

Barriers and Enablers for a Startup Introducing a Circular Business Model in the Swedish Food-Waste Segment



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Abstract

Sustainability is becoming increasingly important both to consumers and to organizations. However, unsustainable practices within food production persist, and through that, large amounts of food are wasted. Controversially, hundreds of millions of people suffer from hunger annually. The number of people suffering from hunger could be reduced through circular approaches in the food industry, while food production is simultaneously becoming more efficient and sustainable. Elaborating on this, the thesis investigates what aspects a young, entrepreneurial startup aiming to introduce solutions for food valorization in a circular manner should focus its attention towards. Through this, two representatives from a startup that are in the process of introducing a novel technology for food-waste valorization have been interviewed. In addition, two experts from industry with experience in sustainable and circular businesses were interviewed. Furthermore, two representatives from public research and development institutes with expertise in food-waste and circular business development were interviewed.

The empirical data gathered from the aforementioned interviews have been analyzed and discussed in relation to existing literature on circular business models and auxiliary fields. Through this, several important aspects to consider when aiming to introduce a circular business model within food-waste have emerged. These aspects were categorized into four overarching areas: wider system, financial, internal organization and value proposition. In addition, these four overarching areas were divided into barriers and enablers. It was found that enabling aspects include collaboration within the value chain, creating and maintaining relationships and partnerships, creating and maintaining trust with collaborators, securing initial funding and maintaining an economic perspective, among others. The identified barriers included, to name a few, lack of standardized methods and frameworks for circular businesses, acquiring initial funding and potential knowledge gaps.

By elaborating on these findings, potential avenues for further research were identified as how to facilitate collaboration within the value chain successfully, how to build and maintain trust within the food-waste segment in addition to exploring what aspects to consider when introducing a circular business model in the food-waste segment in other countries or markets.

Keywords: Circular Business Model, Food-waste, Barriers, Enablers

To Karin and Ola, for their support and supervision.

To Tom and Warren, for their demonstration of consistency.

To Gothenburg, for its melancholy and rugged beauty.

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Daniel Olsson

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1.0 Introduction

1.1 Background

Around one-third of the world's annual food production is either lost or wasted somewhere along the value chain (FAO, 2019). This means that around 931 million tonnes of food are wasted every year (UNEP, 2021). At the same time, between 720 and 811 million people faced hunger in 2020 (FAO, IFAD, UNICEF, WFP and WHO, 2021). This number increased during 2020 in relation to the previous year, likely due to the covid-19 pandemic (FAO, 2021). These facts alone make it abundantly clear that the world's food-production systems need to face significant transformation. One of The United Nations Sustainability Goals concerns eradicating hunger by 2030 (UNEP, 2021). Still, according to projections, this goal will likely be missed by over 650 million people (FAO, IFAD, UNICEF, WFP and WHO, 2021). In addition, it is estimated that around 14 % of all food produced is lost before it even reaches retailers or consumers (FAO, 2019). This loss in primary food production will be termed the food-waste segment throughout this thesis.

In addition to the issues touched upon in the opening paragraph, it is projected that the world's food production will have to increase by 60 % by the year 2050, while the emission of greenhouse gasses needs reduction by between 40 and 70 % during the same period (OECD, 2017). Elaborating on these challenges, the OECD argues that a critical factor in overcoming these obstacles and reaching the aforementioned goals is the circular economy (OECD, 2017). In short, the circular economy relates to manufacturers, producers and stakeholders creating supply chains that feed used resources back to producers, where resources are, for instance, recycled, reused or valorized (Atasu et al., 2021; Donner et al., 2021). It is further argued that privately-owned organizations must lead such an endeavor toward a circular economy by, for instance, creating conditions for future innovation agendas and novel business models (OECD, 2017). A circular business model is thus a business model that makes use of the circular economy, insomuch that used products are brought back through the supply chain and are reused or recycled (Atasu et al., 2021). In addition, circular business models aim to answer how to create, capture and deliver social, environmental and economic value within closed material loops (Donner et al., 2021). However, it is important to emphasize that the focal organization does not need to close said loops on its own, but could be part of a network of organizations that together close the material loops (Antikainen & Valkokari, 2016). At this point, it is sound to disclose that the terms circular supply chains and supply loops will be used interchangeably throughout this thesis. In addition, to not diminish the findings and formulations of previous researchers, the terminology used throughout the thesis will to the largest extent possible match that of the referenced text.

Through this discussion, it becomes evident that while the challenges are of both great proportion and importance, viable solutions are available through business models that make use of circular economy principles and perspectives. However, the academic field is at an infant

stage, and while the subject of circular business models has gained traction since 2016, the field was more or less unexplored until that point (Geissdoerfer et al., 2020). Thus, how to successfully create value both on an economical and sustainable level has largely gone overlooked (Geissdoerfer et al., 2020). Therefore, it is of interest for academia, practitioners and governmental agencies to further explore how organizations can incorporate circular economy principles in their business model design in order to maximize social, environmental and economic value.

1.2 Problem Discussion

Through the discussion in the background, it becomes evident that global issues exist in the food industry. Challenges such as food-waste and hunger pose real threats, but there are also potential solutions available, in part through, for instance, a circular perspective on food production (OECD, 2017). Business models as a research field has gained significant attention over the last couple of decades (Zott et al., 2011; DaSilva & Trkman, 2014), but as aforementioned, the literature on issues specifically related to small and medium-sized enterprises (SMEs) and startups remains scarce. While not in abundance, there exists previous literature on critical factors for implementing circular business models in SMEs through, for instance, Rizos et al. (2016). The scarcity of research on circular business model design in SMEs becomes increasingly interesting when put in relation to the fact that on a global scale, SMEs constitute around 90 % of total companies and provide around half of all job opportunities (World Bank, n.d.). An additional aspect to consider is that large, established organizations have shifted towards working more closely with external actors over the last decades to continue to offer innovative solutions (Neyens et al., 2010). According to Freeman and Engel (2017), a startup can be defined as a young, entrepreneurial company. Weiblen and Chesbrough (2015) contend that startups generally have differing structures and limited resources, as opposed to large, established firms. While it could seem hard to distinguish where the lion's share of innovation occurs, Weiblen and Chesbrough (2015) contend that large organizations have increasingly sought out startups to increase innovative efforts over the last years. Through this, there are indications that startups play an important role in innovative development.

Following this reasoning, it becomes clear that innovation in relation to the circular economy is critical to solving issues related to hunger and food-waste, and small, young and entrepreneurial firms could play an important role in developing the necessary innovation. Furthermore, existing literature on what small, young, entrepreneurial firms with limited resources should focus their efforts on when it comes to introducing circular business models is, as previously mentioned, scarce. Through this, it becomes clear that further research on what aspects should be considered central to the introduction of circular business models, specifically in the food-waste segment, is needed to respond to the aforementioned challenges.

1.3 Case Company

This master thesis is written in collaboration with a startup looking to introduce its technology in the food-waste segment. The firm will create a solution to both preserve and capture value from the residual product in the current production process of food and agricultural products. The solution provided by the firm has the potential to solve problems related to food-waste and the non-optimized utilization of raw materials in the production of foodstuffs, which means that it has the potential to make use of byproducts that today are regarded as worthless and thus add an additional element of value to the current production processes through valorization of waste. The value proposition consists of two pieces of equipment that together offer the possibility to create additional value through an extension of the production process. This means that the producers of agricultural products would need to make additional investments. In other words, the solution offered by the case company can be viewed as an add-on to existing food production processes that generate waste, where the solution offers additional value by valorization of the waste stream.

The two entrepreneurs involved in the company are serial entrepreneurs in that they have previously successfully launched companies with innovative and sustainable technologies. The offering consists of one technology for air-drying and another technology for milling. The drying technology has the potential to reach a thermal efficiency of over 90 %. In some tests, this number approaches 100%. Furthermore, it can be solar-powered and consumes significantly less energy than traditional drying solutions. In addition, the process is carried out at lower temperatures and thus preserves the characteristics, such as nutritional value, of the input to a larger extent than alternative solutions.

The second technology is a milling process, which operates by utilizing air flow as opposed to traditional milling processes that operate on force to tear materials apart. The advantage of the air flow technology is that it breaks materials down along their natural boundaries, which enables much greater preservation of the material's characteristics, such as nutritional value and mechanical properties such as texture and color. Both technologies are patent-protected. Together, the two technologies enable a highly effective valorization process by preserving characteristics such as nutritional value and the natural features of the material. In other words, materials from primary food production that would be considered waste can be effectively dried and milled into a powder with much higher resistance and resilience than the original material. Through that, the value of the waste material is increased and can thus be used for human consumption rather than go to waste.

Through valorization of inputs, the firm is looking to design and introduce a circular business model for the entirety of its operations. This means that circularity has to be achieved both upstream and downstream. In terms of input, this means that food-waste will be upcycled or valorized and thus create additional value. In terms of delivery of value through its product and process solutions, the firm must be able to assure a circular economy perspective. Through this, the business model must ensure that the physical machinery that the firm delivers is included in the circular business mindset as well. In other words, it is of great importance to ensure that

machinery at the end of its product life cycle is brought back into the value chain and that they are not disposed of at, for instance, landfills. Following the reasoning presented in previous chapters concerning global issues in food production, the need to assure sustainability through circularity becomes a topic of importance as well. In other words, the case company is a startup focused on food-waste valorization that is looking to design a circular business model in order to assure sustainable value creation in addition to economic profit.

1.4 Purpose and Research Question

As seen in previous sections of the introduction to this thesis, circular business models are becoming increasingly crucial, especially in the food industry. The academic field, however, is at an infant stage. Therefore, additional research is needed to understand what aspects should be considered when designing a circular business model to create, capture, and deliver social, environmental, and economic value. As previously mentioned, smaller organizations face different or even additional challenges than larger established firms. In addition, the current literature has largely overlooked the area of designing circular business models for startups in the food-waste segment.

The purpose of this thesis is thus to gather insights on which aspects affect a startup in the Swedish food-waste segment when designing a circular business model.

Through the purpose, the following research question has been formulated:

What main aspects should be considered by a startup in the Swedish food-waste segment when designing a circular business model?

To create a more solid foundation for answering the above question, the following two sub-questions have been formulated as well:

- What are the key enablers for a startup designing a circular business model in the Swedish food-waste segment?
- What are the key barriers for a startup designing a circular business model in the Swedish food-waste segment?

1.5 Delimitations

The thesis takes a qualitative approach to answering the research questions, and thus concerns the specific context under observation. Through that, it is out of the scope of this thesis to generalize the findings across contexts. Whether the findings are applicable and transferable to other, perhaps similar, settings is up to each reader and researcher to investigate independently. The research questions relate to identifying what aspects should be considered when introducing a circular business model in the Swedish food-waste segment, including important enablers and barriers. It is thus not within the scope of the focal thesis to evaluate or determine how these aspects should be best reached or avoided. In addition, the scope of the thesis has been limited to the Swedish context. In other words, no explicit effort has been made towards collecting data and findings that relate to countries other than Sweden.

The definition of circular business models provided in the introduction is the definition referred to throughout the thesis. Different researchers at times use similar yet different wordings, such as circular economy business model. These types of differences in terminology have largely been overlooked throughout the thesis, and in other words, the terms have been used interchangeably.

2.0 Theoretical Background

The theoretical background will first present an introduction to business models, business model innovation, sustainable business models and sustainable business model innovation in order to present a solid foundation on the field. Building on these fundamentals, the theoretical background will focus on circularity in business models and product-service systems (PSS). From there, previous research on enablers and barriers to sustainable business models in general, and circularity in particular will be presented, in addition to other connected fields such as PSS.

2.1 Business Models

At its core, Teece (2010) argues, business models center around the way in which a firm delivers value to its customers, gets customers to pay for said value, and how the firm then converts payments to profit. Through this, the business model thus reflects the assumptions held by management in regards to what the customer wants and how they want it, in addition to how to best organize the firm to meet such demands, get paid, and make profit from doing so (Teece, 2010).

DaSilva and Trkman (2014) argue that the process of value creation is rooted in the unique mixture of resources, and that value for both customers and the firm is generated through transactions. A more abstract definition of the business model, based on a synthesis of previous definitions is presented by Baden-Fuller and Morgan (2010). They argue that the business model can be seen as a set of descriptions on the general level that explain the organization of a corporation in order to create and distribute value while retaining profits (Baden-Fuller & Morgan, 2010). Similarly, Magretta (2002) argues that at the fundamental level, business models are stories that help the firm in answering questions about who the customer is, what the customer wants in terms of value and how the firm can retain revenue and make profit.

Common for the totality of the presented definitions is the emphasis on how to both create and capture value. Similarly, Chesbrough (2007) elaborates by stating that at the fundamental level, the business model achieves two integral activities, namely value creation and capture. Magretta (2002) contends that every firm, both novel and established, needs a thoroughly developed business model in order to succeed. Chesbrough (2007) argues that all organizations have a business model, whether formalized or not.

The answer to the question of what the concept of business models contain is still ambiguous to some extent (Zott et al., 2011). However, the definition of the concept in itself has experienced convergence among researchers over the last decades (DaSilva & Trkman, 2014).

For the research carried out in this thesis, the definition of what a business model constitutes will follow the one presented by Teece (2010).

2.1.1 Business Models in Relation to Strategy

DaSilva and Trkman (2014) draw on the relation to resources and capabilities, stating that strategy shapes the capabilities of the firm, and those capabilities subsequently shape the business model. Thus, the business model describes the firm at the given point in time, while the strategy depicts what the organization aspires to become (DaSilva & Trkman, 2014). Pivotal to their view of business models and strategy is the business models stemming from strategy, and not the opposite, meaning that the business model fulfills the role of revealing how the underlying elements of the firm operate in unity at - again - one given point in time (DaSilva & Trkman, 2014). In a similar fashion, Casadesus-Masanell and Ricart (2010) argue that while the concept of a business model can at times seem increasingly similar to that of strategy, the business model represents a reflection of the actual strategy of the firm. Thus, recognizing the strategy functioning as the foundation of the business model in much a similar fashion to that of DaSilva and Trkman (2014). Nandakumar et al. (2010) argue that a firm's strategy is a description of how the firm aims to achieve its goals in relation to the resources and capabilities within the firm, as well as the existent threats and opportunities surrounding it. To summarize the understanding of business models in relation to strategy, again, the thoughts of Casadesus-Masanell and Ricart (2010) are applicable in representing the main view and arguments that underpin the view used in this thesis: "In our formulation, strategy and business model, though related, are different concepts: a business model is the direct result of strategy but is not, itself, strategy" (Casadesus-Masanell & Ricart, 2010, p. 18).

2.1.2 Business Model Innovation

Within the realm of creating new business models or new compositions of the elements that make up the business model, Zott et al. (2011) argue that business models offer firms yet another subject of innovation, in addition to the more traditional avenues such as organizational, process and product innovation. Furthermore, this novel channel for innovation includes new constructs of collaboration and cooperation (Zott et al., 2011). Knowing that the literature on business models precedes business model innovation (BMI), it is no surprise that the latter is less explored than the former (Foss & Saebi, 2016). Foss and Saebi (2016) define BMI as: "designed, novel, nontrivial changes to the key elements of a firm's business model and/or the architecture linking these elements" (Foss & Saebi, 2016, p. 201). Other researchers, such as Amit and Zott (2012), define BMI as introducing novel activities, finding new ways in which activities can be linked or switching out the actor that performs an activity. Amit and Zott (2012) continue by arguing that such a definition of BMI applies to both new and established firms. Similar views can be found from Bucherer et al. (2012), who contend that BMI is a process of intentionally changing the fundamental features of the firm in addition to its business logic. However, this perspective presented by Bucherer et al. (2012) implies that

current processes are in place. Yet another more rigid definition of BMI is provided by Khanagha et al. (2014), who argue that the activities within BMI could include incremental changes, extensions or disruption, completely replacing the existing business model, or creating parallel business models. This definition leaves little room for BMI in startups and thus diverges from Amit and Zott (2012) and Foss and Seabi (2016). Engaging in practices concerned with introducing novel elements to the business model can contribute to a firm's competitive advantage within a segment (Casadesus-Masanell & Ricart, 2010). Similarly, BMI can, at times, according to Chesbrough (2007), be of greater importance than product or process innovation.

Given that this thesis is concerned with circular business model design in a startup, the definition of BMI provided by Amit and Zott (2012) is considered the most suitable. The reason is that the definition provided by Amit and Zott (2012) broadly addresses activities, how activities interplay, and who performs the activity. In addition, Amit and Zott (2012) explicitly include the formation of novel business models in new ventures.

A focal point within BMI especially in relation to the acquisition, transformation and diversification configurations, is the issues that arise when organizations have to manage two separate business models simultaneously (Khanagha et al., 2014). Similarities can be observed between such challenges and the ambidextrous organization as presented by O'Reilly and Tushman (2004), relating to the exploitation of existing business units while simultaneously exploring new ones. Elaborating on this, the argument made here is that issues of this sort should not be a priority when dealing with business model innovation in startups, given the firm's lack of traditional business units.

Identifying what constitutes a business model change is, according to Geissdoerfer et al. (2018a), still somewhat ambiguous. Similarly, Geissdoerfer et al. (2018b) indicate that there is a need to determine the boundaries between product, process and business model innovation, meaning that no common understanding of such distinctions exists in the literature. Furthermore, according to Geissdoerfer et al. (2016), the process of change is not always a deliberate one on account of the focal firm, which stands in stark contrast to what has previously been presented on BMI by Bucherer et al. (2012). Elaborating on the concepts and definitions discussed above, Geissdoerfer et al. (2018a) have argued that there are four general configurations of BMI. These include business model acquisition, transformation, diversification and startups. Given the scope of the research within this study, startups become the configuration of primary interest. In addition, early studies, such as the one carried out by Zott and Amit (2007), indicates that innovative business models correlate with increased firm performance (as measured by market valuation) in entrepreneurial organizations, which further solidifies the importance of BMI as an academic field.

2.2 Sustainable Business Models

Product and technology innovations are becoming increasingly incremental and do not suffice for most firms in meeting their sustainability goals (Geissdoerfer, 2018a). In other words, innovation needs to occur in other areas of the organization than in products and technology. An example of this is presented by Rashid et al. (2013), who argue that manufacturing firms are required to find novel solutions in their business model and supply chains and transition from an open-loop to a closed-loop supply chain in order to offset the increasing scarcity of resources. The concept of closed-loop revolves around two supply chains (Wells & Seitz, 2005). One of the chains is the traditional forward supply chain, and the second can be viewed as a reversed supply chain that feeds recovered or recycled products back into the traditional supply chain (Wells & Seitz, 2005). Similar examples can be found in process innovations where organizations have managed to reduce energy usage in their production by 40 % (Bocken et al., 2014). However, this has not proved to be sufficient given the rise in resource use due to the growing population (Bocken et al., 2014).

Much like a traditional business model, sustainable business models aim to create, capture and deliver value or change the value proposition, with the addition of significantly increasing the positive impact or reducing the negative impact on society and the environment (Bocken et al., 2014). A sustainable business model differs from the traditional neoclassical model of a firm, inasmuch that sustainability goals transform the model of the firm rather than supplement it (Stubbs & Cocklin, 2008). Through this, concepts related to sustainability influence and form the driving force of the organization and its decision-making processes (Stubbs & Cocklin, 2008). A similar view is offered by Geissdoerfer et al. (2018a) who argue that sustainable business models include proactive management of multiple stakeholders, create both monetary and non-monetary value for multiple stakeholders and additionally have a long-term perspective. Including a long-term perspective is, of course, imperative to most, if not all, organizations, since being flexible and responsive to changes in the business environment allows for greater potential in creating, delivering and capturing value. Furthermore, another positive outcome of sustainable business models is that they might proactively serve the organization when faced with new regulations connected to sustainability (Bocken et al., 2014). Additionally, as regulations tighten over time, resources become increasingly scarce and expensive, social pressure increases, and climate change becomes noticeable, firms are likely to seek competitive advantage through progression towards sustainable business model innovation (Bocken et al., 2014).

2.2.1 Sustainable Business Model Innovation

As discussed in the previous section, many organizations may be experiencing a need for innovation in areas other than processes, products or the organization in the near future. Organizations that are likely to be subject to societal or environmental changes are seeking ways in which they can cope with these potential changes, and according to Loorbach and Wijsman (2013), the process of doing so constitutes sustainable business model innovation.

A firm, together with its network of suppliers and customers, can indulge in sustainable business model innovation by introducing innovations that either offset negative effects or increase positive effects on society or the environment (Bocken et al., 2014). In close relation to sustainable business model innovation, circular economy business model (CEBM) innovation relates to business model design that utilizes principles or practices from the circular economy to achieve goals in accordance with those of sustainable business models in general (Geissdoerfer et al., 2020).

How to succeed in fulfilling these prerequisites through business model innovation however requires a less general approach, and is dependent on the specific firm and its specific industry (Boons & Lüdeke-Freund, 2013). It is important to mention that the terminology on utilizing circular economy principles in the design of sustainable business models is to some extent scattered across literature. For instance, Atusu et al. (2021) refer to it as circular business models, and others refer to circular economy business models (Geissdoerfer et al., 2020; Rizos et al., 2016). For the sake of clarity, the term circular business model will be used throughout the remainder of this thesis.

2.2.2 Create Value from Waste

Bocken et al. (2014) introduce sustainable business model archetypes as a way to create business models to address the impending environmental challenges faced by society. Creating value from waste aims at eliminating the concept of waste, instead making use of the streams of waste to create a valuable input to use in other production processes, thus addressing the pressing problem of under-utilized capacity (Bocken et al., 2014). Different from other sustainable undertakings, this type of business model does not necessarily aim to eliminate waste entirely, but rather urges the need and possibility to make use of it - thus simultaneously eliminating the concept of waste (Bocken et al., 2014). In other words, what was previously considered waste, should instead be viewed as something of value (Bocken et al., 2014). In line with this thought is the work of Zucchella and Privatali (2018), focusing, among other things, on the waste coming from sewage plants, which with an increase in human population and developed societies, have no outlook of decreasing (OECD, 2017). Instead, Zucchella and Privatali (2018) argue that waste should be upcycled, where upcycling means that the quality of the input is increased through some valorization process (Ellen MacArthur Foundation, 2015). This, in order to invert the waste dominant logic of the linear economy - again, eliminating the concept of waste (Zucchella and Privatali, 2018). Conducting business this way makes the profit generated by the firm conform with intergovernmental goals on sustainability by reducing the otherwise continuous need for resources (Zucchella & Privatali, 2018). Instead, this way of operating closes the material loops, easing the extent to which virgin materials need to be fed into production, while to a lesser extent disposing of useful materials (Bocken et al., 2014). This perception relates to the notion of waste as an economic concept, that is, not an inherent property of the material. Such a perspective can thus be pivotal in unleashing the potential of complete material usability (Zucchella & Privatali, 2018).

2.3 Circular Business Models

Advancing the notion of closed loops, as mentioned by Bocken et al. (2014), Zucchella and Privatali (2018), and Romero and Romero (2018) elevate the discussion of waste management into the one of circular economy. Romero and Romero's (2018) definition of circular economy corresponds to the view presented by both Bocken et al. (2014) and Zucchella and Privatali (2018), aiming at gathering revenue from previously discarded by-products, thus maximizing the use one could get out of each input resource. However, they contradict the idea of not purposefully trying to reduce waste generation in favor of just focusing on better using the waste, arguing that reducing the amount of waste produced by companies is essential to approach operational efficiency, in itself important to build a competitive edge (Romero & Romero, 2018). Lüdeke-Freund et al. (2018) contend that the primary goal of circular business models is to aid organizations in the creation of value through the iterative reuse of materials, in addition to limiting both waste and consumption. Elaborating on this, fully adopting the principles of a circular business model eliminates the concept of waste, since waste becomes an input for a subsequent process (Lüdeke-Freund et al., 2018).

Businesses are generally not used to regarding waste as something of potential value, but rather that it is a cost that the businesses aim to decrease (Lüdeke-Freund et al., 2018). However, trying to reduce the costs of waste might hinder businesses from actualizing the potential inherent in that same waste, effectively stopping them from pursuing circularity via closed loops (Lüdeke-Freund et al., 2018). This notion challenges the views presented by Romero and Romero (2018), who argue that positive aspects such as improved operational efficiency can derive from waste-reduction. Additionally, using what is otherwise regarded as waste as a valuable input into the next production may not decrease the quality of the final product, but rather the opposite (Ellen MacArthur Foundation, 2015).

2.3.1 Upcycling

Oyenuga and Bhamidimarri (2017) argue that upcycling is the process of transforming byproducts or materials of low or non-existent value into a material or product of higher value. Continuing on this, Donner et al. (2020) contend that entrepreneurial upcycling is a type of circular business model in which the entrepreneurial organization provides innovative solutions that enable the transformation of byproducts of low value into materials or products of a higher value. Relating back to what was previously mentioned on closing loops, the Ellen MacArthur Foundation (2015) argues that in close relation to upcycling, the circular concept of closing loops within and between production processes can be utilized to retain valuable properties from by-products and waste. Similarities and overlaps can thus be observed between circularity and upcycling.

2.3.2 Servitization

What enables or hinders an organization in designing a circular business model is to a large extent dependent on the specific context (Donner et al., 2020). In a similar manner, the way in which an organization develops its circular business model can be done in several different ways (Atasu et al., 2021). However, two common strategies for doing so are to retain product ownership and extend the product life (Atasu et al., 2021). Extension of product life can be achieved through a business model where functionality is prioritized over traditional ownership in an approach toward servitization (Bocken et al., 2014). The retention of product ownership from the perspective of the provider is in itself critical to a model that prioritizes the delivery of functionality rather than traditional ownership (Bocken et al., 2014).

Moving away from the traditional product and ownership dominant logic has close connections to the concept of servitization, which refers to the process of creating value for customers through the bundling of products, services and other auxiliary addons (Vandermerwe & Rada, 1988). However, servitization can be viewed as the process itself as well, that is, organizations moving from purely offering either products or services, to creating more complex offerings that are combinations of products, services and auxiliaries (Brax, 2005). Furthermore, Baines et al. (2009) argue that servitization "is now widely recognized as the process of creating value by adding services to products" (Baines et al., 2009. p. 547).

2.3.3 Product-Service Systems

A distinct instance of servitization is a product-service system (PSS) (Baines et al., 2007). A PSS can be viewed as an extension of the traditional market offering through the inclusion of auxiliary services (Baines et al., 2007). Meaning that the focus shifts from selling the product to instead selling the use of the offering. Through this, customers gain advantages in aspects usually connected to ownership, such as reconstruction of risks, responsibilities and costs (Baines et al., 2007). In addition, it can be argued that PSS enables incentives and benefits for sustainability as well (Baines et al., 2007). However, introducing a PSS in itself is not a guarantee for a sustainable business model (Bocken et al., 2014; de Jesus Pacheco et al., 2019). However, as previously mentioned, Bocken et al. (2014) argue that the product life can be extended through a business model where functionality rather than traditional ownership is prioritized, which can be achieved through servitization in general and PSS in particular, due to design for longer life and continuous maintenance.

PSS is thus a combination of products and services, where the importance of the product remains, but coupled with a focus on the fundamental customer value of using the product (Baines et al., 2007; Bocken et al., 2014). Furthermore, PSS allows both for a focus on delivering value in use rather than ownership, as well as differentiation through the combination of products and services (Baines et al., 2007). As mentioned by Atasu et al. (2021), a circular business model may be developed around both retaining product ownership as well as extending the product life - which is often developed jointly and can be obtained

through employing a PSS (Bocken et al., 2014). With an increased focus on maximizing the consumer use of the product manufactured, the product itself will be designed for a longer lifecycle, thus decreasing resource use (Bocken et al., 2014). That, while simultaneously lessening the financial constraints on the user, otherwise buyer (Bocken et al., 2014; Baines et al., 2007). Similarly, Baines et al. (2007) argue that PSS allows for the decoupling of material use and economic profit, which subsequently has positive effects on the environmental impact. However, to fully realize the environmental benefits of a PSS, the business model itself needs to be characterized by efficiency and generating value from waste (Bocken et al., 2014).

While the literature on different modes of PSS is somewhat divergent, three distinct types of PSS can be identified, namely product-oriented PSS, use-oriented PSS and result-oriented PSS (Baines et al., 2007; Bocken et al., 2014). In a product-oriented PSS, the customer still retains ownership of the product, but auxiliary services such as extended warranties, maintenance, training and consulting to improve the customer's business are offered as a bundle (Bocken et al., 2014; Baines et al., 2007). The motivation behind the introduction of a product-oriented PSS on account of the provider is cost-minimization over the product's life cycle (Baines et al., 2007). In a use-oriented PSS, the customer does not own the products, but instead purchases the use or availability of the product through, for instance, renting, leasing or sharing (Bocken et al., 2014; Baines et al., 2007). In contrast to product-oriented PSS, the rationale of the provider behind a use-oriented PSS relates to maximizing the use of the product to both meet market demand as well as extend product and material life (Baines et al., 2007). Finally, result-oriented PSS concerns the sale of a capability or a result rather than the product itself (Baines et al., 2007). Commonly, this is achieved by pay-per-use (Bocken et al., 2014), where the provider offers a combination of services to customers who only pay for the results (Baines et al., 2007). Through this, ownership and control is fully retained by the provider (Baines et al., 2007). Independent of the mode of PSS, the goal is to satisfy the needs of the customer through bundling of products and services in order to provide the customer with the desired utility or function (Baines et al., 2007).

Kühl et al. (2018) found that PSS is in literature considered one of the best-fitting methods for incorporating circular economy perspectives in a business model. Through reuse and recycling, PSS can contribute to positive impacts on resource productivity and waste generation (Michellini et al., 2017). However, Michellini et al. (2017) also argue that while result-oriented and, to some extent, use-oriented PSS can aid in designing a circular business model, product-oriented PSS does not have positive effects on circular and sustainable objectives. The reason being that product-oriented PSS maintains traditional sale incentives and that use-oriented could lead to less cautious use of the product, which could make it problematic to introduce circularity (Michellini et al., 2017). While PSS has potential benefits for sustainability in general and circularity in particular, it is argued that the PSS model has to be designed carefully to actually create environmental value in addition to economic value (Michellini et al., 2017; Kühl et al., 2018). In addition, Michellini et al. (2017) explicitly contend that while PSS can have positive impacts on circularity, the concept in itself is no guarantee for sustainability. Part of the explanation can be found in the challenge of creating a backward supply chain and the practical implications of closing cycles (Kühl et al., 2018).

To offset some of the aforementioned sustainable ambiguity connected to PSS, and direct further focus on environmental and social aspects, research on Sustainable Product-Service Systems (SPSS) has emerged (de Jesus Pacheco et al., 2019). SPSS is a model where product(s) and service(s) are bundled together to deliver customer value and satisfy a customer need. The value proposition is grounded in the interactions between stakeholders within the system, and the ownership of the product, costs and responsibilities connected to life cycle services remain with the provider. Through this, the provider or providers aim to improve the bundling by advancing the existing, or introducing new environmentally or socially beneficial solutions, while simultaneously seeking economic profit (Vezzoli et al., 2021).

2.4 Barriers and Enablers to Circular Business Model Design

The barriers and enablers below are derived from literature on Product-Service Systems (PSS), and circular business models, specifically in relation to SMEs and Swedish agriculture, to give a combined foundation of relevant literature for this case. In addition, it is of great importance to emphasize that several of the barriers and enablers are context-specific, which means that the organization must be able to assess and evaluate its specific context within the wider system and its supply chain (Donner et al., 2021).

2.4.1 The Wider System

An organization designing a circular business model is heavily reliant on other players within the supply chain and in its proximity (Long et al., 2018; Rizos et al., 2016). Surrounding actors include competitors, suppliers, NGOs, governments and governmental agencies, among others. In addition to this, both social and environmental concerns have emerged as increasingly important issues that need attention during the last decades (OECD, 2017). Through this, the wider system is defined as the network in which the focal firm is active, where the organization interacts with, affects, and is affected by, other actors within the system both directly and indirectly (Long et al., 2018; Rizos et al., 2016).

In close relation to the previous discussion, Long et al. (2018) found that the government took on an important role in organizations transitioning toward sustainable business models. A lack of regulations to benefit organizations to more efficiently pursue sustainable business opportunities was identified as a barrier (Long et al., 2018). On a similar note, Rizos et al. (2016) argue that governments taking a passive role by not creating opportunities through, for instance, funding and grants, regulation and policy et cetera is likely to create barriers for small and medium-sized enterprises pursuing a sustainable business model. However, governmental interference can also provide benefits for circular organizations through, for instance, sustainable requirements in public procurement (Rizos et al., 2016). Additionally, external events within the wider system, such as consumer trends, scandals and boycotts, can have a positive impact on sustainable businesses (Long et al., 2018). The process of servitization could

also be negatively affected by a lack of government support in policy, infrastructure and incentives to pursue environmentally beneficial solutions (Confente et al., 2015). In addition, Donner et al. (2021) argue that both social and environmental benefits can be achieved through sustainable or circular business models. With consumers becoming increasingly concerned with ecological products, these aforementioned societal benefits become a potential enabler of success (Donner et al., 2021). However, research has also indicated that there exists an unwillingness to change among smaller actors in the Swedish farming industry (Cederholm Björklund, 2018), which could potentially lead to obstacles in introducing circularity, PSS and waste valorization within the Swedish agro-waste industry.

Additionally, general support and collaboration are typically needed for sustainable and circular business models, both upstream and downstream, throughout the circular supply chain (Long et al., 2018; Rizos et al., 2016). Furthermore, Rizos et al. (2016) contend that SMEs generally have low levels of power and leverage in relation to other actors within the supply chain. De Jesus Pacheco et al. (2019) also found that successful PSS requires establishing and maintaining relationships with customers and suppliers in order to encourage a perspective where ownership is not the focal objective, which further solidifies the need for collaboration. Moreover, the complicated nature of stakeholder relationships can prove a challenge for establishing sustainable business models in small and medium-sized enterprises (de Jesus Pacheco et al., 2019).

When approaching a Sustainable Product-Service System (SPSS), a potential barrier is the lack of support from the focal company's upstream and downstream network (Rizos et al., 2016). SMEs engaged in a circular economy generally find the lack of support from both the supply and demand network as their main barrier when operating circularly as opposed to linearly (Rizos et al., 2016). Support from the supply and demand network can be categorized as upstream and downstream network, respectively.

2.4.1.1 Upstream Network

In the upstream network, a great emphasis is placed on the role of government, where time-consuming authorization in food security and changes in legislation (Donner et al., 2021) and overall government support for circular economy (Rizos et al., 2016) are mentioned as barriers. Continuing on the logic of agricultural waste presented by Donner et al. (2021), an inherent upstream barrier in utilizing byproducts as an input is the limited volume each farm can and will produce. The problem becomes even more noticeable due to seasonality, which in combination with said limited volume, leads to competition between both actors and sectors for the same agricultural byproducts (Donner et al., 2021).

A PSS requires trust and collaboration in the focal company's upstream networks, consisting of partners able to deliver services as well as suppliers and distributors providing the company with support (Parida et al., 2014). However, servitization is generally characterized by a more

complex and competitive environment than that of traditional production, entailing hardships between the involved parties in both coordination and cooperation (Confente et al., 2015). Gaining the support needed from the upstream network is a barrier in itself (Parida et al., 2014; Confente et al., 2015), while the loss of collaboration and trust may be fatal for the whole PSS (de Jesus Pacheco et al., 2019).

2.4.1.2 Downstream Network

Acquiring the trust of stakeholders is relevant also for the downstream network, especially since trust from customers can be challenged both by utilizing agricultural waste (Donner et al., 2021), as well as in service provision (Confente et al., 2015; de Jesus Pacheco et al., 2019). Regarding the agricultural side of the downstream trust issues, consumers do not necessarily trust an innovative product from this sector blindly (de Jesus Pacheco et al., 2019). For the product-service side of the potential barriers lies a need to change the customer mindset from that of an ownership to a use-centered one, while simultaneously altering the dominant logic of value of exchange in favor for value of use (de Jesus Pacheco et al., 2019; Baines et al., 2007). Beyond those barriers, inherent in a sustainably produced agricultural product is the usually higher price compared to an unsustainable product, making it hard to compete on price (Donner et al., 2021).

As previously discussed, collaboration within the wider system is of great importance for firms looking to introduce sustainable business models. Support and cooperation with actors both upstream and downstream of the focal firm provide a success factor for implementing sustainable business models (Long et al., 2018). Through this, shifting towards a greener economy and sustainable business models require suppliers that can provide sustainable inputs (Long et al., 2018). Further, it requires financing and investors that share the vision of sustainability, education and co-creation with consumers and, in certain situations cooperating with other firms in similar segments in order to develop a viable market (Long et al., 2018). Partnering and working closely with public institutions could also offset some of the difficulties related to the wider system presented in previous sections (Donner et al., 2021). Donner et al. (2021) further argue that collaboration with local stakeholders, such as government, businesses, entrepreneurs, citizens and NGOs is crucial for achieving success, and administering such involvement is alleviated if the focal organization provides local job opportunities. Establishing relationships and partnerships with larger organizations within the supply chain could further enable the success of the focal firm, especially in developing the value proposition (de Jesus Pacheco et al., 2019) and enabling the scale-up process (Donner et al., 2021). Furthermore, the outcome of partnerships with larger actors can be enhanced through the appointment of a champion in the partnering organization (de Jesus Pacheco et al., 2019). Elaborating on the necessity of collaboration and partnerships with external entities, the geographical proximity to the aforementioned actors thus also becomes of importance for the successful development of sustainable businesses (Donner et al., 2021). Establishing relationships with external actors can also aid in obtaining competencies that the organization lacks internally (de Jesus Pacheco et al., 2019).

While the previous section directed a substantial amount of attention towards upstream actors, downstream support from consumers is imperative for the success of SMEs as well (Rizos et al., 2016). Creating such support requires a positive stance on sustainable products and services on account of the consumers (Rizos et al., 2016). Customers perceiving sustainable or upcycled products as inferior could thus constitute an obstacle that organizations have to overcome by changing consumer perceptions (Rizos et al., 2016).

2.4.2 Financial

One of the greater barriers to SMEs striving to become circular is the lack of capital, especially for companies pursuing a PSS model with greater associated upfront costs (Rizos et al., 2016). A combination of the financial sensitivity inherent in being small and the hardships of acquiring financing from banks makes half of the studied SMEs mention lack of capital as a barrier when implementing a circular business model (Rizos et al., 2016). The lack of financial resources for SMEs in general, as well as in the transition toward PSS, is further highlighted by de Jesus Pacheco et al. (2019). This, since attracting capital from banks is difficult in the case of sustainable PSSs (de Jesus Pacheco et al., 2019). This holds true for the case of circular businesses as well, partly due to banks not being flexible enough in their payment policies and partly due to banks not realizing the full potential of a circular economy (Rizos et al., 2016). However, the dependency on large investments in circular economy, as mentioned by Donner et al. (2021), can by large be met by special funds provided by local grants and specific startup financing that sees the attractiveness in the model itself, and the potential for inclusion in government projects (Rizos et al., 2016). In the case of PSS, de Jesus Pacheco et al. (2019) extends the argument above and highlights identifying external financial support through constructing an offer mapping to be a success factor.

Keeping the sustainable and circular business profitable on its own is, however, of critical importance (Long et al., 2018), regardless of if the main point of the company is to deliver environmental or social value. Combining the thoughts of Long et al. (2018), concerned with sustainable business models, and de Jesus Pacheco et al. (2019), concerned with sustainable PSS, a startup engaged with PSS could favor from thoroughly developing a risk, cost and profit analysis to ensure their finances and enable future sustainable operations.

Implementing a PSS implies a changed view on revenue streams, going from a logic where revenues are incurred at the time of sale, to a logic where revenues are incurred both during sales and continuously throughout the whole lifecycle (Matschewsky et al., 2017). The lifecycle perspective is something that needs to be implemented throughout the whole organization, which might entail a need for changes in the view on incentive structures within the company – from product-centric to service-centered (Matschewsky et al., 2017). Further, that shift may induce resistance internally from functions not understanding the importance of a service focus (Confente et al., 2015). Introducing a service focus early in the development phase of the physical product could minimize maintenance costs in the longer run

(Matschewsky et al., 2017). Truly understanding the costs of the PSS offer and adopting a lifecycle-cost logic can move the transition to servitization forward while simultaneously improving the design of the PSS offer (Matschewsky et al., 2017).

2.4.3 Internal Organization

Over one-fifth of organizations studied by Rizos et al. (2016) testified that the administrative burden and the lack of technological capability was a barrier to success in implementing circular business models. In addition, organizations within the food-waste segment are heavily reliant on quick and efficient logistics since the products perish quickly (Donner et al., 2021). High-level strategy and business development are thus needed in the form of continuous innovation of business-related processes in general and the business model in particular (Long et al., 2018; de Jesus Pacheco et al., 2019). The process of continuous improvement is especially important in ensuring that the business model develops over time and remains sustainable (Long et al., 2018). Product innovation and extension of the product portfolio has also been identified as an enabler for firms within the agro-food industry (Donner et al., 2021). The focal organization could also face barriers through issues both in pricing and the unwillingness to take on additional financial risk in relation to PSS (Baines et al., 2007).

For small and medium-sized organizations that are not experienced in creating, designing and implementing PSS business models, a potential barrier is the lack of relevant knowledge (de Jesus Pacheco et al., 2019). These gaps in knowledge can, for instance, relate to the understanding of PSS, the absence of appropriate frameworks, methods and guidelines and an under-developed business strategy (de Jesus Pacheco et al., 2019). Additionally, a coherent vision needs to be established and communicated both internally and with partners (Long et al., 2018), which can be connected to de Jesus Pacheco et al. (2019), who argue that a suitable project champion is a potential enabler and that the lack thereof can result in a barrier for success.

2.4.4 Value proposition

Circular economy is increasingly being promoted by policymakers, and the number of consumers who are interested in environmentally-friendly products are increasing (Donner et al., 2021). Combining the thoughts on circular economy with the thoughts on PSS, a key success factor in a sustainable PSS is to carefully, with the presumed customer, stakeholders and channels in mind, develop a detailed design of the product-service combination (de Jesus Pacheco et al., 2019). From there, the PSS can be designed around the customer to best suit the needs they have (de Jesus Pacheco et al., 2019). However, Donner et al. (2021) argue that an innovative product stemming from the agricultural sector may face resistance, not least if the technology enabling it has never been tested on a large scale, or if there is variation in the output quality. In addition, Tura et al. (2019) argue that there exists a deficit in technologies

that enable the creation of circular business models, and through this, actors often find it challenging to identify circular business opportunities.

Parida et al. (2014) argue that a PSS should stem from a combined product and service development, ensuring that the service provided in connection to the physical product is not an afterthought laid upon an otherwise individual product. Establishing an integrated development, where the service-side of the equation is developed simultaneously with the physical offering, can enable a solution where the physical product is designed with the specific customer in mind while also enabling the integration of customer input to enhance the offer further (Parida et al., 2014; Baines et al., 2007). This additional service may also be what differentiates a company operating in the market (Confente et al., 2015; Baines et al., 2007), by introducing an offering of higher customer value (Baines et al., 2007) as well as becoming sturdier in regard to price competition by offering a multi-layered product (Confente et al., 2015). Central to their thoughts on the subject is, as is also argued in Parida et al. (2014), the company's inclusion of both the upstream and downstream network (Confente et al., 2015). Drawing on the literature on PSS, the inclusion of the company's downstream network is mentioned by de Jesus Pacheco et al. (2019) as well. De Jesus Pacheco et al. (2019) states that the PSS offering should be based on customization and modularity, and that it should include different methods of payment, maintenance, and a take-back system. Structuring the offering like this, the environmental benefits should increase, and the total cost of ownership should decrease, while the product itself is still owned by the company offering the PSS (de Jesus Pacheco et al., 2019).

2.5 Concluding remarks on the theoretical background

The literature review has been carried out in the pursuit of answering the research question on how a startup in the Swedish food-waste segment can design a circular business model, as well as the two sub-questions relating to enablers and barriers of doing so. The theoretical background took its point of departure in defining business models and business model innovation in order to build a solid foundation upon which the research can be conducted. From there, sustainable business models and sustainable business model innovation were introduced and discussed to then arrive in the central area of circular business models. Similar to sustainable business models, circular business models aim to create value for stakeholders through other avenues than economic profit, that is, either socially or environmentally. By diverging from the course of the linear economy, circular business models aim to reuse, recycle and valorize products and waste that arise during the process by feeding these back through what is typically referred to as reverse supply chains. Given the large inefficiencies in current food production and the large deficit in food availability, there is a dire need for transformation of food production systems and supply chains. The literature review suggests that a circular business model can be implemented through upcycling activities and the integration of Product-Service Systems (PSS). The field of circular business models is still at its nascent stage, and therefore literature on how to successfully design a circular business model is scarce. Through this, previous literature on sustainable business models, circular business models, PSS

and servitization was evaluated in order to construct a comprehensive study on potential enablers and barriers to designing a circular business model for a startup in the Swedish food-waste segment. These barriers and enablers were synthesized into four categories, the wider system, financial, internal organization and value proposition, in order to formulate a conceptual framework upon which to base the guidelines for data collection and analysis of empirical data.

A more comprehensive tabular summary of barriers and enablers can be found in Appendix 1.

Conceptual Framework on Circular Business Model design

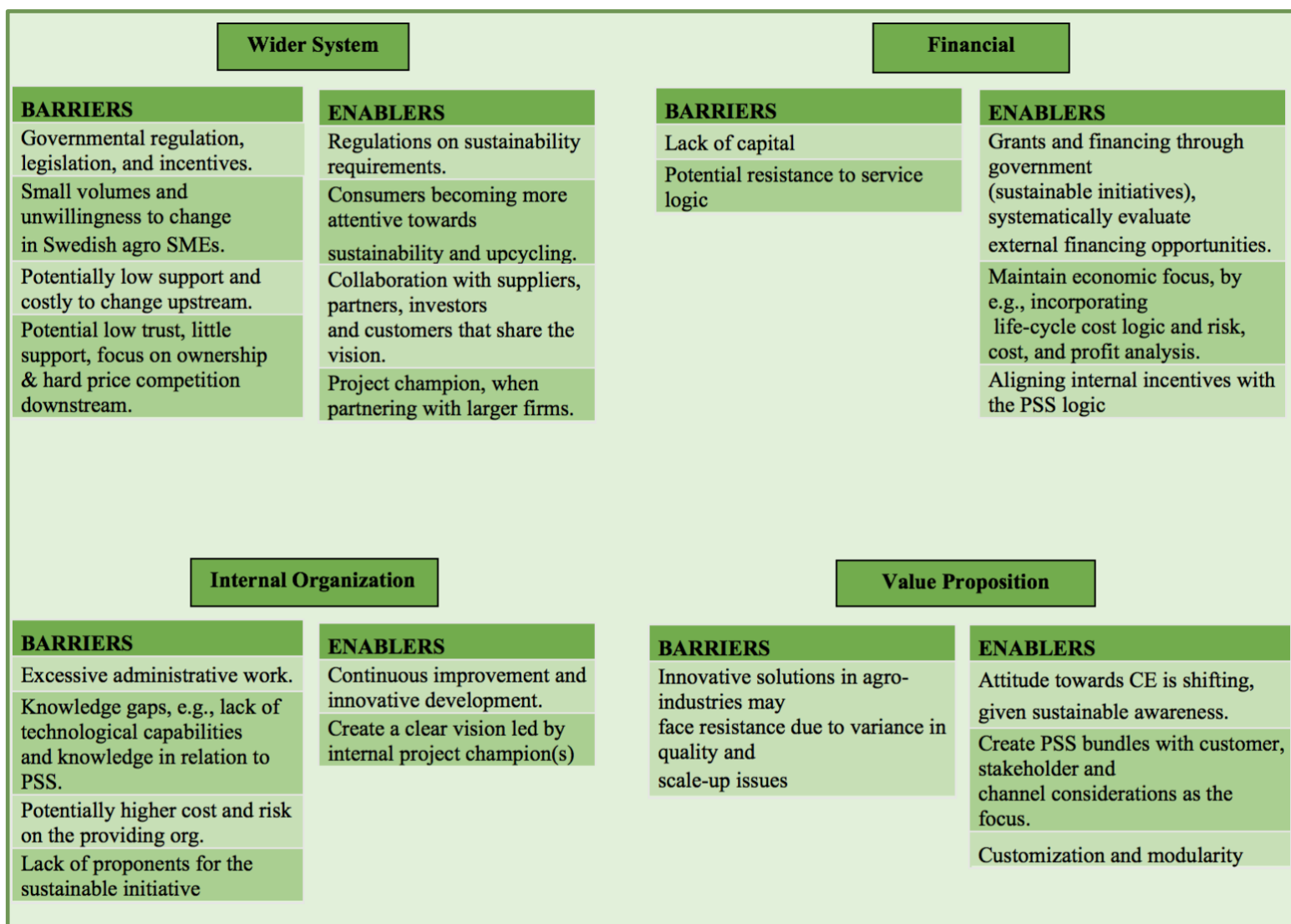


Figure 1: Conceptual Framework based on the theoretical background

3.0 Methodology

In the following section, the overarching positions in connection to methodology will be presented. First, evaluations and decisions made in relation to research strategy and research design will be presented. Methods for the collection of primary data, as well as for the literature review, will be discussed before touching upon methods in connection to the data analysis. Finally, the quality of the research will be discussed in connection to criteria such as trustworthiness and authenticity.

3.1 Research Strategy

The research strategy of a study could be viewed as an overall approach to the research carried out (Bryman & Bell, 2011). A qualitative research strategy is generally more concerned with words rather than quantifiable numerical data (Bryman & Bell, 2011). Conversely, quantitative research primarily relates to testing predetermined hypotheses through a deductive approach that is rooted in the methods of the natural sciences, where the social reality is viewed as being objective rather than subjective (Bryman & Bell, 2011). A quantitative research strategy is generally more focused towards inductive approaches, where the focus is placed on the subjective experiences of individuals (Bryman & Bell, 2011). In addition, in qualitative research, social reality is generally viewed as subjective and thus subject to constant change (Bryman & Bell, 2011). Since answering the research questions formulated in the introduction is primarily concerned with understanding the insights of individuals, it is here argued that a qualitative approach to research strategy is the most appropriate avenue.

With a deductive approach to the relationship between theory and data collection, the theory precedes the formulation of a hypothesis and, subsequently the process of collecting data (Bryman & Bell, 2011). In an inductive approach, however, data collection and observations precede theory, meaning that the gathered data guides theorization, and the theory thus becomes the outcome of the research (Bryman & Bell, 2011). Bryman and Bell (2011), however, argue that there is often a deductive element to an inductive approach and vice versa. Following that line of reasoning, the research strategy of the thesis will take an inductive approach, insomuch that the gathered data will be the basis of theory formulation. However, in order to establish a relevant point of departure within the theoretical landscape as well as create an appropriate interview guide, the theoretical approach will contain a deductive element as well. Bryman & Bell (2011) contends that an inductive approach is commonly closely connected to qualitative research, whereas a deductive approach to theory is more frequently related to quantitative research.

Bryman and Bell (2011) argue that the epistemological view of interpretivism is based on the belief that the strategy must recognize the differences between humans and the natural sciences. Through this, it is required to understand the subjective significance of social activities.

Proponents of this view thus argue that social entities such as humans and their institutions are different from the entities in natural science at the very core (Bryman & Bell, 2011). The ontological position constructionism is yet another concept that relates to perceptions of reality, and according to Bryman and Bell (2011), it represents a view of social reality as a state created by individuals that are subject to continual change. The research carried out in this thesis is anchored in these perceptions of social reality, insomuch that the choices connected to strategy, design, methods and data collection addressed this distinction between the socially constructed and the natural sciences. By large, a research strategy mainly concerns the overall manner in which the research is carried out (Bryman & Bell, 2011). Through what has been previously argued within the area of research strategy, it thus becomes apparent that a qualitative research strategy is deemed most suitable for this study. In other words, an inductive approach to theory, combined with an interpretivist view of social activities in addition to a constructivist view of social reality. Through this, it becomes apparent that the research predominantly relates to the gathering and analysis of subjective meaning through words, and it is thus once again argued that a qualitative research strategy is the best fit.

3.2 Research Design

Yin (2008) argues that research questions that are mainly focused on understanding "what" rather than, for instance, "how" or "why" could justify an exploratory study. The goal of such "what" questions is to create relevant hypotheses or suggestions for further research (Yin, 2008). Additionally, Yin (2008) argues that there are five research methods upon which researchers can base their study, namely experiment, survey, archival analysis, history and case study. An exploratory case study aims to investigate a specific phenomenon where existing knowledge and information are scarce, a phenomenon where clear and testable hypotheses are absent or the distinct research context limits the choices in terms of methodology (Mills, Durepos & Wiebe, 2010). In the case of the research carried out in this thesis, the main research question pertains to *what* aspects should be considered. In addition, the two sub-questions that have been formulated to aid in answering the main research question pertain to *what* the key enablers and barriers are for designing a circular business model, and through this, the argument is made that an exploratory study is well-suited, given the previously presented arguments by Yin (2008). Furthermore, the research area of circular businesses within the Swedish food-waste segment is largely unexplored, and the overall area of circular economy has lately emerged as well (Geissdoerfer, 2020). Knowing this, the argument is made that, in connection to Mills, Durepos and Wiebe (2010), an exploratory case study becomes a suitable design since the existing knowledge and literature on the subject is still scarce.

According to Bryman and Bell (2011), a cross-sectional design concerns the study of several cases at a single point in time. While cross-sectional design is most often connected to quantitative research, a form of cross-sectional design, where unstructured or semi-structured interviews are conducted with several people, is often utilized in qualitative research as well (Bryman & Bell, 2011). Bryman and Bell (2011) further argue that the focus on a distinct

circumstance or system is what distinguishes the case study design from other research designs. However, the distinction between a case study and a cross-sectional research design can, at times, be hard to determine (Bryman & Bell, 2011). Through this, the thesis assumes an exploratory case study design in the sense that the focal object of investigation is the case company, through the two founders and their perceptions and experiences in relation to what constitutes enablers and barriers in creating a circular business model. However, additional streams of data were gathered from experts within the field of circular business as well as food-waste in order to elevate the insights gathered. Through this, data was gathered from experts within the field of circular economy, both from an industry perspective as well as a research perspective. Through this, the study incorporates a cross-sectional element. In other words, the research design of an exploratory case study with a cross-sectional element was deemed appropriate in order to build an understanding of what the enablers and barriers are for creating a circular business model in the Swedish food-waste segment. Through this, the main research question of what aspects should be considered when designing a circular business model in the Swedish food-waste segment is approached from the insights gained through the sub-questions pertaining to what the enablers and barriers for doing so are. The argument for a cross-sectional element is further solidified since the study concerns gathering insights from several distinct objects, which, to some extent, could be viewed as separate cases, at one point in time (Bryman & Bell, 2011).

The focal point of the study is to identify findings in terms of enablers and barriers that can be applied within the context of creating a circular business model, specifically for a startup in the Swedish food-waste segment. Case studies typically take an approach where the researcher wishes to illuminate the specific characteristics of the case, whereas research designs such as the cross-sectional design mainly pertain to drawing conclusions that can be applied outside of the specific context (Bryman & Bell, 2011). A multiple-case study, much like a single case study, has its focus on those specific contexts, but across several distinct cases (Bryman & Bell, 2011). Consequently, a research design based on an exploratory case study with cross-sectional elements is thus deemed as an appropriate approach to understanding the specific context for creating a circular business model within the Swedish food-waste segment.

The choice of research design is, to a large extent, in-line with and based on, what has been previously discussed and argued in relation to the research strategy. Meaning that the argument is made that the chosen research design constitutes a most suitable alternative given that the research aims to understand the subjective meanings and interests of the concerned actors within the specific context, as well as industry and research experts with a broader and more nuanced understanding of circular economy and businesses. In addition, the research strategy primarily takes on an inductive approach, meaning that the collected data, to some extent, guided the theorization. However, as previously mentioned, the research strategy utilizes a deductive approach as well, specifically in relation to forming the interview guide and the data collection. In connection to this, Bryman and Bell (2011) maintain that when the research takes on a primarily qualitative strategy, the approach to theory in research with both case study and cross-sectional designs tends to be inductive, which solidifies the choices made in this thesis.

3.3 Collection of data

3.3.1 Literature Review

As previously discussed, this thesis takes on a qualitative strategy where semi-structured interviews were conducted in order to collect empirical data. Consequently, to fully capitalize on the valuable insights gathered from the interviews, the empirical data was complemented with a review of previous theoretical findings on subjects and fields related to constructing circular business models. Bryman and Bell (2011) argue that when conducting a research project that takes an inductive approach to the relationship between research and theory, a systematic approach to reviewing literature might not be the best alternative. Bryman and Bell (2011) contend that a systematic approach to literature is likely to introduce problems when theory is considered the outcome rather than the foundation of the research, since defining the area of research through its theoretical and conceptual terms prior to the collection of data can be challenging. However, research that utilizes a systematic literature review is often considered to be more based on evidence than research based on a narrative literature review (Bryman & Bell, 2011). The reasoning behind this is that strategic literature reviews generally aim to understand effects or phenomena that are based on previous research (Bryman & Bell, 2011). Another valuable outcome of the systematic literature review is its transparency and replicability, which derives from the clear grounds upon which the review is based (Bryman & Bell, 2011).

However, given the interpretative and inductive approach to the research of this thesis, a narrative approach to the review of literature was considered more appropriate, since the analysis of the gathered data was considered likely to change the researcher's view of the theory (Bryman & Bell, 2011). In addition, a narrative literature review allows the researcher to be broader and wide-ranging than what would be acceptable for a systematic review (Bryman & Bell, 2011). It is thus argued that the narrative literature review fits the focal thesis, since the field of circular business models adopts research from several adjacent disciplines. Furthermore, Bryman and Bell (2011) argue that narrative reviews can be utilized both for creating a point of departure as well as a method of compiling existing literature of importance to the study. Given these arguments, the study thus took a narrative approach to the literature review.

3.3.1.1 Narrative literature review

The literature review has been based on a number of keywords that were defined in order to narrow down the relevant fields of research. The keywords used to identify the literature relevant to the focal thesis were: *business model*, *business model innovation*, *sustainable business models*, *sustainable business model innovation*, *waste management*, *circular economy*, *food-waste business model*, among others.

Searchwords		
Circular Business Models		
Food waste		
Product Service Systems		
Startup		
Business Model Innovation		
Searchwords	Additional searchwords	
Circular Business Models	&	Enablers
Circular Business Models	&	Barriers
Circular Business Models	&	Upcycling

Figure 2: Searchwords used for Literature Review

In addition, both cross-reference snowballing (Geissdoerfer, 2018) and citation searches (Bryman & Bell, 2011) were used to identify and evaluate additional sources. Through this approach, literature and articles that were already determined as relevant were used as a springboard for finding additional articles.

The search engines used in the narrative literature review were *Supersearch from the University of Gothenburg*, *Google Scholar*, and *Chalmers Library* and the databases they provide access to, for example, *ScienceDirect*, *Scopus* and *EBSCO Business Source Premier*.

While the literature review carried out was of a narrative nature, a set of inclusion and exclusion criteria guided the process to some extent. For instance, only articles written in Swedish or English were of relevance to the study. However, after performing the literature review, it became evident that all the articles identified as relevant to the study were written in English. Furthermore, the year of publication was not taken into consideration, which means that all articles that were considered to be of relevance to the study were included in the literature review. Finally, the vast majority of articles included in the literature review were peer-reviewed. Only three articles, all published in *Harvard Business Review*, did not adhere to this norm.

3.3.2 Primary data collection

Bryman and Bell (2011) argue that qualitative interviews often allow the respondent to drift away from the question and talk about topics, ideas and emotions that thus signal what is important to them. Furthermore, Brinkmann (2013) argues that interviews allow the researcher to be flexible in the presentation of the questions, while making sure that all the topics of interest are touched upon. This is in line with the purpose and research questions of this thesis, since it aims to understand both specific and nuanced aspects that can either hinder or enable the design of a circular business model in the specific context of the Swedish food-waste segment. Meaning that subjective understandings in relation to certain predetermined topics,

specifically the wider system, financial aspects, the internal organization and the value proposition, were of interest to be able to answer the research questions.

Again, Bryman & Bell (2011) argue that it is important to focus on how the respondent frames their responses. In other words, to let the respondent express their subjective feelings and responses to patterns, events and so on. In addition, Brinkmann (2013) further adds to the subject by claiming that subjective meanings are the only outcomes of qualitative interviews and that no objective truth can be concluded. In semi-structured interviews, the respondents are, as previously mentioned, able to drift away from the subject to explain their subjective emotions towards certain topics, events and patterns (Bryman & Bell, 2011). This kind of understanding is regarded as highly important to the focal research project, since answering the research questions require an understanding of the respondents' subjective views, concerns and interests in relation to what aspects can enable or hinder the design of a circular business model in the Swedish food-waste segment. The choice to conduct semi-structured interviews for the collection of data was regarded as the most appropriate approach given the aforementioned arguments.

3.3.2.1 Selection of Respondents

In qualitative research, purposive sampling is the prevailing technique (Bryman & Bell, 2011). In purposive sampling, the researcher is not concerned with randomly selecting respondents in order to generalize the findings across a population, and purposive sampling is thus a form of non-probability sampling (Bryman & Bell, 2011). Instead, respondents are selected based on their relevance to answering the research question. Through this, purposive sampling differs from convenience sampling as well, since the latter is more focused on who's available for interviewing, rather than their ability to aid in answering a defined research question (Bryman & Bell, 2011).

The reason behind the two representatives of the case company being interviewed is two-fold. Firstly, they were interviewed in order to better understand the business and industry under observation. Secondly, both the representatives are serial entrepreneurs with experience in developing sustainable solutions, and were therefore considered to have valuable knowledge and insights in relation to sustainable entrepreneurship. In order to gather additional insights, four experts were interviewed as well, two who were primarily active in the private sector, and two from research and development institutes. Through this, different perspectives of what aspects should be considered when designing a circular business model were explored. The selection of the four experts was thus carried out in a purposive manner, in that they were chosen given their experience with circular economy, circular business or food and food-waste. Industry Expert 1 (IE1) has close to 20 years of experience within the food industry, starting out as an entrepreneur to later take on an executive role. Recently, IE1 transitioned back to entrepreneurship with a focus on developing a circular business. Industry Expert 2 (IE2) has extensive experience as an entrepreneur, and has during the last decade been involved in accelerating both sustainable and circular endeavors. Research Expert 1 (RE1) acts as a project

manager in the circular economy group at a Swedish research and development institute. Finally, Research Expert 2 (RE2) acts as a Senior Researcher within the food-waste unit at a Swedish research institute.

Abbreviation	Description of abbreviation	Area of expertise	Length of interview	Date
IE1	Industry Expert 1	Food industry, Startups	45 minutes	04-12-2022
IE2	Industry Expert 2	Sustainability, Entrepreneurship	58 minutes	04-13-2022
RE1	Research Expert 1	Circular economy, Logistics	57 minutes	04-14-2022
RE2	Research Expert 2	Sustainable food systems, Food-waste	43 minutes	04-22-2022
CC1	Case Company representative 1	R&D, Milling	59 minutes	04-20-2022
CC2	Case Company representative 2	R&D, Drying	40 minutes	04-25-2022

Figure 3: Description of Respondents

3.3.2.2 Conducting the interviews

The respondents were contacted through phone or email, where a specific time and date for the interview were booked. In this initial contact with the respondents, a short presentation of the authors, a brief explanation of why they were considered as respondents, and the objectives of the thesis were presented. Following that, the expected length of the interview was presented, and the respondents were asked about their preferred way of conducting the interview - meeting physically or digitally. Given the choice, three out of the six interviews were conducted digitally via zoom, one was conducted via phone, and two were conducted via physical meeting. Getting in touch with respondents and booking dates and times for conducting the interviews was a straightforward process.

Conducting most of the interviews via phone or video call entails both upsides and downsides, as discussed in Bryman and Bell (2011). The main advantage of conducting interviews via phone or video call, for the sake of this thesis, was that it enabled respondents who would not have had the time to meet physically to still partake in the empirical data collection of the thesis. However, there are also drawbacks with conducting interviews via phone, most applicable in the case of this thesis being the missed body language and thus the risk of missing the underlying meanings of the respondent, as well as being able to detect and address confusion or other emotions in regards to a specific question (Bryman & Bell, 2011). Since three out of the six interviews were conducted via video calls, one could however argue that the missed body language as a factor for risking the quality of the interview is somewhat decreased.

Out of the six interviews, five were held in Swedish, and one was held in English. Each interview started with a brief introduction of the authors, their academic background and the case company. Further, all respondents were informed of their anonymity except for their area of expertise or position within their respective organizations, and consented to the interviews being recorded. The interviews were recorded not to miss any vital information during the interview, to enable exclusive focus on the words expressed and suitable follow-up questions,

as well as enable transcription of the interviews to use for data analysis. As previously mentioned, the interviews were semi-structured, and the interview guides can be found in Appendix 2 and 3. The interviews were transcribed in their respective language immediately after each interview session, to later be translated to English to facilitate comparison and links within the dataset.

3.4 Data analysis

According to Bryman and Bell (2011), precedents regulating how the analysis of qualitative data should be carried out are not developed to the same extent as for quantitative analysis. While no clear rules on how to conduct qualitative analysis exist, there are some common approaches to be found in what Okely (1994) refers to as broad guidelines. Thematic analysis is, according to Bryman and Bell (2011), one of the most widely used approaches to qualitative data analysis. However, exactly what thematic analysis entails is, according to Bryman and Bell (2011), a topic where differing voices and opinions exist. According to Clarke and Braun (2017), thematic analysis is a tool, or a method, as opposed to a distinct methodology. Thematic analysis relates to identifying, analyzing and interpreting themes, where themes can be viewed as patterns of meaning (Clarke & Braun, 2017). Through this, Clarke and Braun (2017) argue that thematic analysis has the benefit of being applicable across a wide range of qualitative research fields and paradigms. One of the key benefits of thematic analysis is the flexibility of the method, and it can be utilized for identifying, analyzing and interpreting themes both within and across data. Furthermore, thematic analysis enables the researcher to not only summarize, but rather to consider key concepts identified in the data, rather than identifying and analyzing all terms within the data (Clarke & Braun, 2017). In other words, Clarke and Braun (2017) thus argue that thematic analysis is a flexible tool, rather than a methodology, that is useful for identifying, analyzing and interpreting relevant themes within and across data, such as interviews. As previously mentioned, there is a lack of clear rules for how to conduct qualitative analysis in general (Okely, 1994) and thematic analysis in particular (Bryman & Bell, 2011). The analysis conducted in this thesis follows the method described in Gioia et al. (2012), in an attempt to create qualitative rigor while maintaining the flexibility previously discussed in relation to Clarke and Braun (2017). Through this, whether the method of qualitative analysis carried out in this thesis should be considered a thematic analysis or not could pose a topic of discussion. To mitigate this potential ambiguity, the analytical process carried out in relation to identifying, analyzing and interpreting codes, terms and themes is described in detail below, in close connection to the findings of Gioia et al. (2012).

The analysis of data started with transcribing the interviews, which was done shortly after each interview to make sure that important themes emerging during the interview could be asked more focused in the following interviews (Bryman & Bell, 2011; Gioia et al., 2012). The data was then individually analyzed and underwent open coding for terms, codes and categories which could be used to answer the research question (Gioia et al., 2012; Bryman & Bell, 2011). These terms, codes and categories from each interview were then summarized individually in

a transcript summary, to later be summarized together as first-order concepts (Bryman & Bell, 2011; Gioia et al., 2012). The first-order concepts were then labeled as *enablers* or *barriers* within either of the four overarching areas, that is, wider system, financial, internal organization, and value proposition. Following the joint summary, the data were subjected to further analysis, comparing, contrasting and assembling of the categories to create additional, more specific labels in line with Corley and Gioia (2004), arriving at what Gioia et al. (2012) refer to as second-order themes. Bryman and Bell (2011) argue that searching for, and identifying themes is a prevalent approach in most types of qualitative data analysis. However, what constitutes a theme can, at times, be hard to distinguish (Bell et al., 2018). Moreover, Bell et al. (2018) argue that repetition is often the criteria for considering an instance of data, which Gioia et al. (2012) refer to as terms, as a theme. Repetitions can both occur within an interview, and across interviews (Bell et al., 2018). Granted, repetition alone is not sufficient for a theme to be considered; it also has to be of relevance for answering the research questions (Bell et al., 2018). The analysis carried out in this thesis followed this practice to a large extent. However, in instances where a respondent explicitly stated that a certain area or topic was of great importance for circular business, that very topic or area was considered as a potential theme as well, regardless of repetition. Furthermore, Gioia et al. (2012) contend that it is important for the researcher to be aware of potential second-order themes as first-order concepts, terms and codes are identified. In other words, Gioia et al. (2012) argue that it is important that the researcher maintains a perceptive of multilevel analysis throughout the process. As previously mentioned, in the process of analyzing the empirical data of this thesis, terms and first-order concepts were considered and connected in relation to the four main areas of enablers and barriers, that is the wider system, financial, internal organization and value proposition. When constructing second-order themes, Gioia et al. (2012) argue that the researcher is primarily looking for findings that are not present in previous literature. The research carried out in this thesis followed this procedure to a large extent. However, since certain enablers and barriers for circular business model development are highly context-specific, themes that have been described in previous studies but in adjacent industries, segments, businesses or in different geographical locations were still considered nascent and of value to the analysis, and by extension to answering the research questions. This approach to analyzing the data is supported by literature as well, inasmuch that Gioia et al. (2012) argue that second-order themes that are new to the specific context are to be considered as relevant. An example of how this thematic analysis was carried out in this thesis can be found in Appendix 4.

Finally, in addition to the advantageous aspects discussed earlier, some critique in relation to the process of coding has to be addressed. Bryman and Bell (2011) contend that certain previous authors have argued that the process of coding can in itself deprive the insights and findings of their respective contexts, which in the case of this thesis could be damaging to both the purpose and the ability to answer the research questions. However, much in line with what Bryman and Bell (2011) contend, it is here argued that certain calculated risks have to be accepted in order to facilitate the pursuit of deeper understanding.

3.4.1. Trustworthiness

Given the differences in views and outputs between quantitative and qualitative research, some authors argue for assessing the quality of qualitative research through measures different from those used to evaluate quantitative research (Bryman & Bell, 2011). Through this, it is necessary to define rules and processes in order to both install and evaluate quality in qualitative research, that work as substitutes for reliability and validity (Bryman & Bell, 2011). According to Guba and Lincoln (1994), the quality of a qualitative study can be evaluated through two main criteria; trustworthiness and authenticity. Trustworthiness is made up of four additional criteria, credibility, transferability, dependability and confirmability. Authenticity relates to issues connected to the wider political implications of the study. The four criteria connected to trustworthiness will be elaborated upon and connected to the research carried out in this thesis in the following sections.

3.4.1.1 Credibility

Credibility can be seen as pertaining to the truth value of the qualitative research (Guba, 1981). Furthermore, it can also be viewed as the qualitative counterpart to internal validity in quantitative research (Guba, 1981; Bryman & Bell, 2011). Through the works of Lincoln and Guba (1985) and Shenton (2004), a myriad of adjustments that can be made in order to increase the credibility of the research can be identified. In the following text, the adjustments made in order to increase the likelihood of this thesis producing credible findings will be presented.

According to Shenton (2004), the credibility of a study can be increased by development of early familiarity with the organizations to be subjected for data collection. This can be done by researching each respective organization prior to data collection, in order to gain an understanding of the organization prior to engaging with them. This was done prior to each interview, both to ensure each organization's or expert's suitability for the purposive sampling of the study, as well as in accordance to what Shenton (2004) argues - to gain an understanding of each respondent's setting as well as their experiences and expertise.

Triangulation is often connected to the use of different methods for data collection (Shenton, 2004). However, triangulation can also be achieved through gathering data from a wide range of respondents (Shenton, 2004). Through such an approach, the differing views and opinions of diverse actors can be evaluated and compared to each other, and findings can thus be constructed based on observations from a wide range of respondents (Shenton, 2004). In this thesis, data has been collected from a startup aiming at creating a circular business model, from business experts in the fields of sustainability, circularity and entrepreneurship, as well as from experts within circularity working in research and development institutes. Through this approach, it is argued that views and opinions from experts with different perspectives have been captured, which has allowed for a better understanding of what aspects affect the design of a circular business model, since multiple angles and contexts have been addressed.

Throughout the research process, the study has been subjected to continuous supervision and peer reviews, challenging the assumptions made by the authors and contributing to an increased overall understanding of the study. Peer scrutiny of the research project can, according to Shenton (2004), increase the credibility of the study. Further, an extensive examination of previous research in comparable fields has been conducted, assessing the degree to which the results of the study correspond to that of previous research. According to Shenton (2004), this procedure provides invaluable credibility to a qualitative study.

3.4.1.2 Transferability

The extent to which findings from research can be transferred from one context to another is generally assessed through external validity (Bryman & Bell, 2011). The measurement of external validity is generally applicable in research where for instance, statistical confidence can be determined (Guba & Lincoln, 1994). In general, Bryman and Bell (2011) argue, that qualitative research tends to concentrate more exhaustively on smaller numbers of objects under focus, as opposed to quantitative research. In addition, qualitative research is most often concerned with understanding the particular aspects related to the context of the social world under investigation (Bryman & Bell, 2011). In close connection, Lincoln and Guba (1985) contend that whether the findings of research hold true in other contexts, or in a similar context at different times, is an issue connected to empirical data. Bryman and Bell (2011) elaborate on this by stating that qualitative research should be concerned with creating an exhaustive body of material. Connectedly, Lincoln and Guba (1985) thus argue that what qualitative researchers can do is open up for discussion and evaluation of the transferability of the findings to other environments by providing a corpus of material on the findings. In other words, the researcher should not provide a measure of transferability, but rather supply the material needed for others to make such an evaluation, and thus enable the judgment of the transferability of the findings (Guba & Lincoln, 1994). Through this, the transferability, or rather the opportunity for evaluation of transferability, of this thesis has been addressed by including thorough descriptions of the methodological processes carried out, as well as an exhaustive presentation of empirical data. In conclusion, it can be argued that the material needed to assess the transferability of this study has been provided, but judgments on the actual transferability will have to be carried out by the reader.

3.4.1.3 Dependability

Dependability is argued to be the qualitative parallel to reliability in quantitative research (Lincoln & Guba, 1985), which criteria can be met by adopting an auditing approach. The focal aim of the dependability criterion is to achieve trustworthiness through keeping records of all stages of the research process, such as interview transcripts and analysis of the data, as well as decisions made throughout the research process (Bryman & Bell, 2011). The research process has been documented in chapter three of this thesis, and it can be argued that the supervisions and peer reviews conducted throughout the thesis process have satisfied the auditing criterion

to some extent. However, the auditing process as described in Lincoln and Guba (1985) was deemed unreasonable in relation to the available time and resources of the thesis project, which is further argued to be the reason for the auditing approaches lack of use (Bryman & Bell, 2011). In addition, Lincoln and Guba argue (1985) that with a high degree of *credibility*, the need for strong separate dependability diminishes. However, it should also be noted that Lincoln and Guba (1985) mention that the argument has merit, but is weak.

3.4.1.4 Confirmability

The main concern for conformability is in ensuring that the researchers' own thoughts and values, as well as theoretical bias, does not affect the research process nor the findings obtained from it - thus acting in good faith (Bryman & Bell, 2011). As described in Shenton (2004), confirmability entails taking steps to ensure that the findings of the study are derived from the respondents, not the researchers. Both Shenton (2004) and Guba (1981) argue for the use of triangulation in promoting confirmability - that is, as already mentioned in credibility, to collect data from various perspectives and sources to reduce investigator bias. This was achieved by firstly, basing the theoretical background on a diverse selection of sources, and secondly, by collecting primary data from respondents with potentially differing perspectives. Undertaking these actions, the objectivity of the study increases (Shenton, 2004). In addition to triangulation, Shenton (2004) argues for presenting “audit trails”, allowing for the reader to trace the decisions made in generating the conclusions to be drawn by the study, as well as describing the research process as a whole. To some extent, it can be argued that the decisions made in relation to the formulation of conclusions can be observed through the thematic analysis, and an example of how the thematic analysis has been carried out can be found in Appendix 4. Throughout the methodology chapter, the authors have aspired to demonstrate every step and decision taken as thoroughly as possible, aimed at achieving objectivity and displaying the act of good faith, to somewhat counter the recognition by Bryman and Bell (2011), arguing that business research impossibly can reach complete objectivity.

3.4.1.5 Authenticity

In addition to what has already been presented in relation to trustworthiness, additional criteria of authenticity, which relate to broader political implications of the research, should be considered (Bryman & Bell, 2011). The principle of authenticity, according to Johnson & Rasulova (2017), pertains to considering the process of constructing understandings from the position of the respondents, both in relation to other respondents as well as themselves.

Authenticity is constructed through five underlying criteria (Johnson & Rasulova, 2017). The first criterion, fairness, relates to the extent to which competing or differing constructs have been included (Johnson & Rasulova, 2017). Johnson and Rasulova (2017) argue that ontological authenticity pertains to how constructions evolve towards becoming more informed

and refined over time. This includes the positions held by the ones carrying out the study as well (Johnson & Rasulova, 2017). Educative authenticity is the third criterion, and it relates to how individuals have grown more understanding of positions held by others (Johnson & Rasulova, 2017). Catalytic authenticity relates to whether the study has the ability to act as a catalyst for people, inasmuch that it enables them to change their situation (Bryman & Bell, 2011). Finally, tactical authenticity relates to the extent the study enables individuals to actually carry out the implications of the research (Johnson & Rasulova, 2017). In order to both increase the quality, as well as facilitate the assessment of the quality of this thesis, a number of actions have been taken. First of all, purposive sampling was carried out in an attempt to increase the diversity of perspectives included, which according to Johnson & Rasulova (2017), is a suitable strategy for increasing authenticity. Furthermore, Johnson & Rasulova (2017) also argue that the authenticity of a qualitative study can be increased by allowing participants to have their opinions on the interpretations made with its basis in the empirical data. To some extent, this aspect was included in the thesis by allowing the participants who were interested in reviewing their quotes the possibility of doing so. It should be noted, however, that only one of the participants followed through and reviewed their quotes, and the discussion around the quote was then modified in order to align it with the position of the respondent.

While the touched upon concepts and criteria for achieving authenticity are not exhaustive when compared to the contentions of Johnson & Rasulova (2017), the argument is made that within the scope of this thesis, the strategies and methods carried out have likely increased the authenticity, and thus by extension also the overall quality of the study. Finally, it can also be argued that it opens up for a discussion on the authenticity of the study, and again, by extension, deepens the possibility of discussing the quality of the study overall.

4. Empirical Findings

In the following section, the data gathered from interviews with representatives of the case company, experts with knowledge of the case company's technology and applications, as well as experts within the industry and circular economy will be presented. The structure of the empirical findings will follow that of the theoretical background to the largest extent possible.

4.1 Wider system – Enablers

According to respondent IE2, when operating circularly, transparency throughout the whole supply loop is of importance. Respondent RE1 argued in line with those thoughts, stating that what has proven successful in respondent RE1's previous projects on circular businesses has been to establish good communication between all different actors within the chain. The communication, dialogue and interplay between the actors were mentioned again by respondent RE2, stating the importance of information exchange with both up- and downstream actors through the entire network. In relation to this, respondent RE2 elaborated further on the possibilities that exist in proximity to the firm, and that the firm could collaborate with local actors that wish to engage in circular business.

The importance of good communication was again highlighted by respondent RE2, who argued that there exists a wide array of discussion forums on the subject of circularity in Sweden. Organizations in which actors jointly try to reduce food-waste, as well as organizations that connect small and large companies with an interest in food-waste with each other, were mentioned as potential enablers. Respondent CC1 argued for the importance of spreading one's words and thoughts on one's idea to others, enabling others to hear about it, get new thoughts and opinions on it and receive different viewpoints and implications to the same problem. In relation to that, respondent CC1 stated that Sweden has the benefit of having an excellent educational system, providing startups with easy access to knowledge.

All respondents touched upon the importance of collaboration when conducting a circular business in the food-waste segment. Respondent CC2 mentioned that if one wants to initiate a closer partnership, one has to ensure that the partnering firm understands its own processes and flows – thus being knowledgeable and aware of its own waste, and that the waste could be of potential higher value if valorized. Further, the organization should make sure that both sides of the partnership integrate the needed activities into their respective organizations to make the partnership work, and understand that it may call for investments from the partnering side as well. Relating to initiating a partnership, both respondent RE2 and respondent CC2 mentioned the importance of researching one's opportunities beforehand. Respondent CC2 specifically expressed the need to do the research and due diligence before presenting it to a potential partner, leading to a solid case that is much more intriguing for the potential partner. Respondent RE2 elaborated on the subject further, arguing that the organization should fully understand its area of business and the laws applicable to it – potentially providing the firm

with an entry to the larger actors within the field. Further, respondent RE2 stressed the importance of always creating win-win situations and that the collaborative case is rooted in a fact-based foundation, which can be more challenging for smaller businesses. In close relation to this, respondent RE2 said that in a partnering operation, the organization should be clear in its expectations both towards and from the network it operates in. In connection to collaborative work, respondent IE2 argued that the driving force for creating great solutions and cooperation within any business area is trust. In relation to partnerships, respondent CC1 stated that smaller organizations are oftentimes more straightforward to work with since they are closer to their own operations, thus faster in their decision-making process. However, the same respondent, CC1, also argued that large organizations are generally slow to change, but not when it comes to sustainability and the environment, where the larger organizations are much more willing and quicker to change, and in addition, less risk-averse in relation to funding.

Regarding the bigger picture of the food production and food-waste segment, respondent RE2 stated that research institutes such as RISE and governmental departments could help smaller organizations in establishing a holistic view. In relation to that, respondent RE2 mentioned the importance of understanding who your potential competitors are and what the market looks like. Similarly, respondent CC1 argued for the importance of improving the competitive situation of the organization by satisfying a previously unfulfilled market area. In relation to the aforementioned competition, respondent CC2 mentioned the benefit an organization could enjoy over its competitors if having a patent in place for the product, mitigating some of the early competition.

Respondent IE1 stated that stakeholders' views in general on circularity have changed and become more interesting over the last decade, while respondent IE2 argued that consumer perceptions are starting to shift. Further, respondent IE2 argued that consumers are becoming more informed on the issues within food production, and that consumers thus will demand more circular or at least sustainable food. Respondent CC1 argued in the same way, mentioning that the changed behavior towards the environment, sustainability and circularity stems from several different areas. Oftentimes, the changed behavior is related to the values and beliefs of the decision-maker responsible for an organization's potentially sustainable operations. Respondent RE2 mentioned an increased awareness among producers of the potential of making a viable product out of food-waste.

According to respondent CC1, the regulatory climate in Sweden is predominantly beneficial in comparison to other countries. CC1 compared doing business in Sweden with the US and claimed that the Swedish setting has a much smoother process. Respondent CC1 continued by arguing that the food production industry is more flexible from a regulatory perspective in Sweden compared to the US as well. In Sweden, according to respondent CC1, regulations in the food industry are more directed towards outcome rather than process, meaning that producers are mandated to provide a safe product, rather than having to comply with industry standards e.g., having certain machines and placing those machines in a specific way. In relation to regulation and laws, respondent RE2 stated that it is crucial to be knowledgeable about the laws applicable to one's specific business.

Respondent RE1 stated that the government has a positive impact on innovative startups in the food industry, and that close to all projects that are undertaken by respondent RE1's organization are publicly funded. In close relation to that, respondent CC2 stated that there are public funds and grants to apply for, and that those have helped respondent CC2 historically, and that those funds will be applied for again. Respondent CC2 further stated that respondent CC2's organization has applied for funding from one governing body twice, and has received the funds both times.

4.2 Wider system - Barriers

A barrier that was illuminated early on was the potential differing views and visions between different actors within the loop. Respondent RE1 argued that there might exist opposing opinions of what the goal of the collaboration actually is.

In close relation to the vision, respondent IE1 argued that the concept of a linear value chain is outdated, and that this has affected the view on value creation to become linear as well. Additionally, respondent IE1 contended that views and behaviors in relation to the collaboration must be transformed as well, meaning that who the supplier is, who the customer is and what constitutes a partnership requires redefinition. Through this, IE1 argued that actors must work closely together not only in creating the offering, but in the integration between the actors as well, in order to build solid relationships throughout the loop.

“... but the concept of a value chain is in itself linear. So the whole perspective on how you generate value is linear. Somehow you need to change the view of and erase who is the supplier, who is the customer, what a partnership constitutes. Work more in symbiosis.” -

IE1

Additionally, respondent IE2 argued that the overall surrounding system is the main barrier to creating circular businesses in the current landscape. Much in line with respondent IE1's view on the matter, respondent IE2 argued that there has to be a shift from a linear to a circular perspective. Furthermore, respondent IE2 argued that the whole wider system has to move in a common direction when it comes to circularity by setting shared goals on what to achieve in terms of economic, social and environmental goals. On a similar note, respondent CC2 argued that organizations generally find comfort in their traditional ways of doing business, which is a barrier for new actors with novel solutions. In addition, if the change proposed by the new actors also requires investments, there is an even greater unwillingness to change. Additionally, respondent IE2 also stated that the shift towards circularity and sustainability requires a global perspective. While this is occurring to some extent in the present day, problems are often just moved from developed countries to developing countries. Barriers in relation to perceptions could arise downstream as well, according to respondent RE1, who argued that consumer behavior must change, through, for instance, incorporating a circular mindset when evaluating fruit and vegetables at the grocery store. An additional barrier proposed by respondent CC1 is the customer perceptions and expectations, meaning that customers, in certain segments, do

not accept slight variations in taste or color. This becomes a potential barrier for organic and waste-based products when trying to compete with synthetic alternatives, since the synthetic alternatives always generate the same results in terms of taste and color.

“Their answer was that they [large beverage producer] do not dare as of now to experiment with natural products, since they vary to some extent, and their customers do not accept slight variances between years” - CC1

As previously touched upon, respondents IE2 and IE1 shared a similar view on the need for transformation in terms of collaboration within the value loop. Respondent IE1 also argued that there are barriers to this in terms of laws and regulations, and further stated that these legislations will continue to fall behind, so the transition will take time. The same respondent also stated that the industry structure of food and food production is rather outdated, especially in terms of legislation and regulations, and that it thus becomes a barrier to achieving circularity.

According to respondent IE2, the shift towards a circular economy could be an obstacle to overcome for smaller firms if they are not supported by larger, established actors in this transition. Furthermore, respondent IE2 also argued that a large barrier today is the allocation of public funds for innovation, and that all public investments in private innovation should be allocated towards small actors.

According to respondent IE2, a lack of trust between customer and supplier is a potential barrier to creating a circular business model. There has to be a common understanding between the actors, in order to build long-term relationships. This view was shared by respondent IE1, who argued that trust is an important factor for creating a circular business model. While there are no universal solutions to this, IE1 contended that the firm has to provide both economic and social and/or environmental value. Another barrier when it comes to collaboration was identified by respondent RE1, who argued that the novel and emerging state of circularity could lead to obstacles in terms of finding other firms to collaborate with. Furthermore, respondent RE1 argued that this could lead to larger distances between partnering actors, which in turn could increase the cost of transportation and logistics.

“So first of all, it is difficult to find someone to work with. Distances between actors might be long. Might need to go to a different actor. Might need to transport, increasing the transport distance.” - RE1

The aforementioned potential barrier posed by lack of trust is, according to respondent IE2, connected to both quality and consistency throughout the chain or loop. That is, great variance in the quality and inconsistencies in terms of circularity further upstream can pose barriers for successful design of a circular business model.

Another aspect observed in the findings is the overall attitude towards collaboration within the food production industry. Respondent CC1 argued that this attitude is generally positive,

however, the financial discussion often poses a barrier. Respondent CC1 stated that when the financials are considered, the process is slowed down due to new decision-makers being introduced on account of the larger firms.

Respondent CC1 argued that while there are benefits to creating partnerships with large organizations in terms of funding and knowledge, there are barriers as well. According to respondent CC1, working with large, established organizations can at times be complicated given their generally slow and tedious decision-making processes. Furthermore, respondent CC1 argued that large organizations are highly protective of how they are perceived and are thus selective in terms of whom they create partnerships with. Similarly, respondent CC2 viewed people's unwillingness to think outside the box as a barrier as well. According to respondent CC2, this means that new technologies are not trusted, and that potential partners are reluctant to collaborate with firms that hold novel technologies, since these technologies are not as tested as their traditional counterparts. Respondent CC2 viewed this traditionalism as one of the key barriers.

In relation to the case company, respondent CC1 stated that the exploratory phase, in which new inputs are tested and evaluated, has to be done in collaboration with a potential partner, which could become a barrier. On a similar note, respondent CC2 stated that the viability of new products from the technologies provided by the case company has to be evaluated from a team perspective along with certain stakeholders. Respondent CC1 also argued that, especially in connection to the case company, the geographical context has implications on the process as well. For instance, a residual stream of 80 tons of water weekly, which could very likely be the case when processing certain types of food-waste, poses no real ethical dilemma in Sweden. In other parts of the world, however, this residual water has to be managed and retained for human use, either for irrigation or human consumption. In relation to geographical context, respondent CC1 also argued that manual labor in Sweden is expensive, and automation is thus more or less a must when scaling up the business.

Respondent CC2 stated that while the government has the potential to do the right things, they are not doing so as of right now. On a similar note, respondent IE1 stated that laws and regulations on cleanliness within the food industry could be a potential barrier. The same respondent also stated that traceability is vital in the food industry as well, since each product that reaches a consumer must be traceable back to the very farmer that harvest its components. Elaborating on this, respondent IE1 stated that this becomes a barrier for upcycling food-waste since tracing food-waste is a tedious task.

Respondent CC2 stated that while the government has the potential to do the right things, they are not doing so as of right now. Similarly, respondent RE1 stated that Swedish governmental departments are not entirely up to speed, however, the same respondent also stated that there is an ambition to improve by, for instance, looking at other countries that have been successful. On a similar note, respondent IE1 stated that laws and regulations on cleanliness within the food industry could be a potential barrier. The same respondent also stated that traceability is very important in the food industry as well, since each product that reaches a consumer must

be traceable back to the very farmer that harvest its components. Elaborating on this, respondent IE1 stated that this becomes a barrier for upcycling food-waste since tracing food-waste is a tedious task. Respondent RE2 stated that laws and regulations related to food and food-waste could become potential barriers since, for instance, once taken out of its regular chain, food becomes classified as waste. Then in order to valorize the food-waste into products intended for human consumption, it has to be approved as food once again. The same respondent then argued that such issues are best mitigated by not taking the waste out of the chain until it has been valorized, meaning that valorization is done immediately. From a big picture perspective, respondent IE1 argued that laws and regulations in general and in relation to the food industry in particular pose potential barriers. This relates back to what was previously highlighted from respondent IE1 in terms of a linear mindset, inasmuch that one has to be attentive towards what is classified as food, and what is classified as food-waste.

Applying for public grants can be a rather time-consuming and competitive process, according to respondent RE1, who stated that it takes up to three months to get approval from Vinnova (The Swedish Innovation Agency), for instance. Respondent RE1 also stated that their organization is experienced in helping startups gather public funds and grants. However, the same respondent also stated that startups could find it challenging to apply and be granted such funds without external help. Navigating the legislative landscape and its bureaucracy can, at times, become a barrier for entrepreneurship, according to respondent IE2. To be successful in navigating the legal and governmental landscape, respondent IE2 also argued that there is a need for extensive experience in doing so, which can become a barrier for startups. Respondent CC1 also stated that interactions with governmental agencies and representatives could at times become too bureaucratic, which can lead to problems for a small actor. The root cause, according to respondent CC1, is in the sequence of activities, meaning that public actors at times do the right activities but in the wrong order, which can cause problems. Furthermore, respondent CC2 stated that governmental representatives do not always view the novel technologies, their implications and applications through the same lens as the entrepreneurs themselves, which can cause additional barriers for startups. In line with what has previously been discussed on the topic of applying for public funds and grants, respondent CC2 also added that it is not always an easy task, and that the problem often relates to excessive administrative work.

4.3 Financial – Enablers

In relation to what was earlier argued by respondent CC1, respondent IE2 argued that an alternative to applying for early financing through government agencies such as Vinnova is to work closely with universities. Through this, respondent CC1 argued, that firms can charge companies earlier and are thus not reliant on external financing. However, if pursuing external financing, respondent IE1 pressed the importance of presenting a solution to investors that can prove to retain profits at some point.

“...both of us [the respondent and his business partner] have worked extensively with students, and come to the realization that it is a much much better resource than applying for money from Vinnova.” - IE2

In relation to the more internal side of the finances, respondent IE1 continued the argument with the importance of demonstrating that the organization has control and the necessary knowledge in relation to the internal finances. According to respondent IE1, this includes demonstrating that your business idea is valuable and, again, will provide an economic return for the potential investor.

In close relation to that, respondent RE1 argued for the importance of making sure that one's circular business is financially viable on its own while simultaneously focusing on the more social and environmental goals. The same argument was also made by respondent RE2, stating the importance of making sure that the organization's internal finances are solid. Respondent RE2 mentioned a lack of financial solidity for startups, where many startups neglect the necessary margins needed and thus become unprofitable.

4.4 Financial – Barriers

Many of the financial barriers discussed by respondents relate to what was mentioned in the previous section, insomuch that they often appear in the area of dealing with governmental agencies and departments when aiming to acquire funds and grants. For instance, respondent IE2 argued that when smaller organizations apply for such grants, they are often buried by the administrative workload, which proposes potential barriers. Respondent CC2 stated in a similar manner that when applying for grants from governmental organizations, there is a heavy burden on the small actors in terms of administrative work.

“One wants to get started quickly, and it requires capital, so if you don't have that capital, you try to apply for soft money from the government, that's not easy, because it entails a lot of administration.” - CC1

Several of the respondents indicated that the financials are potential important barriers to overcome early on in the novel organization. Respondent CC2, for instance, argued that acquiring and securing funds is the greatest barrier to overcome for a new venture or firm. The same respondent also stated that money is the key barrier to sustainable entrepreneurship. The issue is partly rooted in banks' and investors' views on profitability, and that the sole focus is on the bottom line according to respondent CC2. In addition, while sustainability is a potential enabler, it is not enough to secure funding. Along the same lines, respondent RE2 stated that the internal finances are of great importance as well, since the firm cannot only focus on environmental goals, even if these goals have the potential to be lifesaving. The same respondent continued by stating that the firm has to be able to show individual profitability as well. Respondent CC2 took a similar stance and stated that costs can always be a barrier, and thus be a barrier that stops the idea from being carried out to completion. Once the feasibility

of the business has been proven, the organization requires scaling up of the operations, which can introduce additional strains both in terms of the technology as well as the financials, according to respondent CC1. In relation to the case company, respondent CC1 thus argued for the need for a larger partner to mitigate some of these issues.

4.5 Internal organization – Enablers

In relation to the internal organization of the firm, both respondent IE1 and respondent RE1 stated that what to focus on is context-specific. However, more specifically, respondent IE1 argued that it is important to keep a holistic view of the processes, not dividing them too much from each other. Respondent RE1 emphasized the role of connections with other organizations, making sure that the visions and goals are similar within the organization's up and downstream network, and that collaborating organizations are knowledgeable of their own processes.

“...you need to have contacts in the chain, have a network and so on. And also that actors within the network have a similar vision and similar goal, which is quite important. That they go into the collaboration knowing what they are doing - knowing what the goal and vision of the collaboration is.” - RE1

In close relation to this, respondent IE1 argued for the increased importance for a circular business to redefine what constitutes the internals and externals of the firm, thus becoming more interested and willing to include external actors within the firm. Further, respondent RE1 stated that when talking about circular businesses, logistics and how to handle it can become of the highest importance when designing the business model.

Respondent CC2 argued for the importance of understanding the bottom-line thinking of potential investors – making sure that money and profitability come first in the business model, then the sustainability aspect. That, since investors, according to respondent CC2, are more interested in profits rather than circularity. In a similar fashion, IE1 touched upon the importance of understanding what problem the organization is solving for the customer through their offering.

Respondent RE2 argued that it is beneficial not to be narrow-minded when trying to find sustainable solutions, but rather have a big picture perspective by including all possible flows of resources and energy. That, since one could otherwise end up in a narrow-minded scenario of including non-sustainable alternatives, such as, for instance, using fossil fuels in the process, which in turn could lead to negative contributions to the environment, instead of positive. Respondent RE2 also mentioned the importance of finding one's own niche, i.e., not being too broad or focusing on too much at the same time.

“... that one finds a niche. You should not try to save the world [on your own], but rather find a niche that you can operate in, and be a piece of the puzzle towards saving the world” - RE2

In relation to internal processes, an enabler, according to respondent RE1, is people who are deeply concerned with environmental issues, and who could be advantageous early on in projects. On a similar note, and especially in relation to the case company, respondent CC1 said that the financial aspect of entrepreneurship is no longer the central motivation, but rather creating a social application where the solution provided brings a greater value. Again, in relation to the case company, respondent CC2 stated that the importance is in the good cause, not about making money.

4.6 Internal organization - Barriers

Respondent RE1 stated that when they had assisted firms in getting grants, or a project, from Vinnova, for instance, a need for project managers arose in many of the firms. For the smaller actors, this could become a barrier due to a lack of time, resources and human capital.

Employees lacking the correct mindset within the organization is a potential barrier according to respondent IE1, especially for sustainable and circular businesses. Similar to what was just presented from respondent RE1, respondent IE1 stated that knowledge gaps within the organization can be a potential barrier as well, and that such knowledge gaps are to some extent related to the mindset of the employees. Respondent IE1 continued on the topic by stating that knowledge gaps constitute a potential barrier, specifically in circular businesses, since there is a scarcity of widespread methods, standards and frameworks. Through this, firms can face additional barriers when met with challenges, since it is easier to rely on the old traditional, linear mindset. Respondent RE1 also highlighted the potential barriers of lacking knowledge and getting people to understand the meaning of circular businesses. In addition to this, respondent RE1 also highlighted that differing views and understandings within the internal organization could become a potential barrier.

In relation to the processes of the internal organization, respondent CC2 stated that creating new supply chains, or rather supply loops, for a product that is new to the market can prove to be a demanding challenge for the organization, and thus a potential barrier as well. Additionally, respondent IE2 argued that people's pre-existing views on, for instance, corporate culture and values have a considerable impact on the current direction of the firm as well. This could, according to respondent IE2, become a barrier if people within the organization do not share a common vision and culture.

The administrative burden that was mentioned in the previous section on the legislative landscape has implications for the internal organization as well, according to respondent IE2. The same respondent continued to argue that small actors have an overall administrative burden, insomuch that they are oftentimes occupied with their core business, and to deal with additional challenges, they would require outside help. Redefining what constitutes the internal organization and external actors has implications for circularity, according to respondent IE1,

who stated that if the firm is too introverted and not open to collaboration, the firm could be faced with potential barriers to circularity.

As mentioned in the previous section on financials, scaling up the process can introduce additional barriers for the firm. Respondent CC1 argued that for small firms in general and for the case company in particular, both logistics and scaling up the process could lead to barriers for the organization. When dealing with small volumes, most of the work can be done by manual labor. When scaling up, technological solutions and processes need to be put in place in order for the overall process to be able to deliver value, and the implementation of such systems and processes can become a barrier, according to respondent CC1. Additional barriers in relation to the logistics of the internal organization were identified through the interview with respondent RE2, who stated that logistics in relation to food-waste, which is a perishable good, is an important aspect. The same respondent stated that the logistical aspect of a novel venture is important in general, but for food and food-waste, additional elements, such as potential cold delivery and smooth transportation are introduced. This is something that has to be thoughtfully considered before entering these kinds of markets, according to respondent CC1. Respondent RE1 had a similar view on logistics and argued that food-waste could impose additional costs on logistics for the firm since the material is quickly perishable. The same respondent also argued that there is no universal solution for making a circular business model work, but since logistics can be very resource-intensive and thus a barrier, it is often reasonable to focus on efficient logistics. In close relation, the same respondent also argued that there are challenges regarding transparency when working closely with other organizations within a supply loop.

4.7 Value proposition – Enablers

The value proposition offered by a circular business has a lot of similarities to that of a traditional firm, according to respondent IE1. However, to successfully develop a circular value proposition, the firm has to integrate the customer and let the customer be a part of the process. In addition, the same respondent also stated that in order to be successful, the firm has to understand the customer and their internal processes, so that the value proposition can deliver actual value to the customer and thus satisfy a need. Furthermore, respondent IE1 also stated it is important to understand the customer's business and where they might have residual streams.

Specifically connected to the case company, respondent CC1 stated that while it might be difficult to initially enter the market with stand-alone products based on food-waste, there is a great potential in delivering ingredients based on food-waste. This could, for instance, be organic substitutes for synthetic materials that today are used to create texture in plant-based hamburger patties. The same respondent also argued that gaining market acceptance is expedited if the waste-based product is closely connected to an existing product, such as using upcycled residual streams from seafood in other seafood products. A similar view was presented by respondent RE2 who argued that it is important to make sure that there is a market

for the product. In addition, respondent RE2 also stated that in certain areas, sustainable products could charge a price premium if consumers view sustainability in high regard. In close connection, respondent CC1 stated that the circular business could benefit from positioning its value proposition within an unexplored market, where competition is scarce or even non-existent. As argued by respondent CC1, sustainability is becoming increasingly important across industries, and the same respondent further argued that a potential enabler for the case company is that even if the output is not suitable for human consumption, there is a possibility to explore alternative areas of use, such as cosmetics.

As touched upon in previous segments, there is a need for a circular business to create both economical and sustainable value. On a similar note, respondent IE1 argued that consumable products have to fulfill the sensory requirements of consumers, such as taste and smell. This holds true for waste-based products as well, and respondent IE1 thus argued that creating a product that solely creates circular or sustainable value is not enough to meet consumer needs. Respondent CC2 stated that it is important to make sure that the market is ready for the technology or solution that the firm is offering. Specifically, in relation to the case company, respondent CC2 further argued that their offering fits in well with what the market is currently demanding, since it enables a decreased dependence on natural gas and oil. Furthermore, respondent RE2 stated that it might be beneficial not to label the residual streams as waste, since this might cause potential suppliers and partners to dismiss the opportunity.

Respondent CC1 argued that a potential enabler for the case company would be to take on some of the risk from a potential partner. As stated in earlier sections, large organizations tend to slow down the process as the financials are included in the discussion. Respondent CC1 thus argued that a revenue model where the potential customer or partner does not pay up front could ease the process of initiating production. In addition, getting steady revenue streams over time is generally advantageous as opposed to a fixed amount, according to respondent CC1. The retention of steady revenue streams, as opposed to fixed amounts at the time of sale, could, according to respondent CC1, also increase the growth and value of the firm. Furthermore, the case company has a potential upside in its technology according to respondent CC1, since the technology preserves the characteristics of the input material. Through this, the material can be hydrated again after dehydration and still maintain its nutritional and mechanical properties. Similarly, respondent CC2 stated that the technology solution enables the drying of materials at much lower energy consumption, which is a key enabler since the cost of a more traditional process could jeopardize the profitability of the operation. In relation to profitability, respondent RE2 argued that it is crucial to make sure that production is operational all year round, since unutilized capacity is costly. Furthermore, respondent RE2 also stated that it is important to create a win-win situation with the supplier or partner, where the value of the valorized output is higher than the value of the waste.

4.8 Value Proposition – Barriers

Transitioning from traditional buying towards a service point of view requires a change in the mindset, according to respondent IE1. The same respondent further stated that many firms today have excess capacity due to owning the machines, and these machines are thus not running at full capacity. In connection to this, respondent IE1 also stated that there could be more profit in not owning the machines, but rather paying for the usage.

In connection to the case company, respondent CC1 argued that there could be difficulties in delivering consumer food products that are based on food-waste. As previously mentioned, respondent CC1 thus argued that such difficulties could be mitigated by offering waste-based ingredients rather than standalone products. The same respondent argued that these difficulties are rooted in consumer perceptions, and that consumers thus have to be eased into consuming waste-based products. Respondent IE1 argued that a potential issue when operating circularly in the food industry could be the access to inputs. That is, according to respondent IE1, both in terms of volume and availability, as well as the quality of the input itself. Respondent RE2 also highlighted that, as previously mentioned, there is a seasonal aspect to food that has to be considered to make sure that the firm can deliver output throughout the entire year.

Again in relation to the case company, respondent CC1 argued that the offering provided, that is, a combination of dryer(s) and mill(s), requires a relatively large financial investment, which according to the respondent, is a definitive barrier. The waste generated by certain food producers is often mixed with water to increase the mobility of the waste stream, according to respondent CC1. This, in combination with the perishable nature of food-waste, makes the transportation of food-waste unviable in many situations, and the valorization process thus has to be carried out in close connection to the primary production facility.

5.0 Discussion

In the following section, the material presented in the empirical findings will be discussed in connection with the theoretical framework. In doing so, findings from the empirical data will be compared and contrasted both with each other and with previous findings derived from the theoretical framework. Additionally, some conclusions and recommendations will be provided where deemed appropriate. The outcomes, recommendations and conclusions developed throughout the discussion will then serve as the basis upon which the conclusions will be constructed, and thus provide answers to the research questions presented in the introduction.

The structure of the discussion follows that of the empirical findings and, by extension, the literature review. However, please note that in certain cases, enablers and barriers are highlighted in connection to each other, especially in cases where for instance, an enabler is specifically concerned with overcoming a specific barrier, or vice versa.

5.1 Wider System - Enablers

Collaboration within the Supply Loop

At the top level, the empirical findings illuminated the great importance of collaboration with other actors within the supply loop. This view was presented as a key enabler in the interviews, and it thus solidifies the findings of Long et al. (2018) and Rizos et al. (2016), who argued that the design of a circular business model relies heavily on the interplay with other actors in the focal firm's proximity. The empirical findings highlighted actors such as governmental organizations and agencies, potential suppliers and partners, as well as customers and consumers as important for successfully achieving circularity. The gathered data also suggested that clear communication with stakeholders and a high level of transparency are additional factors that can positively influence collaborative work. De Jesus Pacheco et al. (2019) argued that stakeholder relationships could pose a challenge for small and medium-sized enterprises due to their complicated nature, and clear communication and transparency can thus be viewed as factors contributing to decreasing some of the complexity. In practice, the data suggests that communication and collaboration with external actors within the chain or loop can be facilitated through, for instance, discussion forums focused on circularity in Sweden, that focus on food-waste and connecting small businesses with larger actors.

Partnership Creation

When it comes to creating partnerships, the data suggests that the partnering organization must be deeply informed and understanding of their own waste flows and processes, and also that the partnering firm must be able to identify the waste as a potential for creating additional

value. In essence, this relates to the partnering firm being both willing and able to initialize a process of waste valorization. While the theoretical background does not explicitly support this view, findings from de Jesus Pacheco et al. (2019) do support the notion of working closely, and creating relationships with larger actors, especially for the sake of developing the value proposition.

The gathered data highlighted that this understanding of the process is of great importance for the focal startup as well, meaning that the firm must investigate and evaluate the possibilities connected to a specific potential partner, since the case presented must appear beneficial to the partner. Furthermore, the empirical findings also suggested that anchoring the business case in a factual foundation is necessary in order to signal a win-win situation to the partnering organization. This focus within the empirical data on a mutual understanding of processes, businesses, and flows becomes increasingly interesting for designing circular business models in general and for the case company in particular, since previous research does not highlight such factors as key to enabling a successful design.

Unwillingness to Change

Some indications of potential unwillingness to change from small actors within the Swedish agricultural sector were identified in the previous literature (Cederholm Björklund, 2018). However, some of the respondents suggested that smaller actors can at times be easier to collaborate with as compared to larger actors, since the smaller actors are quicker in their decision-making process and that larger actors are thus slower in their change process. However, it was also found that these larger actors are generally more open to change, and quicker to do so, if the change pertains to a sustainable or circular initiative. It should, of course, be noted that the findings of this thesis focuses on a specific case in a specific sector of the food industry, and this could be contributing factors in explaining the divergent views.

Upstream and Downstream Trust

Regarding trust between actors within the up- and downstream network, the empirical data suggested that lack of trust can act as a potential barrier to creating a circular business model. The trust can be challenged by the entailing hardships of using food-waste, since the food-waste can vary in both consistency of volume, quality and seasonality. In the adjacent field of Product-Service Systems (PSS), trust is mentioned as a barrier in the upstream network by de Jesus Pacheco et al. (2019), while trust is mentioned as a barrier in the downstream network within primary food production, through agricultural waste, by Donner et al. (2021). As also mentioned in the empirical data, the novelty of the field of circularity can make it difficult to find other firms to initiate collaborations with. On the one hand, it could thus become increasingly important to create and maintain trust with the existing actors, and on the other hand, it could be an issue to collaborate with other actors in the network due to the aforementioned lack of trust. Knowing this, the collaboration based on trust may have to be with firms located a significant distance away from the focal firm, increasingly emphasizing

the important role of logistics as a part of a circular business model within food-waste. In other words, the choice of collaborators could to a large extent, be based upon which actors within the network the firm has mutual trust with, as opposed to choosing collaborators based on proximity. The barrier connected to finding local collaborators can be found in the empirical data as well, where one respondent highlighted the issue and its consequences in relation to the increased cost of logistics. Relating this discussion to the case company, it becomes increasingly important to emphasize the creation and maintenance of relationships based on trust, since the firm is a circular startup dealing with valorization of food-waste. Through this, trust is crucial from a twofold perspective. First, the case company is a circular startup, and as aforementioned, circular economy is a novel field, and the availability of potential partners could be scarce. Second, the case company is aiming to produce food products through the valorization of food-waste, and downstream trust from customers and consumers is thus essential as well. To some extent, trust is thus needed to overcome some of the skepticism toward upcycled food products, which was highlighted both by Rizos et al. (2016) as well as the empirical data.

Views on Circularity within the Wider System

Dealing with the big picture, and understanding the food and food-waste segment from a holistic perspective can at times be a challenge for startups and smaller firms, according to the empirical findings, and one possible way of dealing with these challenges is to seek aid and support from research institutes. Support for this notion can be found in the previous literature through Donner et al. (2021), who argue that seeking help from public institutes can offset some of the challenges faced in regard to the wider system and incorporate a holistic view. In addition, de Jesus Pacheco et al. (2019) argue that relationships with external actors other than the focal firm itself can be an enabler inasmuch that these external actors could provide competencies that the firm lacks internally.

More positive views on circularity and sustainability are emerging both upstream and downstream, as suggested by the empirical data. This can be connected to the findings of Long et al. (2018), who argue that shifts in consumer trends were identified as a potential enabler for circular business models. Furthermore, Donner et al. (2021) contend that the shifting views on sustainability pose as potential enablers for circular products, which in turn enable greater creation of social and environmental value. Again, the empirical data highlighted that views on circularity and sustainability have shifted for the better in the last decades. By extension, it could be argued that more positive views on the products and services offered are a potential enabler.

5.2 Wider System - Barriers

Diverging Visions

An important barrier observed in the data was the potential of differing views and visions between actors within the chain. This can be connected to the findings of Long et al. (2018), who argue that shifting towards a more sustainable economy requires a shared vision between the focal firms and their suppliers. Furthermore, the findings of this thesis also indicate that there has to be close collaboration between actors in not only creating the offering, but also in the integration of the actors, in order to build long-term relationships. Connections between this notion and the literature can be made through Long et al. (2018), who argue that actors, at times, need to cooperate in order to create a viable market in the first place. However, the empirical findings also suggested that the linear value chain as a concept is becoming increasingly obsolete, and that such a view on the value chain has implications for the view on value creation as well, meaning that the perspective in regards to value creation is also linear. Previous research by Matschewsky et al. (2017) similarly suggests that the mindset within the organization has to shift towards a perspective where the entire lifecycle of the offering is in focus. However, the findings presented in this thesis suggest that a similar shift in focus must occur, but on a much greater scale, in order to enable the design of circular business models. That is, not only within the focal organization and across its network, but on a societal scale. To take this even further, the empirical data indicates that in order for such a shift to occur, broad and wide-spanning goals and objectives must be defined within the entire economic system. It is here argued that shifts on such a high level require immense planning and coordination across nations and between organizations, and should therefore be seen as a barrier, at the least in the near future.

In order for perspectives to change at the higher levels, one could argue that a shift has to occur on an individual level as well. The empirical data suggests that downstream perceptions of circularity, that is, consumers, can be viewed as a barrier as well. While positive perceptions on sustainability and circularity are increasingly emerging, upcycled or valorized food products could still be met with resistance, according to the empirical data. A similar line of reasoning can be found in Rizos et al. (2016), who argue that customers' potentially negative perceptions of upcycled food products can constitute a barrier to successfully creating a circular business model, and that the organization has to allocate resources toward changing these aforementioned perceptions.

Legislative Landscape

The gathered data highlighted the view that the regulatory and legislative landscape in Sweden could constitute a barrier, especially for startups active in the food and food-waste segment. The view on regulation and legislation as potential barriers is solidified by Donner et al. (2021), who argue that authorization in food security and changes in legislation could become barriers for firms looking to introduce a circular business model. Furthermore, the overall government

support for a circular economy is presented as a potential barrier by Rizos et al. (2016). In contrast to this, one respondent also stated that the governmental interference in Sweden is much easier to deal with as compared to the US. The regulatory system in Sweden is much more centered around outcome, whereas the US regulatory system focuses more on processes. This potential misalignment between the empirical findings and previous literature could likely be based on differences in scope and sampling. For instance, Donner et al. (2021) base their research on projects undertaken throughout both Europe and Asia. While Rizos et al. (2018) primarily based their research on companies active in The United Kingdom and the Netherlands. It thus becomes apparent that different regulatory landscapes will introduce differing effects on actors within the food-waste segment.

Observations from the empirical data indicate that the Swedish government is not facilitating a circular economy to the extent that it potentially could, but there is an ambition from governmental agencies to further improve the landscape for circular economy and circular businesses. A similar position is identified in the literature, where the overall perception is that the government has the potential to enable the development of circular businesses. For instance, Long et al. (2018) argue that the lack of regulations that positively impact circular economy, and circular business can pose a barrier. Through this, it could be seen as circular economy and circular businesses needing initial support to gain acceptance and traction. On a similar note, Rizos et al. (2016) argue that the government can create barriers for small and medium-sized businesses by being passive and not creating opportunities through for instance, grants and funding. The gathered data indicates that several of the respondents have had positive experiences in getting funding from governmental agencies. It is thus hard to explicitly state whether the governmental landscape in Sweden poses a barrier or an enabler when it comes to financially supporting startups in the food-waste segment. A potential barrier was, however, identified in relation to this from the gathered data, insomuch that smaller organizations might lack the knowledge and experience needed to apply for such grants and funding, meaning that they have to seek external support. A similar line of reasoning can be identified in the adjacent field of Product-Service Systems (PSS), where de Jesus Pacheco et al. (2019) argue that building such business models can be hindered by a lack of relevant knowledge. Also, applying for public grants and funding could lead to additional barriers, according to the empirical findings, insomuch that it requires a significant amount of time and effort, which could lead to a considerable increase in workload. Additionally, the administrative burden could, according to Rizos et al. (2016), constitute a potential barrier for organizations looking to implement circular business models. It is argued here that startups that are neither familiar nor experienced with applying for grants and funds from governmental agencies could thus face potential challenges due to the increase in administrative work. In essence, it could be argued that circular startups at times face challenges in acquiring public funds, not necessarily due to economic or technological barriers, but rather through a lack of expertise in navigating the bureaucratic system. This view was solidified by one respondent who argued that the bureaucratic landscape could very well become an issue for startups, given their lack of experience.

As aforementioned, collaboration is of great importance for achieving circularity. The empirical findings suggest that the overall attitude towards collaboration in the food industry is positive, however, financial discussions often constitute a barrier. This notion could further solidify the need for a solid financial evaluation of the case before reaching out to partners. The topic of financials will be discussed more in-depth in the coming section.

5.3 Financial - Enablers

One of the respondents argued that working closely with universities and students can provide startups in the circular economy with a potential enabler. Through this, the startup can gain additional support without having to spend additional resources, and can thus start earning revenues from the novel business model earlier. Consequently, the need for external funding can thus be diminished, and the founders can retain larger equity stakes. As mentioned earlier, both the empirical findings and the previous literature indicate that potential barriers for startups aiming at achieving circularity are often the lack of knowledge and the administrative burden (de Jesus Pacheco et al., 2019; Rizos et al., 2016). The argument is thus made that by working with students, small and medium-sized enterprises could gain access to external support and competencies without having to allocate vast amounts of resources towards the initiative. On a similar note, the empirical data also suggested that external support can be gained from research institutes and the like. Continuing with the same reasoning, it is not farfetched to suggest that additional support could potentially be gained from non-profit organizations and interest groups, among others, as well.

Economic Profitability in Addition to Circularity

Maintaining an economically solid perspective where profit is either made, or at least projected to be made in the near future was observed as a potential key enabler both in the empirical findings and in the literature. For instance, Long et al. (2018) argue that it is of the utmost importance to maintain profitability for sustainable and circular businesses. Further observations in line with this perspective were made in the empirical findings as well, where respondents argued that it is never enough to just create sustainable value, the firm must also show promise in terms of generating profit. Some of the respondents showed an annoyance towards this, particularly inasmuch that banks and investors are more focused on creating economic value than doing socially or environmentally sustainable work. This perspective on the barrier of acquiring funding can be connected to previous findings by Rizos et al. (2016), who argue that banks pose a challenge to smaller, circular, actors in part due to their static payment policies and in part due to banks not understanding the potential of circular economy in general. Similar findings in terms of hardships in acquiring funding can be observed in the adjacent field of sustainable PSS, according to de Jesus Pacheco et al. (2019). While this of course constitutes a barrier for small and medium-sized circular businesses, one has to be understanding of the other side as well. Banks are generally for-profit organizations, and it is thus in their interest to evaluate potential customers based on their ability to make payments. On the other hand, there are organizations that are more inclined to create social and

environmental value. The argument made here is thus that one possible way to overcome the barrier of acquiring financing could be through, as previously mentioned, working towards retaining public funds. In addition, other resources than funding, such as knowledge, expertise and capabilities, are available through, for instance, research institutes and universities. As aforementioned, the empirical findings also suggested that the economy and the perspective on value creation must likely change for circularity to become increasingly approachable for smaller actors. Through this, the argument can be made that large-scale public initiatives, to provide funds in order to increase circularity, would be necessary. Again, the empirical data suggest that at least one of the respondents argued that governmental agencies in Sweden are actively trying to improve their processes and are looking to other countries that have been successful in circular initiatives.

Specifically, the two entrepreneurs of the case company indicated that they are more interested in creating sustainable value rather than economic value. However, another respondent also indicated that a particular project that they had worked on was extended due to voluntary work, largely based on their beliefs of doing the right thing. It can thus be said that while the financial aspect of circular and sustainable businesses is of great importance, the lifespan of a startup could potentially be extended through sustainability champions. In other words, the startup could earn more time before it has to become profitable due to the work of entrepreneurs, employees and volunteers who believe in the cause. It should be noted that while this might be true in some instances, both the empirical data and the previous literature suggest that economic profitability must be reached at some point sooner or later, regardless of how much social or environmental value the company contributes.

5.4 Financial - Barriers

Early Funding

Acquiring initial funding was viewed as a potential key barrier in the empirical data. It was argued by several respondents that while securing funding is an issue for startups in general, the barrier is even more significant for circular startups. One respondent even stated that this issue is the most important factor for determining early success, especially for sustainable startups. This notion is supported in previous literature by Rizos et al. (2016), who argue that around half of the small and medium-sized circular businesses studied stated that either acquiring financing or simply the inherent financial difficulties of being a small actor was a barrier.

Scaling Up

Scale-up, after the technology has proven feasible, was also identified as a potential barrier in the empirical data. In previous studies, it has been identified that a potential partner could mitigate some of these issues connected to scaling up the process (Donner et al., 2021). The

same argument was used by one of the respondents in relation to the case company, where it was argued that a potential partner could serve as an aid for both technological and financial barriers connected to scaling up. However, Donner et al. (2021) also found that startups can face barriers in relation to the scale-up if the technology is novel, meaning that it has not been successfully implemented at a large scale. Once again in relation to the case company, one respondent argued, much in line with Donner et al. (2021), that potential partners could be reluctant to engage in collaboration with a startup whose technology is novel. This is, according to the respondent, just as Donner et al. (2021) argued, due to technology not being tested to the same extent as their traditional substitutes. The respondent viewed this bias toward the traditional alternatives as a key barrier to sustainable entrepreneurship. To some extent, this can be related back to what was previously discussed in relation to the overall perception of value creation, in that many actors are accustomed to the traditional ways of creating value. Knowing this, it seems that the discussion on the feasibility of designing and implementing circular business models drifts further and further towards the behaviors and perceptions of the actors within the chain. This barrier related to behaviors and perspectives can be viewed as a large-scale barrier, and it would thus be reasonable that the underlying actors that make up these larger systems hold similar behavior and perceptions. One of the respondents solidified this perspective by stating that companies are often prone to move backward when faced with challenges, meaning that when problems arise, they are more prone to rely on traditional alternatives and solutions. One way of approaching this could be to evaluate whether this has any connection or correlation to risk aversion, however, such questions are unfortunately out of the scope of this thesis. If the underlying mechanisms behind the traditionalist mindset could be identified through future research, startups could better focus the presentation of their offerings to mitigate some of this resistance from potential partners.

5.5 Internal Organization - Enablers

The key areas of focus in relation to the internal organization, both in terms of enablers and barriers, were identified as highly context-specific by two of the respondents. To a large extent, the view that the details of enablers and barriers are context-specific has previously been presented by Donner et al. (2021) as well. While the topic of context-specificity is widely known in the business literature, it is important to highlight that this holds true for circular businesses as well.

Maintaining a Holistic Perspective

Maintaining a high-level view of the organizational processes, and not separating them too much, was highlighted as a potential enabler in the empirical data. Furthermore, it was also suggested that the firm should control and maintain its connections to other actors within its business network. A similar perspective can be found in the existing literature, where it is suggested that high-level strategy and business development are enabling factors for the circular firm, especially through continuous innovation of the firm's processes and business

model (Long et al., 2018; de Jesus Pacheco et al., 2019). Long et al. (2018) go even further by stating that this focus is essential for the firm to maintain its sustainable position. This becomes increasingly important when put into connection with the empirical data, which suggests that while sustainability is not a competitive advantage in itself, being circular or sustainable makes the firm increasingly attractive to suppliers, customers and potential partners. In addition, one respondent argued that in order to be attractive to, especially investors and partners, the profitability perspective of the firm should be prioritized over the sustainability perspective.

In relation to the discussion on economic and sustainable incentives, one of the respondents argued that the firm must maintain its circularity. However, the vision communicated to investors and partners should be rooted in financial profitability. In a sense, this can be seen as aligning the vision of the firm with other actors in the network, but through a focus on profitability. As aforementioned, changing large, established actors can be challenging for small startups. Thus, focusing the communication and the selling point of the offering on parameters that the potential partner understands, such as profitability, can thus work as an enabler for the startup. Through this, the economic profitability works as the initial incentive, while the circular aspects work as highly positive side-effects at the outset. There were respondents who viewed this from yet another perspective, where one argued that larger organizations are generally slow to change. However, the same organizations are often much more flexible and rapid in changing when it comes to collaborations that pertain to sustainability and circularity. It is thus apparent that differing views exist on whether sustainability and circularity can be used as the key incentive for doing business. One possible explanation could be that these differing views are rooted in the context-specificity of the respondents' previous experiences. It thus becomes interesting to put this discussion in relation to what was previously touched upon in relation to the importance of finding investors that share the view on sustainability (Long et al., 2018). Through the empirical findings, it seems that one can overcome the barrier of acquiring financing for a circular business without having to find investors that are as deeply concerned with circularity and sustainability as the focal firm. Instead, the circular business could aim to improve its future projections in terms of margins and profitability and use that as the selling point for investors, and let circularity and sustainability work as a second-order incentive. Of course, achieving profitable margins is no easy task either, but the argument made here is that it could, at times, be more worthwhile to focus on perfecting the business in terms of profitability to win over investors, rather than try to change their behavior and perception of what constitutes a good investment. In other words, winning over investors through profitability is never a negative, as long as the circular perspective of the focal firm and its network is maintained.

Redefining Internal and External

One of the respondents argued that there is a need for new definitions of what constitutes the internal and the external of the firm, and that the circular business model needs to be designed with a willingness to include external actors. This can also be connected to the previously mentioned findings of Long et al. (2018), who argue that a common vision needs to be

communicated both internally and externally. Furthermore, one respondent highlighted the fact that the internal organization should be concerned with finding its own specific focus area, basically stating that a circular startup should not try to save the world, but rather find one specific area in which it can improve. This reasoning of focusing on one core area of sustainability can be connected to what was previously discussed on enablers linked to external support. By getting support from external sources such as universities, research institutes and governmental agencies, the startup can focus its scarce resources on its core business. Also, having a clear area of focus could potentially ease aligning the visions of both employees within the organization, as well as stakeholders within the startup's network. Through this, finding a specific sustainable focus area, upon which the startup aims to improve, can be seen as a potential enabler. In other words, maintaining a particular focus area could thus be facilitated by gaining support from external actors, while the clear focus of the startup could in itself aid in aligning the visions of key stakeholders such as employees and partners.

5.6 Internal Organization - Barriers

Internal Knowledge Gaps

As touched upon earlier, it was observed that small actors often require external help in order to acquire funding. In addition to this, one of the respondents argued that once funding, or a project, was acquired, the need for additional resources and human capital for project management arose. Donner et al. (2021) argue that working closely with public institutions could help overcome this barrier. Collaborating with local stakeholders such as governmental agencies and NGOs could further increase the chances of overcoming these challenges (Donner et al., 2021). In close connection to what was just described in the literature, one respondent who works at a research and development institute stated that they often help smaller organizations to both acquire the public funding, as well as assist with project management if necessary. Another respondent argued that a potential internal barrier can be found in the mindset of the people working within the organization, and that this aspect is especially crucial for circular or sustainable businesses. In connection to knowledge gaps within the organization, the empirical data suggested that the lack of knowledge could, in certain situations, relate to the mindset of the employees. Another respondent also indicated that differences in views and understandings among the employees of the organization could pose a barrier as well. This can be connected to the views of yet another respondent who argued that employees' previous experiences and corporate culture could have a large impact on the direction of the focal firm. From this, one could argue that another key barrier identified in the empirical data is the need for a common vision and direction within the internal organization. How to achieve this in practice is likely no easy task, and the specifics of how to do so are out of the scope of this thesis. The need for a shared vision that is established and then communicated internally, but also externally, is emphasized by Long et al. (2018). Moreover, the discussion on project management is elevated further by de Jesus Pacheco et al. (2019), who argue that a project

champion might be necessary to increase the likelihood of success, and that a lack of such a champion could instead impose a barrier on the firm.

In connection to what was just stated by de Jesus Pacheco et al. (2019), the empirical data also indicated that the two parties involved in a partnership should integrate the critical activities to gain acceptance in both organizations. Elaborating on this in relation to the aforementioned need for project champions, one can observe that management and leadership could be one of the focal barriers to overcome for startups involved in circularity and sustainability, especially in connection to the internal organization and competencies. To some extent, it is interesting to note that, as previously mentioned, several of the respondents argued that startups aiming at circularity often benefit from people who believe in the cause, and are thus increasingly motivated to carry out the vision. The argument made thus is that these employees are potential candidates for championing the project towards partners and other external stakeholders. However, it should be noted that none of the respondents explicitly stated that project champions constitute an enabler. Despite this possible enabler, challenges in relation to information, knowledge and human capital are likely to persist. One respondent stated that knowledge gaps constitute a barrier in startups, specifically those ingrained in circularity or sustainability, since there is a lack of standards, frameworks and methods for managing such a business. With this last addition, it gets increasingly clear that startups oftentimes require additional support from external actors, such as research institutes, partners and NGOs, to name a few. However, two of the respondents argued that governmental agencies, for instance, are moving in the right direction, but are not fully there in terms of assisting startups in circularity. This last discussion on internal barriers in terms of project management, champions and knowledge gaps thus, to some extent, solidifies the observed need for additional public resources for circularity. However, the exact areas to focus on must be further explored in order to make full use of public funds.

Internal Organization in connection to Governmental Activities

In previous research, Long et al. (2018) have found a lack of regulations that support firms in a more efficient pursuit of sustainable operations. In addition, as previously mentioned, Rizos et al. (2016) found that a barrier for startups in sustainability and circularity can appear when the government takes on a too passive role. To evaluate whether this is the case when it comes to managing circular startups is beyond the scope of this thesis and the data gathered. However, it could be said that certain indicators suggest that the issue is not one of passiveness on account of the government. For instance, as previously mentioned, the empirical data suggested that certain respondents felt that the government is on the right track, but not quite there yet, and another respondent argued that government agencies often do the right activities, but perhaps in a suboptimal order.

Logistics

Observations from both the empirical data and Donner et al. (2021) indicate that businesses involved in food and food-waste are heavily reliant on fast and efficient logistics, and this is highly connected to the perishable nature of food. Furthermore, one of the respondents argued that it is increasingly difficult to deal with the creation of new supply loops for a new, circular, product, which could impose barriers on the circular startup. To some extent, this notion can be connected to the views of another respondent who argued that how to handle logistics is of the highest importance when designing the circular business model. This view can be connected to the previous findings of Donner et al. (2021) as well, who argue that the food-waste segment is specifically dependent on both efficient and fast logistics. This discussion on the reliance on logistics becomes increasingly interesting when introducing the cost aspect. The gathered data suggested that logistics, in general, could be a costly activity, especially in the food-waste segment, due to the aforementioned perishability of the material. In the early stages of the business development, one respondent argued that some of this could be offset by the fact that volumes are kept small, and logistics within a plant, for instance, could be done manually. When scaling up, however, the extent of the issue increases as larger volumes would require technical and innovative processes, according to one respondent. Since logistics could prove to be a barrier for the circular startup, primarily through its resource intensity, one respondent argued that it is a reasonable area to focus on when designing the business model. Additionally, another respondent said that the logistical aspect of the business model should be taken into account when evaluating markets. It thus becomes clear that logistics holds the potential to be one of the key barriers for the circular startup within food-waste valorization. One could therefore argue that some of this could be mitigated by, for instance, shortening or even eliminating the distances that the input or product has to travel. Through this, the geographical location of the operation becomes a key point in designing the business model, since costs of location have to be put into relation to the cost of logistics. Such a perspective was illuminated in the empirical findings as well in connection to the case company, where it was argued that certain components of the process could be located in close proximity to the primary production and have the outputs of those processes then be transported to another location where further valorization is carried out. In this specific context, this could decrease costs by not being as reliant on fast and efficient logistics, since the perishability of the material is reduced.

The discussion on logistics becomes increasingly interesting when connected to what was previously mentioned on the topic of the importance of mutual trust between actors, and the effects it can have on proximity. By increasing the resilience of the food product, the startup is less restricted by distance when it comes to finding collaborators and initiating partnerships. Through this, finding effective logistic practices can act as an enabler both in terms of reducing cost, as well as broadening the potential network. In addition, if one can successfully make the material more resilient and less perishable, one can also create inventory, and through that, make sure that the logistics operate at close to full capacity, which potentially could lead to costs decreasing even further.

5.7 Value Proposition - Enablers

When dealing with a circular value proposition and a circular business model, it becomes increasingly important to integrate the customer into the development process. This view is supported both in the empirical findings as well as in the previous literature (Parida et al., 2014; Baines et al., 2007). One respondent explicitly stated that the firm has to understand the customer and their processes in order to create value for the customer. Similar perspectives can be found in the literature where Parida et al. (2014) and Baines et al. (2007) argue that customer integration can enhance the product offer even further. This becomes increasingly important when dealing with a bundling of products and services, and the integration of both upstream and downstream actors is central to further developing the offering (Confente et al., 2015). These findings are specifically interesting when put in relation to the case company, since the offering is a solution that will support actors in valorizing their residual streams. The case company can thus be seen as an intermediary between a partnering firm and their valorization process, meaning that the case company offers value by providing a sort of add-on service to the existing process. In other words, the business model design is deeply reliant on the joint development of the offering with a potential partner, since the partner can be seen as an upstream actor in the sense that they provide the inputs, and a downstream actor in another sense, since they also buy the process solution from the case company, i.e., the service of valorizing residual streams. Through this, the argument is made that both empirical findings and previous literature point towards a potential enabler in collaborating with customers in developing the product-service offering.

Customer Perceptions

The empirical data suggested that dealing with products based on food-waste could be problematic from a consumer point of view. In previous research, de Jesus Pacheco et al. (2019) found that consumers can at times distrust innovative products stemming from the agricultural sector. Donner et al. (2021) similarly stated that innovative products from the agricultural sector might face resistance if there is variation in the output quality. Another issue identified is the consumer perceptions on waste-based food products, which according to one of the respondents, can be mitigated by referring to it as residual or side streams instead of waste. In connection to the case company, one respondent argued that this resistance could be mitigated by initially offering the outputs as ingredients rather than standalone products. Additionally, product extension can be achieved by offering the outputs as ingredients for products that are not intended for human consumption, such as cosmetics. This approach can be connected to Donner et al. (2021), who argue that extension of the product portfolio can work as an enabler, especially for firms in the agro-food industry. While the two are not inherently the same, connections could be made between the two since the startup could focus on one product, and later extend or transition into adjacent segments. It is thus argued that having this perspective early on in the value proposition development process could enable the firm to reach customers and by extension, profitability earlier. In other words, focusing on materials and inputs that have multiple potential areas of use at an early stage could enable the firm to extend or

transition if needed. This does not necessarily have to contradict what was previously discussed on the topic of finding a particular focus area. The argument made is that a startup could mitigate some uncertainties by identifying input materials that have several use cases once valorized while maintaining its particular sustainable or circular objective. In the example of the case company, the circular objective of enabling valorization of food-waste would remain as the core focus, independent of the actual use of the output. Since sustainability is becoming increasingly important across industries, one respondent argued that the approach of being able to transition is made easier as well, since there is an increasing demand for sustainably produced products, and that actors in other industries, such as cosmetics, are looking increasingly towards sustainable inputs and components in their products.

Market Readiness

As for many innovative organizations, the gathered data indicated that it is important for the startup to consider whether the market is ready for the technology they are supplying. Specifically for the case company, one of the respondents argued that the technology fits well with current market demands, since it enables valorization at much lower energy consumption. From these empirical findings, in connection to the previous research of Tura et al. (2019), who argue that actors often find it hard to identify circular business opportunities due to a lack of existing technology, one could make the conjecture that there exists an unmet demand for solutions that enable the transition towards circular and sustainable production within the food industry. If this proposition holds true, especially in the Swedish market as well, it could thus be seen as an enabler specifically in relation to the case company, since holding the intellectual property could ease and facilitate collaboration with larger actors who seek to make a shift towards circularity or sustainability.

Risk Dynamic

In connection to the risk dynamic between partners, one of the respondents argued that it is positive to provide a Product-Service System (PSS) offering rather than selling directly, since this mitigates some of the tension created by partners or customers having to make investments. This stands in stark contrast with the previous findings of Baines et al. (2007), who argued that product and service bundling could constitute a barrier due to the shift in the risk dynamic. Of course, the empirical evidence in this thesis is on a small scale, however, it is interesting to discuss the topic further. To begin with, it could be that the Swedish business climate is more accepting of paying for use rather than ownership, and the same could be true in the specific industry, that is, food and food-waste. Finally, it could be argued that the business landscape and dynamics have changed since Baines et al. (2007) carried out their research. Some, all, or none of the aforementioned factors could, to some extent, explain the divergence in opinions between the empirical data and the findings of Baines et al. (2007). In connection to the discussion of PSS, the same respondent also argued that the steady revenue flows from offering a product-service bundling could increase the valuation of the firm as well. Through this, offering a product-service bundling could be an enabler for the startup, insomuch that it could

increase the valuation and thus increase the attractiveness towards investors and potential partners. Additionally, another respondent stated that purchasing use of equipment, rather than ownership, is more economically feasible, since ownership often leads to unutilized capacity. However, the same respondent also argued that such a model requires a shift in the mindset of customers and partners since many organizations are accustomed to buying equipment, which could constitute a barrier for firms offering product-service bundles rather than traditional sales.

5.8 Value Proposition - Barriers

Accessibility of Inputs

In the empirical findings, the aspects of access to inputs and the seasonality of the agricultural industry were highlighted as potential barriers for firms active in food-waste valorization. Factors such as availability, volume and quality of the input have implications for the utilization of the production. Similar issues have been highlighted in previous studies as well, where Donner et al. (2021) argue that there is often a limited volume of residual products, which in combination with the seasonal aspect, could lead to a highly competitive landscape if several actors require the same input. Consequently, it could thus be argued that the accessibility of inputs, in terms of residual streams from primary food production, could become a barrier due to variability of availability and seasonality.

Mitigating Resistance by forming Relationships

While there seem to be potential enablers connected to offering product-service bundlings according to the empirical data, some potential barriers were identified as well. As touched upon in the previous section, one respondent argued that the mindset of customers and potential partners could still be an issue, in that some actors are still keen on owning their equipment and machines. According to previous research by de Jesus Pacheco et al. (2019), this barrier could be overcome by forming and maintaining relationships with the affected actors, where the startup has to emphasize a perspective where owning the equipment is not central. Through this, it becomes increasingly important for the startup to prioritize collaboration and relationship-building with stakeholders, which is a topic that has been discussed throughout the chapter. The empirical data as well as the previous literature, thus indicate that a potential key enabler for a startup aiming to design a circular business model through the offering of Product-Service Systems (PSS) is both the formation, and the maintenance of relationships with key stakeholders.

The argument made here is thus that providing product-service bundles could serve as an enabler, but there are issues connected to the mindset of customers. Through this, the supplying firm would thus have to demonstrate that it takes on some of the risk connected to ownership, which in turn could likely be viewed as a positive outcome for the receiving firm. In other

words, whether the offering of product-service bundles serves as an enabler or a barrier for the focal firm depends on the context. Evaluations are thus likely necessary on a case-to-case basis, which to some extent further solidifies the notion of collaborative development with customers and partners.

5.9 Revised Framework

Through the analysis discussed above, a revised version of the conceptual framework has been constructed, which can be found below. Barriers and enablers in each of the four overarching areas have been included. Based on the analysis of the empirical findings, it is argued that these are the main aspects a startup should consider in this specific context of creating a circular business model in the Swedish food-waste segment. Of course, the findings are dependent on the organization under observation, as well as its specific setting, but hopefully, the revised framework can act as a stepping stone for both practitioners seeking to undertake similar endeavors, as well as researchers looking to extend the theoretical knowledge in the area of circular business models. Through this, it can be concluded that certain aspects found in other settings apply to the context of this study as well, while several novel barriers and enablers emerged through this thesis. This opens up for discussion on carrying out similar research projects in different settings, which will be explored further in the coming section. Findings that were identified both in the empirical data and the previous literature, as well as aspects identified solely in the empirical findings, have been included in the revised framework. In addition, aspects that were identified in the conceptual framework based on previous literature that were not highlighted at all in the empirical data were not included in the revised framework. This decision was made since these aspects do not seem to need consideration when designing a circular business model as a startup in the Swedish food-waste segment. Findings that are in accordance with previous literature are indicated as such with an asterisk (*).

Interestingly, while customization and inclusion of the customer in the development process were highlighted in the empirical data, modularity was not touched upon by any of the respondents. In addition, while continuous innovation and innovative development were not explicitly highlighted by any of the respondents, an extension of the product portfolio was mentioned. This is somewhat surprising, since continuous innovation and innovative development was considered an enabler by previous research. Some of the enablers and barriers in the revised framework that were identified in the empirical data can be seen as a synthesize of enablers and barriers that were identified in the previous literature. In other words, some of the aspects in the revised framework draw support from two or more enablers and barriers identified in the previous literature. It was also interesting that the need for clear project champions from both parties of the collaboration was not identified by the empirical findings. However, it was similarly argued that there is a need for converging visions within the company as well as with its external stakeholders. Furthermore, it was also argued that there is a potential barrier in the lack of project leaders and project management, but it was

never explicitly stated that project champions are an important aspect to consider. Finally, aligning the internal incentives with a PSS logic was not identified as an aspect to consider in the empirical data either. However, similar aspects, such as aligning visions, were touched upon.

Wider System		Financial	
BARRIERS	ENABLERS	BARRIERS	ENABLERS
Diverging visions between actors	Collaboration within the supply loop*	Acquiring initial financing*	Economic value in addition to circularity*
Linear view on value chain and creation*	High levels of transparency and clear communication*	Administrative burden	Maintaining a profitable business*
Negative consumer views on upcycled food products*	Discussion forums	Scaling up novel technology*	Collaboration with public institutions such as universities and research institutes
Legislative landscape*	Partnership creation*	Traditionalist view on technology *	Partnering with larger actors
Public funds could lead to administrative burden	Partner aware of its own processes and residual streams		
	Understanding of the potential partner		
	Trust (lack thereof = barrier)*		
	Collaboration with research institutes		
	Positive trend in views on circularity*		
Internal Organization		Value Proposition	
BARRIERS	ENABLERS	BARRIERS	ENABLERS
Knowledge gaps (especially leadership & project management)*	Maintaining holistic view	Negative perceptions of upcycled food	Include customers in development process*
Gaining acceptance from partners*	Tend to connections within network*	Use-centric sales could require shift in mindset*	Initial position higher up in the value chain
Lack of standardized methods & frameworks	Highlight economic incentives (partnership creation)	Accessibility of inputs*	Supplying product-service bundles adapted to the customer
Mindset & differing understandings	Re-evaluate internal vs. external		
Cost of logistics	Seek external support		
	Core circular focus		
	For logistics:		
	Decrease distances		
	Increase resilience of goods		

Figure 4: Revised Framework based on Empirical Findings and the conceptual framework presented in the theoretical background

6.0 Conclusion

In the following section, the findings presented in the discussion will be summarized and displayed in connection to the purpose, in order to answer the research questions. Enablers and barriers, that is, aspects that are of importance to the startup looking to design a circular business model in the Swedish food-waste segment will be presented. These enablers and barriers are rooted in the discussion and, subsequently the revised framework presented in the final part of the discussion. These will then constitute the basis upon which the research questions are answered. Finally, avenues for further research will be discussed before recommendations for legislators, universities and practitioners are presented.

The purpose of this thesis has been to gather insights on which aspects affect a startup in the Swedish food-waste segment when designing a circular business model. Through the purpose, the following research question was formulated:

What main aspects should be considered by a startup in the Swedish food-waste segment when designing a circular business model?

In order to better understand these aforementioned aspects, the following two sub-questions were formulated as well:

- What are the key enablers for a startup designing a circular business model in the Swedish food-waste segment?
- What are the key barriers for a startup designing a circular business model in the Swedish food-waste segment?

Through analysis of the empirical data, comparing and contrasting said data to previous literature, specific enablers and barriers for creating a circular business model in the Swedish food-waste segment emerged. In the following section, these enablers and barriers will be presented and summarized. In addition, certain themes emerged from the analysis of the empirical data as well, and through this, several enablers or barriers could be grouped together. These groupings are based on either a set of enablers or barriers being closely connected in that they relate to the same topic. Alternatively, that one or several enablers or barriers have effects on another enabler or barrier.

The first portion of the conclusion will summarize the findings presented in the discussion and present them in a way to allow the research questions to be answered. In the second portion of the conclusion, avenues for further research are presented before recommendations for practitioners, universities, as well as legislators and public institutions, are offered. Below, the identified aspects in the form of barriers and enablers will be discussed and summarized in

order to answer the two sub-research questions. By answering these, the main research question will be answered as well, and subsequently, the purpose will be accomplished.

Wider system

Collaboration within the supply loop was identified as a key enabler by several of the respondents. It was also identified that this collaborative work could be positively influenced by *high levels of transparency and clear communication*. In addition, collaboration can be further facilitated through discussion forums. Another identified enabler that is closely connected to collaboration was *partnership creation*. To enable this, the findings suggest that the potential partner must be *highly aware of its own processes and residual streams*. Furthermore, the startup aiming to establish a circular business model *must also have a great understanding of its potential partner*, so that the startup can display a mutually beneficial proposition. In addition, it was highlighted that while large actors are generally perceived as slow to change, the *speed of the change process* could be increased by the fact that the initiative is sustainable or circular.

In connection to what has been discussed so far, *trust* was also identified as an important enabler, and lack thereof could constitute a barrier. Since circularity is at an infant stage, it could be hard to identify important partners, and therefore, it could be imperative to *create and maintain trust* with the actors that do exist. Furthermore, the findings suggest that the importance of having trust between actors could be viewed as paramount to, for instance, geographical distance. Meaning that, at times, suitable collaborators should be evaluated on *trust rather than the logistical costs* of doing business with that particular collaborator.

When evaluating potential partners and collaborators based on trust, this might lead to the closeness of partners and collaborators being prioritized lower. In other words, the distances could be significant since trust seems to be a more critical aspect

Findings suggest that it can at times be *challenging for startups to maintain a comprehensive overview of the wider system*. However, through collaboration with research institutes, some of this issue can be mitigated. One additional enabling factor found is the *changing views on sustainability and circularity*, where both suppliers and customers are starting to have a more positive view of circularity.

Despite the aforementioned positive trend of views on circularity, the findings suggest that *diverging visions* of actors within the wider system could pose a barrier. The *linear view* on the value chain and subsequently linear views on value creation could become an issue as well. According to the findings, it thus seems like *these grand perspectives on the value chain and value creation will have to change* in order for circularity and circular businesses to flourish. Findings also indicated that *consumer views on upcycled food products* specifically might not be as positive as the views on sustainability and circularity in general, which could pose a barrier.

The *legislative landscape* in Sweden could also become a barrier for startups looking to achieve circularity, especially if active in the food-waste segment. While the findings suggest an *ambition from Swedish regulators* to facilitate circularity, the outcome as of now is not as good as it could be. However, whether the legislative landscape poses a barrier or an enabler is context-dependent. It should be stated though, that applying for public grants and funding *requires a lot of administrative work*, as well as experience in doing so, time and effort, which could become a barrier for startups. In other words, it seems that funding is available, however, navigating the administrative and bureaucratic system could be a barrier for startups.

Financial

The findings suggest that a potential key barrier is *acquiring the initial funding*, and that this can be especially challenging for circular startups. Additionally, it is of great importance that the startup is able to deliver *economic value and profits in addition to circularity*. Thus, *maintaining a profitable business*, or at least being projected to turn profitable in the near future, is of great importance, which could be enabled by public grants and funds, allowing the startup more time before it turns profitable. As aforementioned, the *administrative burden* could likely pose a potential barrier for a startup. This issue could, according to the findings, be mitigated through *collaboration with public institutions such as universities and research institutes*, which could provide support at modest costs for the startup.

Yet another potential barrier could be found in *the scaling up of the business*, especially if the technology is novel. Furthermore, it was identified that larger actors tend to turn to the *traditional technologies or processes in times of uncertainty*, which could be problematic for a startup looking to introduce a novel technology. *Partnering with a larger, established firm* could be of great importance when it comes to overcoming some of these issues connected to scaling up.

Internal organization

The importance of *maintaining a holistic perspective* of processes was identified as a potential enabler as well. In addition, the firm should focus on *maintaining its connections* to other actors in the network. Furthermore, the circular aspect of the business should be displayed toward suppliers and customers since it could make the firm increasingly attractive. However, towards investors and partners, the *economic incentives* could be more important to highlight, but the circular or sustainable aspect could, in fact, *fast-track the process* of gaining a potential partner.

Given the importance of collaboration, it was found that what constitutes the *internal and external* might have to be re-evaluated, and the firm must be willing to include external actors. Both *gaining support from universities and research institutes* and *focusing the sustainability values on one focal area* were identified as potential enablers.

Concerning the aforementioned administrative burden, another identified barrier was the potential *knowledge gap*, especially in relation to *leadership* and *project management*.

Furthermore, *gaining acceptance* in both the focal and the partnering organization is of importance. In addition, knowledge gaps connected to sustainability and circularity were identified as potential barriers, especially due to the *lack of standardized frameworks and methods*. Furthermore, the *mindset* of the people within the organization is essential for a sustainable or circular business. In close connection to this, *differing understandings*, often due to previous experiences of work culture among employees, could be a potential barrier as well. It was thus found that a common, shared vision within the organization is of importance. A potential key barrier could be found in the cost of logistics. This becomes increasingly important when working with food and food-waste, since the goods are perishable, which could increase costs additionally. The issue could be intensified when introducing *novel supply loops* or when the *necessity for automation* arises in connection to scaling up. These costs could potentially be reduced by enabling aspects such as *decreasing geographical distances* and *increasing the resilience of the goods*.

Value proposition

The findings highlighted that *incorporating customers* in developing the value proposition when it comes to designing a circular business model could constitute an enabler. In order to create value for the customer, the startup must thus first understand the customer, their processes and their challenges.

Customer and consumer *perceptions of upcycled food products* also constitute a potential barrier. Solutions for this issue range from changing the narrative to initially creating *ingredients or components rather than standalone products*. An initial position higher up the value chain could also enable the firm to *gain revenues earlier*, and focusing on products or ingredients with more than one use case could enable the startup to better transition into other markets or segments if needed. In addition, if the startup is supplying technology for waste valorization, evaluating *market readiness* and *tangible demand* for the technology is of importance. Another potential enabler identified was to offer *product-service bundles* instead of selling directly. Through that, the firm assumes some of the risk, receives revenues more steadily and delays or even removes discussions on financing. However, this could also require a *potential shift in mindset* on account of customers and partners. One way of mitigating potential resistance connected to selling use rather than ownership is to carefully *form and maintain relationships and collaborations* with customers and partners. The *accessibility of inputs* could pose a barrier, since it pertains to food-waste. Additionally, the *seasonality* of agricultural foods could become an issue.

6.1 Limitations

The limitations of this study primarily relate to generalizability and reliability. A case study was incorporated in order to understand a specific context better. However, this aspect likely affected the cross-sectional dimension of the study, meaning that findings may be case-dependent. However, independent research institutes and industry experts were interviewed to

mitigate the case dependency to the greatest extent possible. The specific context has its merit, but it also results in this aforementioned reduced generalizability. This then has potentially adverse effects on the generalizability of the study. Furthermore, since the number of interviews held is relatively low, it is hard to tell how exhaustive the findings are, meaning that additional aspects that were not identified by the empirical data could likely exist. In addition, the reliability of the findings is, to some extent, negatively affected by the same aspect as well.

6.2 Further research

Through the findings, it has become evident that collaboration within the network of the focal firm is of great importance for successfully designing and carrying out a circular business model within the Swedish food-waste segment. Further research is thus necessary in order to better understand how to facilitate such collaborations. Additionally, trust was identified as a potential enabler both in general and for collaborations in particular. It would thus be interesting to explore further how trust can be built among and between actors in the Swedish food-waste segment, especially from the perspective of a startup or an SME.

The purpose and focus of this thesis have been on circularity in the Swedish food-waste segment. A potential avenue for future research would thus be to explore similar research in other settings, such as other countries. Furthermore, it would likely be valuable to investigate how circularity could be achieved in a global context, meaning that collaborations across borders could be taken into consideration. When evaluating potential partners and collaborators based on trust, this might lead to the closeness of partners and collaborators being prioritized lower. In other words, the distances could be significant since trust seems to be a more critical aspect. This in turn could increase the likelihood of future collaborations across borders, and research on how to facilitate such collaborations within the European Union, for instance, would be an interesting direction. In addition, visions and directions emerged as important aspects to consider, both internally and within the value chain. Potential avenues for further research could thus be to more thoroughly explore how these aspects affect a circular startup, as well as investigate how to facilitate the convergence of visions and directions, both internally or within the value chain.

6.3 Recommendations

Recommendations for Practitioners

The findings of this study could be considered as a first indication of what aspects to consider when designing a circular business model in the Swedish food and food-waste segment. However, it should be noted that both previous literature and the empirical findings suggest that what constitutes a barrier or an enabler is often highly context-specific. Therefore, what is applicable or transferable to other similar cases is up to each reader, practitioner and researcher. That being said, the findings suggest that collaboration is an important aspect, especially when aiming to introduce a circular business model, so practitioners should consider which actors

are the most important to collaborate with in their specific setting. Additionally, how to actually do this is at this time somewhat ambiguous. Trust has been pointed out as an important aspect, especially in connection to collaborations, however, how to build trust is beyond the scope of this thesis, and should therefore be considered on a case by case basis. Securing initial funding and continuous profitability were both identified as important, especially in the circular setting, and should therefore likely be evaluated thoroughly before proceeding. Moreover, the importance of maintaining a holistic view of the network was also highlighted in the findings. As previously mentioned, specific aspects are likely highly context-specific. It is thus argued that practitioners aiming to introduce a circular business model in the Swedish food-waste segment should consider how each of the aspects included in the revised framework presented in the discussion relates and connects to their specific firm, in its specific setting.

Recommendations for Universities

In the findings, the role of Universities was highlighted by some of the respondents. More specifically, it was argued that university students are a potential resource for startups, since students could contribute without the firm having to allocate too much funding towards it. Through this, it could be both interesting and beneficial for universities to explore whether this is a viable avenue for collaboration. For instance, universities could explore whether local startups are interested in participating in collaborations of that kind. Additionally, it would be necessary to also investigate whether the students would be interested in partaking in more practical activities in connection to theoretical studies. Finally, it should also be emphasized that the endeavors carried out in collaboration with startups actually fit in with the specific curricula of the universities, and this is thus a potential avenue for further investigation as well.

Recommendations for Legislators and Public Institutions

While there seem to be several potential avenues for improvement when it comes to the legislative landscape in relation to circular economy and circular businesses, one that stood out is the acquisition of public funding. It was found that funding and grants are available to startups, especially if the firm is characterized by sustainability or circularity. However, it was highlighted that applying for public funding could be a tedious process that requires expertise and experience in navigating the bureaucratic system. Through this, one recommendation for public institutions is to investigate how this process can be better adapted for startups. This becomes especially important since small actors often have limited resources that can be allocated towards external help. A first step towards this could be to quantitatively investigate whether this perception is shared among the population of sustainable and circular startups. If it holds true that startups perceive the process as complex, actions should then be taken to actually improve the process of applying for public funding so that startups are better equipped to carry it out.

7.0 References

- Amit, R., & Zott, C. (2012). Creating value through business model innovation. *MIT Sloan Management Review*, 53(3), 41-49.
- Antikainen, M., & Valkokari, K. (2016). A Framework for Sustainable Circular Business Model Innovation. *Technology Innovation Management Review*, 6(7), 5–12.
<https://doi.org/10.22215/timreview/1000>
- Atalay Atasu, Céline Dumas, & Luk N Van Wassenhove. (2021). The Circular Business Model. *Harvard Business Review*, (4), 72. Retrieved from: <https://hbr.org/2021/07/the-circular-business-model>
- Baden-Fuller, C., & Morgan, M. S. (2010). Business Models as Models. *Long Range Planning*, 43(2–3), 156–171. <https://doi.org/10.1016/j.lrp.2010.02.005>
- Baines, T., Lightfoot, H., Benedettini, O., & Kay, J. (2009). The servitization of manufacturing. *Journal of Manufacturing Technology Management*, 20(5), 547–567.
<https://doi.org/10.1108/17410380910960984>
- Baines, T. S., Lightfoot, H. W., Evans, S., Neely, A., Greenough, R., Peppard, J., Roy, R., Shehab, E., Braganza, A., Tiwari, A., Alcock, J. R., Angus, J. P., Bastl, M., Cousens, A., Irving, P., Johnson, M., Kingston, J., Lockett, H., Martinez, V., . . . Wilson, H. (2007). State-of-the-art in product-service systems. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, 221(10), 1543–1552.
<https://doi.org/10.1243/09544054jem858>
- Bell, E., Bryman, A., & Harley, B. (2018). *Business Research Methods* (5th ed.). Oxford University Press.
- Bocken, N., Short, S., Rana, P., & Evans, S. (2014). A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production*, 65, 42–56.
<https://doi.org/10.1016/j.jclepro.2013.11.039>
- Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9–19.
<https://doi.org/10.1016/j.jclepro.2012.07.007>
- Brax, S. (2005). A manufacturer becoming service provider – challenges and a paradox. *Managing Service Quality: An International Journal*, 15(2), 142–155.
<https://doi.org/10.1108/09604520510585334>

- Brinkmann, S. (2013). *Qualitative Interviewing (Understanding Qualitative Research)* (1st ed.). Oxford University Press.
- Bryman, A., & Bell, E. (2011). *Business Research Methods* (3rd ed.). Oxford University Press.
- Bucherer, E., Eisert, U., & Gassmann, O. (2012). Towards Systematic Business Model Innovation: Lessons from Product Innovation Management. *Creativity and Innovation Management*, 21(2), 183–198. <https://doi.org/10.1111/j.1467-8691.2012.00637.x>
- Casadesus-Masanell, R., & Ricart, J. E. (2010). From Strategy to Business Models and onto Tactics. *Long Range Planning*, 43(2–3), 195–215. <https://doi.org/10.1016/j.lrp.2010.01.004>
- Cederholm Björklund, J. (2018). Barriers to Sustainable Business Model Innovation in Swedish Agriculture. *Journal of Entrepreneurship, Management and Innovation*, 14(1), 65–90. <https://doi.org/10.7341/20181414>
- Chesbrough, H. (2007). Business model innovation: it's not just about technology anymore. *Strategy & Leadership*, 35(6), 12–17. <https://doi.org/10.1108/10878570710833714>
- Clarke, V. & Braun, V. (2017). Thematic analysis. *The Journal of Positive Psychology*, 12(3), 297–298. <https://doi.org/10.1080/17439760.2016.1262613>
- Confente, I., Buratti, A., & Russo, I. (2015). The role of servitization for small firms: drivers versus barriers. *International Journal of Entrepreneurship and Small Business*, 26(3), 312. <https://doi.org/10.1504/ijesb.2015.072394>
- Corley, K. G., & Gioia, D. A. (2004). Identity Ambiguity and Change in the Wake of a Corporate Spin-off. *Administrative Science Quarterly*, 49(2), 173–208. <https://doi.org/10.2307/4131471>
- DaSilva, C. M., & Trkman, P. (2014). Business Model: What It Is and What It Is Not. *Long Range Planning*, 47(6), 379–389. <https://doi.org/10.1016/j.lrp.2013.08.004>
- de Jesus Pacheco, D. A., ten Caten, C. S., Jung, C. F., Sassanelli, C., & Terzi, S. (2019). Overcoming barriers towards Sustainable Product-Service Systems in Small and Medium-sized enterprises: State of the art and a novel Decision Matrix. *Journal of Cleaner Production*, 222, 903–921. <https://doi.org/10.1016/j.jclepro.2019.01.152>
- Donner, M., Gohier, R., & de Vries, H. (2020). A new circular business model typology for creating value from agro-waste. *Science of The Total Environment*, 716, 137065. <https://doi.org/10.1016/j.scitotenv.2020.137065>

Donner, M., Verniquet, A., Broeze, J., Kayser, K., & de Vries, H. (2021). Critical success and risk factors for circular business models valorising agricultural waste and by-products. *Resources, Conservation and Recycling*, 165, 105236. <https://doi.org/10.1016/j.resconrec.2020.105236>

Ellen MacArthur Foundation (2015). *Growth within: A circular economy vision for a competitive Europe*. <https://ellenmacarthurfoundation.org/growth-within-a-circular-economy-vision-for-a-competitive-europe>

FAO (2019). *The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction*. <https://www.fao.org/3/ca6030en/ca6030en.pdf>

FAO, IFAD, UNICEF, WFP and WHO (2021). *The State of Food Security and Nutrition in the World 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. <https://www.fao.org/documents/card/en/c/cb4474en>

Foss, N. J., & Saebi, T. (2016). Fifteen Years of Research on Business Model Innovation. *Journal of Management*, 43(1), 200–227. <https://doi.org/10.1177/0149206316675927>

Freeman, J., & Engel, J. S. (2007). Models of Innovation: Startups and Mature Corporations. *California Management Review*, 50(1), 94–119. <https://doi.org/10.2307/41166418>

Geissdoerfer, M., Bocken, N. M., & Hultink, E. J. (2016). Design thinking to enhance the sustainable business modelling process – A workshop based on a value mapping process. *Journal of Cleaner Production*, 135, 1218–1232. <https://doi.org/10.1016/j.jclepro.2016.07.020>

Geissdoerfer, M., Pieroni, M. P., Pigosso, D. C., & Soufani, K. (2020). Circular business models: A review. *Journal of Cleaner Production*, 277, 123741. <https://doi.org/10.1016/j.jclepro.2020.123741>

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018a). Sustainable business model innovation: A review. *Journal of Cleaner Production*, 198, 401–416. <https://doi.org/10.1016/j.jclepro.2018.06.240>

Geissdoerfer, M., Vladimirova, D., Fossen, K. V., & Evans, S. (2018b). Product, service, and business model innovation: A discussion. *Procedia Manufacturing*, 21, 165–172. <https://doi.org/10.1016/j.promfg.2018.02.107>

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2012). Seeking Qualitative Rigor in Inductive Research. *Organizational Research Methods*, 16(1), 15–31. <https://doi.org/10.1177/1094428112452151>

- Guba, E. G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communications & Technology*, 29(2), 75-91.
<https://doi.org/10.1007/bf02766777>
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y.S. Lincoln (eds.), *Handbook of Qualitative Research* (pp. 105-117). Sage.
- Johnson, S., & Rasuloova, S. (2017). Qualitative research and the evaluation of development impact: incorporating authenticity into the assessment of rigour. *Journal of Development Effectiveness*, 9(2), 263–276. <https://doi.org/10.1080/19439342.2017.1306577>
- Khanagha, S., Volberda, H., & Oshri, I. (2014). Business model renewal and ambidexterity: structural alteration and strategy formation process during transition to a Cloud business model. *R&D Management*, 44(3), 322–340. <https://doi.org/10.1111/radm.12070>
- Kühl, C., Tjahjono, B., Bourlakis, M., & Aktas, E. (2018). Implementation of Circular Economy principles in PSS operations. *Procedia CIRP*, 73, 124–129.
<https://doi.org/10.1016/j.procir.2018.03.303>
- Lincoln Y., & Guba, E. (1985). *Naturalistic Inquiry*. SAGE Publications.
- Long, T. B., Looijen, A., & Blok, V. (2018). Critical success factors for the transition to business models for sustainability in the food and beverage industry in the Netherlands. *Journal of Cleaner Production*, 175, 82–95. <https://doi.org/10.1016/j.jclepro.2017.11.067>
- Loorbach, D., & Wijsman, K. (2013). Business transition management: exploring a new role for business in sustainability transitions. *Journal of Cleaner Production*, 45, 20–28.
<https://doi.org/10.1016/j.jclepro.2012.11.002>
- Lüdeke-Freund, F., Gold, S., & Bocken, N. M. P. (2018). A Review and Typology of Circular Economy Business Model Patterns. *Journal of Industrial Ecology*, 23(1), 36–61.
<https://doi.org/10.1111/jiec.12763>
- Magretta, J. (2002). Why business models matter. *Harvard Business Review*, 80(5), 86-87.
Retrieved from: <https://hbr.org/2002/05/why-business-models-matter>
- Matschewsky, J., Kambanou, M. L., & Sakao, T. (2017). Designing and providing integrated product-service systems – challenges, opportunities and solutions resulting from prescriptive approaches in two industrial companies. *International Journal of Production Research*, 56(6), 2150–2168. <https://doi.org/10.1080/00207543.2017.1332792>
- Michellini, G., Moraes, R. N., Cunha, R. N., Costa, J. M., & Ometto, A. R. (2017). From Linear to Circular Economy: PSS Conducting the Transition. *Procedia CIRP*, 64, 2–6.
<https://doi.org/10.1016/j.procir.2017.03.012>

Mills, A. J., Durepos, G., & Wiebe, E. (2010). *Encyclopedia of case study research* (Vols. 1-0). SAGE Publications, Inc. <https://doi.org/10.4135/9781412957397>

Nandakumar, M., Ghobadian, A., & O'Regan, N. (2010). Business-level strategy and performance. *Management Decision*, 48(6), 907–939. <https://doi.org/10.1108/00251741011053460>

Neyens, I., Faems, D., & Sels, L. (2010). The impact of continuous and discontinuous alliance strategies on startup innovation performance. *International Journal of Technology Management*, 52(3/4), 392. <https://doi.org/10.1504/ijtm.2010.035982>

OECD (2017). OECD Science, Technology and Innovation Outlook 2016. Paris: OECD, 2017. Web.

Okely, J. (1994). Thinking through fieldwork. In A. Bryman & R.G. Burgess (Eds.), *Analyzing qualitative data* (p. 18-34). Routledge. <https://doi.org/10.4324/9780203413081>

O'Reilly III, C., & Tushman, M. (2004). The Ambidextrous Organization. *Harvard Business Review*, 82(4), 74-140. Retrieved from: <https://hbr.org/2004/04/the-ambidextrous-organization>

Oyenuga. & R. Bhamidimarri. (2017). Upcycling ideas for Sustainable Construction and Demolition Waste Management: Challenges, Opportunities, and Boundaries. *International Journal of Innovative Research in Science, Engineering and Technology*, 6(3) 4066-4079 <https://doi.org/10.15680/IJIRSET.2017.0603187>

Parida, V., Rönnerberg Sjödin, D., Wincent, J., Kohtamäki, M. (2014) Mastering the Transition to Product-Service Provision: Insights into Business Models, Learning Activities, and Capabilities. *Research-Technology Management*, 57(3), 44-52, <https://doi.org/10.5437/08956308X5703227>

Rashid, A., Asif, F. M., Krajnik, P., & Nicolescu, C. M. (2013). Resource Conservative Manufacturing: an essential change in business and technology paradigm for sustainable manufacturing. *Journal of Cleaner Production*, 57, 166–177. <https://doi.org/10.1016/j.jclepro.2013.06.012>

Rizos, V., Behrens, A., van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M., & Topi, C. (2016). Implementation of Circular Economy Business Models by Small and Medium-Sized Enterprises (SMEs): Barriers and Enablers. *Sustainability*, 8(11), 1212. <https://doi.org/10.3390/su8111212>

Romero-Hernández, O., & Romero, S. (2018). Maximizing the value of waste: From waste management to the circular economy. *Thunderbird International Business Review*, 60(5), 757–764. <https://doi.org/10.1002/tie.21968>

- Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, 22(2), 63–75. <https://doi.org/10.3233/efi-2004-22201>
- Stubbs, W., & Cocklin, C. (2008). Conceptualizing a “Sustainability Business Model.” *Organization and Environment*, 21(2), 103–127. <https://doi.org/10.1177/1086026608318042>
- Teece, D. J. (2010). Business Models, Business Strategy and Innovation. *Long Range Planning*, 43(2–3), 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>
- Tura, N., Hanski, J., Ahola, T., Ståhle, M., Piiparinen, S., & Valkokari, P. (2019). Unlocking circular business: A framework of barriers and drivers. *Journal of Cleaner Production*, 212, 90–98. <https://doi.org/10.1016/j.jclepro.2018.11.202>
- United Nations. (n.d.) Stop Food Loss and waste, for the people, for the planet. Retrieved 2022-02-24 from <https://www.un.org/en/observances/end-food-waste-day>.
- United Nations Environment Programme (2021). *Food Waste Index Report 2021*. <https://www.unep.org/resources/report/unep-food-waste-index-report-2021>
- Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6(4), 314–324. [https://doi.org/10.1016/0263-2373\(88\)90033-3](https://doi.org/10.1016/0263-2373(88)90033-3)
- Vezzoli, C., Garcia Parra, B., & Kohtala, C. (2021). *Designing Sustainability for All* (Lecture Notes in Mechanical Engineering). Cham: Springer International Publishing AG.
- Weiblen, T., & Chesbrough, H. W. (2015). Engaging with Startups to Enhance Corporate Innovation. *California Management Review*, 57(2), 66–90. <https://doi.org/10.1525/cmr.2015.57.2.66>
- Wells, P., & Seitz, M. (2005). Business models and closed-loop supply chains: a typology. *Supply Chain Management: An International Journal*, 10(4), 249–251. <https://doi.org/10.1108/13598540510612712>
- World Bank (n.d.) *SME Finance: Development news, research, data*. Retrieved May 18, 2022, from <https://www.worldbank.org/en/topic/smefinance>
- Yin, R. K. (2008). *Case Study Research: Design and Methods (Applied Social Research Methods)* (4th ed.). SAGE Publications, Inc.
- Zott, C., & Amit, R. (2007). Business Model Design and the Performance of Entrepreneurial Firms. *Organization Science*, 18(2), 181–199. <https://doi.org/10.1287/orsc.1060.0232>

Zott, C., Amit, R., & Massa, L. (2011). The Business Model: Recent Developments and Future Research. *Journal of Management*, 37(4), 1019–1042.
<https://doi.org/10.1177/0149206311406265>

Zucchella, A., & Previtali, P. (2018). Circular business models for sustainable development: A “waste is food” restorative ecosystem. *Business Strategy and the Environment*, 28(2), 274–285. <https://doi.org/10.1002/bse.2216>

Appendix

Appendix 1: Tabular summary of Enablers and Barriers identified in the Literature Review

	Barrier	Explanation		Enabler	Explanation
Wider system	<i>Governmental regulation, legislation, and incentives</i>	Lack of regulation, incentives and passiveness from government		<i>Regulation on sustainability requirements</i>	
		Legislation on food security [FDA approval]		<i>Consumers becoming more attentive towards sustainability and upcycling</i>	Consumer opinions and positions in favour of sustainable business practices
	<i>Small volumes and unwillingness to change in Swedish agric. SME:s</i>	Potential unwillingness to change in Swedish agric. SME:s			Changing consumer perceptions on upcycling
		Insufficient input volume from small agric. businesses		<i>Collaboration with suppliers, partners, investors and customers that share the vision</i>	Collaboration is a key enabler: With sustainable suppliers
		Seasonal effects given Swedish climate			Partners and investors that share the vision
	<i>Potentially low support and costly to change upstream</i>	Lack of support for CE (both up- and downstream)			Cooperation and co-creation with customers
		Resource-intensive to gain upstream support			Partnering with other firms to create
	<i>Potential low trust, little support, focus on ownership & hard price competition downstream</i>	Potentially low trust for upcycled agric.- and food products			Local stakeholders in general: Process made easier if the firm can create local value through e.g., job opportunities.

		Product and ownership dominant mindset		<i>Project champion, when partnering with larger firms</i>	
		Price competition with unsustainable products			
	Barrier	Explanation		Enabler	Explanation
Financial	<i>Lack of capital</i>	Especially due to large upfront costs of PSS		<i>Grants and financing through government (sustainable initiatives), systematically evaluate external financing opportunities</i>	Potential grants and support from government and NGO:s for sustainable undertakings and development
		High inaccessibility in lending from banks			Systematic mapping of potential external financiers
		CE/CB is a recently emerged concept, not yet fully understood		<i>Maintain economic focus by e.g., incorporating life-cycle cost logic and risk, cost and profit analysis</i>	Maintaining economic viability, i.e., not directing all focus on social/environmental sustainability
	<i>Potential resistance to service logic</i>				Constructing risk, cost and profit analysis to ensure economic prosperity
					Understanding and implementing life-cycle cost logic to ensure sufficient cash flow
				<i>Aligning internal incentives with the PSS logic</i>	Changed internal incentive systems
	Barrier	Explanation		Enabler	Explanation
Internal organization	<i>Excessive administrative work</i>			<i>Continuous improvement and innovative development</i>	Diligent strategic and development activities

	<i>Knowledge gaps, e.g., lack of technological capabilities</i>	Potential lack of technological capabilities			Continuous improvement to ensure a future economic and sustainable practice
		In relation to PSS (lack of understanding, frameworks, methods/guidelines, strategy)			Product innovation and extension of product portfolio
		Heavy reliance on efficient logistics systems due to perishable goods		<i>Create a clear vision led by internal project champion(s)</i>	The vision must be communicated, and understood by stakeholder
	<i>Potentially higher cost and risk on the providing organization</i>				Internal project champion(s)
	<i>Lack of proponents for the sustainable initiative</i>				
	Barrier	Explanation		Enabler	Explanation
Value proposition	<i>Innovative solutions in agric. Industries may face resistance due to variance in quality and scale-up issues</i>	Especially if never truly tested and scaled up		<i>Aforementioned attitude towards CE is shifting, given sustainability awareness</i>	
		If output quality varies		<i>Create PSS bundles with customer, stakeholder and channel considerations as the focus</i>	To satisfy the needs of the customer
					Parallel development of services and products enables a more complete offering
					Differentiate through multi-

					layered offerings and higher total value
				<i>Customization and modularity</i>	Provide several solutions for payment
					Different services related to maintenance
					Take-back systems, to ensure circularity

Appendix 2: Interview Guide

- What is your title?
- What are your main responsibilities and tasks?
 - Potential follow-up: What is your main area of expertise?
- What would you say are the most important factors for successfully designing a business model that achieves circularity?
 - Potential follow-up: what is servitizations role in achieving circularity?

Wider

- Are there any specific enablers related to the external surrounding system, i.e., government, suppliers, customers and the relationships with them?

Financial

- What would you say are the key enabling factors to consider in terms of securing funding?
- If we shift the focus towards the firm's internal financials, what are the key areas to consider to enable success at an early stage (*or*: as a startup)?
 - For partners (perhaps for other interviews as well). Follow-up: How do you view profitability in a new initiative?

Internal organization

- From your perspective, what are the key internal processes and activities needed to enable successful implementation of a circular BM?

Value proposition

- From a customer point of view, what are the most important factors to consider when creating a circular value proposition?
 - How should such an offering be developed?
 - Would you say that stakeholder's views on circularity have change over the last decade?
 - Potential follow-up: How has this affected you or your organization?

What would you say are the key barriers one has to overcome in order to successfully design a circular BM through PSS/servitization?

Wider

- What are the key challenges to overcome in relation to the chain, i.e., suppliers, customers, and also the government.

Financial

- What would you say are the key challenges to overcome in terms of securing funding?
 - What are the greatest barriers to overcome in relation to beginning to generate revenues?

Internal organization

- What are the key internal challenges within the organization that have to be overcome in order to successfully implement the BM?

- What are the greatest barriers connected to relationships and the coordination within the organization?
- Which barriers connected to knowledge, capabilities and human capital within the organization would you say are of the greatest importance to overcome?

Value Proposition

- Do you see any potential change in the cost or risk structure since offering a PSS-solution rather than a traditional sale of product?
- Are there any particular barriers connected to production that specifically arise when active within agro/food/food-waste
 - I.e., problems relating to inputs, or scale-up of production
 - Any other problems in relation to the value proposition?

Appendix 3: Interview Guide for the Case Company

- Where do you see the company in, let's say 5 years?
- In general, what would you say are the largest barriers to starting a sustainable or circular business in Sweden?
- In general, what are the greatest enablers for starting a new, sustainable company in Sweden?

Wider

- What is your view on governmental regulations when it comes to starting a company?
- Similarly, what is your view on regulations and laws when it comes to sustainable entrepreneurship?
 - Potential follow-up: What are the largest barriers regarding laws and regulations in relation to upcycling of food-products?
- Do you feel that it is possible for the actors in the industry to influence future laws and regulations?
 - Potential follow-up: how would laws and regulations have to change in order to mitigate some of the issues previously discussed when it comes to launching a new circular business?
- What's your view on collaboration between actors in the food production value chain?
 - What are the most important aspects (could be both positive and negative) when it comes to collaboration, according to you?
 - Are there any particular stakeholders, or stakeholder groups, that you find particularly important to work with?

Financial

- In your previous endeavors and collaborations, has the financial side introduced any barriers?
 - Potential follow-up: if so, what do you think have been the driving forces behind these challenges?
- What do you think are the largest financial aspects to consider as a circular startup?
- Follow-up in relation to funding: what are your experiences or perceptions of getting funding in Sweden?

Internal

- Do you feel that there are any particular knowledge gaps that need filling as of right now?
- Given that an organization cannot focus on all areas at once, which area would you say has the greatest potential for innovation in the organization? (This could for instance be in product, service offerings, process innovation and so on).
- Have you ever worked in close connection to the food or agriculture industries before?
 - If so, what were your experiences from this?
 - Would you say that there were any significant differences between working with small and large actors?
- Are there any technical or logistical issues that you find particularly critical barriers when it comes to dealing with, and valorizing food-waste?

- Alt. technical or logistical issues you perceive in general when being a small actor?
- In a potential scenario where you have just initiated a collaboration with a partner, what do you think are the biggest challenges to overcome?
 - In such a scenario, do you feel that you have the resources and human capital necessary to carry out a project?

Value Proposition

- On the customer side, do you think that there are any problems in relation to customers' views and perceptions on products based on food-waste?
 - How do you think this will develop over the coming decade?
- What is your view on providing a solution that consists of both machinery and services?
 - Follow-up: Especially in the food and food-waste segments?
 - Is it possible to include the customer in the development process, for instance to calibrate the machinery for specific inputs?

Appendix 4: Example of Thematic Analysis

