food sold mainly by small specialty retailers.</td>
<td>Eataly Case.</td>
</tr>
<tr>
<td>Article</td>
<td>Business Model and Primary Building Block(s)</td>
<td>Business Model Innovation</td>
<td>Sustainability Aspect</td>
<td>Empirical/Conceptual Paper</td>
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<tr>
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<tr>
<td>[64]</td>
<td>Practical business model concept focusing on revenues and costs Primary building blocks—value proposition, value creation and delivery, and value capture.</td>
<td>This study takes a first look at the business models and economics of Vancouver's urban farms. Focuses on revenues, costs, financing, and sales models of urban farmers as well as their community connections and benefits.</td>
<td>Theoretical sustainability concept: Sustainable food systems are important for environmental, social, and economic reasons.</td>
<td>Empirical—eight cases; urban farmers in Vancouver, BC</td>
</tr>
<tr>
<td>[65]</td>
<td>Practical business model concept Primary building block—value creation and delivery</td>
<td>Business model focused on integrated supply chains.</td>
<td>Practical sustainability concept; food security and continuous employment are discussed</td>
<td>Empirical—Morrisons Case, a UK supermarket chain (pig meat supply chain)</td>
</tr>
<tr>
<td>[66]</td>
<td>Theoretical business model concept centered on ownership and control through internalization at one extreme, and externalization at the other. Primary building blocks—value creation and delivery.</td>
<td>Assesses evidence for a plurality of competitive business models (internalization vs. externalization) in a single industry.</td>
<td>N/A</td>
<td>Empirical—seven case firms from the New Zealand wine industry.</td>
</tr>
<tr>
<td>[67]</td>
<td>Theoretical business model concept. Management must consider the firm's value proposition, choose the activities it will undertake within the firm, select the appropriate technologies, and determine how the firm fits into the value creation network. Primary building blocks—value proposition, value creation and delivery.</td>
<td>Practical sustainability concept—the Global Alliance for a Safe and Sustainable Agriculture (EurepGAP) is mentioned</td>
<td>N/A</td>
<td>Empirical—three cases (one agro-business)</td>
</tr>
<tr>
<td>[68]</td>
<td>Practical business model concept, no definition provided. Primary building block—value capture.</td>
<td>Presents a regional irrigation business partnership model for sustainable public-private irrigation planning and investment</td>
<td>Practical sustainability concept, presents experience and lessons of sustainable business partnership.</td>
<td>Empirical—four cases tested with the model.</td>
</tr>
<tr>
<td>[69]</td>
<td>Practical business model concept. Primary building block—value creation and delivery.</td>
<td>Presents a framework focused on servitization as a competitive advantage.</td>
<td>N/A</td>
<td>Empirical—a case study from the livestock feed manufacturing industry.</td>
</tr>
<tr>
<td>[70]</td>
<td>Theoretical business model concept describing the business model consisting of nine elements. Primary building block—value creation and delivery and value capture.</td>
<td>Categorization of business models as driven by efficiency or perceived value (a model almost always has elements of both) based on Porter's generic strategy.</td>
<td>N/A</td>
<td>Conceptual—with some empirical short examples (including &quot;rent a cow&quot;).</td>
</tr>
<tr>
<td>[72]</td>
<td>Theoretical business model concept. Primary building block—value proposition.</td>
<td>This study combines the characteristics of network marketing and business models for e-commerce. This innovative business model in e-commerce suggests a new paradigm for traditional industries.</td>
<td>N/A</td>
<td>Empirical—five cases; Food souvenir producers.</td>
</tr>
<tr>
<td>Article</td>
<td>Business Model and Primary Building Block(s)</td>
<td>Business Model Innovation</td>
<td>Sustainability Aspect</td>
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<tr>
<td>[74]</td>
<td>Theoretical business model concept</td>
<td>Provides a business model framework for accommodating managerial implications from hedonic price analysis</td>
<td>N/A</td>
<td>Empirical—Analysis of price and quality information in a specialty coffee supply chain</td>
</tr>
<tr>
<td>[75]</td>
<td>Practical business model concept</td>
<td>Vertical integration (vertical business model) (farm to fork) of its activities from primary production to the end user through extensive retail networks</td>
<td>N/A</td>
<td>Empirical—one case from the beef supply chain</td>
</tr>
<tr>
<td>[76]</td>
<td>Practical business model concept</td>
<td>No direct focus on business model. The focus is on entrepreneurship. R&amp;D leaders must develop growth strategies and business models competencies</td>
<td>N/A</td>
<td>Confectioner Mars Case</td>
</tr>
</tbody>
</table>
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Article III
Overcoming barriers in agri-business development: two education programs for entrepreneurs in the Swedish agricultural sector

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ABSTRACT

Purpose: The paper compares two government-sponsored education programs for agricultural entrepreneurs: a Leadership program and a Lean program.

Methodology: The paper takes both a qualitative and a quantitative approach in its collection and analysis of data from 54 semi-structured interviews and from a survey with 109 participants.

Findings: The main challenges to business and personal development are time pressure and the need for better communications. The Leadership program participants emphasize the effect of internal barriers such as fixed mind-sets. The Lean program participants emphasize the effect of external barriers such as financing. Both groups emphasize personal and business growth more than the control group.

Practical Implications: Entrepreneur education programs can help participants, program developers, and advisory organizations identify and manage business challenges and barriers.

Theoretical Implications: The paper contributes to the literature about educations for entrepreneurs in the agricultural sector with its examination of agricultural entrepreneurs’ reflections on barriers and challenges in business development and their linkage to overcoming barriers focused on a resource-based perspective with different types of resources.

Originality/Value: The paper encourages examination of development challenges and barriers from the perspective of participants in entrepreneur education programs.

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Introduction

This article focuses on the need for agricultural entrepreneurs to develop their skills both in terms of self-leadership/leadership and lean thinking. The article compares the findings from two national education programs for entrepreneurs in the Swedish agricultural sector; Leader Practice (LP) and Lean Agriculture (LA). Further, the ambition is to
suggest possible ways to continue the development for sustainable business model innovation in the agricultural sector.

To develop and strengthen agricultural entrepreneurs is of importance for several reasons. First, there are global challenges for a sustainable food production both when it comes to increasing food production and decreasing food waste. It is for example estimated that by the year 2050, food production must increase by 70% from present levels (Dobermann and Nelson 2013; FAO 2009). A sustainable agriculture is focused from several actors in society (European Commission 2011; Griggs et al. 2013; United Nations 2015). Further, reducing food waste and preserving our natural resources are ideas that appear frequently in the discussion and the literature on sustainable food production (Godfray et al. 2010; IPCC Report 2018). The United Nations estimates that one-third of the food produced for human consumption (or about 1.3 billion tons annually) is wasted globally (FAO 2018). All this together reveals challenges for entrepreneurs working in the food production.

It is also important because of the trends in the agricultural sector. In its assessment of global agriculture, the OECD (2004) called attention to the future growth of larger agricultural operations that employ more staff, to the expected increase in governmental legislation and regulation, and to the urgent demand for more effective leadership. Some researchers, however, have noted barriers to managing these challenges. One especially worrisome barrier is that many entrepreneurs of small and medium-size farms see themselves as traditional producers and suppliers rather than as innovative entrepreneurs and leaders (Ståhl et al. 2016; Vesala, Peuro, and McElwee 2007). Chesbrough (2010) states that a static mind-set is one of the main barriers to business model innovation, which requires thinking and acting in new ways. Yet it is difficult for some farmers to adopt and implement new business models that create, deliver, and capture value (Barth, Ulvenblad, and Ulvenblad 2017). One way to change this mind-set, then, is to educate farmers about leadership and entrepreneurship.

Previous research shows different types of education efforts for developing agricultural entrepreneurs all over the world. The major parts of the education efforts have traditionally focused on the challenges related to technical aspects, breeding, crop farming, soil fertilizing, etc. However, there are also examples of education efforts with focus on developing business management (de Romemont, Macombe, and Faure 2018; Joerger 2003; Yang et al. 2005), corporate social responsibility (Crowther and Vilkė 2018), entrepreneurship (Lans et al. 2008; Tambwe 2017; Tracey and Phillips 2007), leadership (Brosnan 2014; Ulvenblad and Cederholm Björklund 2018) and risk management (Kauppila and Pelsue 2003). Further, research show the importance of relating business model innovation to the development of agricultural entrepreneurs (Barth, Ulvenblad, and Ulvenblad 2017; Tell et al. 2016; Ulvenblad et al. 2014) and to work cross-over disciplines to develop agricultural entrepreneurs since a review of entrepreneurship literature shows that mainstream entrepreneurship research has largely overlooked the agricultural sector (Dias, Rodrigues, and Ferreira 2019; Fitz-Koch et al. 2018).

Some researchers have proposed the use of various tools and practices (e.g. business model innovation; farm networks) to support growth and development in the agricultural sector (e.g. Carter 2001; Ulvenblad et al. 2014). Other researchers have recommended that the organizations that support agricultural entrepreneurs should re-examine their advisory approaches. According to Landini, Brites, and y Rebolé (2017), for example, in-
service training for rural extensionists should focus more on knowledge reflection and less on traditional knowledge transfer. Other research, however, has noted the professional identity conflicts that may arise when advisors are assigned new roles in which new knowledge is required (Nettle, Crawford, and Brightling 2018).

In short, many observers of the sector conclude it is essential to develop and educate agricultural entrepreneurs so that they can manage future challenges and overcome existing barriers in agricultural production. Not the least because of the rapid changes in agriculture (De Lauwere 2005). However, research about entrepreneurs in the agri-industry has been overlooked (Fitz-Koch et al. 2018). Dias, Rodrigues, and Ferreira (2019) call for more studies about for example entrepreneurial skills in the agri-industry. McElwee, Anderson, and Vesala (2006) argue that there is a need for a greater emphasis on education and training for farmers not the least in business and entrepreneurship skills (McElwee 2006; McElwee, Anderson, and Vesala 2006; McElwee and Smith 2012). Further, research on barriers to agricultural business development has been limited.

The purpose of this article is to contribute to previous research by comparing the findings from two national education programs for entrepreneurs in the Swedish agricultural sector; Leader Practice (LP) and Lean Agriculture (LA). The ambition is also to suggest possible ways to continue the development for business model innovation in the agricultural industry.

The article is structured as follows. Next, a frame of reference including barriers and challenges in the development of agri-business is presented. After that, the methodology for the comparison between the programs is described including a presentation of the two education programs. The following sections contains the findings and discussion. Finally, we present our conclusion, describe practical and theoretical implications of the programs as well as future research avenues.

**Literature review**

**Barriers and challenges in the development of agri-business – a resource-based perspective**

To enhance the understanding of barriers and challenges in the development of agricultural businesses a resource-based perspective is adopted. Resources have been categorized in several ways. Examples of resources are tangible assets such as machinery, capital, etc., while intangible assets are such as brand names, knowledge, skills, etc. Penrose (1959), being one of the pioneers in the resource-based view, followed by the work of for example both Wernerfeldt (1984) and Barney (1991), have put the individual, the entrepreneur and especially resources within the business, in focus. The process school of the resource-based view focuses processes, activities and internal strategic capabilities (Tucker, Meyer, and Westerman 1996). Capabilities are related to the human capital emphasizing developing, carrying and exchanging information through the business’s human capital (Tucker, Meyer, and Westerman 1996). Further, Grant (1991: 122) defined such capabilities as ‘complex patterns of coordination and cooperation between people, and between people and (tangible) resources’. Resources have been recognized as being the basics for entrepreneurial activities in terms of for example information, human capital and finance (Shane and Venkataraman 2000) and as the core elements
to handle in entrepreneurship (Katz and Gartner 1988). A resource-based perspective has also been used in research focusing the start-up of farming (Alsos, Ljunggren, and Toril Pettersen 2003; Perks and Medway 2012).

According to a recent structured literature review based on literature from 1969–2017 (Dias, Rodrigues, and Ferreira 2019) research with focus on agricultural entrepreneurship also to some extent have focused on internal resources such as entrepreneurial skills. Entrepreneurial activities involve mobilizing resources – financial, human and social (Baron 2007). However, the researchers also call for more studies on entrepreneurial skills and income sources and state that ‘future research should examine what skills farmers need, according to farmers and stakeholders (Dias, Rodrigues, and Ferreira 2019, 136). In the present article we compare two national education programs for agricultural entrepreneurs developed in cooperation with agricultural organizations which include agricultural entrepreneurs as well as agricultural advisors in Sweden.

The literature on the barriers to growth and innovation, especially among small and young firms, is extensive (e.g. Barber, Metcalfe, and Porteous 1989; Barth 2004; Pellegrino 2018; Sandberg and Aarikka-Stenroos 2014). Entrepreneurs in the agricultural sector face many of these same barriers. However, research on barriers to agricultural business development is less extensive. In a resource-based perspective, barriers can be understood both as a material object (tangible) such as a lack of parts or component for manufacturing, or an immaterial object (intangible) such as cultural differences. Furthermore, perceived barriers have also been determined as internal and external barriers (Barth 2004; Sandberg and Aarikka-Stenroos 2014). Researchers who study barriers in business often propose measures that policymakers, business advisors, and business managers can take to manage these barriers. Descriptions of barriers preface their proposals (Barth 2004; Pellegrino 2018; Sandberg and Aarikka-Stenroos 2014). Some examples of internal barriers are the lack of equipment, of strategic planning, of skills, and of adequate financing. All these may also be labelled resources in accordance with the above described. Some examples of external barriers are global competition, burdensome regulations, and market and environmental changes (e.g. Cederholm Björklund 2018).

Barriers are in many cases related to the context, market structure and maturity of the industry (Pellegrino 2018). Especially the agricultural sector has experienced many challenges due to increased global competition and environmental challenges. A systematic literature review of business model innovation in the agri-food sector by Ulvenblad et al. (2018) identified several barriers to growth and development. The internal barriers identified at the organizational level in the review mainly concern lack of resources such as shortages of internal financing, managerial and leadership skills and experience. Furthermore, external barriers to business model innovation include undeveloped networks and eco-systems, followed by unsupportive government and inappropriate infrastructure (Ulvenblad et al. 2018). The authors state that little attention has been paid to individual barriers and resources such as mind-set, perceptions, values and behaviour in previous research (Ulvenblad et al. 2018) although an inflexible mind set has been shown to be one of the main barriers to innovation (Chesbrough 2010).

In order to use resources at hand in the business, to acquire new resources and to recombine resources the entrepreneur needs to develop new ways of thinking and acting together with a mind-set and tools that helps her/him to handle eventual barriers and challenges. The education content in the two programs evaluated in this article has
been developed in cooperation with representatives from agricultural organisations which include agricultural entrepreneurs as well as agricultural advisors in Sweden. These stakeholders suggested that the educations should focus on leadership and self-leadership when it comes to the development of entrepreneurial behaviour and mind-set, while lean thinking could be a tool to develop new effective production methods in the agricultural sector.

**Leadership and self-leadership strategies**

Leadership skills is one part of the internal resources of great importance for the entrepreneur. There is a need for agricultural entrepreneurs to learn leadership and self-leadership strategies. There is a substantial body of research on self-leadership (e.g. D’Intino et al. 2007; Houghton, Dawley, and DiLiello 2012; Manz 1986; Manz and Neck 2013; Neck and Houghton 2006; Neck et al. 1999; Willis 2015). In this research, self-leadership generally refers to the idea that leaders need to lead themselves before they can lead others.

Several countries are focusing the development of leadership skills. Australia, Canada, the United States, and New Zealand have for example developed strategies for leadership development in the agricultural sector (Brosnan 2014). These programs include some aspects of self-leadership in terms of Goleman’s (2004) five characteristics of emotional intelligence (EI): self-awareness, self-regulation, social skill, empathy and motivation. However, the main focus is on the leadership of followers. Further, in the interviews in different countries ‘self-leadership was a term that required clarification by most interviewees. All asked what was meant by it …’ (Brosnan 2014, 39). For Ireland the plan is to integrate self-leadership for adult farmers as part of knowledge transfer courses in the forthcoming Rural Development plan (Brosnan 2014). Willis (2015) showed in his MA thesis that this was of great importance for entrepreneurs in Kenya. The notion of leadership as something that includes to lead yourself made it possible with the change of mind-sets when it comes to the interpretation of the concept leadership. If you are able to lead yourself – you are a leader, was one thing highlighted in the study of ‘Certificate in Community Leadership’ program in Kenya (Willis 2015). Further, the concept of self-leadership should be introduced early on in educations.

However, much of the academic leadership education on undergraduate level is designed with a focus on course curricula, learning/teaching formats and available jobs (Morgan et al. 2013). A result of this is that the education takes a traditional approach to the concept of leadership that is based in how to lead others – instead of leading yourself.

**Lean thinking**

Lean thinking is about developing high value for customers by removing non-value-adding activities (Caldera, Desha, and Dawes 2017). The concept of Lean originates from the automotive manufacturing industry and specifically the implementation of Toyota production system (Krafcik 1988; Womack, Jones, and Roos 1990). The main goal of the Toyota production system is cost minimization achieved through quality control, quality measurement and improvement of the working environment (Womack and Jones 1996).
The implementation of lean thinking can be categorized into three phases (Narayananmurthy and Gurumurthy 2016). The first phase is the pre-implementation where the fundamental prerequisites for starting the lean journey are assessed. In the second phase, the firm’s success in implementing the lean practices is followed up, and in the third phase the outcome of the lean implementation is assessed in terms of operational and financial performance.

Several research studies on Lean implementation in the agricultural sector have been reported over the years (Simons and Zokaei 2005; Perez et al. 2010; Henchion and McIntyre 2010; Ferry, Parton, and Cox 2013). Many of these studies provide evidence that the production and management system in the agricultural sector differs in many ways compared to traditional manufacturing industries. One of these distinguished features includes a broader business perspective, that also include sustainable values and obligations to protect the land. Barth, Ulvenblad, and Ulvenblad (2017) identified a number of characteristics based on a literature review, namely (i) the nature of agricultural production, which is diffuse and seasonal. It means that there are many small primary producers, depending on a diversity of climates, who sell and deliver products to processors and retailers; (ii) the market concentration at the end of the supply chain; and (iii) the close connection between production processes and the quality and safety of the product (Barth, Ulvenblad, and Ulvenblad 2017, 3).

However, several barriers and challenges have been reported in the Lean empirical literature when it comes to implementing lean principles. Jadhav, Mantha, and Rane (2014) identified several barriers to successful implementation of Lean in a literature review, including insufficient resources, lack of top management commitment, and employee resistance to change. Similar findings can be identified in the implementation of lean in the agricultural sector (Melin and Barth 2018). In the Pre-implementation phase farmers had only basic Lean knowledge where Lean was viewed as a set of tools. It was not until the farmers had reached the third phase that some of them began to apply value stream mapping. However, the findings suggest that lean principles provide business values, especially in the short run when it comes to operational issues, but further research is needed on long term effects regarding continuous changes (Barth and Melin 2018).

**The role of advisory service organizations as resource providers**

In several countries advisory service organizations are responsible for providing resources in terms of advice to farmers on agricultural, entrepreneurship and business development practices. Examples of agricultural organizations that offer education programs are the Cooperative Extension Service in the United States (Katz 2003), the Agricultural Development Programs (ADPs) in Nigeria (Adebayo and Idowu 2000), and India’s Agricultural Technology Management Agency (ATMA) program (Glendenning, Babu, and Asenso-Okyere 2010). Another example is the ‘Minnesota farm business management program’ in the United States that shows farmers how to keep business records, how to understand agricultural reports, and how to use technology (Joerger 2003). In Benin, a program for family farm management is available (de Romemont, Macombe, and Faure 2018). In Tanzania, an entrepreneurship education program helps farmers transform their businesses (Tambwe 2017).
Despite these programs, research reveals that many agricultural entrepreneurs still need more leadership knowledge and improved leadership skills. In addition, Morgan et al. (2013) report that while agricultural leadership programs are increasing at the undergraduate level, research is lacking that identifies program objectives, needed courses, internship requirements, and future placement opportunities. Based on interviews with agricultural leadership experts, these authors conclude that such programs need further evaluation and development.

**Education programs in the Swedish agricultural sector**

For more than 200 years, Swedish agricultural advisory organizations (in part, government-financed) have provided various kinds of assistance to farmers. Traditionally, this assistance is in scientific/technical areas (e.g. production, soil testing, and water management). However, to support and promote rural enterprise in other ways, the Swedish National Department of Agriculture (Statens Jordbruksverk) recently offered two agricultural leadership programs. The goal of these programs was to help farmers become better leaders as they acquired greater knowledge about farm strategy and development, business growth, and networks as well as general leadership skills and attitudes (Jordbruksverket 2006, 2017).

In this paper we compare two government-sponsored education programs for agricultural entrepreneurs: a Leadership program and a Lean program, and also relate this findings to a control group.

**Methodology**

The empirical data for this article derives from two education programs for agricultural entrepreneurs in Sweden. First, the respective program is presented in this part. Thereafter the data collection and analysis are described.

**The two education programs**

The Swedish National Department of Agriculture financed the leadership program called Ledarpraktikan (in English: Leader Practice). The European Social Fund financed the leadership program called Lean Lantbruk (in English: Lean Agriculture). [Hereafter, these programs are referred to as LP and LA]. Both programs used advisors (i.e. coaches) who have been trained in leadership coaching (Boyatzis, Smith, and Blaize 2006). The programs follow a two-step education process: (i) the advisors are trained in coaching skills; (ii) the advisors coach the farmers on program elements. The training for the coaches, which was mainly based on the idea of solution-based coaching (O’Connell, Palmer, and Williams 2012), used the coaching tool called PRACTICE (Palmer 2008).

**Program 1: Leader Practice (LP)**

The LP program, which existed in Sweden during 2011–2013, aimed to promote sustainable and innovative leadership among dairy farm entrepreneurs. Employees at several agricultural advisory organizations and researchers from Halmstad University, in cooperation, identified the dairy farmers’ needs, compared these needs with needs in
other industries, prepared a handbook on leadership, and created a development and education program for the agricultural entrepreneurs who own and manage dairy farms. In its first stage, 27 entrepreneurs attended the LP program. For more detail, see Ulvenblad and Cederholm Björklund (2018).

The handbook, ‘Ledarpraktikan – The art of leading myself, my employees and my business’ (Ulvenblad et al. 2012), addressed the need for sustainable and innovative leadership at all levels of agricultural organizations. Following the handbook guidelines, nine agricultural advisors were trained in the autumn of 2012 on leadership and leadership coaching. Following this training, these advisors (the Coaches) coached the dairy farmers as they experimented with their new leadership skills and knowledge. In the coaching and feedback sessions, the farmers learned new ways to work and communicate. In August of 2013, a second edition of the handbook was published.

The handbook and the LP program addressed three leadership levels: (i) self-leadership (ii) leadership of employees, and (iii) leadership of businesses. Self-leadership (Manz 1986; Manz and Neck 2013) involves strategies for thought patterns and behaviors. The first premise of self-leadership, which begins with the self, is that it facilitates leading others and leading a business. The second premise is that leadership is a process that occurs in the nexus of the leader, the employees, and the situation (Hughes, Ginnett, and Curphy 2008). Leadership of employees refers to various leadership styles such as participatory leadership (Hersey and Blanchard 1969; Kanape-Willingshofer and Bergner 2014) and transformational leadership (Bass 1991; Bass et al. 2003; Stewart 2006). Leadership of businesses, for example, focuses on strategic management systems and tools such as the Balanced Scorecard (Kaplan and Norton 1992, 1996) and on strategic groups such as boards of directors.

Program 2: Lean Agriculture (LA)

The LA program, which was introduced in Sweden in 2010, was based on principles derived from the Toyota Production System (Womack, Jones, and Roos 1990). The aim of the program was to transfer the Lean production ideas used in the manufacturing sector to the agricultural sector. The program focused on farm profitability, resource efficiency, competitiveness, and growth. The Lean modules in the program included the Lean philosophy, Lean tools and principles, and Lean efficiency and effectiveness. The overarching goal of the LA program was to help the farms survive economically. In its first stage, 34 entrepreneurs attended the LA program. For more detail, see Melin and Barth (2018) and Barth and Ståhl (2014).

The farmers were mainly engaged in dairy production, poultry farming, and pig farming. Some farmers were also involved in forestry activities, restaurant and hotel operations, or machinery rental. Nine Lean Coaches (supported by the program management team) led the LA program that had both theoretical and practical modules. The Lean Coaches made monthly farm visits where Lean tools were evaluated and implemented, action plans (Dickens and Watkins 1999) were evaluated, and strategies for change management were discussed. The Lean Coaches also held coaching sessions with the farmers, promoted the idea a farmer network, and held monthly telephone meetings with the program management team.
Data collection and analysis

The research for this paper had two phases: the interview phase in which 54 entrepreneurs were interviewed and the survey phase in which 109 entrepreneurs completed a survey.

The semi-structured interviews were conducted via telephone with entrepreneurs who had participated in one or both of the two programs (LP and LA). The interviews lasted 20–30 minutes each and addressed various themes – the background, expectations, goals, and farm activities of the participants; challenges in the agricultural sector; leadership; and learning outcomes (see Appendix I and II). Content analysis was used to interpret and categorize the interview responses. In the Findings section, in which we focus on the participants’ commentary on the challenges they face, we quote from the interviews.

The structured survey was sent to 109 entrepreneurs: 37 in the LP program, 35 in the LA program, and 37 in a control group (CG) who had not participated in either program. The control group have been randomly selected from Statistics Sweden, based on a sample that included agricultural entrepreneurs working full-time with at least 1 Million SEK (~100.000 Euro) in turnover 2014. Twelve entrepreneurs had participated in both programs. The survey was structured around questions on the barriers in the agricultural sector. Response rate: 66% (72/109). A six-point Likert scale ranging from ‘not at all’ to ‘very much’ was employed as it has been proven to increase response rate and response quality (Sachdev and Verma 2004), see Appendix III.

Data collected from the survey were analyzed using the Statistical Package for the Social Sciences (SPSS). An independent sample t-test was used to analyze differences scores. The t-test compared the mean scores among the LP participants, the LA participants, and the CG participants.

Findings

The interview findings

The LP program respondents

The LP program respondents said their greatest challenge related to self-leadership and their leadership role. They found it difficult to assume a new role and somewhat frightening to imagine themselves in leadership roles although they reported they had profited from the programs. However, they agreed a leader must exercise self-leadership.

I had to accept I was the leader and not just a worker. It was hard because when I was in my office making plans, I thought, wrongly, my employees assumed I was not working.

I feel secure now as a leader. I do not do as much operations work on the farm as before.

I think completely differently now. If I think we are working wrongly, I no longer rush into the situation. I think it through and come up with more thoughtful suggestions before I act. I try to discuss the situation with my employees rather than just tell them the right solution.

The respondents agreed they are under severe time pressure. However, they understood that leaders can delegate tasks and responsibilities.

The employees think I have changed. They have more responsibilities. I also have a much more structured schedule. I think I will be a more effective rational decision-maker.
I am much more secure leading myself and managing my time. I now realize the importance of reflecting and planning tasks rather than just working on immediate tasks.

The respondents also recognized the need for better communications with employees, and even in some circumstances, with family members. Almost all participants said they had a better understanding of the importance of good communications.

The biggest change is in my private life. It is believed that close relatives understand everything, but they don’t. Now, my wife and I are really talking with each other, which is very good.

We had a good spread in our group, some people were in the beginning of the career and other were close to retirement. It was very rewarding. Different status, age and life situations. Then one can learn to understand others – I understand my father, who is also working at our company, much better now.

Now I really understand the importance of individual performance dialogues with the employees. I did not think we needed dialogues, but now I understand why they are important.

Many respondents agreed that the coaching sessions (during and after the program) were very helpful.

The coaching was crucial for learning how to change my leadership and develop my firm.

It’s easier when someone tells you what to do. However, I like it more when I am coached and have to think for myself.

**The LA program respondents**

The LA program respondents focused on the importance of leadership education. They thought more leadership education would help them (and did help them) become better business executives.

I have probably learned to become a better business leader. I certainly imagine that.

It’s important to have a holistic view, to do the right things at the right time. It’s hard to put your finger on it, but you’re thinking about Lean all the time.

The respondents pointed to time pressure as an enormous barrier. After completing the program, some respondents said they had learned how to make the work go more smoothly by establishing work routines and following standard procedures. They thought they were better prepared to ‘save time.’

Time is the biggest challenge. You can’t make all the changes at once. You have to do one thing at a time.

Today we have a structure based on routines and standards that is hands-on and visible. We have changed the layout of the farm, which now includes space for meetings and discussions. We meet every Monday to discuss the work for the week. We talk about things we can do better and differently. We use a whiteboard. The employees are now more involved in the daily work. We spend less time on looking for equipment and solving daily problems. Because we work less with day-to-day issues, I can address leadership and management issues. That was not the case before the program.
The respondents commented about the importance of good communications at work. Even respondents who thought they had no difficulty communicating with co-workers realized that they needed to work harder on getting information to the employees. They said structured meetings were also a good way to spread information.

Comparison of the LP and LA programs
As the focus topics in the interviews reveal, the LP program participants gained a better grasp of self-leadership than the LA program participants did. The LA entrepreneurs requested more leadership education. The LA entrepreneurs, in their Lean analysis of the day-to-day work, established a more systematic working environment (see Ståhl et al. 2016). This finding is unsurprising because the primary focus differs between the two programs. The LP program focuses on self-leadership while the LA program focuses on using Lean to manage business activities.

The two groups of entrepreneurs had slightly different responses to how the programs influenced mind-set change. As Chesbrough (2010) states, an inflexible mind-set is one of the main barriers to business model innovation. The LP entrepreneurs said they thought in new ways about self-leadership and their roles as leaders. The LA entrepreneurs thought about new ways to work. Again, this finding is unsurprising given the programs’ different focus. However, both groups talked about the importance of good communications and the acceptance of others’ points of view. This is evidence of a more flexible mind-set.

An area where the two programs made a similar impression on the two groups relates to time pressure. Almost without exception, the LP program and the LA program participants saw lack of time as barrier to business growth and development (Ulvenblad et al. 2018). The LP entrepreneurs reported that the program had encouraged them to delegate more tasks. The LA entrepreneurs reported that adoption of Lean tools and principles could save time for everyone.

The participators in the programs have clearly found support from the external environment in their development as entrepreneurs and leaders during the programs. This means that external resources in terms of both the education activities (LA) and coaching activities (LP) have had an impact on the participator’s development outcomes.

The internal resources with focus on leadership skills and behaviour have also been enhanced during the programs. The LP participants express intangible resources such as the change in roles from being a farmer to becoming an entrepreneur or a leader. To think and work in new ways is also something that have been valued by the participators. New skills and competencies have given a new focus on reflection, planning, better decision making, etc. From a resource-based perspective, it is especially important with managerial resources because a possible expansion requires planning and this planning is firm-specific.

The time pressure experienced from participators on both the programs is perceived as a barrier for the development. This is also in accordance with Penrose (1959) arguing that unused resources are of great importance for the development of a business. If the entrepreneur, leader or manager is under time pressure with no time for planning, etc. there is also a lack in the resource ‘time’ for further development or growth.
The survey findings

The survey findings (Table 1) reveal both similarities to, and differences in, the responses of the LP survey participants and the LA survey participants. The most significant differences in their responses were the following items under ‘Barriers to growth and development’:

(i) Hard to find finances for expanding the business \( (p < 0.05) \),
(ii) Old thought patterns \( (p < 0.01) \), and
(iii) Traditional ways of working \( (p < 0.01) \).

The LP participants had higher mean scores for the two internal barriers (ii and iii). The explanation may be the more direct focus on self-leadership and leadership in the LP program. However, the LA participants scored significantly higher on the external barrier (i). These findings are consistent with the fact that the LA program focuses more on operational activities (e.g. implementation tools and methods) and on growth and development. This is also in line with a resource-based perspective since the LP program regard the entrepreneur as the primary and most developable resource of the business. The focus is to start in the entrepreneur with self-leadership skills in order to develop the employees and the business.

The groups are rather similar in terms of both the entrepreneurs’ age, level of education and number of employees. There is a tendency for participators in LP to express a higher

Table 1. \( t \)-test analysis between the Leader Practice and Lean Agriculture programs.

|                          | Leader Practice | Lean Agriculture | \( t \)  
|--------------------------|-----------------|------------------|----  
|                          | \( (N = 10) \)   | \( (N = 23) \)   |    |
development during the last five years in all three aspects and significantly higher development in leading their company. This result might mirror the interest in leadership from the participators taking part in the LP program. In addition, the LP participators express the driving forces a little higher although without significance.

The groups tend to express different resource needs. The LP participators indicate needs related to intangible internal resources such as thought patterns while the LA participators indicate needs related to tangible external resources such as financing.

A comparison among the three survey groups (LP, LA, and CG) reveals certain similarities and differences in their responses (Table 2). In this comparison, LP/LA participants are treated as a single group.

The entrepreneurs who have completed an education program have a higher education background than the entrepreneurs of the control group. Further, the entrepreneurs who have completed an education program express having more employees than the entrepreneurs in the control group; an average of 5.6 employees compared to 3.7 employees. This result indicates a greater need for leadership in the larger firms, which are run by the entrepreneurs who have participated in an education program. It could perhaps also indicate that their companies are under development. The entrepreneurs with LA or LP stated that the development of their ability to lead themselves, their employees and their firm had increased clearly in the past five years. When it comes to managing employees, the difference was significant compared to entrepreneurs of the control group, CG.

An interesting observation is that entrepreneurs with LA or LP use employees and external contacts in order to develop the business in a higher degree, compared with

Table 2. T-test analysis of the two programs (LA and LP) and the control group (CG).

<table>
<thead>
<tr>
<th></th>
<th>Education programs</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N = 45)</td>
<td>(N = 27)</td>
</tr>
<tr>
<td><strong>M</strong></td>
<td><strong>SD</strong></td>
<td><strong>M</strong></td>
</tr>
<tr>
<td><strong>Background</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>50</td>
<td>9.2</td>
</tr>
<tr>
<td>Level of education</td>
<td>2.33</td>
<td>0.707</td>
</tr>
<tr>
<td>Number of employees</td>
<td>5.4</td>
<td>3.671</td>
</tr>
<tr>
<td><strong>Development in the last five years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My development (Owner/CEO)</td>
<td>3.42</td>
<td>0.965</td>
</tr>
<tr>
<td>Leading my employees</td>
<td>3.5</td>
<td>0.731</td>
</tr>
<tr>
<td>Leading my company</td>
<td>3.6</td>
<td>1.053</td>
</tr>
<tr>
<td><strong>Driving forces in the last five years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiatives/ideas of my own (Owner/CEO)</td>
<td>3.8</td>
<td>1.014</td>
</tr>
<tr>
<td>Initiatives/ideas of employees</td>
<td>3.34</td>
<td>0.834</td>
</tr>
<tr>
<td>Initiatives/ideas of family/friends</td>
<td>2.27</td>
<td>1.468</td>
</tr>
<tr>
<td>Initiatives/ideas of external partners/network</td>
<td>2.61</td>
<td>1.298</td>
</tr>
<tr>
<td><strong>Barriers to growth and development</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of my time</td>
<td>3.27</td>
<td>0.997</td>
</tr>
<tr>
<td>Lack of employees</td>
<td>2.56</td>
<td>1.216</td>
</tr>
<tr>
<td>Lack of advice/support</td>
<td>1.66</td>
<td>1.01</td>
</tr>
<tr>
<td>Hard to find finances for expanding the business</td>
<td>2.31</td>
<td>1.869</td>
</tr>
<tr>
<td>Lack of demand</td>
<td>1.93</td>
<td>1.421</td>
</tr>
<tr>
<td>Competition from other firms</td>
<td>2.24</td>
<td>1.464</td>
</tr>
<tr>
<td>Laws and government regulations</td>
<td>2.82</td>
<td>1.319</td>
</tr>
<tr>
<td>Reluctance to grow</td>
<td>1.31</td>
<td>1.345</td>
</tr>
<tr>
<td>Old thought patterns</td>
<td>1.51</td>
<td>1.44</td>
</tr>
<tr>
<td>Traditional ways of working</td>
<td>1.49</td>
<td>1.272</td>
</tr>
</tbody>
</table>

Notes: *p < 0.05 and **p < 0.01.
the other group of entrepreneurs, CG. The latter group is more internally oriented and rely in a higher degree on themselves, family and friends. This indicates that entrepreneurs with LA or LP consider themselves professionals and entrepreneurs to larger extent than the CG entrepreneurs.

The LA/LP entrepreneurs experience a higher degree of multiple barriers. At first sight, it can be considered remarkable, but it could be understood from an entrepreneurial perspective. An explanation for this may be that the LA/LP entrepreneurs identify themselves as entrepreneurs in a market in a higher degree than the CG entrepreneurs, which may identify themselves as producers and subcontractors. If you regard yourself as an entrepreneur acting on a market and with intentions to grow, then you will face challenges and barriers in a higher degree than a CG entrepreneur, who may regard her-/himself more like a producer and supplier rather than an entrepreneur. If they do not have the intention to change and develop, they will not experience any barriers either. The LA/LP entrepreneurs have greater willingness to change and develop. They also experience a greater lack of time and lack of access to employees. Here, the differences between the groups are significant. The LA/LP entrepreneurs also experience a slightly greater lack of access to advisers/support, which could indicate that they have a higher and more qualified demand for external knowledge. Lack of resources is also one of the main internal barriers for business model innovation found in a systematic literature review in the agri-food industry (Ulvenblad et al. 2018). These barriers studied focused lack of resources such as shortages of internal financing, managerial and leadership skills and experience (Ulvenblad et al. 2018)

The resource needs between the groups LA/LP and CG tend to vary in terms of both internal resource needs and external resource needs. The participators in the programs seem to have strengthened their internal resources, managerial and leadership competencies not the least in relation to the employees. They also show higher demands for external knowledge and indicate more contact with external actors.

The lack of time is both present in the interview findings and the survey findings. This is, as mentioned before, of importance for the development of a business since unused resources is a valuable source for being able to continue the planning of the business development.

Discussion

Altogether, the two education programs have had an impact on the participators. Not the least related to thinking in new ways. The challenges with taking on a role of being a leader was mentioned explicit by several of the LP participators since many of them didn’t see themselves as nor entrepreneurs neither leaders. This is also something that has been highlighted as important for developing the business in previous research (Vesala, Peuro, and McElwee 2007). In another context this was emphasized by participators in the study of ‘Certificate in Community Leadership’ program in Kenya who perceived a change in ways of thinking (Willis 2015). The interpretation of the concept leadership was shown to be valuable in terms of: if you are able to lead yourself then you actually are a leader (Willis 2015). This implies that a change in mindset also can change attitudes and hopefully behavior. Chesbrough (2010) underlines that the existing mindset is a main barrier when it comes to business model innovation.
The participants in the education programs experience several barriers and challenges. To overcome these barriers there are needs for mobilizing different types of resources. In the table below (Table 3) we have applied a framework for barriers and challenges by Sandberg and Aarikka-Stenroos (2014) further developed by Ulvenblad et al. (2018) based on a systematic literature review of business model innovation research in the agri-food industry. For overcoming barriers and challenges we have applied a resource-based perspective (Penrose 1959; Wernerfeldt 1984).

Resources in a business have been categorized in various ways for example internal, external, tangibles and intangibles (Penrose 1959; Wernerfeldt 1984). In the present study, the resources to overcome identified internal barriers and challenges are connected to the ‘human capital’, which is regarded as an internal resource (Shane and Venkataraman 2000), on both the individual and the organizational levels.

Regarding the individual level, the participants have expressed that being stuck in old thought patterns, the difficulty to perceive oneself as a leader and the challenge to fill a leadership role can be strong barriers for development. Resources to overcome this barrier can be to develop self-leadership competence, willingness to change, leadership skills and the capacity for reflecting, planning, and decision making. There have been calls for enhancing both business- and entrepreneurship skills (Dias, Rodrigues, and Ferreira 2019; McElwee 2006; McElwee, Anderson, and Vesala 2006; McElwee and Smith 2012) and the two programs have focused on this in terms of developing leadership potential.

<table>
<thead>
<tr>
<th>Internal Individual:</th>
<th>Barriers and challenges from previous research: Sandberg and Aarikka-Stenroos (2014), Ulvenblad et al. (2018)</th>
<th>Barriers and challenges identified in the present study</th>
<th>Resources to overcome identified barriers and challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrictive mindset</td>
<td>• Restrictive mindset • Perceptions • Values • Behavior</td>
<td>• Old thought patterns • Perceptions of being an entrepreneur or leader, Leadership role</td>
<td>• Self-leadership • Change willingness • Leadership skills • Reflecting, planning, decision making</td>
</tr>
<tr>
<td>Organizational:</td>
<td>• Lack of competencies • Insufficient resources • Unsupportive organizational structure</td>
<td>• Time pressure • Lack of leadership and entrepreneurship skills • Traditional ways of working • Communication • Lack of internal finance</td>
<td>• Unused resources • Co-worker skills • Delegating • Lean principles • Routines and standards</td>
</tr>
<tr>
<td>External</td>
<td>• Resistance and lack of support from specific actors • Restrictive macro-environment</td>
<td>• Lack of external finance • Lack of demand • Lack of advisory services • Lack of support</td>
<td>• External contacts</td>
</tr>
</tbody>
</table>

Table 3. Framework for barriers and challenges based on Sandberg and Aarikka-Stenroos (2014) and Ulvenblad et al. (2018), with potential resources to overcome identified barriers and challenges.
skills and behaviors but also tried to enhance the more intangible resources such as the change in roles from being a farmer to becoming an entrepreneur or a leader. From a resource-based perspective, it is especially important with managerial resources because a possible expansion requires planning and this planning is firm-specific and depending on the specific context.

On the organizational level the important internal barriers are time pressure, traditional ways of working, lack of leadership and entrepreneurship skills and communication flaws. Further, lack of internal finance is also perceived as a barrier. These barriers can be met by exploiting resources through development of co-worker skills, delegation, applying lean principles and introducing routines and standards. The time pressure is especially important to handle since it is perceived as a barrier for the development. Penrose (1959) state that unused resources are of great importance for the development of a business. If the entrepreneur, leader or manager is under time pressure with no time for planning, etc. the resource ‘time’ is missing and will hinder the further development possibilities.

The external barriers are connected to perceived lack of external finance, demand, advisory services and support. A general resource to mitigate these barriers is to develop and strengthen external relations. The participators in the programs show higher demands for external knowledge and indicate more contact with external actors. This can also be related to the development of strategic capabilities with focus on exchanging information (Tucker, Meyer, and Westerman 1996) and cooperation between people Grant (1991).

All these barriers, internal on both the individual and organizational level and external barriers can be overcome or mitigated with education and coaching activities. The outcomes from the interviews and survey indicates that the participants in the programs have found support from the external environment in their development as entrepreneurs and leaders during the programs – external resources in terms of both the education activities and coaching activities have had an impact on the participator’s development outcomes.

The participating entrepreneurs have learnt both entrepreneurship, leadership and management aspects for developing their business, although the education programs have different focus. The LP program which focuses a lot on self-leadership aspects in order to be a better leader in the relation with the employees have the focus on to lead your company and company related aspects. LA in turn have focused more on lean activities but also included a minor part of leadership in the program.

The content in both the education programs have been conducted in a two-step process. First, the advisors have been educated to be coachers in order to adjust the traditional transfer of knowledge approach (Landini, Brites, and y Rebolé 2017). In the second step the educated advisor/coachers in turn have educated and coached the agricultural entrepreneurs. This way of working adds value not only to the agricultural entrepreneurs and the advisors but also to the agricultural advisor service organizations.

**Conclusions, implications, and future research avenues**

This paper has focused two education programs for developing entrepreneurs in the Swedish agriculture – Leader Practice (LP) and Lean Agriculture (LA). The aim has been to compare the two education efforts related to outcomes in terms of barriers and challenges in the business development process and link these to resources which could
help the entrepreneurs in the further development. The barriers and challenges focus mainly internal factors like changing mind-set, acting as a leader, time management and lack of resources. To think in new ways is something that the participating entrepreneurs have experienced. Since Chesbrough (2010) emphasizes that the existing mindset is a main barrier when it comes to business model innovation a change in mind-set from the educational programs is promising when it comes to changes in both attitudes and behaviors.

There are practical implications regarding self-leadership for agricultural entrepreneurs. The entrepreneur her-/herself is very important for the success of the agricultural farm. The results of the survey indicate that personal motivation is an important starting point for business development for both groups of entrepreneurs (LA/LP and CG). It underlines the importance of the entrepreneur and her/his will and skill when developing the firm. Hence, development of self-leadership is crucial for business model innovation in the agricultural sector an important practical implication for agricultural entrepreneurs.

There are also practical implications for advisory organizations. Self-leadership education does not focus the entrepreneur’s knowledge – what the entrepreneur should know. Rather, the focus in self-leadership education is in strategies for thought patterns and strategies for behaviors – what the entrepreneur should be able to do. Hence, this requires that the traditional counseling – where the counselor informs the entrepreneur of the best solution – is developed into coaching where the coach (former adviser) focuses on developing the entrepreneur’s leadership abilities to do, lead and create – including innovation processes.

Based on this study, we can conclude that we have identified several limitations that should be addressed in future research. First, this is to our knowledge one of the first studies that have evaluated leadership programs in the agricultural sector and compared these results with a control group, but only a limited set of participators have been undergoing this program. More studies are needed to evaluate content and outcome of such programs. Second, the survey method used in this study provide some insights of what could be perceived as a barrier or driving force, but our perception of these aspects is highly individual. For example, barriers could be overestimated or underestimated before overcoming perceived challenges. Thus, it should be noted that measures of mean-values in such a survey only can be regarded as an estimation. Furthermore, objective aspects of contextual factors should also be addressed in coming studies to give a broader understanding of the local and regional aspects that stimulate/prevent agri-business development. In addition, it should be mentioned that the control group has been randomly selected based on financial measures and not based on other matching criteria. To evaluate and control for other explanations, it would be of interest to include non-financial aspects such as resources and strategies applied, and the infrastructure in the local and regional setting, in the selection process of the control group. Finally, future research avenues should also focus on how to overcome barriers and challenges related to thought patterns, changing existing mind-sets and cognitive factors. There is a need for knowledge development regarding different aspects of leadership in agricultural firms. This is valid for leadership in relation to the employees and in relation to the business. However, the crucial aspect is the self-leadership, or the leading of oneself (Manz 1986; Manz and Neck 2013). It would also be relevant with a systematic literature review including how research have handled different types of education for agricultural entrepreneurs worldwide in different countries.
Disclosure statement

No potential conflict of interest was reported by the author(s).

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References


Article IV
Unpacking sustainable business models in the Swedish agricultural sector— the challenges of technological, social and organisational innovation

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ABSTRACT

The global challenges of today are many, and one of the most concerning aspects relates to food production for an increasing global population. The sustainability of doing ‘more of the same thing’ is being increasingly called into question. Several sustainable business model frameworks have been presented in recent years to address these challenges, but our knowledge is limited about the change processes of the agricultural sector. This paper aims to increase our understanding of how sustainable business models have developed in the agricultural sector in Sweden. It maps eight archetypes of sustainable business models, clustered in three groups, with a focus on the technological, social, and organisational innovation components at agri-food companies. The study takes a quantitative, methodological approach, conducting a telephone survey with owners and managers of 1143 agri-food companies in Sweden, and using analysis of variance (ANOVA) for the analysis. The paper provides empirical evidence on the various options for sustainable business models that Swedish agri-food companies use. No major differences were found with respect to technical or social innovation components in the three regions: East, south, and north Sweden. However, significant differences were found between the regions with respect to the organisational innovation component. The organisational innovation component is based on two sustainable business model archetypes, namely, repurpose for society/environment and develop scale up solutions. North Sweden had a higher degree of organisational innovation than both south and east Sweden. The reason for this could be the larger environmental, economic, and organisational challenges in north Sweden compared to the rest of the country, which makes the need for innovation stronger. The paper also suggests new areas for researchers and practical avenues for stakeholders in the agricultural sector (and other industries) to translate social and environmental value creation into economic profit and competitive advantage. To our knowledge, this is the first study to use sustainable business model archetypes in an empirical setting in the agricultural sector.

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1. Introduction

1.1. Background

The agricultural sector has a key role to play in addressing many of the global challenges identified in Agenda (2030). One of the major challenges is to feed a growing world population, and it has been estimated that global food production will have to increase by 50 percent by 2050 (Alexandratos and Bruinsma, 2012). Another challenge is that increase in food production must take place at the same time as the negative climate impact of agriculture is reduced (IPCC, 2019). These challenges are enforced by a situation where many companies in the agricultural sector is struggling with low profitability (Board of Agriculture, 2019) and low profit margins (Fi-compass, 2020).

The agricultural sector is experiencing increased global competition and the response in several industrialised countries seems to be doing more of the same thing. Companies have become fewer and larger, and have been focused on production efficiency, cost reduction and economies of scale (Alston, 2018). On a general level, this development would increase share of livestock, expand cultivated land and irrigation, and entail more and longer transports of goods. From a sustainability perspective, it is questionable whether this pathway can meet the global challenges ahead.
One alternative would be to develop innovative and sustainable solutions along several different pathways, e.g., combining technological, social, and sustainable possibilities when creating new business opportunities. However, the research field of entrepreneurship and innovation has not focused on the agricultural sector to any great extent although there are some examples in recent years (Alsos et al., 2011; Alvik et al., 2014b; Alsos et al., 2014; Dias and Franco, 2018; McElwee, 2006; Ulvenblad et al., 2020). The majority of studies has been conducted in developing regions (Beuchelt and Zeller, 2016). Instead research about entrepreneurs in the agricultural sector has been largely overlooked (Dias et al., 2019; Fitz-Koch et al., 2018). Obviously, the agricultural sector is not a typical research field for entrepreneurship researchers to study; the entrepreneurial and innovation-oriented research field has a long tradition of focusing on emerging technology-based industries in the search for promising new products, services, companies and entrepreneurs. Moreover, most research within the agri-food industry tends to examine production rather than innovation. In addition, several researchers have called for more research in the industry (Dias et al., 2019; McElwee and Smith, 2012; Vesala et al., 2007). Based on the need to find alternative ways of meeting the global challenges ahead, several contributions can be identified on the topic, such as sustainable business models (Gessessewer et al., 2018; Lüdeke-Freund et al., 2019). Circular business models (Bocken et al., 2018; Lüdeke-Freund et al., 2019), sustainability-oriented innovations (Adams et al., 2016) and responsible innovation (Stighoe et al., 2013). Many of the business models (BM) today focus on the traditional aspects of value proposition, value capture, value creation and delivery, but complimentary aspects such as value intention (Barth et al., 2017), value surplus, value absence, value missed and value destroyed (Yang et al., 2017) have been suggested. The literature has proposed many different frameworks and solutions that have the potential to address business development and sustainability as a common goal. The article by Bocken et al. (2014) is one of the most cited on the subject, presenting a detailed framework, based on previous research, of the patterns and attributes that address sustainable business goals. Sustainable business model (SBM) archetypes are presented to describe groupings of mechanisms and solutions (Bocken et al., 2014). This framework has also been used and developed in the banking industry (Yip and Bocken, 2018). Also, interesting to note is that experience from the manufacturing industry provides evidence that business model innovation is a promising approach for improving sustainability (Yang et al., 2017).

However, many business model innovations seem to fail, but our knowledge of this process is limited within the agricultural sector—especially when addressing SBM innovation. Furthermore, the agricultural sector has several characteristics that distinguish it from many other industries. First, many farms in the agricultural sector are owner-managed family businesses, deeply rooted in their communities (Nuthall and Old, 2017; Vesala and Vesala, 2010). Secondly, the owner often takes a long-term view and expects their heirs to continue the business—they regard themselves as stewards or custodians of the business and the environment, and have a responsibility to both living and non-living things (Fitz-Koch et al., 2018; Ulvenblad et al., 2016). Thirdly, the owners are not solely focused on growth and revenues (Barth et al., 2017). Fourthly, the industry has many small producers and processors at the start of the supply chain and power is often concentrated in retailers at the end of the supply chain (Carbone, 2017). Finally, a close connection exists between production processes and the quality and safety of the product (Rueda et al., 2017).

The growing number of publications in recent years provides evidence that the business model field is increasingly relevant to a wide range of scientific subject areas. Despite this development, several experts have called for empirical research in order to achieve major advances in the business model field of research (Wirtz et al., 2016). The number of studies that address sustainable business models is also increasing, but less attention has been devoted to measuring the sustainability aspect of business models—especially in the agri-food industry (Barth et al., 2017; Tell et al., 2016). There have also been calls for more quantitative empirical studies with a focus on analysing innovative forms of sustainable production in the agricultural sector (Tell et al., 2019).

This article attempts to bridge this gap, especially when it comes to empirical contributions and the measurement of organisational, technological and social innovation of business models. It provides empirical evidence of the progress towards sustainable business models in the agricultural sector in Sweden. Empirical research on innovation in the agri-food industry is essential given the present and future challenges to food production, agricultural productivity, and societal sustainability. Furthermore, the study contributes with theoretical insights regarding the relationship between regional context, infrastructure and the development of sustainable business models with different points of focus.

The aim of the paper is to map and describe the various SBMs of the Swedish agri-food industry with a special focus on the challenges of the technological, social, and organisational innovation components of those business models. The aim is also to analyse and create an understanding of the different types of sustainable business models in relation to geographical regions in Sweden. The research data comprise a telephone survey of entrepreneurs at agri-food companies in Sweden with an annual turnover of more than one million Swedish crowns.

### 1.3. The Swedish context

The conditions for agriculture are very heterogeneous in different parts of Sweden. The southern part of Sweden has equal conditions as Denmark, but in north Sweden agriculture has to be conducted close to the Arctic Circle. Terrain, zoning and soil also vary between different regions. Crops are common on the plains in the south and around the large lakes in central and east Sweden, where the soils provide good yields. Cattle for beef and milk production are important for north Sweden and in forest areas all over the country, since these parts of Sweden has poorer production conditions (Board of Agriculture, 2019).

The population of Sweden is concentrated around the three big cities: (i) Stockholm, situated in east Sweden and (ii) Göteborg and (iii) Malmö situated in south Sweden. North Sweden is much less densely populated than the other parts of the country. The most populated areas, in all parts of Sweden, are situated close to Sweden's long shoreline. Around half of Sweden's population lives within a mile from the sea (Statistics Sweden, 2020). Further, the majority of governmental institutions, EU-related functions and universities are situated in south and east Sweden, with a concentration to the Stockholm area, the capital of Sweden.

Sweden has approx. 15 500 full-time farms. The number of farms, however, has declined by 17% over the last ten years (Board of Agriculture, 2016), leading to larger farms with an average size of 43 ha (OECD, 2018). The remaining companies have fewer employees overall and a third of the agri-entrepreneurs are over 65 years old (Board of Agriculture, 2009). There is thus a need to stimulate a structural change to attract younger, highly educated people, which could also improve the possibility of developing innovation in the sector.
Sweden is a high-cost country that also has strict regulations regarding environmental and animal welfare. Since the international agri-food market is very competitive and price sensitive, the Swedish agricultural sector is also facing challenges. However, the strict regulations can also be used as an incentive to produce high-quality sustainable products, which will lead to more value for the end customer. Another consequence of strict regulations is that consumer confidence in the quality and methods of Swedish food production is high (Geissdoerfer et al., 2018). Strict regulations can also be used as an incentive to produce high-quality sustainable products, which will lead to more value for the end customer. However, the strict regulations can also be used as an incentive to produce high-quality sustainable products, which will lead to more value for the end customer. Another consequence of strict regulations is that consumer confidence in the quality and methods of Swedish food production is high (Geissdoerfer et al., 2018).

Section 2 presents the theoretical framework for the research and introduces the SBM archetypes. Section 3, which presents the research method, describes the sample, the variables in the data collection, and the validation of the measures used to map SBMs in the Swedish agricultural sector. Section 4 describes the results of the research, while sections 5 and 6 present the discussion and conclusions, respectively.

2. Theoretical framework

2.1. Business models and business model innovation

The research literature and business practice have generated increased interest in BMs and business model innovation (BMI) in recent decades (Amit and Zott, 2012; Chesbrough, 2007; Magretta, 2002; Osterwalder and Pigneur, 2010; Osterwalder et al., 2005; Teece, 2010). Different definitions and setups appear in the research literature – some of which examines the single business, while other parts address the entire value network (Amit and Zott, 2012; Johnson, 2010; Zott et al., 2011).

The BM research is extensive. Magretta (2002) writes that a BM explains how an organisation earns a profit, how it functions, who its customers are, and what its customers value is. A similar definition is found in the literature on the BMs of social enterprises (Yunus et al., 2010). Teece (2010) defines the BM as a description of value creation, value delivery, and value capture. Gibson and Jones (2014) claim that, while a well-planned and successfully implemented BM can generate large profits, poor planning and problematic implementation of a BM can severely damage an organisation.

The BM research is nearly as extensive. BMs is generally interpreted as a process or an outcome. For example, BMI as a process can be seen as a strategy aiming at maximising environmental regeneration, social benefits, and financial viability (i.e., ‘doing well to do good’) above the level achieved by traditional ‘profit-normative’ BMs (Upward and Jones, 2016). BMs tend to focus on a variety of definition is found in the literature on the BMs of social enterprises (Yunus et al., 2010). Teece (2010) defines the BM as a description of value creation, value delivery, and value capture. Gibson and Jones (2014) claim that, while a well-planned and successfully implemented BM can generate large profits, poor planning and problematic implementation of a BM can severely damage an organisation.

The BM research is highly comprehensive and covers a wide range of stake- holders (including start-up companies and new entities following mergers or acquisitions). After the SBM innovation process is planned, it is necessary to follow systematic and well-established management practices and procedures (i.e., tools) that provide the organisation with stability and continuity. In such processes, these tools, which contribute to the SBM’s outcomes, can be enhanced by visual collaborative business modelling informed by stakeholders’ goals (e.g., Elkington and Upward, 2016; Geissdoerfer et al., 2018; Jones and Upward, 2014; Joyce et al., 2015). These tools are particularly useful for stakeholders in the identification and communication of problematic areas in the BM and its building blocks, as well as in the creation of a blueprint for analysis (Gibson and Jetter, 2014; Osterwalder and Pigneur, 2010).

2.2. Sustainable business models and sustainable business model innovation

Researchers have also called for studies of BMs that address sustainable development and take a value-added approach (Boons and Lüdeke-Freund, 2011; Breuer et al., 2019; Short et al., 2014; Stubbs and Cocklin, 2008). Wirtz et al. (2016) review of 681 articles on BMs reveals that BM research tends to focus on a variety of definitions, perspectives and components, though we still lack in-depth sustainability research on social, environmental and economic factors. Although Wirtz et al.’s (ibid) review focuses on the importance of “change and evolution” in BM research, the authors do not relate such research to the social and environmental aspects of sustainability. Arend (2013) and Markides (2015) argue for the potential benefit of viewing the BM as a model for value creation through non-monetary exchanges in new areas, such as social entrepreneurship and other non-traditional business contexts. Their work reflects the trend in research on SBMs that looks beyond a profit-centred focus to the environmental and social aspects of BMs. In addition, Lüdeke-Freund (2015) also stresses the importance of integrating sustainable entrepreneurship, innovation, and business models.

Bocken et al. (2014) describe SBM as a tool that provides substantial positive environmental and societal effects achieved by changes in how the organisation and its value network create, deliver, and capture value, or by changes in its value propositions. This process often requires making strategic choices intended to maximise environmental regeneration, social benefits, and financial viability (i.e., ‘doing well to do good’) above the level achieved by traditional ‘profit-normative’ BMs (Upward and Jones, 2016). According to Lüdeke-Freund (2019), an SBM can create competitive advantage through offering superior customer value and contributing to the sustainable development of both the organisation and society. Similarly, Schaltegger et al. (2016, p. 4) write that the SBM helps in describing, analyzing, managing, and communicating (i) a company’s sustainable value proposition to its customers and all other stakeholders, (ii) how it creates and delivers this value, and (iii) how it captures economic value while maintaining or regenerating natural, social and economic capital beyond its organizational boundaries.

Geissdoerfer et al. (2016) refine the definition of SBM by explicitly conceptualising it as a process with a specific focus on the integration of sustainable value among a wide range of stakeholders (including start-up companies and new entities following mergers or acquisitions). After the SBM innovation process is planned, it is necessary to follow systematic and well-established management practices and procedures (i.e., tools) that provide the organisation with stability and continuity. In such processes, these tools, which contribute to the SBM’s outcomes, can be enhanced by visual collaborative business modelling informed by stakeholders’ goals (e.g., Elkington and Upward, 2016; Geissdoerfer et al., 2018; Jones and Upward, 2014; Joyce et al., 2015). These tools are particularly useful for stakeholders in the identification and communication of problematic areas in the BM and its building blocks, as well as in the creation of a blueprint for analysis (Gibson and Jetter, 2014; Osterwalder and Pigneur, 2010).

2.3. Sustainable business model archetypes

The traditional building blocks of BM are (i) value proposition, (ii) value creation/delivery, and (iii) value capture. Bocken et al.
(2014) apply an integrated approach to the development of eight SBM archetypes around these blocks. These archetypes derive from questions of ‘value proposition’, ‘value creation and delivery’, and ‘value capture’. These authors categorise the eight archetypes as Technological, Social, and Organisational. Together, the archetypes present a comprehensive view of SBMs.

**Technological archetypes:** (1) Maximise material and energy efficiency, (2) Create value from waste, and (3) Use Substitute with non-renewable resources and current production systems.

**Social archetypes:** (4) Deliver functionality rather than ownership, (5) Adopt a stewardship role, and (6) Encourage sufficiency. The Deliver functionality rather than ownership archetype shows how companies can provide services that satisfy users’ needs without ownership of the physical products. The Adopt a stewardship role archetype shows how firms proactively engage with all stakeholders to ensure their health and well-being. The Encourage sufficiency archetype shows how companies employ solutions that actively seek to reduce consumption and production.

**Organisational archetypes:** (7) Repurpose for society/environment and (8) Develop scale up solutions. The Repurpose for society/environment archetype shows how companies prioritise the delivery of social and environmental benefits rather than financial profit (i.e., shareholder value) through close integration between the company, its community, and other stakeholder groups. The traditional business model, where the customer is the primary beneficiary, may shift. Lastly, the Develop scale up solutions archetype shows how companies deliver sustainable solutions on a scale that maximises benefits for society and the environment.

The original eight business models were developed based on the manufacturing industry (Bocken et al., 2014). Yip and Bocken (2018) have also conducted a study regarding business models for sustainability in the banking sector. Their point of departure was the original eight business models archetypes, which were revised after semi-structured interviews with bankers. One important reason for the revision was that the banking industry is a service industry which is different from manufacturing (Yip and Bocken, 2018).

The agricultural sector, which is the focus in this study, has several common denominators with the manufacturing industry. Both sectors focus on products, not services, and have developed into increasingly high-tech, machine-intensive operations with high levels of production but relatively few workers (Wåhlin, 2014). Hence, the study presented here will be based on the original eight archetypes of Bocken et al. (2014).

### 3. Method

#### 3.1. Research project setting and background

The research presented in this paper is part of the larger research project, Lean Innovation (initiated in 2012 at Halmstad University, Sweden). This paper reports on one aspect namely sustainable business models (SBMs) in the agri-food industry.

Fig. 1 shows how the research process is embedded in the larger research project and outlines the research process from (i) deciding on the main focus of the research through the (ii) planning of data collection, (iii) data collection and (iv) data analysis to enable to create an understanding of different types of sustainable business models in the agricultural sector in Sweden.

#### 3.2. Pilot study

In order to test and potentially improve the method used in the full-scale study a pilot study was conducted. The pilot study consisted of two parts: (i) four qualitative case studies of agri-food companies, and (ii) 204 structured interviews with agri-food companies. Both the case studies and the structured interviews included companies focusing on cattle, dairy and/or crops production and processing. The 204 structured interviews are included in the total number of conducted interviews.

The aim of the four case studies was to get a deeper understanding of the applicability of Bocken et al. (2014) archetypes in the agricultural sector. Since the four case studies indicated that the eight original archetypes where relevant to the agricultural sector, the 204 structured interviews were conducted to further validate the relevance of the archetypes. The structured interviews study also showed that Bocken et al. (2014) archetypes were relevant to the agricultural sector.

Further, the aim with the combination of qualitative case studies and quantitative structured interviews was to validate the conformity of the results of the different methods used. The results of the pilot study (Ulvenblad et al., 2019) confirmed that the construction and layout of the main study was adequate. Finally, the aim was to analyse all the empirical data from a different theoretical angle e.g., sustainability-oriented innovation (Adams et al., 2016).

#### 3.3. Data collection in the main study

Both primary and secondary data are used in this research. The primary data were collected through a telephone survey to all Swedish full-time agricultural entrepreneurs with at least an annual company turnover of 1 million SEK (approx. 100,000 Euro). All 4064 agricultural entrepreneurs were identified from the Agricultural Register for 2015 issued by Statistics Sweden. The goal was to conduct interviews with the entire population, but it was not possible to establish contact with some entrepreneurs and some declined to participate. Eventually, the telephone survey was conducted with 1143 agricultural entrepreneurs, which is a 28% response rate.

The secondary data (from Statistics Sweden) provided the following facts: company location (county), company characteristics (crops, dairy, etc.), annual turnover, land area, and contact information.

The telephone survey was conducted from June 2016 to June 2017. Prior to the telephone survey, we mailed letters to all 4064 entrepreneurs describing the eight SBM archetypes, which were the focus of the survey questions. The 1143 telephone surveys, in Swedish, lasted for about 20–30 min each. The respondents could reply to questions in their own words or choose among pre-structured answers. The data were processed using the Statistical Package for Social Sciences (SPSS).

The population of this study was classified using NUTS (Nomenclature of Territorial Units for Statistics); Sweden has 21
counties that are defined on NUTS Level 3. On NUTS Level 2, the counties are transformed into eight different regions. Furthermore, these eight regions form three large parts of Sweden in NUTS Level 1: (i) East Sweden (SE 1), (ii) South Sweden (SE 2) and (iii) North Sweden (SE 3). See Fig. 2.

Table 1 displays the figures for the entire population of agricultural entrepreneurs for NUTS Level 1. Of the total number of companies 80% have an annual turnover of between 1 million and 10 million SEK. As far as farm size is concerned, 34% of the farms in the population average between 100 and 200 ha of land, while 78% of the farms have between 50 and 400 ha of land.

The companies mainly produce beef cattle, crops, and dairy products. Table 2 displays the distribution of respondents regarding the main production focus in terms of cattle, crop, and dairy figures for NUTS Level 1 and by this shows how well the distribution of respondents represents the total population.

Of the total number of companies 1003 focus on cattle. 37.8% of these have participated in the study. 2597 companies in turn focus on crops, 23% of those have participated and finally 464 companies focus on dairy, 35% have participated in the study.

### 3.4 Variables and measures

The survey had one question about the county and 24 questions on the eight SBM archetypes. Each business model archetype had three questions with the following focus: (a) what value is delivered, (b) how value is delivered, and (c) how does the company earn money and capture other values. A Likert scale (1–5) was used for all 24 questions: 1) absolutely agree, 2) agree, 3) neutral, 4) partially disagree, and 5) absolutely do not agree. Consequently, the lower the Likert scale value is for every question, the higher the degree of the respondent’s agreement.

A translated version of the questionnaire can be viewed in appendix A, including the three questions for each of the eight business models, and the descriptive statistic (appendix B) generated from the study. Following Bocken et al.’s logic in defining the descriptive categories, we used higher order groupings
There are fewer than ten questions. After these tests and analyses were completed, we prepared indexes by calculating the mean values of all questions forming one main component (question), thus creating three essential variables. The results reflected the higher order groupings of the components of technological, social, and organisational innovation.

4. Results

In this section, we present the results of the statistical tests based on three major regions of Sweden (NUTS Level 1). First, we analysed the aggregated level of the eight SBM archetypes identified as ‘higher order groupings’. Our focus was on describing the main SBM archetypes. Thereafter, we continued the analysis of the organisational grouping variable, for which a homogeneity test revealed no difference between the major region groups (Levine Test).

Table 4 shows that the respondents of all three regions regard the technological component ‘Maximise material and energy efficiency’ as being the most prominent. The least prominent component is in turn connected to the organisational component ‘Develop scale up solutions’, which is valid for all three regions.

The analysis of variance (ANOVA) in Table 5 shows the results for the three innovation component groups and the independent variable NUTS Level 1. Significant differences were found for the organisational variable: F (2, 1130) = 14.28, p < 0.001. But no significant differences were found for the technological and social variables.

Since the range of the Likert scale used in this study is from 1 to 5, where 1 is “absolutely agree” and 5 is “absolutely do not agree”, the organisational innovation components Repurpose for society/environment and Develop scale up solutions are more common in north Sweden than in the other parts of Sweden.

Employing the Bonferroni post hoc test, the results show that the agri-entrepreneurs of north Sweden regard all the innovation components; technological, social and organisational, more prominent than agri-entrepreneurs in other parts of Sweden. The only exception is the technological innovation component, where the agri-entrepreneurs of south Sweden make the same assessment as their colleagues in north Sweden. The agri-entrepreneurs of east Sweden regard their business models less prominent in all three dimensions than in both south and north Sweden. The largest difference, which is statistically significant, is found regarding the organisational innovation component, where the sustainable business models in north Sweden have a more prominent organisational innovation component than the other parts of Sweden (Bonferroni, p < 0.05).

Overall, according to the Bonferroni post hoc test, the results show that the agri-entrepreneurs of north Sweden regard the sustainable business model archetype Develop scale up solutions where the agri-entrepreneurs of north Sweden

Table 2

<table>
<thead>
<tr>
<th>NUTS 1</th>
<th>Total nr. of firms</th>
<th>Response rate 1 (100%)</th>
<th>Response rate 2 (283%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cattle</td>
<td>Dairy</td>
<td>Cattle</td>
</tr>
<tr>
<td>East Sweden</td>
<td>328 (33%)</td>
<td>951 (36%)</td>
<td>85 (18%)</td>
</tr>
<tr>
<td>South Sweden</td>
<td>541 (54%)</td>
<td>1299 (50%)</td>
<td>347 (78%)</td>
</tr>
<tr>
<td>North Sweden</td>
<td>133 (13%)</td>
<td>347 (13%)</td>
<td>32 (7%)</td>
</tr>
<tr>
<td>Total</td>
<td>1003 (100%)</td>
<td>2597 (100%)</td>
<td>464 (100%)</td>
</tr>
</tbody>
</table>
also show significantly higher assessment than both east and south Sweden (Bonferroni, p < 0.05).

5. Discussion

Sustainable business models are an important and growing field of interest among researchers and practitioners (Daspit, 2017; Evans et al., 2017; Geissdoerfer et al., 2018; Lüdeke-Freund et al., 2019). However, knowledge of the development and use of SBMs is limited, specifically in the agri-food industry (Tell et al., 2016), which is facing many challenges such as increased global competition, price pressure, reduced profitability, increased administrative and statutory requirements, and changing demands from society (see, for example, Alexandrato and Bruinsma, 2012; Swedish Government, 2017).

The findings from this research offer new insights into SBM archetypes in the agricultural sector of Sweden. The most common business model archetype in all three regions is Maximise material and energy efficiency, which is defined as part of the technological component. This is not surprising since agricultural companies often regard themselves as primary producers and not entrepreneurs (Ulvenblad, 2021). The producer-farmer focus on production within traditional boundaries (Stenholm and Hytti, 2014) which puts material and energy efficiency in focus, rather than other ways of business development.

Further, the findings reveal that no major differences exist between the technological and social innovation components in three of the country’s regions. However, significant differences were revealed for organisational innovation components between the three regions for two SBM archetypes: Repurpose for society/environment and Develop scale up solutions. The agri-entrepreneurs of north Sweden assessed that their sustainable business models had more significant organisational innovation components than their colleagues in both east and south Sweden.

It is interesting that the agri-entrepreneurs of north Sweden seem to be more innovative when it comes to sustainable business model innovation than the other parts of Sweden. Especially when considering the challenges of north Sweden, with long distances

Table 3
Results from scales internal reliability analysis (Cronbach’s):

<table>
<thead>
<tr>
<th>Business model archetypes</th>
<th>No. of Items</th>
<th>Cronbach’s Alpha</th>
<th>Groupings</th>
<th>No. of Items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximise material and energy efficiency</td>
<td>3</td>
<td>0.720</td>
<td>Technological component</td>
<td>9</td>
<td>0.77</td>
</tr>
<tr>
<td>Create value from waste</td>
<td>3</td>
<td>0.645</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitute with renewable and natural processes</td>
<td>3</td>
<td>0.790</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliver functionality rather than ownership</td>
<td>3</td>
<td>0.679</td>
<td>Social component</td>
<td>9</td>
<td>0.73</td>
</tr>
<tr>
<td>Adopt a stewardship role</td>
<td>3</td>
<td>0.563</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encourage sufficiency</td>
<td>3</td>
<td>0.674</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repurpose for society/environment</td>
<td>3</td>
<td>0.475</td>
<td>Organisational component</td>
<td>6</td>
<td>0.665</td>
</tr>
<tr>
<td>Develop scale up solutions</td>
<td>3</td>
<td>0.533</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4
Mean value for the business model archetypes based on Bocken et al. (2014) for east, south and north Sweden:

<table>
<thead>
<tr>
<th>Groupings</th>
<th>Business model archetypes</th>
<th>East Sweden</th>
<th>South Sweden</th>
<th>North Sweden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological</td>
<td>Maximise material and energy efficiency</td>
<td>1.83</td>
<td>1.77</td>
<td>1.75</td>
</tr>
<tr>
<td></td>
<td>Create value from waste</td>
<td>2.51</td>
<td>2.30</td>
<td>2.30</td>
</tr>
<tr>
<td></td>
<td>Substitute with renewable and natural processes</td>
<td>2.43</td>
<td>2.50</td>
<td>2.51</td>
</tr>
<tr>
<td>Social</td>
<td>Deliver functionality rather than ownership</td>
<td>2.48</td>
<td>2.63</td>
<td>2.66</td>
</tr>
<tr>
<td></td>
<td>Adopt a stewardship role</td>
<td>2.33</td>
<td>2.17</td>
<td>2.07</td>
</tr>
<tr>
<td></td>
<td>Encourage sufficiency</td>
<td>2.95</td>
<td>2.75</td>
<td>2.58</td>
</tr>
<tr>
<td>Organisational</td>
<td>Repurpose for society/environment</td>
<td>2.77</td>
<td>2.64</td>
<td>2.37</td>
</tr>
<tr>
<td></td>
<td>Develop scale up solutions</td>
<td>3.23</td>
<td>2.83</td>
<td>2.73</td>
</tr>
</tbody>
</table>

Table 5
ANOVA results for technological, social, and organisational innovation components:

<table>
<thead>
<tr>
<th>Innovation components</th>
<th>NUTS n = 1143</th>
<th>East</th>
<th>South</th>
<th>North</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>sd</td>
<td>M</td>
<td>sd</td>
</tr>
<tr>
<td>Technological innovation</td>
<td>2.26</td>
<td>0.63</td>
<td>2.19</td>
<td>0.64</td>
</tr>
<tr>
<td>Social innovation</td>
<td>2.59</td>
<td>0.8</td>
<td>2.52</td>
<td>0.78</td>
</tr>
<tr>
<td>Organisational innovation</td>
<td>2.74</td>
<td>0.85</td>
<td>2.52</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Table 6
ANOVA results with Bonferroni post hoc test:

<table>
<thead>
<tr>
<th>BM archetypes</th>
<th>NUTS n = 1133</th>
<th>East</th>
<th>South</th>
<th>North</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>sd</td>
<td>M</td>
<td>sd</td>
</tr>
<tr>
<td>Re-purpose</td>
<td>2.77</td>
<td>0.86</td>
<td>2.64</td>
<td>0.85</td>
</tr>
<tr>
<td>Develop scale up solutions</td>
<td>3.23</td>
<td>0.98</td>
<td>2.83</td>
<td>0.92</td>
</tr>
</tbody>
</table>
and transports to large and medium-sized cities. Furthermore, north Sweden has a colder climate so conditions for agri-food production are generally more limited than in east or south Sweden. North Sweden, in comparison with east and south Sweden, has a higher risk of farmland abandonment due to low farm incomes and a weak land market (Terres et al., 2015). It could be assumed that business values such as profit maximisation would be addressed before sustainable values during harsh conditions like that.

However, this could also indicate that other strategies are addressed when it comes to the rural development in north Sweden. For example, more differentiated strategies that focus on sustainable and local business values could be addressed by the consumers in the region. These types of strategies could be beneficial for sustainable development of rural areas and for the promotion of food systems towards sustainability in food consumption (Tisd et al., 2020). The Repurpose for society/environment SBM archetype shows how companies prioritise delivery of social and environmental benefits. It highlights the importance of economic production from their close integration with the community and other stakeholders. The traditional BM focus, in which the customer is the primary beneficiary, may therefore alter. Knickel (2018) show for example that providing new governance structures and cooperation with several actors can help to integrate different interests and increase socio-ecological resilience at regional level.

The Develop scale up solutions archetype shows how companies deliver sustainable solutions on a large scale in order to maximise benefits for society and the environment. Due to the long distances in north Sweden, it could be argued that the scale up solutions have been developed further here to full sustainable as well as economic aspects of the business. Rural areas are not only a place for production, but also a place for consumption (Rivera, 2018). Empirical findings suggest an increased emphasis on environmental conservation and residential decentralization in Sweden, as well as other countries (Knickel, 2018).

The results presented in this article are in line with Taalbi (2017) who has studied drivers of innovation and found that many innovations were developed as a creative response to challenges and economic problems. Environmental, economic, and organizational challenges in different industries have shifted the focus of firms towards search for new solutions and innovations. Further, after studies of innovations in northern parts of Sweden, Norway and Canada, Healy (2017) found that geographical location and environmental conditions have formed the foundation for developing higher-value activities in companies. He concludes that “recognizing the value of these assets, rather than seeing them as constraints, has opened up possibilities for innovation-led economic development” (p. 25).

The results are also in line with the final evaluation report of the EU Rural Development Programme in Sweden, which identifies the importance of business model innovation in the agricultural sector (Johansson et al., 2016). Further, the final evaluation report emphasizes three main conclusions, which all correspond with the results of this paper and are detailed below.

First, rural development programmes in the future should adapt more to local conditions, such as climate, geography, population, and distance to large cities/markets, etc. Secondly, the rural development programmes should emphasise regional and local capacity, decision-making skills, and mutual trust between companies and their various stakeholders. In this study, all these factors are important. South Sweden has higher degrees of organisational innovation than east Sweden, although lower than north Sweden. South Sweden, in general, has a good growing climate and is also rather densely populated. However, it lacks a national population centre equivalent to that of Stockholm in east Sweden. These factors may explain the differences found in this study. The logic is that with easier conditions for running the business, the less incentives for working with business model innovation. Thirdly, future rural development programmes ought to focus more on innovation. According to the evaluation report (Johansson et al., 2016), the Swedish programme has supported the renewal of production capacity rather than the development of new sustainable business models – even though the latter is important to address socio-economic characteristics such as age, education, and income. Unfortunately, this data was not available, but would be of interest to develop further as these aspects could be of relevance to the different SBM archetypes.

6. Conclusions

This article presents empirical data on sustainable business model innovation in the Swedish agricultural sector. The research takes an integrated approach based on technological, social, and organisational innovation in the context of selected agricultural companies in Sweden. Bocken et al. (2014) eight SBM archetypes are the basis of the analysis.

No major differences were found with respect to technological and social innovation components in the three major regions of the country. However, significant differences were identified with respect to organisational innovation components in all three regions. North Sweden reports a more prominent organisational innovation component than both east and south Sweden. The organisations innovation component encompasses two SBM archetypes, which explain the differences between the regions: Repurpose for society/environment and Develop scale up solutions.

North Sweden has a harsh climate, long distances and is not heavily populated. Further, nature is regarded as a resource to use and to keep. It seems reasonable that the Repurpose for society/environment SBM archetype, which builds on close integration between the firm and local communities and other stakeholder group is prioritized by agri-entrepreneurs in north Sweden, where cooperation between actors in the value chains are needed. In line with Bocken et al. (2014) it also implies that the agri-entrepreneurs prioritise delivery of social and environmental benefits rather than economic profit maximisation.

The same arguments are valid for the Develop scale up solutions SBM archetype, which also is more common in north Sweden than the rest of the country. The agri-entrepreneurs of north Sweden are more likely to develop sustainable solutions to maximise benefits for society and the environment based on collaborative approaches regarding sourcing, funding, and lobbying and open innovation (Bocken et al., 2014).

We call attention to two limitations in this study of SBM archetypes. First, the approach of using such archetypes emphasizes environmental innovations. From a sustainability perspective, it is of interest to explore social and economic variables when using the different archetypes. For example, ‘value intention’ could be of interest because the concept focuses on the mind-set of the owner (and manager) of an agri-food company, including her/his attitude to change and innovation (Barth et al., 2017). From an individual owner’s perspective, sustainability could be a means, a goal, or something else that enhances or limits the business model. This perspective could be relevant because agri-food companies are often owner-managed, family businesses that place a priority on values other than profit maximisation. Second, it would also be of interest to address socio-economic characteristics such as age, education, and income. Unfortunately, this data was not available, but would be of interest to develop further as these aspects could be of relevance to the different SBM archetypes.
Even though more research is needed to help explain the contextual differences, the findings presented here have implications for business practices, regional extension services and rural development programs since an integrated approach to SBM innovation seems linked to the regional context and infrastructure.

To conclude, Sweden has a record of high innovation performance in general in international comparisons (Torregrosa-Heidt et al., 2019). Further, the Swedish government has set a goal to make food production in Sweden a globally competitive, innovative, sustainable, and attractive industry by the year 2030 (Swedish Government, 2017). Innovation in Swedish agriculture has focused both on competitiveness and sustainability, as well as on the productivity and financial viability of the companies. The findings in the study presented here have the potential to be useful and generate knowledge that can be relevant in an international context as well.

CRediT authorship contribution statement

H. Barth: Writing – original draft, preparation, Methodology, Investigation, Formal analysis, Visualization, Writing- Reviewing and Editing. Pia Ulvenblad: Writing – original draft, preparation, Methodology, Investigation, Formal analysis, Visualization, Writing- Reviewing and Editing. Maya Hovestok: Writing – original draft, preparation, Methodology, Investigation, Formal analysis, Visualization, Writing- Reviewing and E diting. Pia Ulvenblad: original draft, preparation, Methodology, Investigation, Formal analysis, Visualization, Writing- Reviewing and Editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jclepro.2021.12.004.
Article V
Chapter 5
Development of Sustainable Business Models for Innovation in the Swedish Agri-sector: Resource-Effective Producer or Stewardship-Based Entrepreneur?

Per-Ola Ulvenblad

5.1 Introduction

This chapter focuses on the development of sustainable business models for innovation in the Swedish agri-sector. This is important for several reasons. At the global level, many of society’s challenges are linked to social, environmental and economic aspects of agriculture. Worldwide food production must increase by 70% from 2009 to 2050, and in developing countries, the increase needs to be 100% (FAO 2011). However, productivity growth has fallen and remains below potential in many countries (OECD 2019). Simultaneously, the negative climate impact of agriculture has to be reduced. The recently released IPCC Special Report on Climate Change and Land highlights the interconnection between climate change and the agri-sector (including forestry). At the same time, as some parts of the agri-sector are drivers of climate change, sustainable agriculture and forestry can reduce climate change (IPCC 2019). Further, research has suggested that investment in agriculture is an effective strategy to achieve many of society’s development goals, like poverty and hunger, nutrition and health, education, economic and social growth, peace and security and preserving the world’s environment (Dobermann and Nelson 2013).

The IPCC report also states that climate change represents a threat to the agri-sector (IPCC 2019). As research has identified, there is a need to focus R&D on how to improve agricultural adaptation to climate change, especially in food-insecure human populations (e.g. Lobell et al. 2008). Furthermore, sustainable food production will have to address aspects such as the nutritional quality of diets and positive health effects (Benbrook et al. 2013; Średnicka-Tober et al. 2016).
Agricultural research has made important contributions to poverty reduction and food security over the last 40 years (Thornton et al. 2017). Research has also identified investment in R&D as an important driver of growth in agricultural production efficiency (Alston 2010, 2018; Fuglie et al. 2017). Regardless, European Union’s Research and Innovation Programme “Horizon 2020” (European Commission 2011) and United Nations’ “The 2030 Agenda for Sustainable Development” including the 17 sustainable development goals (SDG) (Griggs et al. 2013; United Nations 2015; European Commission 2016) call attention to the need for more research and innovation on food security and sustainable agriculture.

At the firm level, many agri-companies often struggle with low profitability. In order to be able to produce, distribute and sell more food, they need to achieve profit goals. The majority of agri-companies have focused on their role as producer at the beginning of the food value chain and, consequently, have focused on becoming more effective and being able to produce more with the same, or less, resources. However, the issue of profitability remains an issue for agri-companies (Dobermann and Nelson 2013; Ulvenblad et al. 2016), and they face increasing demands from governments, local authorities, other companies in the agri-value chain and end customers regarding quality and sustainability issues.

The focus on efficiency, economies of scale and growth has been an effective approach for the agri-sector (Alston 2018). Over time, many of the small cooperatives and networking firms in the agri-sector have either joined or become large multinational companies through mergers and acquisitions. Though this trend has led to cost-effective production and distribution systems, has it also built barriers for sustainable business model innovation in the agri-value chain?

In recent times, small agri-companies have often been reduced to a subcontractor role without any real influence (Ulvenblad et al. 2016). It is known that power asymmetry combined with low-quality business relationships can lead to suboptimization and a reduced ability to identify and meet end-consumer needs (Benton and Maloni 2005; Schulze-Ehlers et al. 2014). Large companies mainly look for standardized products that suppliers produced at low cost, and innovations developed by smaller companies along the food chain making products better but different can be difficult to integrate into big companies’ business plans and delivery systems.

These are important issues, because of the increased worldwide competition, advanced technological developments and large-scale production existing in the agri-sector, and with a resulting general trend towards fewer and larger farms (OECD 2016), it remains to be seen whether the global goals of sustainable agricultural development can be met.

The agri-sector is different from other industries for several reasons: food from living things, animals and plants, must meet specific welfare, health and safety requirements. Furthermore, production and often distribution are generally connected to a specific geographic area, where nature and climate may have important influence and establish constraints to production and distribution. OECD (2019) highlights the need for more responsive agricultural innovation systems, since climate change and weather-related production shocks are expected to increase the challenge of improving productivity, sustainability and resilience on farms.
When increasing productivity, efficiency and economies of scale have become very important in the agri-sector, small- and medium-sized agri-companies engaged in business model innovation focusing on sustainability must take a more strategic and innovative perspective. A strategy for these companies can be to expand their business not through traditional growth, but rather by diversifying activities and focusing on cooperation. Research have shown that small- and medium-sized agri-companies that have been able to overcome the challenges of the agri-sector have developed sustainable business models based on a diversified approach (Ulvenblad et al. 2016), a network approach (Lawson et al. 2008) or a value-net approach (Kähkönen 2012). These sustainable business models often generate value not only for customers but also for other stakeholders, the community and the environment (Barnett and Salomon 2012; Kiron et al. 2013; Schaltegger et al. 2016).

Previous research regarding agri-companies have, in general terms, focused on production and cost-efficiency (Alston 2010, 2018). Further, research regarding business models has often addressed industries other than the agri-sector (Tell et al. 2016) such as media, information technology and biotechnology industries (Johnson 2010).

Schaltegger et al. (2016) state that “The business model perspective is particularly interesting in the context of sustainability because it highlights the value creation logic of an organization and its effects and potentially allows (and calls for) new governance forms such as cooperatives, public private partnerships, or social businesses, thus helping transcend narrow for-profit and profit-maximizing models” (p.5). This is line with Boons et al. (2013), who conclude that business models are useful for the creation and study of sustainable innovation. Lambert and Davidson (2013) and Zott et al. (2011) have shown that a sustainable business model is a useful tool when studying how a single company or an entire value network achieves sustainability in terms of environmental, social as well as economic value. However, the existing research on sustainable business models in the agri-sector has often been limited to and addresses developing rather than developed countries (e.g. the United States and European countries) (Beuchelt and Zeller 2012). Even though a structured literature review reveals an increasing number of research articles that examine sustainable business model innovation in the agri-sector, there is a need for more research on this topic (Tell et al. 2016).

To summarize, businesses in the agri-sector face difficult challenges – but have also unique opportunities to develop sustainability-oriented innovation and sustainable business models which create value in other ways than low-cost production. However, even if the needs at the global and firm levels are large, research regarding the development of sustainable business models within the agri-sector is limited. This is a significant issue, since profitable agri-companies, which develop sustainable business models and advance along the agri-value chain, need to become part of the solution at a moment in history when the world needs more food, which is to be produced and distributed in sustainable ways.

In order to reduce the research gap identified, the aim of this chapter is to illustrate and analyse how Swedish agri-companies strive to develop sustainable business models to innovate their business activities. I will illustrate, map, categorize
and analyse the orientation of the practices of sustainability innovation and the development of sustainable business models. The research questions are: (i) “How do Swedish agri-companies apply sustainable innovation practices?”, (ii) “Which sustainable business models do Swedish agri-companies use?”, and (iii) “How can these innovation practices and sustainable business models be understood?”

The remaining of this chapter is organized as follows: A conceptual framework will be articulated, and, subsequently, the methodological research approach will be presented. Later on, eight Swedish cases including companies and cooperatives will be illustrated and analysed. Once these cases are discussed, some aspects of theory development will be developed. Finally, based on the most salient learnings from the research, guidelines for agri-entrepreneurs will be provided as well as suggestions for future research.

5.2 Conceptual Framework

The theory section is organized as follows: sustainability in the agri-sector, sustainability-oriented innovation, sustainable business models and eight types of sustainable business models.

5.2.1 Sustainability in the Agri-sector

The field of sustainability is a relatively new discipline that has developed over the last 15–20 years (Coad and Pritchard 2017). Nidumolu et al. (2009) showed a decade ago that sustainability became innovation’s new frontier. They stated that sustainability is a fundamental layer of organizational and technological innovations that yield both bottom-line and top-line returns. This has only escalated further during the last decade. The majority of businesses are now well aware of the importance of sustainability, which represents a key driver for innovation and a challenge in many aspects at the same time. The challenges include not only obvious aspects such as products, processes, technologies and business models but also more abstract dimensions like cognitive, psychological and organizational challenges (Sharma 2017).

Sustainability in the agri-sector is of vital importance since this large sector uses over 37% of the total land area of the world and 21% of the land area of the European Union. If forestry is included, the area used reaches 68% of the world and 46% of the European Union (FAO 2019). Further, the agri-sector represents a significant component of the EU economy, accounting for about 7% of its total exports. The agri-sector also accounts for 4.3% of the total labour market in the European Union (Eurostat 2018).

Many businesses in the agri-sector are small companies with primary production as the dominating aspect of their business. These companies need new ideas and
approaches to become more profitable at the same time as they are exposed to both internal and external pressure to become more sustainable. Internal pressure to build a business on sustainable values may arise from the board, management, shareholders, family and employees. External pressure can be derived from competitors, customers, special interest groups and governmental regulation-legislation (Tell et al. 2016).

There are also actors and forces working in the opposite direction, contributing to an increasing “unsustainability” of the agri-food sector. Bernard et al. (2014) have identified actors whose impact can lead to decision-making in the agri-company which leads to unsustainability: (i) loss-making investors and credit providers who abandon farms due to low economic returns; (ii) angry neighbours and environmental activists engaging in silent or active conflict, because they are negatively affected by farming activities; (iii) dissatisfied customers at the endpoint of value chains who do not trust the quality of products or disapprove of production conditions; and (iv) overacting regulators who over-regulate farm activities. Even though each actor perceives their actions as sustainable, they can influence agri-companies’ management path towards unsustainability. Further, Fritz and Matopoulos (2008) have identified forces that can lead to unsustainability, such as (i) globalization of the agri-food industry resulting in increased imports and exports; (ii) consumer changes in consumption, resulting in a larger demand of food products, often out of season, that are transported long distances; (iii) the concentration of the sector, which has resulted in an ever-increased power imbalance in favour of retailers; and, finally (iv) major changes in delivery patterns with most goods now routed through supermarket regional distribution centres using larger heavy goods vehicles.

Despite the pressure to raise efficiency and lower costs from strong actors in the food value chain, many agri-food companies strive to conduct a sustainable business from social and ecological perspectives as well as from an economic one. Recent research (Cagliano et al. 2016) has identified three main integrated challenges for sustainability in the agri-food sector: first, the interdependency between food production and environmental, human and physical resources; second, the important role – sustainability and health aspects – of food for humans; and, third, the special characteristics of the food supply chain, with companies of different size and different sustainability focus.

The mindset and awareness of the owners and/or the managers of agri-companies can be an important factor for the development of sustainability-oriented innovation (Cagliano et al. 2016). Walker has identified this as a values-based driver (Walker 2012, 2014). Further, Barth et al. (2017) have found that many agri-food producers have a strong “value intention” to conduct their agri-business in a sustainable way. Explanations for this could be that many agri-companies are family businesses, rooted in their communities and strongly connected to the land of the ancestors. The owners/managers have experienced the effect of their actions on their land and production. They have accepted a responsibility for coming generations (Ulvenblad et al. 2016; Barth et al. 2017).
5.2.2 Sustainability-Oriented Innovation (SOI)

During the recent decades, the use of concepts connected to sustainable innovation, such as green innovation, environmental innovation and ecological innovation, have grown (Schiederig et al. 2012). In recent years, circular economy (Korhonen et al. 2018) and circular innovation (Guzzo et al. 2019) have also emerged as concepts. Bigliardi and Bertolini (2012, p 400) offer three explanations for this growing interest: “it may confer legitimacy, enhance competitiveness, and highlight ecological responsibility in an environment of both regulatory and consumer sensitization”. However, the connection between innovation and sustainability has still to be developed further (Neutzling et al. 2018). Adams et al. (2016) have, after conducting a structured literature review of both academic and grey literature, identified four shortcomings with previous work. There is uncertainty regarding what sustainability actually means and how it can be achieved, because of the large variety of different conceptualizations. Previous work also tends to treat sustainability dichotomously (sustainable/not sustainable), rather than as a dynamic, unfolding process that is achieved over time. Further, previous work often overlooks the social dimension. Finally, many reviews of environmental management and sustainability exclude contemporary grey literature.

Based on their literature review, Adams et al. (2016) developed a framework of sustainability-oriented innovation. Their perspective is that “sustainability-oriented innovation involves making intentional changes to an organization’s philosophy and values, as well as to its products, processes or practices to serve the specific purpose of creating and realizing social and environmental value in addition to economic returns” (p. 181). The framework starts as regulatory compliance with incremental change at the firm level and culminates with radical change at the large-scale systems level. The researchers claim that moving through the framework requires a step change in philosophy, values and behaviour, which will be reflected in the innovation activity of the company.

The framework is divided into three dimensions (from diminishingly unsustainable to increasingly sustainable). The first dimension, technical/people, is about a movement in the literature from a focus on technology, i.e. a “set of tools”, to a recent focus on people-centred innovation. The second dimension, stand-alone/integrated, is internal and describes how “innovation for sustainable manufacturing has moved from end-of-pipe, stand-alone solutions to modes of practice that require sustainability to be more deeply embedded in the culture of the firm” (p. 183). The third dimension, insular/systemic, reflects the firm’s view of itself in relation to a wider socio-economic system beyond the firm’s immediate boundaries and stakeholders.

These three dimensions represent three sustainability-oriented approaches on the journey to a sustainable business, operational optimization, organizational transformation and system building that a firm can have when it comes to innovation objective, outcome and relationship, defining the sustainability of the business (Table 5.1).
Table 5.1 A simplified model of SOI

<table>
<thead>
<tr>
<th>Approach</th>
<th>Operational optimization: doing more with less</th>
<th>Organizational transformation: doing good by doing new things</th>
<th>System building: doing good by doing new things with others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation objective</td>
<td>Compliance, efficiency “Doing the same things better”</td>
<td>Novel products, services or business models “Doing good by doing new things”</td>
<td>Novel products, services or business models that are impossible to achieve alone “Doing good by doing new things with others”</td>
</tr>
<tr>
<td>Innovation outcome</td>
<td>Reduces harm</td>
<td>Creates shared value</td>
<td>Creates net positive impact</td>
</tr>
<tr>
<td>Innovation’s relationship to</td>
<td>Incremental improvements to business as usual</td>
<td>Fundamental shift in firm purpose</td>
<td>Extend beyond the firm to drive institutional change</td>
</tr>
<tr>
<td>the firm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Taken from Adams et al. (2016)

5.3 Business Models

Business models are descriptions of how companies create value through exploitation of business opportunities (Rosca et al. 2017). Business models can be regarded as structured management tools, which are considered especially relevant for success (Magretta 2002). The research regarding business models has been growing since the mid-1990s (Osterwalder and Pigneur 2012). In recent years, research has put a steadily increasing focus on business models (Wirtz et al. 2016).

Most of this research addresses the importance of business models for companies’ competitiveness, renewal and growth (Chesbrough and Rosenbloom 2002; Johnson 2010; Lambert and Davidson 2013; Teece 2010). Companies can apply several business models simultaneously, regarding, e.g. different products or markets (e.g. Aspara et al. 2013; Casadesus-Masanell and Tarziján 2012).

Researchers have used a variety of business models’ definitions and settings in their studies, from the single company to the entire value network (Johnson 2010, Zott et al. 2011, Osterwalder and Pigneur, 2012). Even though empirical research on business models in 1996–2010 has focused on media, information technology and biotechnology industries (Lambert and Davidson 2013), a newly conducted structured literature review shows that the number of articles published regarding business models in food production has grown during the last 5 years (Tell et al. 2016). However, Wirtz et al. (2016) state that the growing field of research for the business model is in a consolidation phase, which still contains research gaps and thus offers possibilities for future research. The researchers suggest that research about business models’ forms and components should be empirically validated, since a certain heterogeneity regarding this research area’s focus has been determined.

Several researchers have discussed the central building elements of a business model: (i) value proposition, (ii) value creation and delivery and (iii) value capture (Bocken et al. 2014; Richardsson 2008; Osterwalder and Pigneur 2005). The value
proposition is typically concerned with the product and/or service offering to generate economic return (Boons and Lüdeke-Freund 2013). Value creation and delivery is at the centre of any business model, and companies create and deliver value by seizing new business opportunities, new markets and new revenue streams (Beltramello et al. 2013; Teece 2010). Value capture is about considering how to manage cost structure and create revenue streams from the provision of good, services or information to users and customers (Teece 2010); see Table 5.2.

5.3.1 Sustainable Business Models

This interest in social and environmental sustainability is not new. Thirty years ago the Brundtland Report called for sustainable development that meets “the needs of the present without compromising the ability of future generations to meet their needs” (WCED, p. 43). Many researchers argue that more leadership is still needed around the issue of social and environmental sustainability (e.g. Kurucz et al., 2017). Researchers have also stated that a narrow focus on profitability without more attention paid to social and environmental sustainability can even limit a company’s achievement of its economic goals (Kiron et al. 2013; Schaltegger et al. 2016).

Regarding the development of the sustainability-oriented innovations field, an increasing number of scholars frame it as a business model challenge (Rohrbeck et al. 2013). Several researchers have stated that the business model concept is a productive way to study the creation and use of sustainable innovation, both in practice and in theory (Boons et al. 2013). Further, researchers have called for more studies of business models oriented towards sustainable development (Boons and Lüdeke-Freund 2013; Boons et al. 2013; Breuer et al. 2016; Stubbs and Cocklin 2008; Upward and Jones 2016). They have proposed alternatives to the traditional business model with its focus on maximizing growth and revenues and on minimizing costs. One alternative model is sustainable business models based on the network approach or the value-net approach (Breuer et al. 2016; Boons and Lüdeke-Freund 2013; Kähkönen 2012; Lawson et al. 2008).

Boons and Lüdeke-Freund (2013) state that research on sustainable innovation is lacking conceptual consensus, which is needed to further develop the field. Based on a review of previous research, the authors propose a generic business model concept with four key elements:

| Table 5.2  Conceptual business model framework |
|-----------------|-----------------|-----------------|
| Business model building element | Value proposition | Value creation and delivery | Value capture |
| Focus | Product/service | Key activities, resources, channels, partners, technology | Cost structure |
| Customer segments and relationships | Value streams | |

From Bocken et al. (2014), Richardsson (2008), Osterwalder and Pigneur (2005)
(i) Value proposition: what value is embedded in the product/service offered by the company.

(ii) Supply chain: how upstream relationships with suppliers are structured and managed.

(iii) Customer interface: how downstream relationships with customers are structured and managed.

(iv) Financial model: costs and benefits from (i–iii) and their distribution across business model stakeholders.

These four business model elements, when combined with a perspective on social and environmental sustainability, describe a sustainable business model (Boons and Lüdeke-Freund 2013). Organizations committed to such sustainability integrate their social, environmental and economic activities in order to create value for their customers and for society. The sustainable business model analyses not only how organizations produce and deliver goods and services but, at the same time, how they contribute to the improvement of society – environmentally and socially. A company, cooperation or other organization with a sustainable business model is often part of, to a greater or lesser extent, a community or region that highly values the sustainable society and the sustainable environment.

Because of this increased focus on social and environmental sustainability, many companies worldwide have taken a greater interest in sequential business model innovation in which they refine an existing business model or launch a new one. The business model canvas framework (Osterwalder and Pigneur, 2012) has been developed for companies to envision and implement sustainable business models in practice. One of the new tools promoted for this work is the strongly sustainable business model canvas (Jones and Upward 2014; Upward and Jones 2016). In practice, a stewardship style of leadership is required for use of sustainable business models in which leaders understand their role as temporary custodians of power. Such leaders are committed to achieving value for all organizational stakeholders, including society (Bocken et al. 2014; Harvey 2001).

When focusing on sustainable business models, Barth et al. (2017) have proposed that a fourth building element should be added to the previously defined building elements of business models, (i) value proposition, (ii) value creation and delivery and (iii) value capture (Bocken et al. 2014; Richardsson 2008; Osterwalder and Pigneur 2005), namely, (iv) value intention. Many agri-companies are owner-managed family businesses. The owners regard themselves as stewards or custodians of the company, the property and the environment, with a responsibility for living and non-living things (Ulvenblad et al. 2016, Barth et al. 2017). Research regarding sustainability-oriented innovation also stresses the importance of intentional changes to the philosophy and values of the organization (Adams et al. 2016). Including value intention of the owner-manager in the conceptual framework could present important insights of potential trade-offs and barriers when addressing growth ambitions based on social, environmental and economic aspects (Table 5.3).
Table 5.3  A conceptual sustainable business model framework including the value intention

<table>
<thead>
<tr>
<th>Business model building elements</th>
<th>Value intention</th>
<th>Value proposition</th>
<th>Value creation and delivery</th>
<th>Value capture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Mindset of owner/manager</td>
<td>Product/service Customer segments and relationships</td>
<td>Key activities, resources, channels, partners, technology</td>
<td>Cost structure Value streams</td>
</tr>
</tbody>
</table>

Developed by Barth et al. (2017), based on a framework developed by Bocken et al. (2014), Richardsson (2008), Osterwalder and Pigneur (2005)

5.3.2  Eight Sustainable Business Model Archetypes

The research framework, which was used to address the research questions stated above, namely, (i) “How do Swedish agri-companies apply sustainable innovation practices?”, (ii) “Which sustainable business models do Swedish agri-companies use” and (iii) “How can these innovation practices and sustainable business models be understood?”, is also based on Bocken et al.’s (2014) eight SBM archetypes. In turn, they build their archetypes on the nine business model “building blocks” of the business model canvas (Osterwalder and Pigneur 2012), Boons and Lüdeke-Freund (2013) reference. Among the blocks most relevant to our study are value propositions, key activities, key partnerships and revenue streams. Building on this key tool for the analysis of business models, Bocken et al. (2014) add sustainable social and environmental activities. They (p. 44) define SBMs as follows:

Innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions.

Table 5.4 presents Bocken et al.’s (2014) eight SBM archetypes. These archetypes can be used in order to identify patterns and attributes that facilitate the categorization of the business model innovations for social and environmental sustainability. The archetypes can constitute a base for the development of a common language for the development of sustainable business models in research and practice.

5.3.3  A Combined SOI and SBM Archetypes Framework

In this chapter, the framework developed by Adams et al. (2016) focusing on sustainability-oriented innovations (SOI) is integrated with the framework containing eight different SBM archetypes developed by Bocken et al. (2014) (see Table 5.5). The idea behind combining these two frameworks, which was developed by Ulvenblad et al. (2019), is to categorize the business model innovations and study the organizational development (the sustainability-oriented innovation practices and processes) taken by agri-companies in Sweden.
### Table 5.4  Eight SBM archetypes

<table>
<thead>
<tr>
<th>Sustainable business model archetypes</th>
<th>Description and operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Maximize material and energy efficiency</td>
<td>Do more with fewer resources, generating less waste and emissions and fewer pollutants</td>
</tr>
<tr>
<td>2. Create value from waste</td>
<td>Eliminate “waste” by turning waste into useful and valuable input in other production activities, making better use of underutilized capacity</td>
</tr>
<tr>
<td>3. Substitute with renewables and natural processes</td>
<td>Reduce the environmental impact and increase business resilience by addressing resource constraints associated with renewable resources and man-made artificial production systems</td>
</tr>
<tr>
<td>4. Deliver functionality, rather than ownership</td>
<td>Provide services that satisfy the users’ needs without having to own the physical products</td>
</tr>
<tr>
<td>5. Adopt a stewardship role</td>
<td>Pro-actively engage with all stakeholders to promote their long-term health and well-being</td>
</tr>
<tr>
<td>6. Encourage sufficiency</td>
<td>Identify solutions that will reduce consumption and production</td>
</tr>
<tr>
<td>7. Repurpose the business for society/environment</td>
<td>Prioritize the delivery of social and environmental benefits rather than economic benefits (i.e. shareholder value) through close integration between the company and local communities and other stakeholder groups. Recognize that the traditional business model in which the customer is the primary beneficiary may shift</td>
</tr>
<tr>
<td>8. Develop scale-up solutions</td>
<td>Deliver sustainable solutions on a large scale to maximise benefits for society and the environment</td>
</tr>
</tbody>
</table>

Taken from Bocken et al. (2014)

### Table 5.5  A combined SOI and SBM archetypes framework

<table>
<thead>
<tr>
<th>Approach</th>
<th>Operational optimization: doing more with less</th>
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<tbody>
<tr>
<td>Sustainable business model archetypes</td>
<td>1. Maximize material and energy efficiency</td>
<td>4. Deliver functionality, rather than ownership</td>
<td>2. Create value from waste</td>
</tr>
<tr>
<td></td>
<td>7. Repurpose the business for society/environment</td>
<td></td>
<td>7. Repurpose the business for society/environment</td>
</tr>
<tr>
<td></td>
<td>8. Develop scale-up solutions</td>
<td></td>
<td>8. Develop scale-up solutions</td>
</tr>
</tbody>
</table>
5.4 The Case of Sweden

Sweden is often categorized as a country leading sustainable agri-production in many areas such as environmental awareness, animal welfare, low use of antibiotics and access to high-quality natural resources (Bucht 2016). The Swedish Ministry of the Environment presented as early as 2003 a vision for sustainable development that strongly recommends all policy decisions take into account the longer-term economic, social and environmental implications (Swedish Ministry of the Environment 2003). This is a vision that applies to food producers in Sweden.

The OECD report regarding Innovation, Agricultural Productivity and Sustainability in Sweden (OECD 2018) identifies Sweden as one of the earliest OECD countries to raise awareness of environmental issues and develop environmental policies. The result has been that the negative environmental impact has decreased, although agricultural production in Sweden has remained stable. OECD (2018, p. 12) states that: “Swedish legislation, which reflects consumer and citizen preferences, sets norms and standards for food safety, environment and animal welfare that is well above EU requirements in many areas of agriculture and horticulture. Swedish consumers and citizens have a high level of confidence for the Swedish agricultural and food system”. The majority of Swedish agri-companies regard social and environmental issues as part of their goals, besides economic revenue (Ulvenblad et al. 2019).

However, the agri-sector in Sweden is facing challenges as well. The Swedish agri-sector has undergone significant structural changes in the last 20 years. The surviving food producers have become larger through internal growth and/or mergers and acquisitions (Swedish Board of Agriculture 2018). Others have been forced into subcontractor roles with diminished managerial influence on production goals and activities. This power asymmetry, combined with low-quality business relationships, can lead to suboptimization of resources and a reduced capacity to identify and satisfy consumer needs (Benton and Maloni 2005; Schulze-Ehlers et al. 2014). Furthermore, some larger companies in higher positions in the food value chain may not share smaller companies’ interest in social and environmentally sustainable innovation. Even when such sustainable innovation (sometimes in response to consumer pressure) improves a product’s quality, these larger companies may be disinclined to adopt the innovations for use in their production activities, delivery systems and product portfolios. They hesitate primarily because of fear of greater logistics complexity and higher costs. In some instances, however, these structural changes in the agri-sector have resulted in more cost-effective production and distribution systems, although with survival and profit still greater concerns than social and environmental issues. Thus, many stakeholders (e.g. consumers, consumer rights organizations, the media and citizens) are asking for healthy food and more sustainable social and environmental innovation in the agri-sector.

This pressure from stakeholders combined with the situation with declining profits in spite of production efficiency and economies of scale has led many agri-companies to develop their business models towards sustainability and high-quality products. Further, many agri-companies try to advance in the agri-value chain and get closer to the final customer.
To summarize, it seems likely that Sweden, as one of pathfinders in the world regarding sustainability and innovation, can contribute in the strive towards an innovative and sustainable agri-sector. Considering the global needs and challenges, it is important to deepen the international cooperation regarding the development of sustainable business models in the agri-sector. Hence, by studying the Swedish context, we can identify barriers, challenges and possibilities that can be relevant in other countries as well.

5.5 Methodology

In this paper, I will present, discuss and analyse eight different agri-companies/agri-cooperatives connected to agriculture in Sweden. Since forestry is an integrated part of agri-companies of Sweden and often an important part from cash flow and solidity perspectives, I have also studied one organisation, a large cooperative, from the forestry sector. All the companies/cooperatives are presented in Table 5.6.

The empirical data consists of both primary and secondary data, which have been collected by a set of different methods. The primary data consists mainly of interviews with owners/managers or other representatives of the companies and visits on the company/farm. Initially, the respondents were asked to tell their story of the companies in their own words. A semi-structured interview guide with open-ended questions was also used. It covered subjects like company history, past and current business activities, customers, partnerships, networks, goals, culture, values, sustainability, innovation and business models.

The secondary data has been gathered through document studies (official economic records, printed material and Internet pages). This multi-method approach has been used in previous research on business models (Täuscher and Laudien 2018; Zott and Amit 2008). In the study presented in this chapter, multiple methods have been used for each case, but not all methods have been used for all cases. The collected data, including the interviews, have been analysed through categorizations and content analysis (Täuscher and Laudien 2018).

5.5.1 Högared Milk Farm

Högared’s main business is to produce and sell milk to a large milk distributor higher up in the value chain. Currently, there are 190 milk cows at the farm. The company is owned by two brothers with their families. Besides the two owners, there are six employees at the company. The company has historically experienced few possibilities to develop and change the business model. However, during the last decade, the owners/managers have prioritized their competence building through several leadership and management courses and have now formulated a new vision for the company:
Our vision is to be a well-functioning farm for animals and humans, a modern machine station with the customer in focus. As a company, we want to build a good reputation in our district. They have diversified their business model and activities in several directions; they have started a mechanical workshop and a custom for hire service. In the workshop, farming companies and other companies can buy services as maintenance and repair of vehicles and farming machinery. In the custom for hire service, the customer can buy services such as harvesting, applying fertilizers and pesticides, etc. Recently, the company has diversified even more, starting to sell a small fraction of its milk production directly to end consumers in their farm shop and in some of the larger groceries in the neighbouring city.

The owners have developed the sustainability focus of the company step by step. They started their journey towards sustainability according to the archetype...
“maximize material and energy efficiency”, which still remains as the dominating archetype. It also means that from a sustainability-oriented innovation perspective, they are focusing on operational optimization (“doing more with less”).

The development of their sustainable business model is underway. A minor part of their business model fits the archetype “deliver functionality, rather than ownership”. Further, the managers have continuously developed their stewardship role over the last years (which could be seen in the vision of the company). The company’s sustainable business model is moving towards organizational transformation (“doing good by doing new things”).

5.5.2 Gäsene Dairy

Gäsene Dairy is a dairy cooperative company owned by 28 small- and medium-sized milk farms (between 30 and 500 milk cows on each farm). The dairy’s main business is production and selling of high-quality cheese.

The dairy was founded in 1930, when milk prices were low and it was difficult for the producers to get good enough prices. Farmers in one neighbourhood developed a new business model before the concept was even conceptualized. They joined together in a cooperative association and started their own dairy, which produced and sold milk, cheese and other dairy products. The vicinity was important for the founders of the dairy, and it is still important today. All the milk are produced on farms which are situated within 25 minutes travel time from the dairy. Most of the milk and cheese are sold in groceries in southern Sweden. A minor part is sold directly to end consumers at the dairy. The quality of their products, based on sustainability and closeness, has made their brand well-known. Last year, the dairy had over 100 bus loads with visitors, exceeding 23,000 visitors. The dairy has recently decided to use biofuel for heating its premises. The surplus heat will be used for heating of the neighbouring municipality senior housing.

Since the dairy products create larger value for end customers than the products sold by large international processing companies, the dairy company can sell their products at higher prices. Consequently, the farms owning the dairy have larger revenues than other farms which deliver to the large international processing companies.

The business model of the company as such has not changed much since the company was founded, but the development of society has renewed it. From the start, the business model was based on economic necessity but also on the founding farmers’ stewardship perspective. A business that was regarded as out of date has now become both modern and sustainable. One of the owners says:

We have been out of fashion for 70 years, but now we are modern and in the front again.

Since sustainability became an important societal concept during the last decade, the company focuses even more on sustainability. The investment decision regarding the biofuel heater, which will benefit both the company and the senior housing,
is one indication of the sustainability focus. Further, the company has changed its communication with customers and emphasized values as quality, vicinity and sustainability.

The founding and succeeding farmers have over time acted based on a “stewardship perspective”. Due to the societal change, the dairy matches the SBM archetype “repurpose the business for society/environment”. It also matches “substitute with renewables and natural processes”.

From a sustainability-oriented innovation perspective, their company has covered all three dimensions. Even though the dairy was founded in order to reach operational optimization (doing more with less), the stewardship perspective with focus on vicinity and sustainability in combination with societal change has led to organizational transformation and system building.

5.5.3 The Gudmund Farm

The Gudmund Farm is a farm charcuterie, which also conducts pig breeding and production. The company was founded in 1998 and produces high-quality sausages and other meat products. Fresh and processed meat products are sold in the farm shop, in other farms’ shops and in the groceries in the city. The meat comes from the farm or from subcontractors, farms in the neighbourhood. The company has long-term spoken agreements with the subcontractors, based on trust and a handshake. The sausages are handcrafted by old methods and have no additives other than natural spices and herbs. The company has diversified its products and activities continuously over the years. The company develops new sausage varieties and other meat products. Some of the new products have been developed by the employees of the company. Recently, the owners have also started to provide courses in sausage craftsmanship, food waste minimization and nutrition. Even though one goal of courses is to generate some revenue, the main reason is to educate customers. The company has also started a restaurant at the farm, where they serve lunch and arrange conferences. In order to get closer to the end customers and to learn their needs and expectations, the company opened a shop in the city close to the farm charcuterie, in 2005.

An important part of the business model is to develop and nurture long-lasting cooperation with customers, other companies, subcontractors and neighbours. The owner is also explicit regarding sustainability:

Our company and our farm will stay where it is. Of course, we have to take good care of our land, our employees, our neighbours and our animals. We also want to create win-win relationships with customers, sub-contractors and other companies.

The company matches three SBM archetypes: (i) encourage sufficiency, (ii) substitute with renewables and natural processes and (iii) adopt a stewardship role.

From the start, the company has been run by the owner with a clear and explicit stewardship perspective, where sustainability is a central theme. The owner stresses the importance of local and professional networks. The company was the first to
apply this perspective when it started the business 20 years ago. Since then other companies have followed suit. From a sustainability-oriented innovation perspective, the company is conducting system building through the strategy of working in networks with a win-win focus.

5.5.4 Ästad Vineyard

Ästad Vineyard used to be a traditional farm, with 100 hectares of fields, meadows and pastures, producing milk and grain. The previous owner, and father of the current owners, changed to ecological milk production in the mid-1980s in order to raise the low profitability of the farm. That was the starting point for a continuous and ongoing sustainable business model development. The next step was to invite school classes with fifth graders to come and have an experience of the farming activities. It developed into a team-building concept, where companies could bring their employees to the farm and solve intellectual and practical problems together.

The current owners, three siblings, improved the old farm buildings and built some additional buildings, which they used to develop the business model with a spa integrated with the small river, a restaurant, a conference centre, a hotel and a winery/vineyard. Today, they have 15,000 vines, and the wine is sold to distributors and directly to end consumers at the restaurant. An important and explicit building block of their business model is to use and develop the resources of the farm, the small river, the buildings, the vegetables, the wine, etc. The owners claim that:

By experience we know that every challenge we meet also leads to new opportunities.

The family was conducting a traditional farm business from its inception. A desire to increase profitability and catch opportunities led to diversification and continuous business development. The sustainability aspect was based on partly an identification of the farm and land as a key asset from a business perspective and partly on a stewardship perspective. The company matches three SBM archetypes: (i) deliver functionality, rather than ownership, (ii) substitute with renewables and natural processes and (iii) adopt a stewardship role.

From a sustainability-oriented innovation perspective, this firm is at the organizational transformation level (“doing good by doing new things”).

5.5.5 Wapnö Farm

Wapnö Gård is an estate with an old history. It has been one of largest farming estates in Sweden since the fourteenth century. The current owner’s family has owned Wapnö since 1741. Today, Wapnö is organized as a limited company and has about 85 employees.
Wapnö Farm used to be an ordinary, although large, farm producing milk. The owners and management regarded the farm as a producer at the onset of the agri-food value. The milk was delivered to a large organization, which now has become an actor on the international market. Over 20 years ago, the owner and the management decided to start developing a diversified sustainable business model. They choose to advance in the agri-food value chain and get closer to the end consumer. Wapnö focused on sustainable environment and the preferences of the end customers, e.g. taste and flavour experiences. Today, the management of Wapnö talks about “sustainability into the future”. Wapnö has been working actively towards a sustainable environment for many years. The manager states that:

the present generation should take care in using natural resources reasonably and being environmentally responsible so that we leave the environment as untouched as possible for future generations.

Wapnö is developing a circular economy with a diversified sustainable business model. Wapnö call themselves an open farm, which means that consumers can come to the farm to get a closer look at the animals, the barns and the dairy. Wapnö also has a restaurant, which uses ingredients from the farm.

The company has established a farm brewery, and the beer is brewed from the farm’s water and grain. The cattle are moving freely and never given antibiotics. The cattle are not given soy products, but rather pressed canola. Wapnö is also producing biofuel from canola oil. The milk flows directly in a tube from the barn to the dairy 30 meters away. Wapnö also has a large greenhouse, where they grew vegetables for sale in the farm shop and for the farm restaurant. The greenhouse is heated with renewable energy generated on the farm.

Wapnö farm biogas, produced from cattle manure, contributes to renewable energy in the form of electricity, heat and cooling, which is needed year-round in the food premises. Wapnö only uses manure from animals on the farm for biogas production and has cut the energy consumption with more than 90%. The biogas plant also provides fertilization, which improves the fertility and value of the farmland.

Through the development of a sustainable diversified business model, Wapnö has climbed the value chain, got closer to the end consumer and developed a very strong brand. Therefore, it is able to sell its products at a higher price, which reflects the value end customers put on the products.

As many other farms, Wapnö used to be a traditional, although large, farm business in the start of the agri-value chain. Over the last 20 years, Wapnö has developed a diversified sustainable business model, and the development is still ongoing. Today, the company matches several business model archetypes. Wapnö maximizes its resources, creates value from waste and substitutes with renewables and natural processes. Further, the company has repurposed the business for society/environment since the sustainability and circular economy are in focus. Finally, and not least, the stewardship role is very clear and articulated.

From a sustainability-oriented innovation perspective, Wapnö is a good example of a company which has developed sustainability as a process. The company has developed from operational optimization to organizational transformation: doing
good by doing new things. It could also be argued that the company has developed to system building. Although the company is mainly working as an entity, the farm is large and has advanced to a form of system building, where one part of the farm is supporting – and getting support – from other parts of the farm.

### 5.5.6 Green Farms

In the beginning, Green Farms used to be run as a traditional farm by the current owner’s father. When the son, the current owner, took over the company, he wanted to focus on sustainability and converted it to organic production in 1989. At first, sales did not go according to plan and the cash flow was below expectations. He could not afford to feed the cattle with expensive concentrate, so he had to feed the cows with cheaper roughage, grass in different forms. This meant that his cattle grew slower and were older than normal at slaughter. The owner expected that the meat would then be of low quality and hard to sell at a good price. However, he soon realized that the meat was of very high quality. Since it also was produced in a more sustainable way than before, it could be sold to a premium price to customer wanting high-quality meat.

Twelve years later, in 2001 he started Green Farms. The business model was to create a network of farms that raised and feed cattle in the same way as the first farm. A new farm can get into the network after a trial period, if they meet the sustainable production requirements of Green Farms. The farms have to focus on animal health, sustainability and meat quality. The network members deliver their meat to Green Farms, which sells, through the Internet, and distributes high-quality meat to the end customers, restaurants, public kitchens and individuals. Green farms cooperate with around 40 sustainable cattle farms in the southwest of Sweden.

When the present owner took over the farm from his father, he wanted to transform it into a sustainable farm. He took a stewardship role from the start and substituted the production processes to more sustainable processes. From a sustainability-oriented perspective, he had developed his company through all three phases. Today, the company has developed into system building, since the company has developed a scale-up solution and engaged other companies in the system.

### 5.5.7 The South Forest Owners (Södra)

The farmers who owned forest began to organize themselves as a forest owner association in the beginning of the twentieth century. The southern and middle part of Sweden was almost a deforested country at that time, due to bad forest management and short-sighted profit-maximizing forest companies. In the beginning, the forest association provided advisory services regarding forest management. However, one significant issue for the small forest farmers was that the market was dominated by
few large forest companies. Hence, the small forest farmers could not get fair prices for their product or for their forests. As a response to this situation, their cooperative soon developed to coordinate distribution, sales and processing of timber and other forest-based products. Over the years many small forest cooperatives merged, and the large cooperative association Södra was formed in 1938.

Today, Södra has 51,000 small forest owners as members/owners. A large majority of these forest owners are very engaged in sustainable forestry. Many of them have been engaged even before sustainability was a concept in research and regulation. In fact, over time some of the forest owners have refused to manage their forests the way the authorities required, since the forest owners believed they could manage their forests in more sustainable ways. Södra states that:

the overall mission of the owners is to secure the provision for the members’ forest raw material and promote forestry profitability through advice and support, so that the members’ forests can be managed responsibly and with sustainability and to contribute to a market-based return on the forest raw material.

The timber from the forest farms is refined in Södra’s industries for sawn and planed timber products, interior wood products, biofuel and pulp for the market in the market. Södra runs one of Europe’s largest sawmill operations and is one of the largest producers of softwood pulp. Södra also produces textile pulp of hardwood. Their three pulp mills have almost fossil-free production and generate a large energy surplus. This bio-based energy is sold, among other things, as green electricity and district heating. Södra also owns manufacturing company, which produces one-family houses. Södra claims that they are focusing in innovation in order to develop new products, based on the renewable wood raw material.

Södra is emphasizing sustainable forestry and a sustainable forest value chain. This means, among other things, that efforts are taken to ensure that members’ forestry is conducted using methods that ensure the production capacity of forest land and forests as well as conservation of ecosystem services and biodiversity. Södra mainly uses biofuels for the industrial production processes. The energy surplus is delivered in the form of electricity to the open market, district heating to places near pulp mills and sawmills and solid biofuels for heating plants. Through the industrial activities, the forest raw material contributes to the local community’s conversion to a more sustainable energy use. Efficient use of the forest raw material from a material and energy perspective creates new conditions for sustainable products.

Even though Södra is based on small-scale forestry with strong local roots and local relations, it has ascended in the forest value chain and developed to a large international actor. A large majority of the small forest farms are run by owners who regard themselves as stewards. The stewardship perspective is also clearly communicated by their large cooperative Södra. Södra is applying several sustainable business model archetypes besides stewardship, maximize, create value from waste and develop scale-up solutions. Hence, Södra’s sustainability-oriented process is covering all three steps, encompassing system building.
5.5.8 **The Farmers (Lantmännen)**

The Farmers in Sweden started to organize in the end of the nineteenth century, and they founded the national association in 1905. Today, it is an economic cooperative, owned by 27,000 Swedish farmers, and has grown to one of the largest actors in agriculture, food and energy in Northern Europe.

The Farmers’ focus is to provide the members with seed, fertilizer, plant protection products and feed as well as to receive, store, refine and sell what farmers grow. Other important elements of the business are sales of forest, construction and agricultural machinery. The Farmers is the largest purchaser of grain in Sweden. They claim that they protect the earth’s resources in a responsible manner and are included in the entire value chain from farm to table. Their business model strives to deliver sustainable products and new innovative solutions to customers while at the same time creating value for our owners and contributing to a viable agriculture.

The visions and goals of The Farmers are closely connected to innovation and sustainability. In 2018, The Farmers (Lantmännen in Swedish) was named one of Sweden’s most sustainable brands (Sustainable Brand Index 2018). The Farmers strive after viable agriculture, greener energy and a sustainable food chain. The Farmers state that,

> Together we take responsibility from land to table…. we lead the processing of arable land resources in an innovative and responsible manner for tomorrow’s agriculture… we create a viable agriculture.

The Farmers shares several aspects with Södra. Many of the small farm owners have also sustainability priorities and have stewardship perspectives. The Farmers has also developed applying several sustainable business model archetypes besides stewardship, maximize, create value from waste and develop scale-up solutions. From a sustainability-oriented perspective, The Farmers are also involved in system building.

5.6 **Analysis**

The eight companies and cooperatives will be positioned in the combined framework of sustainability-oriented innovations (SOI) and different sustainable business model archetypes. See Table 5.7.

All of the companies analysed share a stewardship perspective on the business. All of them are also regarding themselves as entrepreneurs and business leaders, not only producers. Further, all of companies have over time developed and moved closer to customers in the agri-value chain. Another relevant aspect of their sustainable business models is that they have diversified their business models. Since these companies are depending on natural resources and often connected to one place, it is hard for them to develop scale-up solutions. However, one way to develop
scale-up solutions is to organize themselves into larger cooperatives, like Södra and Lantmännen.

All companies are closely connected to the real estate where they are situated. The companies, all of which are owner-managed, are family businesses in which the families expect to retain ownership for the foreseeable future. As family businesses strongly rooted in their communities, the owners are not concerned solely with growth and revenues. The owners think of themselves as stewards or custodians of the company, the property and the environment, with responsibility for living and non-living things. Cooperation in network structures or cooperatives is important for these companies. Trust, common values, other-orientation and win-win perspective are crucial concepts in the network structures.

Table 5.7 The combined framework of sustainability-oriented innovations (SOI) and different SBM archetypes

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<tr>
<th>Sustainability-oriented innovation Approach</th>
<th>Operational optimization: doing more with less</th>
<th>Organizational transformation: doing good by doing new things</th>
<th>System building: doing good by doing new things with others</th>
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<tr>
<td>Sustainable business model archetypes</td>
<td>1. Maximize material and energy efficiency</td>
<td>4. Deliver functionality, rather than ownership</td>
<td>2. Create value from waste</td>
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<td>5. Adopt a stewardship role</td>
<td>3. Substitute with renewables and natural processes</td>
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<td>6. Encourage sufficiency</td>
<td>7. Repurpose the business for society/environment</td>
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<td>8. Develop scale-up solutions</td>
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<td>The Farmers (Lantmännen)</td>
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5.7 Conclusions, Future Research Avenues and Practical Implications

The research presented in this chapter builds on, and adds to, previous research regarding sustainability-oriented innovation (Adams et al. 2016), business model archetypes (Bocken et al. 2014) and building blocks of business models (Barth et al. 2017).

The sustainability-oriented innovation framework regards sustainability as a continuous process that is developed and achieved over time (Adams et al. 2016). Their study has also shown how organizations can develop to become more sustainable. Further, they suggest that the development of sustainability-oriented innovation often starts with intentional changes to the values of the organization and as a response to regulation.

The analysis based on the cases of the study presented in this chapter deepens the knowledge regarding why agri-entrepreneurs develop the sustainability aspects of their business model. This study shows that many agri-entrepreneurs have a stewardship intention and want to develop and preserve their company, relationships and environment for the future and coming generations. Some agri-entrepreneurs applied the values of sustainability even before the concept was used in literature and discourse. The agri-entrepreneurs who strive for sustainability are often ahead of, or even in conflict with, legislation and policy when they develop their sustainable business models.

The aim of the eight sustainable business model archetypes developed by Bocken et al. (2014) is to “develop a common language that can be used to accelerate the development of sustainable business models in research and practice”. In the study presented here, stewardship is a frequent and important sustainable business model archetype. The stewardship archetype seeks to “maximize the positive societal and environmental impacts of the firm on society by ensuring long-term health and well-being of stakeholders (including society and the environment)”. According to researchers behind such archetype, it can preferably be used in combination with other archetypes. Based on the analysis in this study, the stewardship role is of paramount importance. However, it could be argued that stewardship should not be regarded as a business model archetype. Rather, it is an explanation or an incentive for developing sustainable business models.

The frequent use of adopting a stewardship role can be explained by the unique characteristics of the agri-sector. As Cagliano et al. (2016) have shown, there is a clear interdependency between agriculture and environmental, human and physical resources. Walker 2012 and 2014 have also pointed on the awareness of the entrepreneur as a value-based driver for sustainable business models. Ulvenblad et al. (2016) and Barth et al. (2017) have elaborated on this relationship. The owners/managers regard themselves as stewards or custodians of the company, the property and the environment, with a responsibility for individuals, animals and growing things. The company is often based on a farm, which has been owned by the ancestors before. The company is depending on the resources of the land, and it is going to stay where it is. Relations to neighbours and other companies are also important and have to be managed and maintained. The stewardship perspective is important when developing sustainable business models in the agri-sector.
Barth et al. (2017) have suggested that when studying the development of sustainable business models, the building block “value intention” should be added to previously developed building elements of the conceptual business model framework: (i) value proposition, (ii) value creation and delivery and (iii) value capture (Bocken et al. 2014; Richardsson 2008; Osterwalder and Pigneur 2005). Sustainability-oriented research also underlines the philosophy and values of the organization (Adams et al. 2016). Based on the cases presented in this chapter, the value intention is an important base for a sustainable business model in the agri-sector. Hence, it seems relevant to include the value intention element into the conceptual business model framework as well. Including the value intention of the owner-manager in the future theory building could present important insights of potential trade-offs and barriers when addressing growth ambitions based on social, environmental and economic aspects.

Future research might also examine how agri-companies innovate their sustainable business models when they introduce new products and engage in new business activities. It would also be relevant to further deepen the understanding of the connection with the special challenges in the agri-sector (Cagliano et al. 2016), the importance of the value intention (Barth et al. 2017) and value-based drivers for sustainable innovation (Walker 2012, 2014). The case study approach is well-suited for such studies.

Another relevant question to further investigate is a comparative analysis of the sustainable business model concept among industries. “Literature indicates that a wide range of traditional SMEs are still mostly focused on harvesting low hanging fruits by engaging primarily in incremental innovation” (Klewitz and Hansen 2014). The results from the agri-sector in Sweden show that there are companies in the agri-sector that optimize their operation with doing more with less, but the majority states that they focus on organizational transformation or even system building. Further, many of the owners/managers of the agri-companies adopt a stewardship perspective. Hence, many companies in other industries, and not only SMEs, can gain inspiration, insights and experiences and learn from the agri-sector.

5.8 Practical Implications

If agri-entrepreneurs and society focus on added value higher up in the value chain rather than only on efficiency at the inception of the value chain, it will be natural to emphasize the importance of agri-businesses for a sustainable society. Instead of a focus on the negative climate and environmental impact of production, focus can be on creating added value from climate and environmental perspectives.

A growing awareness and understanding of these values increases the opportunities for agri-companies to obtain higher prices for their products and/or services. Agri-companies can then focus more on how sustainable innovations can be developed. The climate and environmental perspectives will then become an opportunity and not a limitation for agri-companies and society.

Extension services focused on the agri-sector should reinforce the concept of agri-entrepreneurs as entrepreneurs instead of just producers. The efforts should
focus on new, sustainable business models that encompass more links in the value chain than primary production. This means that education and counselling to businesses should focus on leadership, business development and innovation. The dissemination of knowledge should be conducted through coaching, in order to strengthen the competence and ability of the agri-entrepreneur.

5.9 Concluding Remarks

It is important for sustainable development to further emphasize the importance of innovations in the agri-sector, not only for the agri-companies themselves but also as a response to many of the challenges society faces. While social development has benefited major cities and urban centres, rural areas and agri-companies have substantial opportunities and resources to contribute to the solutions to many of our major social challenges today. These social challenges apply to several major and comprehensive issues such as:

- Climate and environment
- Integration, diversity and gender equality
- Labour and employment
- Access to housing
- The degree of self-sufficiency of society

Agri-companies and agri-entrepreneurs are often situated in rural areas. They can provide solutions to these challenges. Their owners are aware that their companies are connected to a village, a place. They are aware, sometimes intuitively, that the family, the farm, the place and the company will exist in the future - even after they leave business. Therefore, they have every reason to take care of relationships, neighbours, companies, land and animals. Agri-entrepreneurs are aware of their responsibility for future generations and have opportunities to contribute to environmental and climate solutions, which are some of today’s major issues. Their mind-sets and value intentions ought to be spread in society in general. These agri-entrepreneurs are stewards in the best sense of the word.

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