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Closing the Loop – Designing a Subscription-Based Circular Economy Business Model

A Case Study of a Kitchen Household Appliances Company

Master's thesis in:
Supply Chain Management
Management and Economics of Innovation

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ABSTRACT

Kitchen household appliances bear a great impact on the environment through both the production and use of the products. While great attention has been paid to theorising general models for adopting the circular economy, there remains research avenues in contextualising these within specific industries. To bridge the kitchen household appliance industry into the circular economy paradigm, the thesis aims to design a subscription-based circular economy business model. Furthermore, it explores how to construct the supply chains to enable the business model. This is performed through a case study of a company in the Benelux region.

Laying the groundwork for the investigation, two studies were conducted. First, a literature study into circular economy business models (CEBM) with a particular focus on closing the supply chain. Second, an interview study was performed with management employees from the case company along with external industry and CEBM experts. Collectively, these represented the qualitative data that was subsequently used to answer the research questions.

The empirical findings and ensuant results reveal a possible construction of a subscription-based CEBM, highlighting the interdependencies of the forward and reverse supply chain. The results furthermore display a need for new D2C channels and the targeting of three segments that showcase potential. Throughout the model, there is a recurring theme on the need for partnerships as an enabler of the model which stands in agreement with most circular economy research. The subsequent discussion delves deeper into the various views raised on the proposed model during both the interviews as well as in established research.

In conclusion, the thesis contributes to closing the gap between theoretical CEBMs and industry related factors by providing a contextualised model for the kitchen household appliance industry.

Keywords: *kitchen household appliances, circular economy, circular economy business models, reverse supply chain, closed-loop supply chains.*

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Oscar Östberg

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1 Introduction

Global consumption of resources has grown vastly in recent decades, bearing adverse consequences for humans and the surrounding environment (Oberle et al., 2019). In response to the growing concern around the impact, companies are looking for ways of rethinking their product flows. Rather than building models around short product life cycles where the product is scrapped at the end of its life, companies are considering opportunities to slow down product flows and connect resource flows back as inputs (Bressanelli et al., 2020). A move towards better and increased utilisation of existing resources bears the potential of reversing the trajectory of current projected environmental developments (Bocken et al., 2016). Following, interest in the promise of switching from a linear model to circular is growing from multiple directions, such as governments, business, and society for its promise around meeting all areas of the triple-bottom-line; financial, social, and environmental benefit (Lewandovski, 2016). With more efficient use and re-use of resources, the adverse social and environmental impacts can be reduced without jeopardising economic growth (Geissdoerfer et al., 2018). The associated benefit along with Porter's Hypothesis, that environmental regulation can foster innovative behaviour that creates sustainable competitive advantages (Porter & Van der Linde, 1995), has convinced governments to take action. For example, the European Commission adopted in March of 2020 a circular economy action plan, CEAP, which aims to support the transition (European Commission, 2020). The ability to switch to a circular economy, however, is in part reliant on policymakers and in part dependent on businesses introducing circularity to their operations by rethinking their business models (Lewandovski, 2016).

Since the concept of circular economy business models was introduced, it has sparked a conversation about how businesses may adopt the new way of delivering value, resulting in multiple studies around the typology and conceptualisation of such models (e.g. Bocken et al., 2016; Lewandoviski, 2016). These efforts have resulted in extensive contributions toward the transformation of practices. Bocken et al. (2016) introduced strategies for companies to slow down and limit the flow of resources while Lewandovski (2016) reevaluated the components of the business model canvas in the context of a circular economy and Lüdeke-Freund et al. (2019) assessed a range of model options for companies. While the ambition of companies lies in achieving circularity, Lewandoviski (2016) stresses that it is more accurate in reality to refer to it as achieving a level of circularness as every business model will contain elements of both linearity and circularity to varying extents. Furthermore, as developed markets of established firms rarely display characteristics of fully transforming into circularity, firms often find themselves operating dual models as they operate under both a linear and circular logic. This dual logic remains as structures and technologies do not currently allow for a complete, circular flow of resources (Frishammar & Parida, 2019). In exploring this paradigm, the concept of a circular economy, despite many contributions, remains in its infancy, as multiple dimensions of the subject remain to be covered. Predominantly these gaps exist in exploring the reality of circular business

models in the context of specific industries (Ferasso et al., 2020). Lewandovski (2016) stresses the importance of contextual factors as determinants for the potential successful use of business models to work in practice. Supplier networks, manufacturing, and value offering communication may need to be adapted to fit the unique circumstances and characteristics of the industry as no one solution exists (Ferasso et al., 2020). Therein, lies great value in investigating how firms may organise around certain business models such as a subscription-based offering to fit the specific demands of the industry. Furthermore, in order to enable the transformation to a circular economy, Lüdeke-Freund et al. (2019) argue the importance of the supply chain. The call for the focus on the supply chain arises from the need of closing the loop of materials and products which is done by combining the classic forward supply chain with the reverse, creating a so-called closed-loop supply chain. By introducing the reverse supply chain, used products can be returned from the customers to ensure that the encapsulated resources are properly taken care of by pursuing the most appropriate course of action. This can be for example remanufacturing, reuse or recycling of the product. As such, the supply chain becomes an important enabler and a key operation to move from a classic linear economy towards a circular economy as it enables the closed loop as described by the Ellen MacArthur Foundation (2019).

In companies' potential for entering the circular economy paradigm, the introduction of serviced business models have been widely cited as a possible enabler (Bressanelli, 2018). A serviced business model is where the customers do not buy the product but instead simply purchase the ability to use it (Tukker, 2004). Such use-oriented business models have been successfully employed in other industries by e.g., Car2go, a B2C car-sharing platform (Bressanelli, 2018). In the context of leveraging a subscription-based business model for the circular economy, recent years have seen additional successful work. A prominent example of which is MudJeans, a company that offers its customers the opportunity to lease the jeans for a monthly fee and where MudJeans orchestrates repair and recycling (Bressanelli, 2018).

With the potential that serviced, and more specifically, subscription-based business models bear as an enabler for the circular economy, there is great interest in applying the same approach in other settings. Given the impact that household appliances have on the environment, they represent a promising area of study for the adoption of the circular economy (Bressanelli et al., 2020). In fact, the total energy needs of the European industry to produce them amounts to 500kt of steel, 200kt of plastics, 60 kt of copper and 40 kt of aluminium per year which totals an emission of 2,6 megatons of CO2 per annum. Yet despite the vast consumption of resources, only 35 percent of appliances are recycled in the EU each year (Bressanelli et al., 2020).

Among household appliances, the kitchen bears a great impact further exacerbated by frequent renewals (Maller et al., 2012; Femenias et al., 2016). In this regard, they also represent an area of great promise for improvement. However, in a move towards sustainable models, several obstacles emerge such as increasingly complex product designs, high costs of repairs, and weak demand for second life cycle items (Hagefjärd, 2020). Notwithstanding, the impact that the industry has on its surroundings has led

industry innovators to attempt to rethink the status quo, to service customer needs through sustainable practices. However, as legacy approaches are well established and remain of how to organise business activities and servicing demand there remains a gap of how to adapt these to fit tomorrow's needs and demands. More specifically there exist research opportunities in applying the logic of serviced business models, such as a subscription-based offering to the production and use of kitchen appliances to achieve circularity. To bridge this gap between legacy structures and future needs, this thesis will examine the potential for subscription-based business models for kitchen household appliances. This is performed through a case study of a premium European kitchen household appliance manufacturer.

1.1 Case Company Profile

The focal company sells kitchen household appliances in the three countries constituting the Benelux Union. The company sells a wide range of appliances, ranging from hobs, hoods, and ovens to coffee machines and dishwashers. With the exception of fridges, the unifying theme across all product categories is that they are built-in. These are frequently sold jointly, i.e. a customer purchasing multiple different appliances from the vendor. The products are currently sold through three different distribution channels; *Replace*, *New Kitchen*, and *Project*. The *Replace* market allows consumers to replace or upgrade an existing machine. *New Kitchen* is for homeowners buying new appliances and lastly, in the *Project* channel, the company works jointly with other companies in delivering products to larger housing projects. Both the *Replace* and *New Kitchen* channels are mainly B2B markets where the former is through online retail. The *Project* channel, however, is solely B2B. The channel architecture is visualised in Figure 1.

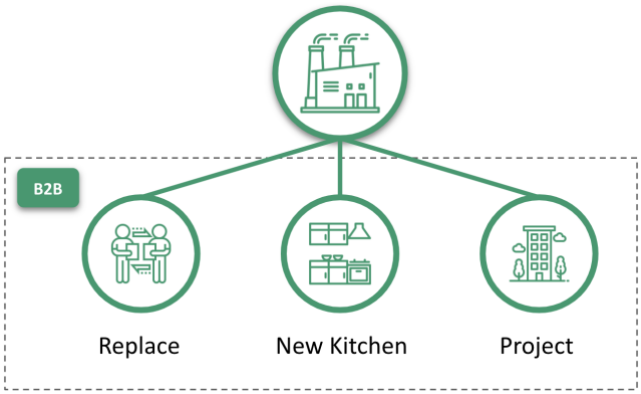

Figure 1: Shows the distribution channels of the focal company.

The company brand and product line is designed to meet the needs of three distinct customer personas; the *Social cook*, the *Pleasure cooker*, and the *Semi-pro*. While each persona raises unique attributes around the customers some of their unifying themes exist around cooking as a social experience allowing for experimentation with easy-to-use appliances.

1.2 Aim

The aim of the thesis is to design a subscription-based circular economy business model for household appliances for the focal company in the Benelux region. Furthermore, it will explore how to construct the supply chain to enable the business model.

1.3 Limitation

The study will not delve into aspects that are specific to any single market. This approach does, however, entail the risk that certain contexts may not be identified. Furthermore, the perspectives from customers of the focal company will not be collected as the thesis rather aims to design a conceptualised model that subsequently can be further iterated and developed on with feedback from customers. The study will therein not delve deeper into the traits of the customer base. This aim for a conceptual model further extends to only qualitative data being collected. Hence, no quantitative experiments will be performed to e.g. validate the profitability of the model.

1.4 Specification of Issue Under Investigation

The research questions to be answered in this master thesis are:

> *1. How can a subscription model be configured for kitchen household appliances in the circular economy?*
>
> *2. How can the associated supply chain be organised to service kitchen household appliances in a circular economy?*

2 Theoretical Framework

This chapter covers the theoretical underpinnings of the study by delving into literature around business models, supply chain and concepts related to the circular economy. The theoretical standing that the framework provides is later applied in conjunction with the empirical findings in the results and the discussion. The chapter starts by covering critical elements around business models and then continues to expand on these topics through the lens of a circular economy.

2.1 Business Models

The intense competition in global markets pressures industry actors to develop strategies and align their organisation to the needs of their customers. A critical component of a company's strategy is its business model (Thompson et al., 2019). The business model does not only serve as a snapshot of the established logic of the firm for creating value but is also a key component of the roadmap when transforming a business (Osterwalder et al., 2005). There exist multiple definitions of what a business model encompasses. In literature, the concept can range from referring to types of models (e.g. business-to-business) to company-specific models, such as the Dell model (Osterwalder et al., 2005). To address the ambiguity of the concept, Osterwalder et al. (2005) synthesised the literature on the area to construct the following definition:

> A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams. (p. 17-18)

The definition constructed by Osterwalder et al. (2005) does not go on to include e.g. competitive dynamics as in the case of Wirtz (2011). However, as the scope of this project only pertains to the firm under investigation and its suppliers and customers, the competitive dynamics will not be directly addressed in formulating the business model.

Beyond defining the scope of the subject, the proliferation of research on business models has also led to them being delineated into various categories based on the focal point of the firm's service offering. Kortmann and Piller (2016) introduced nine archetypes that vary across the two dimensions of the openness of the model and the integration along the product life cycle. The most widely cited categorisation, however, remains that of Tukker (2004) who provided three categories; *product-oriented*, *use-oriented*, and *results-oriented*.

The product-oriented is emblematic of the traditional maker economy wherein the producer provides a product of direct tangible value to the customer. The bounds of the firm typically only extend so far as to provide the customer with the product and most value creation rests on the attributes of the product (Tukker, 2004). In the use-oriented, or servitization, model, customers do not buy a product but instead purchase the ability

to use it. The relationship between the firm and its customers is therein altered as interactions persist post the customer's purchase decision. Furthermore, the central notion of ownership is therein challenged as the firm instead retains it and subsequently charges the customers for the use of the company's assets (Tukker, 2004). In the final category, results-oriented, customers do not pay for a product or provision of service but instead the ability to attain a predetermined result. This further enhances the firm's responsibility in carrying all life cycle costs of the material and resources used to reach the desired goal (Tukker, 2004).

Regardless of which archetype a model can be classified as the components of a business model can be divided into four different components; value proposition, value creation, value delivery, and value capture (e.g. Remane et al., 2017; Lüdeke-Freund et al., 2019; Richardson, 2005). These four categories further consist of the nine elements; value proposition, customer segments, channels, customer relationships, key activities, key resources, key partnerships, revenue streams, and cost structure (Remane et al., 2017). However, with greater attention being paid to the sustainability aspects of the firm, there have been attempts at modifying these elements to fit into the circular economy. The following section will present the work that has attempted to bridge business models into the circular economy.

2.2 Circular Economy Business Models

The notion of a circular economy was first popularised by the Ellen MacArthur Foundation as "an industrial system that is restorative and regenerative by intention and design" (Ellen MacArthur Foundation, 2014). The concept represents a shift from a linear flow of resources, beginning to end of life, into a circular flow. Furthermore, in contrast to a linear economy, a circular economy focuses on using renewable resources both for energy and materials, at the same time minimising waste generated, closing the loop (Ellen MacArthur Foundation, 2019). The circular economy therein brings a new vision for the use and treatment of resources and value creation.

As with the concept of a business model, there has been an equivalent proliferation in definitions of what a circular economy business model is (Lewandovski, 2016). Frishammar and Parida (2019) define a circular economy business model as:

> One in which a focal company, together with partners, uses innovation to create, capture, and deliver value to improve resource efficiency by extending the lifespan of products and parts, thereby realizing environmental, social, and economic benefits. (p6)

The definition of the circular economy business model, hereon referred to as CEBM, in comparison to that of the linear economy focused business model, goes to emphasise partnerships as an enabler in reaching the environmental, social, and economic objectives. Furthermore, Frishammar and Parida (2019) highlights extending the product- and spare part life cycle as a means of attaining these objectives. In achieving such life extensions, Bocken et al. (2016) introduces two distinct forms of strategies;

slowing flows (designing for the longevity of the product), and closing the flow (e.g. recycling).

While the benefits of introducing CEBMs may loom great for governments, businesses, and society for its promises (Lewandovski, 2016) it is not without its challenges. A move towards closing the loop requires a holistic approach in assessing the full business (Lewandovski, 2016). It requires firms to fundamentally challenge the logic of their existing business, how they create and capture value (Frishammar & Parida, 2019). Due to the increased specialisation and division of labour that has taken place over the past decades as e.g., transaction costs have greatly been lowered, many firms do not possess the scope of activities to deliver a CEBM. Therein, firms may need to substantially increase their efforts in orchestrating the network by leveraging the support of third parties to complete the offer (Frishammar & Parida, 2019). Besides challenges upstream, firms may face challenges downstream in moving from selling products to services. Customers may alter their behaviour and start to misuse the service provisions (Whalen & Whalen, 2020) which initially occurred following Rolls Royce launch of the power-by-the-hour offering wherein customers altered their behaviour to make greater use of the service offered (Frishammar & Parida, 2019). Orchestration and incentive alignment, therefore, has to be a careful effort throughout the value chain. These issues display the obstacles in each dimension of the business model, however, challenges also occur in balancing each dimension. For example, imbalances between the revenue and cost dimension may ensue in switching to a service offering as previous one-time payments are replaced with smaller recurring payments which may impose liquidity issues to the firm (Frishammar & Parida, 2019).

To face the entailing challenges of transforming the business model, firms often deploy an iterative shift with small scale trials (Frishammar & Parida, 2019) where the business model transformation is determined along two key dimensions. First, how many elements that can and should be adopted. Second, the degree of change within each element.

To support the move towards circularity Bocken et al. (2016) developed a conceptual strategic framework. In it, Bocken et al. (2016) highlight the importance that design plays in determining the possibilities for creating circular models as it sets the bounds of reality. Extending on the ideas of Bocken et al. (2016), Bressanelli et al. (2018) and Bressanelli et al. (2020) emphasise the importance of digital technologies as well as Supply Chain Management as enablers of the CEBMs.

For a company to be able to move into a circular economy, it is according to Lüdeke-Freund et al. (2019) important to revise their supply chain to comply with the new logic of a circular economy. Supply chains of linear business models are characterised by so-called forward supply chains in which the focus is to produce products from raw materials that later are sold to customers (Lüdeke-Freund et al., 2019) and discarded at the end-of-life. To be able to implement a CEBM, the need for an additional supply chain emerges, namely the reverse supply chains (Lüdeke-Freund et al., 2019). In reverse supply chains, the focus is to enable the reintroduction of entire or parts of

products to the market to be used again or to recycle these, instead of the products being disposed of as waste, as when only forward supply chains are employed (Govindan et al., 2015). Together, the forward supply chain and the reverse supply chain result in what is referred to as a Closed-Loop Supply Chain, further referred to as CLSC (Govindan et al., 2015; Schenkel et al., 2015). These three concepts will be further elaborated in the upcoming three sections.

2.2.1 Forward Supply Chains

The forward supply chain can be seen as the traditional view of a supply chain (Defee et al., 2009). It consists of several processes which together aim to serve an end customer with a finished product, moving the products in only one direction. Supply chain management has been defined by Lambert and Cooper (2000) as:

> Supply Chain Management is the integration of key business processes from the end user through original suppliers that provide products, services, and information that add value for customers and other stakeholders. (p. 66)

Moreover, Govindan et al. (2015) state that the forward supply chain involves several different types of steps, actors and facilities. Common steps included in the forward supply chain are according to Govindan et al. (2015) *acquisition of raw materials, manufacturing, distribution,* and *sales to the end customer*. The sales to the end customer are usually seen as the last step of the forward supply chain (Govindan et al., 2015; Guide Jr et al., 2003). Actors on the other hand can be e.g., logistics companies or retailers and an example of the facilities included in the forward supply chain is the warehouse.

Furthermore, the processes stated by Govindan et al. (2015) agree almost completely with the ones as described by Stevens (1989) which states the supply chain consists of the five activities *Purchasing, Material Control, Production, Sales,* and *Distribution,* hence adding the process of material control. But as the ones described by Stevens (1989) and illustrated in Figure 2 are more detailed, those activities, being *Purchasing, Material Control, Production, Sales,* and *Distribution,* will be further elaborated in the upcoming section Key activities.

Figure 2: Shows the forward supply chain as described by Stevens (1989).

As previously described, the forward supply chain needs to be combined with a reverse supply chain to enable a closure of the loop, creating a CLSC. The characteristics of the reverse supply chain will be elaborated in the following section.

2.2.2 Reverse Supply Chains

The reverse supply chain can be described in different ways, in which one way has a broader approach and the other a narrow approach. The reverse supply chain as defined by Rogers and Tibben-Lembke (2001) is of a more narrow approach and is defined as:

> The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing or creating value or proper disposal. (p. 130)

The approach as described by Rogers and Tibben-Lembke (2001) focuses on the acquisition of the products from the customers and the logistics operations needed to move the products from the customers to the facility for further operations, omitting any further processes. The other, broader, view as described by Guide Jr. and Van Wassenhove (2002) states that the reverse supply chain is the enablement of recapturing value from products already produced through a number of activities which enable the take back from the customers and reconditioning of the products. The reverse supply chain is described as the following by Guide Jr. and Van Wassenhove (2002):

> It's the series of activities required to retrieve a used product from a customer and either dispose of it or reuse it. (p. 25)

This is a complex and costly process as it requires both a lot of time and labour and was previously perceived as a non-value adding activity (Habibi et al., 2017; Schenkel et al., 2015). Schenkel et al. (2015) has a similar view of the reverse supply chain as Guide Jr. and Van Wassenhove (2002) and defines it as follows:

> Reverse supply chain (RSC) management entails the effective and efficient management of a series of activities to return products, parts or materials from the customer with the aim to recover their value. These activities include reverse logistics and recovery options such as remanufacturing, refurbishing or recycling. (p. 729)

As the definition of Rogers and Tibben-Lembke (2001) thus only incorporates the initial stages of the reverse supply chain as described by e.g., Guide Jr. and Van Wassenhove (2002) and Schenkel et al. (2015), the more comprehensive and thorough definition of the reverse supply chain of e.g., Guide Jr. and Van Wassenhove (2002) will be used here on.

A frequently cited and more general view regarding the activities included in the broader reverse supply chain is proposed by Govindan et al. (2015) which states it consists of the collection of the products from the customers and the following process which includes the best reconditioning option which is exemplified to be either remanufacturing, recycling, repair, or disposal if necessary followed by remarketing the products if the previous process allows for either a first or second market of customers. On the other hand, Guide Jr. and Van Wassenhove (2002) proposed a more detailed description of the reverse supply chain activities. These are: *Product acquisition, Reverse logistics, Inspection and disposition, Reconditioning,* and *Distribution and*

Sales. The more detailed reverse supply chain activities as mentioned by Guide Jr. and Van Wassenhove (2002) are supported by Guide Jr et al. (2003), Blackburn et al. (2004) and Defee et al. (2009) but the terminology used among the authors differs. Instead of using the term "reconditioning" as Guide Jr. and Van Wassenhove (2002) does, Guide Jr et al. (2003), Blackburn et al. (2004) and Defee et al. (2009) uses the term "refurbishing" which according to Guide Jr et al. (2003) includes repair, remanufacturing, reuse, recycling and disposal. This definition for refurbishment will be used henceforth. Guide Jr et al. (2003) and Defee et al. (2009) furthermore uses the term "remarketing" instead of "distribution and sales" as Guide Jr. and Van Wassenhove (2002) does, referring to the same activity. Remarketing is the term that will be used for this activity from here on. This results in the five activities of the reverse supply chain to be defined as *Product acquisition, Reverse logistics, Inspection and disposition, Refurbishing,* and *Remarketing*. As these five activities provide a greater level of detail than the activities mentioned by Govindan et al. (2015) and are agreed upon by several authors, these activities will further be used to describe the reverse supply chain. Together, these activities represent the reversed flow of a product from the customer back to the company, the subsequent evaluation of the product's status to decide how to capture maximum value from the product and the decided reconditioning processes. Lastly, it also covers the marketing and distribution of the reconditioned product back to the market again. The five activities as agreed by e.g., Blackburn et al. (2004) will be further described in the Key Activities section and are visualised in Figure 3.

Figure 3: Shows the reverse supply chain as it will be used in the thesis.

Moreover, in a reverse supply chain apart from the activities themselves, it is determined to be important to have fast processes, as with the forward supply chain, since there is a risk that the value of products that are meant to reenter the market again would greatly diminish if the processes are too time-consuming (Guide Jr et al., 2003). The importance of this can differ though depending on the type of product. It is argued that there are two types of reverse supply chain structures, namely *efficient,* and *responsive* (Blackburn et al., 2004; Gobbi, 2011). An efficient reverse supply chain is preferred if it is a time-insensitive product, meaning its value decreases slowly, and a responsive reverse supply chain is preferred when the opposite is true when the value decreases at a fast pace. Blackburn et al. (2004) states that an efficient reverse supply chain is characterised by central inspection of the incoming goods while a responsive reverse supply chain should adopt a decentralised inspection. The main difference between the centralised and decentralised structure is how many facilities are performing the same type of activities (Gobbi, 2011). In a decentralised structure, many units perform the same processes while in a centralised structure, the processes are performed by only a few units (Gobbi, 2011). A centralised inspection suits an efficient

reverse supply chain as it is stated to have a longer throughput time of the refurbished products but on the other hand, enable a decrease in cost by being able to achieve economies of scale through consolidation of activities. In regards to the responsive reverse supply chain, a decentralised inspection is stated to be the best fit as it enables fast decisions regarding the products' condition closer to the re-acquisition of the products, something which could decrease the time for a product to re-enter the loop (Blackburn et al., 2004). It is also expressed by Gobbi (2011) to result in better customer service as well as a more local presence. A negative aspect of the decentralised reverse supply chain is the increased cost because of the need for multiple facilities instead of only one or a few (Blackburn et al., 2004).

2.2.3 Closed-Loop Supply Chains

Together, the forward and reverse supply chain forms the CLSC (Govindan et al., 2015). It is stated by Lüdeke-Freund et al. (2019) that this type of circular flow includes both the flow of physical components and products in a supply chain as well as information, and the different relationships between involved parties that occur in such a flow. It is explained by Guide Jr and Van Wassenhove (2009) that CLSC allows companies to add new value to used products by e.g., reusing an entire product directly or some of its components. Furthermore, CLSC management is defined by Guide Jr and Van Wassenhove (2009) as:

> The design, control, and operation of a system to maximize value creation over the entire life cycle of a product with dynamic recovery of value from different types and volumes of returns over time. (p. 10)

Moreover, Schenkel et al. (2015) stresses the fact that as the CLSC is composed of the forward and reverse supply chain, this leads to a dependency between these two which means that decisions made in one of the supply chains affects the other. Thus, different choices made in the forward supply chain could affect future decisions and activities in the reverse supply chain. An example of such a dependency is that the initial design of a product and its components in the forward supply chain, affects the possibilities to refurbish the product later in the reverse supply chain because of e.g., either easy or complicated disassembly (Bocken et al., 2016). Moreover, it is stated by Wang et al. (2018) that the complexity of the supply chain is increased when resources such as inventory within a company are shared between refurbished and new products.

Schenkel et al. (2015) argue that a CLSC serves as a point of value creation to the company and the environment. This is achieved through the image it provides the company, having a sustainable agenda, while simultaneously it provides the company with sustainable processes and products, something that can result in a reduction of waste and packaging, more sustainable logistics and a general reduction on the negative footprint on the environment (Schenkel et al., 2015).

He (2017) states that moving towards a CLSC with integrated forward and reverse supply chains is associated with some risks. These are risks which are connected to the returns of used products. The concerns are related to the quality of the returned products

as well as the quantities that will be returned, something that results in uncertainties for the organisation. Furthermore, it constitutes a risk according to Wang et al. (2018) not knowing to what degree the customers are interested in purchasing refurbished products, hence there is a demand uncertainty. It is further stated by Gobbi (2011) that there is a need for a market that finds the used products attractive and that the used products are not bypassed by more modern versions which outperform the old products.

The activities of the CLSC along with all other elements of the CEBM are detailed in the following section.

2.3 Elements of the Circular Economy Business Model

In the following section, each of the four components of the circular economy business model is explored along with the elements that constitute them.

2.3.1 Value Proposition

The value proposition is the value a company offers its customers (Richardson, 2005; Osterwalder & Pigneur, 2010). This component is described by Lewandowski (2016) as the most important part of the business model. The offer as described by the value proposition is meant to attract the different targeted segments and offer solutions to their problems or to aid them in achieving their goals. The value proposition can consist of either products or services which are offered by the company (Bocken et al., 2014). The perceived value of these will then translate into the willingness to pay of the customer for which she compares it to the price (Thompson et al., 2019). If the perceived value is, for example, much greater than the price at which it is offered, this provides a powerful purchase trigger to the customer (Granstrand, 2018). Constructing the value proposition to provide great value to the customer is hence of vital importance. As previously stated, this market offering can be constituted by a product, services or a combination of the two. An example of a frequently employed service conjointly offered with the core product is the service of said product focused on maintaining the condition of the products (Anderson et al., 2009).

However, recognising that different customers, even within a shared segment, may desire unique solutions, companies may employ a Flexible Market Offering (Anderson et al., 2009) in seeking to provide each customer with the greatest amount of value. A Flexible Market Offering combines the strengths of standardisation with the advantages of providing flexibility to the customer. In the Flexible Market Offering the combination of the core product and surrounding services is not a fixed solution. Instead, the core product is offered along with a “pick and choose” ability to the customer where they decide which services that provide them with the greatest value. Anderson et al. (2009) emphasise two important elements for companies to succeed in providing a Flexible Market Offering. These are first, clear communications to the customer about what is the core offering and what are optional add-ons. Second, analysing the costs to the producer as well as the value to the customer to ensure that a net benefit is created.

By introducing a CLSC, Schenkel et al. (2015) argue that customer value can be increased. It is suggested to be increased both because it enables economic viability in offering other types of ownership solutions such as e.g., subscription offerings, and increased maintenance services thanks to the increase in spare parts as a result of the return flow of products. Moreover, the customer value can also increase as more environmentally friendly products can be offered as parts can be reused in new products, decreasing the need for new raw material inflow (Schenkel et al., 2015).

When applying the value proposition in a circular economy context, Bocken et al. (2014) argue that it should also take into account and include environmental and social aspects. This is further emphasised by Baldassarre et al. (2017) who concludes that a business model aiming for sustainability should target multiple stakeholders, not only focusing on the economic aspect. Added focus on the environmental aspects of the value proposition has furthermore been cited as a possible source of enhancing customer value and positively impacting the purchase decision of customers (Bukhari et al., 2017). With growing concerns and consideration to the value of the environment, customers have diverted attention from traditional value-oriented products to more eco-friendly alternatives. Instead of solely focusing on the price and use dimension, customers prefer products that do not place harm on the environment (Panda et al., 2020). In that sense, customers seek to gain an understanding and assess what brands have a positive environmental image, ultimately choosing offers stemming from these brands over competitors and forging closer relationships to those brands. The preferences of customers for dealing with organisations that value and consider the environment put great pressure on companies to showcase the value they provide through means of sustainable use of e.g. resources. Anderson et al. (2009), however, raise the issue of companies succumbing to Green Marketing Myopia when seeking to create value offerings centred on an environmental component. They argue that companies may put too great of a focus on the environmental aspect of the value proposition and thereby fall short in servicing the other needs of the customer. They stipulate that the "green argument" is often not enough to convince the customers to commit to a purchase. Instead, it is of vital importance to ensure that the customers' problems or desires are properly accommodated in conjunction with providing value in terms of sustainability.

2.3.2 Value Delivery

The value delivery component of the business model focuses on a company's customers, its relationship to them and where it interacts with the customers. This is described by three elements: customer segments, channels, and customer relationships (Remane et al., 2017; Lewandowski, 2016).

2.3.2.1 Customer Segments

The customer segment element seeks to clarify and describe for whom the company creates value by devising customer segments. Customer segmentation is done to be able to differentiate among different types of customer groups. Segmentation is done by grouping customers based on shared attributes (Osterwalder & Pigneur, 2010).

Examples of attributes that can provide a basis for segmentation are, for example, demographics, profitability, and the use of product or service. Constructing customer segments allows companies to provide the right customer with the right product using the right communication in the right channel based on their preferences (Thompson et al., 2019). Thompson et al. (2019) provide three guiding principles for determining the potential of a segment; ability to measure it, ability to reach it, and its capacity for generating profits. By those principles, the perfect segment can be described as one that is easily measured, which you easily reach in communication and distribution and with your products and that provide a sizable profit.

2.3.2.2 Channels

It is through the channels that the company can connect with its potential customers and inform the customers about its offerings and deliver value (Osterwalder & Pigneur, 2010). These channels can be categorised in different manners depending on the focal point of the analysis. Anderson et al. (2009) suggest how the channel component can be divided based on whether the flow through the channel is of a tangible (e.g. product) or intangible (e.g. information) nature. The channels can also be divided based on the interaction with the consumer, that is whether it is direct or indirect, where the separating feature between the two is the use of one or more intermediary parties to distribute the product to the consumer (Osterwalder & Pigneur, 2010). Employing either direct or indirect channels comes with its associated advantages and disadvantages and can provide different forms of value to both the manufacturing company and the consumer. The use of an intermediary can allow the manufacturer to greatly decrease the number of customer relationships to maintain and can be especially suited when the market structure is fragmented and with small order values. To the end consumer, using an intermediary can, for example, generate value by offering a greater assortment to choose between (Anderson et al., 2009). Benefits of a direct channel correspondingly arise when the products that the company sells are of a more complex nature as properly educating the customers becomes vital. Additionally, the direct channel is beneficial when the manufacturing company wants to sell a system solution or when the relationship to the consumer is of great importance. Regardless of which actors are involved in the process, some of the most widely used channel mediums are physical stores, websites, or a sales force (Anderson et al., 2009). Nevertheless, the use of channels employed by the company will have to mirror the value proposition and the customer segments that are targeted to properly structure them around the nature of what is offered and the demands posed by the end consumer (Osterwalder & Pigneur, 2010).

2.3.2.3 Customer Relationships

The last element of the value delivery component of the business model is around the relationships that the producing company has with its customers (Osterwalder & Pigneur, 2010). It reflects both the type of relationships the company wants to have with its customers along with the customers' expectations on that relationship. There are several different ways for a company to interact with its different customer

segments. These may according to Osterwalder and Pigneur (2010) be through e.g., personal assistance and self-service. The relationship with a company's customers is important since it can have a great effect on the customer experience. Furthermore, with increasing expectations from customers on companies to deliver on their needs, proper management of the relationships become of greater vitality to the success of the business (McKinsey & Company, 2018). To deliver and maintain these relationships, the role of data and technology come to play a greater role. However, the challenges and opportunities do not stop at generating these insights but extend to the subsequent step of also weaving it all together to create a cohesive experience across all aspects of managing the relationship (McKinsey & Company, 2018). Taking the heightened expectations of customers jointly with technology-enabled added insights into customers, relationship management, such as through contact centres, become a strategic point of creating a competitive advantage as the demands can be met through creating personalised experiences for the customers (McKinsey & Company, 2020).

The relationship with customers can facilitate the path towards a CEBM (Lewandowski, 2016). Lewandowski (2016) argues that in the move towards a CEBM, increased customer relations should be emphasised as an increased relationship with customers can simplify and enable a pull production adapted to the demand from the customers. Thereby, decreasing waste of materials and products, as the company through better relations with the customers can better know the demand. Furthermore, the increased relationship could lead to better decisions regarding what type of products are wanted by the customers, something that would decrease the production of products with a low demand on the market. Hence decreasing waste further as those resources can be used in products with higher demand.

2.3.3 Value Creation

Value creation is a component within the business model which covers the three elements: key activities, key resources, and key partnerships (e.g., Remane et al., 2017).

2.3.3.1 Key Activities

Key activities are meant to enable the operations of the company (Osterwalder & Pigneur, 2010). Key activities that become more prominent within the circular economy are for example activities which decrease the waste of products produced, e.g., design and refurbishment activities (Lewandowski, 2016; Bocken et al., 2016). As such, enabling a circular economy business model includes the activities of both the forward and reverse supply chain which together forms the closed loop supply chain (Wells & Seitz, 2005).

The design activities are argued to be of great relevance within a CEBM as these activities can enable enhanced quality of the products to make them last longer as well as to allow for continuous updates, maintenance and modification of a product along its lifetime to ensure it will be used for as long as possible. Furthermore, it is argued that designing to enable use of the same type of components in different products by

facilitating the ease of disassembly and reassembly is of importance to minimise material waste (Bocken et al., 2016).

The five activities included in a forward supply chain as previously stated by Stevens (1989) are *purchasing, material control, production, sales,* and *distribution*. Purchasing is the activity in which the company secures all resources needed to enable the company's operations and can e.g., include the procurement of the raw materials and components to enable the manufacturing of a company's products (van Weele, 2018). Moreover, CLSC can lead to a natural flow of spare parts from the used products which will give the company increased control in the spare part flow and the dependency among other actors such as suppliers will decrease (Schenkel et al., 2015). Material control moreover refers to activities that support the handling of the goods as they have reached the company facilities to secure accurate and high quality deliveries to the production (Bhaskaran, 1998). Production is defined as the processing of the input materials into finished products that are to be further sold to the customers (Rushton et al., 2017). The fourth activity, sales, is defined as the process that aims to attract an eventual buyer of the products offered (Viio & Grönroos, 2014). The final activity, distribution, is described by Rushton et al. (2017) to be the physical movement of the produced products to the customer.

The importance of maintenance in a circular economy is stressed by Iung and Levrat (2014) including the abilities to repair the products as well as monitor them. It is argued that when moving towards a circular economy, the focus of the maintenance shifts to being a service offered and included with the product instead of something that needs to be offered when something breaks after the purchase. As such, maintenance becomes a part of the value proposition. Maintenance has long been seen as a costly process only needed after a product failure, but its status has shifted in the circular economy context (Iung & Levrat, 2014). Maintenance is not only seen as an important enabler to close the loop through e.g., repairing a product to make it last longer. This activity can furthermore help to facilitate the decision whether a certain product has reached a point in the product life cycle (PLC) where it is better to refurbish it into a more efficient version than to repair it (Bianchini et al., 2019). Additionally, the maintenance activity can be combined with technology which connects the products and as such, the condition of products can be monitored and eventual failures can be predicted, and maintenance can be done to products in need of it. This enables preventive maintenance and hence a further extension of the PLC (Bianchini et al., 2019).

As previously stated, Blackburn et al. (2004) defines the reverse supply chain, in contrast to the forward, to consist of *product acquisition, reversed logistics, inspection and disposition, refurbishment,* and *remarketing*.

Product acquisition is the activity in which a company acquires the already used item from the customer (Defee et al., 2009). It is further stated by Guide Jr. and Van Wassenhove (2002) to include the management of when the products should be returned, the quantities returned and what quality the returned products should have. The reversed logistics includes the activities which are related to the physical take-back

of the used products from the customer back to the facilities of the company in which further operations on the used appliance will be performed, such as refurbishment (Guide et al., 2000). The reversed logistics can also be expressed as take-back management (Lewandowski, 2016). To facilitate the reversed logistics and the transportation of the products, Gupta (2013) argues for the use of technology by which the use of RFID (Radio Frequency Identification) is exemplified in which each item is equipped with a RFID tag. A RFID tag has a unique identification number which can be scanned during the movement in the supply chain and thus provide continuous up-to-date information at each site regarding a product's status which facilitates the planning of the reverse supply chain (Jović et al., 2020; Gupta, 2013; Slack et al., 2016). Inspection includes the activities which are to determine the condition of incoming products to decide on the most viable direction for refurbishment (Defee et al., 2009).

As previously described, the refurbishment activity can be defined in many ways, but according to the definition of Guide Jr et al. (2003) it entails the following activities; reuse, repair, remanufacturing, recycling, and disposal. These activities related to the refurbishment hence differ in the processes performed on each appliance depending on the condition of the product. Reuse is the immediate reintroduction to the market. Repair and remanufacturing on the other hand entail some work to be done to the product before reintroducing them to the market. Repair involves some minor adjustments while remanufacturing requires more substantial work to be made to the product (Lüdeke-Freund et al., 2019). Lastly, as a product has reached a certain point in the PLC where neither of the previous options is found to be a viable solution, the product is recycled or disposed of (Lüdeke-Freund et al., 2019; Govindan et al., 2015). Similar to Gupta (2013) advocating for the use of technology to facilitate transportation, it is argued by Blackburn et al. (2004) that through the use of technology, the decision making regarding what refurbishment option would be the most suitable for a product is facilitated. According to Blackburn et al. (2004) this is enabled through the use of e.g., a device that logs the usage of a product. When reading the log, the product's producer will know the status of the product and decide which refurbishment option is the most suitable, saving both time and money.

An activity of importance related to the refurbishment activity is to ensure that the hygiene of the product is of a certain standard that is accepted by the customers. Catulli and Reed (2017) states this is of high importance and that it needs to be clearly proved and communicated to the customers that correct and adequate cleaning has been done to ensure the refurbished products are hygienic. Moreover, Gullstrand Edbring et al. (2016), concludes that hygiene is a high concern by customers regarding products previously used by others. This is especially acknowledged for products which are perceived to be hard to clean as well as products which are argued to be intimate (Gullstrand Edbring et al., 2016). In the study provided by Gullstand et al. (2016), products that are related to the preparation and consumption of food are mentioned as a product group which customers especially relates to hygiene issues when previously used by others. Lastly, to enable use of the refurbished products, new markets need to be found or created and targeted to get the items back on the market, an activity

associated with what Defee et al. (2009) refers to as the remarketing activity of the reverse supply chain.

2.3.3.2 Key Resources

Key resources can be divided into physical, financial, human and intellectual resources and are defined as the resources that enable a company's operations and business model (Osterwalder & Pigneur, 2010). Examples of these resources are employee knowledge, facilities, patents, and the company brand (Osterwalder & Pigneur, 2010; Abimbola & Kocak, 2007; Santos-Vijande et al., 2013). Santos-Vijande et al. (2013) states that the company brand can be leveraged to develop and deliver more meaningful and valuable relationships with its customers. Key resources that arise in the context of the circular economy can, for example, be materials used in the products that come from recyclable sources instead of extracting new materials (Lewandowski, 2016).

Customer data is mentioned as a key resource by Michalik et al. (2018), especially in the current digital era. This type of data can come from e.g., sensors placed on products. The use of data is furthermore stated as an enabler to offer servitization of products and can be further leveraged in other parts of the organisation to gain more value from other resources (Michalik et al., 2018). Schenkel et al. (2015) furthermore argue that the holistic approach of operating a CLSC allows for greater information capture. As information is received about the usage of the product and the status of it, this can be analysed by the company to improve the products and services offered, having a positive effect on customer, economic and environmental value (Schenkel et al., 2015).

As a further matter, as previously mentioned in Section 2.3.3.1, key activities, the design becomes an integral part of the CEBM thereby making the human capital necessary to develop these designs a key resource to the company. This is, furthermore, because of the impact the product's design has on its properties as well as the entire production phase which furthermore could affect the products' ability to fit into a circular economy context to a great extent (Bocken et al., 2016).

2.3.3.3 Key Partnerships

Key partnerships are formed between the company and its suppliers and partners (Osterwalder & Pigneur, 2010). These partnerships are formed to increase a company's operational performance through for example outsourcing parts of a company's non-core operations and to reduce a company's exposure to risk (Osterwalder & Pigneur, 2010). Partnerships can be formed through e.g., joint ventures and alliances (Osterwalder & Pigneur, 2010). Key partnerships can furthermore increase the performance of key activities and key resources as partners can be better at certain activities and possess other resources that the company itself lacks (Lewandowski, 2016). An example is to have a partner be responsible for the recycling instead of doing it on-site, or providing and delivering connected services.

Several additional benefits of partnerships have been stated and are linked to e.g., financial benefits, sharing of risk and quality (Ellram & Cooper, 1990; van Weele, 2018). Financial benefits can be attained as a company is able to jointly innovate on

new solutions and products together with its partners. It also results in the costs related to certain operations becoming clearer and better decisions can hence be made regarding those costs (Ellram & Cooper, 1990). Furthermore, as the company uses a partner organisation to perform a certain activity, the risk associated with that activity is shifted to the partnering company and hence decreased for the outsourcing company (Ellram & Cooper, 1990). By using a partner company for certain operations, enhanced quality can be reached in those operations by taking advantage of the partner company's knowledge base and skills (van Weele, 2018). Lastly, van Weele (2018) states that through using a third party provider, the company becomes less vulnerable to changes in demand and hence achieves greater flexibility in its operations.

With regard to partnerships, van Weele (2018) states four types of risks associated with partnerships. These four risks are *technical risk, commercial risk, contractual risk,* and *performance risk.* Technical risk is referred to as the risk that the partner company is incapable of keeping up with the technical knowledge and use industry best practices. This type of risk can be overcome by using outcome-based contracts, where the delivered result is evaluated. Moreover, there is a risk on the commercial side regarding the costs for the partner's performed activities as well as the risk that the partner will display specific technical solutions to competitors. The risk that is exposed regarding the cost from the partner's performed activities can be reduced by knowing the cost structure for these activities and in regards to the risk for displaying vulnerable information, the need for confidentiality agreements are acknowledged (van Weele, 2018). Contractual risk covers the uncertainty that everything is included in the contract such as what is expected from the partner, how its performance is evaluated and how eventual departures from those agreements are handled. The final risk, performance, is associated with the actual capabilities of the partnering company, if it can deliver the expected result on time, with the expected and agreed quality and in the right quantities.

2.3.4 Value Capture

The last component of the business model, value capture, includes revenue streams and the cost structure of the company (Bocken et al., 2014). This component describes how a company generates its revenue as well as the costs associated with the business model (Bocken et al., 2014).

2.3.4.1 Revenue Streams

The revenue streams describe how a company generates revenue (Osterwalder & Pigneur, 2010). This can be done in several different ways and be generated from a multiplicity of actors in the network. In the product-oriented model, revenues are typically generated from transactional sales of the product while in the servitization model, revenues may be generated from for example monthly instalments of payments, i.e. a subscription (Osterwalder & Pigneur, 2010). In the case that the company offers a subscription model in comparison to a one-time-point-of-sales model, revenues are dispersed over time instead of the company being able to capture the full value at a single point. Switching the revenue model to that of offering a subscription carries benefits to both the producer and the customers. For businesses, it is reported that it can

promote customer loyalty (McKinsey & Company, 2017) and allow the producer to capture more value from the products and services that they create (Bain & Company, 2019). Customers on the other hand enjoy the smaller up-front investment as well as the flexibility compared with locking themselves through a large purchase (McKinsey & Company, 2017). The mutually beneficial circumstances of subscription models for capturing value therein provides a promising avenue for companies to explore (Bain & Company, 2019; McKinsey & Company, 2017). Baxter (2016), however, raises the importance for companies of updating the products that are part of a subscription offering to bestow continued relevance.

Besides the specific form of capturing value, in comparison with the linear economy, the circular economy introduces new forms of generating revenue as companies can extract value from products that have been taken back and are re-sold (Lewandowski, 2016). This point is also argued by Schenkel et al. (2015) who state that increased revenue possibilities arise as an effect of for example the opportunity to enter new market segments with refurbished products and an increase of the aftermarket businesses such as the sale of spare parts. Therein, in addition to subscriptions models' ability to capture more of the value, creating and structuring flows for greater use of the products that a company produces further enhances their ability to seize upon the value generated inside the company's organisation.

2.3.4.2 Cost Structure

A description of all the essential costs which can be attributed to a specific business model is included in the cost structure and is classified by Osterwalder and Pigneur (2010) into two categories, cost-driven and value-driven. A cost-driven cost structure is characterised by companies trying to minimise its costs while value-driven companies focus on creating the greatest amount of value as possible for its customers. Minimising the costs can be used to offer products or services for such a low price as possible. On the opposite of cost-driven, value-driven companies are often associated with offering the customers great services along with the products offered, which often are high-quality products, according to Osterwalder and Pigneur (2010).

Transitioning subscription-based offering with services means not only that revenues are generated over time but also that costs are continuously incurred through e.g., the provision of said services. Equivalently to revenues, the horizon at which companies must look at in assessing the costs of the business models extends greatly forward into the future. Instead of merely looking at the direct costs associated with the manufacturing and selling of the product, the costs that arise from provisioning services through the full life cycle of the product must be properly attributed (Jansen et al., 2020). It is only by assessing the full life cycle cost of the product that the true economic performance of the market offering can be determined.

With respect to the circular economy and the full lifetime cost of products, the potential added cost of new activities may prove an impediment for firms to embrace the transition. By moving to a circular economy, negative externalities transition the boundary to become costs incurred inside the scope of the firm meaning that the full

extension of the firm's practices is accounted for. Negative externalities refer to e.g. the costs to the environment as a consequence of the firm's business that are not incorporated into the calculation of product or service value (Granstrand, 2018). The increase in costs that therein can arise as a result of transitioning to a circular economy may rather be viewed as that the firm taking greater accountability for its practices and carrying the full impact that they bear on the environment (Ellen MacArthur Foundation, 2015).

With regards to the cost components, Schenkel et al. (2015) and van Loon and Van Wassenhove (2020) raise contrasting views in terms of the impact that circular operations may bear. van Loon and Van Wassenhove (2020) describes the imposed challenge on companies in keeping the additional costs of a circular business model low when compared to the savings of remanufacturing instead of producing new products. This may prove especially challenging as production of new products tends to be automated while remanufacturing is often labor-intensive (van Loon & Van Wassenhove, 2020). Additionally, van Loon et al. (2020) also raises repair and administrative costs as sizable components that are often neglected when looking at the full scope of costs in a circular business model. Schenkel et al. (2015), however, when focusing on other areas of the supply chain, mentions that there are cost reductions to capture through the introduction of CLSC. Cost is reduced as e.g., less raw material needs to be used since material and components from returned products can be used. It can as well increase the efficiency of the supply chain and the production, which further implies reduced costs. Furthermore, CLSC leads to a decrease in the economic risk for a company. Schenkel et al. (2015) argue that the reason for reduced risk in this field is a result of e.g., the continuous flow of recycled material from used products which decreases a company's dependency of raw material inflow and the price fluctuations that can occur among raw material.

3 Methodology

This chapter describes the methodology employed to answer the research questions posed by the thesis. First, the chosen research approach along with motivation is presented. Second, the data collection is detailed, followed by a description of the tools and processes used in the data analysis. Finally, the chapter ends with a discussion around the research quality of the thesis.

3.1 Research Approach

The aim of the thesis is to investigate subscription-based CEBMs for household appliances and how the associated supply chain could be constructed to enable the business model. For this purpose two studies were performed concurrently. These were a literature study and an interview study. The explorative and contextual nature of the thesis naturally lent both studies to follow a qualitative research approach. As Patton (2001) states, a qualitative approach is well suited when understanding why or how something works or does not in a certain context.

Within the scope of qualitative research, there exist three distinct approaches; inductive, deductive, and abductive (Bryman & Bell, 2011; Dubois & Gadde, 2002). An inductive approach is according to Bryman and Bell (2011) when observations in a study are connected to current theory to draw new conclusions regarding a certain research area. It is expressed by Bryman & Bell (2011) as "drawing generalisable inferences out of observations" (p. 13). A deductive research approach, on the other hand, has its starting point in current theory, formulating hypotheses based on the current theory which later is validated through data collection and findings (Bryman & Bell, 2011). Depending on the results of the gathered data and observations, the hypotheses can then either be determined as true or false. Dubois and Gadde (2002) propose a third research approach, namely an abductive approach. When the purpose of the research is to add new insights and extend the current theory base within a certain research area, the abductive research approach is favourable (Dubois & Gadde, 2002). It is also argued that the abductive approach is relevant to use when theories from different research fields are to be combined and evolve into new theories. Rashid et al. (2019) further states that the abductive research is of use when theory is to be combined with gathered data. Moreover, it is mentioned that when conducting a case study, abduction is an advantageous method to use (Rashid et al., 2019). When pursuing an abductive approach, it is furthermore stated that because of new perspectives and insights obtained as the research proceeds, the framework used in the research is constantly evolving, a characteristic stated by Dubois and Gadde (2002). As the thesis aims to explore a subscription CEBM applicable for kitchen household appliances by connecting findings from relevant literature fields to interviews, conducted through a case study, the thesis has adopted an abductive research approach.

To bridge the gap between the theoretical foundations of CEBMs and the practical reality, the thesis is set to explore the topic inside a company in the kitchen household appliance industry. This methodology, referred to as a case study, allows a topic to be

explored in its natural setting to enable insights into the complexities of real-life influences (Benbasat et al., 1987; Yin, 2009). Having a single company as the unit of analysis in a case study is appropriate in a number of circumstances. These include when the subject represents a revelatory case, a critical case for testing theoretical concepts, or if it displays extreme characteristics (Benbasat et al., 1987). As the subject company is in a critical stage of looking at end-to-end solutions of transforming their business into leveraging sustainable circular practices, the company stands as an interesting subject for investigation.

3.2 Data Collection

A literature review was performed with the purpose of attaining a deeper understanding of the topic and to gain an appreciation of the current state of research (Bryman & Bell, 2011; Snyder, 2019). Furthermore, to serve the degree of uncertainty that exists in exploring the realities of theoretical concepts, the empirical data of the thesis is exclusively collected from primary sources. The key advantage of using primary data is that it is tailored to the context and circumstance of the thesis (Patton, 2001; Bryman & Bell, 2011). While it provides a more resource consuming means of collecting data (Patton, 2001), the counteracting factors of it providing greater control best reflects the purposes of the thesis.

3.2.1 Literature Study

Bryman and Bell (2011) states that there are two key reasons to pursue a literature review. First, is to ensure the reliability of the work provided. Second, is to gain knowledge regarding the subject researched (Bryman & Bell, 2011). It is furthermore stressed by Snyder (2019) that reviewing others' work is a fundamental part in performing research. A literature review can be conducted in many different ways, in which there are three main approaches; a systematic, semi-systematic or integrative literature review (Snyder, 2019). The reason for choosing one approach over the others depends on the nature of the research and its expected results, as these differ between one another. When applying a systematic review, all articles within the specific research subject being investigated are identified, something that according to Snyder (2019) and Bryman and Bell (2011) decreases the risk of a biased selection of research being used. A semi-systematic approach on the other hand, also known as narrative review, has a broader perspective in which previous research from different fields are studied to answer a research question (Snyder, 2019). Wong et al. (2013) states that by using a semi-systematic approach, the findings of researchers within different fields can be combined, such as the perspective of e.g. business modelling and supply chain. It is further described by Snyder (2019) that a semi-systematic literature review is applicable when there do not exist resources to examine all literature within a certain field. Through conducting a semi-systematic research, Snyder (2019) exemplifies that it can result in "the ability to map a field of research, synthesise the state of knowledge" (p. 335) to further research. The semi-systematic review assesses research articles, and the following analysis is often of qualitative nature. Lastly, when pursuing an integrative literature review, the approach is even broader than both systematic and the semi-

systematic approaches and is especially suited when investigating either all-new or mature subjects (Snyder, 2019). The goal of the integrative literature review is to expand the current theoretical knowledge base within a certain field. Furthermore, the integrative method can according to Snyder (2019) be demanding and difficult to use because of its freedom when searching for relevant literature. For the purposes of this thesis, the semi-systematic approach was chosen as it best suited the circumstances, combining the two perspectives of both business modelling and supply chain management to design a CEBM along with the limited resources available.

Following the semi-structured approach, the literature study began with a review of the topics at hand to identify key theories, concepts, problems, and sources amongst others within the subject area. In reading the articles, attention was paid to identify areas of agreement and disagreement to aid in capturing the multiple perspectives that exist within the research areas. This effort was supported by, after reading each article, constructing a bullet point review of the key topics and arguments raised. Before synthesising the subject area literature, these bullet reviews were linked and mapped. This provided the structure that ultimately yielded the literature study.

3.2.2 Interview Study

With the thesis' purpose of investigating the potential for a serviced circular business model in a particular firm setting, the researchers determined on conducting semi-structured interviews for the purpose of collecting data. Bryman and Bell (2011) state that a semi-structured approach is well suited when the researchers have a fairly clear focus of the scope. The semi-structured interview format allows the interviewers to combine a degree of specificity in the questions that are posed along with a great deal of leeway to follow emergent tangents during the interview that are of relevance to the study (Walle, 2015). Therein, the format proved well suited for the thesis as predetermined concepts were able to be explored while providing room for additional concepts and interrelationships to be discovered during the interviews. Accordingly, prior to the interviews, the researchers prepared interview guides for each interviewee. The guides followed one of two outlines depending on if the subject worked for the focal company or was an external party. In both outlines, each interviewee guide shared common themes while other questions were tailored to the specific affiliation of the interviewee.

All interview subjects were contacted via email, through which an online interview was scheduled. While each interviewee was briefed in short about the subject of the interview as part of the invitation, they were also sent a more detailed agenda two days prior to the interview being held. Before the formal interview commenced, each subject was asked if they gave consent to the conversation being recorded. In addition, each interviewee was made aware of how their anonymity would be guaranteed through their participation in the thesis, the importance of which is argued by Kvale (1997). The interviews were performed by the two researchers in which one was chiefly responsible for the interviewing and the other one took notes and filled in with potential additional or follow up questions. In accordance with the semi-structured interview approach, the

prepared interview guides were followed, and follow-up questions were asked to gain a deeper understanding of the topic covered. The interviews ended by asking if the interviewee had anything to add apart from what already had been asked, with the purpose of letting the interviewee touch upon subjects that had not been addressed during the interview (Kvale, 1997).

With regards to the sampling method employed, according to Bryman and Bell (2011), within qualitative research, theoretical sampling is frequently used. The method is employed to obtain data about concepts used for descriptions and verifications, which lent it suitable to the study. In theoretical sampling, the researcher continuously collects, codes, and analyses data until reaching theoretical saturation (Auerbach and Silverstein, 2003). This stage is achieved when (1) no new data emerges about the concept, (2) the concept is well developed in terms of its dimensions, and (3) relationships between concepts are established and validated (Bryman & Bell, 2011). Hence, the researchers of the study carried on with the data collection until having reached theoretical saturation. This occurred after having conducted 18 interviews with employees at the focal company as well as industry and subject experts. Table 1 shows an overview of the interviews performed as part of the thesis. The total was represented by 18 distinct interviewees and one follow up interview with an employee in Sales & Marketing. The reason for having a follow up interview with the Sales & Marketing interviewee was the lack of time during the first interview in which all areas could not be covered. The first and second interview, respectively, are referenced by the additional identifier A or B in the interviewee code.

Table 1: Shows the list of interviews performed as part of the thesis.

Interviewee Code	Affiliation	Actor Type	Date	Duration
PD1	Product & Design	Internal	03-03-2021	1h 5 min
PD2	Product & Design	Internal	04-03-2021	1h 31min
PD3	Product & Design	Internal	22-03-2021	1h 1 min
SM1A	Sales & Marketing	Internal	01-03-2021	57 min
SM1B	Sales & Marketing	Internal	22-03-2021	32 min
SM2	Sales & Marketing	Internal	09-03-2021	1h 17 min
SM3	Sales & Marketing	Internal	10-03-2021	1h 2 min
SM4	Sales & Marketing	Internal	02-03-2021	58 min
IT1	IT	Internal	03-03-2021	48 min
F1	Finance	Internal	25-02-2021	52 min
SC1	Supply Chain	Internal	26-03-2021	1h 4 min
SC2	Supply Chain	Internal	26-02-2021	53 min
SC3	Supply Chain	Internal	11-03-2021	1h 7 min
SC4	Supply Chain	Internal	10-03-2021	1h 8 min
EXT1	Industry Expert	External	10-03-2021	47 min
EXT2	Industry Expert	External	16-03-2021	1h 5 min
EXT3	Industry Expert	External	26-02-2021	1h 4 min
EXT4	Supply Chain Researcher	External Expert	10-03-2021	1h 4 min
EXT5	Business model Researcher	External Expert	19-03-2021	54 min

Following each interview, the field notes were reviewed, and a concept memo was constructed, detailing all the key themes and concepts that emerged during the interview. This procedure aided in combating one of the main disadvantages of a qualitative form of study, which is the overflow of information that often occurs (Bryman & Bell, 2011).

3.3 Data Analysis

Subsequently to all the interviews having been conducted, all interviews were transcribed, which further aided in reviewing the information collected. Kvale (1997) argues that by transcribing the interviews, the analysis of the information gathered from

the interviews can be facilitated as the result is made visible in text. Furthermore, it is stated that the thoroughness of the transcription depends on multiple factors such as time available for the researchers. The transcriptions of the research interviews were performed with great detail of what was said by the interviewees but left out inaccurate words and sentence fillers such as “Eh” and “Mm”. According to Kvale (1997), there does not exist any guidelines on how detailed a transcription should be, but the context of the interviews should instead be the deciding factor. Hence, the detail in the transcriptions was motivated with the researchers' ambitions to analyse the interviewees' answers in its originality and how they decided to express themselves. Furthermore, in accordance with Burnard (1991), reviewing of the notes and transcriptions was done continuously to get a deeper understanding of the data collected. As the data gathered was expressed in both Swedish and English, Swedish citations found of interest and later used in the thesis were translated by the researchers to the best of their knowledge to capture what was said.

When following a qualitative data approach, there are according to Kvale (1997) five different qualitative analysis methods. These five methods are *concentration, narrative, interpretation, categorisation,* and *ad hoc*. Apart from these five analysis methods, a sixth method of relevance, as described by Yin (2009) is called *pattern matching*. Concentration builds on the idea of summarising longer statements into shorter ones, compressing what is important. This is done to make the gathered data more understandable, something which is supported by Eriksson and Wiedersheim-Paul (2008). Another method, which focuses more on understanding the specific context the interviewee is talking about, is the narrative analysis method (Kvale, 1997). This method makes the interviewee’s statements more understandable by compressing the statements, same way as with concentration, but also explains more what is said by widening the statements and in what contexts they have been expressed. Interpretation is a method which tries to interpret more about what has been said, a method which often enlarges the interview material instead of compressing it. Eriksson and Wiedersheim-Paul (2008) express this method as “Making stories out of stories” (p. 51). The fourth way of structuring and analysing qualitative data, as mentioned by Kvale (1997) is categorisation. This refers to categorising the themes into different groups. Through this approach, the data collected is divided into different classes on different levels, depending on the content of the data. As such, the data is more easily grasped as a lot of information and findings can be narrowed down to a few categories and sub-categories instead of handling every information piece individually, and the data becomes more exhaustive (Eriksson & Wiedersheim-Paul, 2008; Kvale, 1997). The final analysis method as described by Kvale (1997) is using ad hoc. Through the ad hoc method, several different methods can be combined and used to analyse the qualitative material collected and get a better understanding of the material. It is stated that as different analysis methods are used and combined to analyse the gathered material, new insights and conclusions about the data can be formed, compared to when only using a single method of analysis (Kvale, 1997). This is made possible as different data can be handled in the way that most suits the gathered material. This type of

method is described as the most common qualitative analysis method. The sixth method to be explored, the one described by Yin (2009), is pattern matching. This is a method in which the researchers try to speculate on the outcome of the analysis before it is done. Pattern matching can enhance the internal validity if the predictions agree with the outcome. Such an outcome is further stated by Yin (2009) to increase the reliability of the conclusions. If the opposite occurs, meaning the prediction disagrees with the actual outcome, Yin (2009) argues that the first predictions must be re-evaluated to determine why the outcome did not agree with the predicted one. All six methods as stated by Kvale (1997) and Yin (2009) were deemed as possible analysis methods for the thesis.

The actual analysis performed was influenced by both Kvale (1997) and Yin (2009). A prediction regarding the results was performed before the actual analysis of the data gathered. The reason for predicting the results was to enable better internal validity as argued by Yin (2009). The analysis of the data gathered from the interviews was later performed through an ad hoc method in which the most prominent method used was the categorising method. After all transcriptions had been completed, all concept memos were surveyed and combined into a database that contained all pertinent information alongside with references to the transcribed interviews. This allowed all themes and concepts to be easily juxtaposed to more accurately identify similarities and disparities in the statements of the interview subjects. This comparison of statements collected was iteratively performed until all information had been properly sorted into its corresponding component along with having identified its linkages to other topics. The framework employed is shown in Figure 4, including the themes, concepts and elements used. The two central themes refer to whether the information was directly linked to the CEBM or the circular economy at large. The concepts of the CEBM were then linked to the four components of a business model while the concepts of the circular economy were dependent on the macro level of the subject at hand, i.e. society or industry. The ensuing elements were devised from the delineation of the concepts.

Figure 4: Shows the themes, concepts, and elements used in the data analysis.

3.4 Research Quality

Bryman and Bell (2011) state that the three most common criteria in evaluating the quality of the research are reliability, replication, and validity. Patton (2001) refers to these as the traditional tools by which you can judge the research findings. To assess the nature of the research, Patton (2001), suggests in addition, to employ practical standards, such as utility. However, due to the difference in qualitative and quantitative studies, Guba (1981) recognised the special circumstances pertaining to qualitative studies. According to Guba (1981), there are four aspects that are of concern for the

trustworthiness for research of a qualitative nature. These are truth value, applicability, consistency, and neutrality. According to Guba (1981) truth value refers to the extent to which the research can be accepted as an accurate depiction of the reality it sets out to explore. In adhering to this aspect, a wide range of subjects were interviewed within the focal company to remove any departmental biases that might occur. Applicability is about whether the research can be applied in situations beyond those where it was derived. Guba (1981) states how to direct applicability, which is not the objective of qualitative research as it is often derived from specific contexts. Instead, it is the goal of qualitative research in this area to make the audience aware of possible applications by providing circumstantial information. The results of the thesis are subject to the reality of the context from which they were derived, however great attention was paid to illuminate the reader about the circumstances of the findings to support informed decision-making about the applicability-potential. Consistency refers to if similar research was conducted, the findings would stay the same. As qualitative studies recognise and build on particular environments and situations, Guba (1981) acknowledges how duplicating qualitative research is impossible. Instead, consistency in the realm of qualitative investigations refers to the recurrence of patterns in similar studies. Lastly, neutrality refers to the objectivity of the research. As opposed to quantitative research, qualitative investigation often seeks to not distance itself from the subject under investigation. It is therein the objective of qualitative research to mitigate and control for the immersive effects. While performing the interviews via video calls was a challenging requirement to meet, posed by the COVID-19 pandemic, it did serve as an impediment to the possible detrimental effects of being immersed in the environment. Hence, a greater degree of objectivity in the investigation could be maintained. To further assert the neutrality of the thesis, the researchers sought to gain an understanding of multiple perspectives that exist within the various research domains, thereby minimising the occurrence of any bias.

4 Empirical Findings

The following chapter presents the empirical findings retrieved from the interview study. The chapter is divided into two parts. The first covers the findings clustered around each of the four components of the CEBM; Value Proposition, Value Delivery, Value Creation, and Value Capture. The second part presents emblematic challenges anticipated when introducing CEBM to the kitchen household appliance industry.

4.1 Elements of a CEBM

This section presents the findings around the four components of the CEBM and the nine elements that together constitute them.

4.1.1 A Subscription Offering of New and Refurbished Products

The following section details the perspectives of the respondents on the value offered by the subscription offering of new and refurbished kitchen household appliances. The offer is detailed by delineating the proposition into the three dimensions of payment, product and additional services that collectively provide the basis of the subscription-based offering.

4.1.1.1 Payment Structure

Adapting the payment model to a subscription-based approach was primarily thought by the respondents to create value for the customer by allowing them to not have to carry the cost of a one-time large purchase. Instead of having to pay a large upfront price, they would be able to defer that payment overtime. This was particularly emphasised as a means of alleviating a pain point for customers who are looking to avoid expanding their initial housing budgets such as ex-pats, students, and housing corporations. These customer groups are explored further in Section 4.1.2.1.

A second point of value enhancement was thought to be around the price-quality trade-off. The focal company today offers premium kitchen household appliances which are set at a premium price to reflect this. This means only customers with a certain level of disposable income can afford the high-quality products offered. Through alternative payment solutions which result in lower payments, the high-end solutions, with e.g. better durability and energy efficiency, can be acquired at a lower initial cost. In addition, offering greater flexibility to the customer. This was thought to enhance the customer's view of the quality-price tradeoff, creating the perception of more value for the money therein lowering the threshold of purchase. Furthermore, refurbished products that are reintroduced to the market would also result in increased access to premium appliances for a lower price as it was suggested that second or third life cycle appliances should be provided at a lower monthly fee. These appliances would prior to being remarketed, be refurbished to restore functional performance as well as their design.

4.1.1.2 Core Product

The value stemming from the physical product was thought to arise along three key dimensions: design, functionality, and durability. The former two are important elements in the value offering today at the focal company as they provide modern kitchen appliances with both a sophisticated and easy cooking experience. The latter, however, durability, was expressed to be of greater importance in business models built around sustainability. The more durable products were thought to provide value to the consumer by the increased reliability of the product as it removes a great experienced pain point. This was thought to be the case in the subscription offering even though service would be included as product breakdowns create an inconvenience for the consumer. One interview subject stated about product breakdowns:

> *"There is always this enormous hassle when something breaks down. You do not want to be without an oven for quite a long time or a washing machine for instance." (PD1)*

4.1.1.3 Additional Services

As the aim of the thesis has been to explore how the company can transfer from a focus on product and price to instead offer a product-service solution as an enabling model of the circular economy, great attention was paid to how additional services may enhance the value proposition. These were found to act on both an individual level as well as a macro.

On the individual level, ideas for value-added services were thought of around cleaning and maintenance as well as to enhance the cooking experience. To further support the durability and ensure the performance of the product, it was suggested that a cleaning and maintenance service would be included in the offering. Two other respondents further suggested that this service can be offered in levels, where for example a basic service of an annual cleaning visit is included and a second level where the customer can pay a greater price for more visits to be included. As such, both with the basic service as well as with the additional visits, the customer does not have to be afraid that a certain part in an appliance is broken and needs to be repaired at a high cost if the product failure is because of normal wear and tear. Furthermore, it was stated that the customer could have the product exchanged for a new one after a predetermined period of time or when the company finds it beneficial for the customer to have an appliance exchanged due to significantly better performance for example. This could furthermore increase the experienced value for the customer.

In terms of enhancing the cooking experience, most of these were contingent on the idea of the appliance not being considered mostly as hardware but increasingly software. One respondent envisioned the company as creating:

> *"... an entire ecosystem that helps the consumer in their daily life. Plan and do the shopping, make sure the groceries have the right temperature and are put in the right drawers etc." (SM1B)*

This approach of selling complete solutions was thought to greatly impact the value for customers because the perceived value of a package solution is greater than the sum of its parts. This vision of an ecosystem was thought to be made a reality through increasingly connected devices and an application that consumers can use to create an overview of the entire kitchen experience. This was believed to provide great value to customers as simplicity and ease of use is an important purchase trigger. It was further suggested that in this kitchen ecosystem, consumers can, through the application, be provided with recipes that are based on the capabilities of the appliances that the consumer owns as well as their food preferences. Additionally, the application was thought to be able to provide consumers with insights on how to better use the appliances or send notifications when cleaning needs to be done. Furthermore, one respondent stated the suggestion of selling:

> *"... a subscription for wine for example for the new wine climate cabinets. The consumer will get, for example, a Sommelier as a service every month for a fixed fee." (SM1A)*

The consumer would thereby get advice about wine which the company then will deliver.

Additionally, as the products are becoming more connected to the internet, it also enables remote updates of the software, something that could improve the performance of the appliance, such as better energy efficiency.

In general, one respondent (PD2) thought that the offer of value-adding services best be adapted to the local market and their needs while products may remain the same across markets.

On a macro level, however, the offer was thought to provide social and environmental value. In addition to services that are meant to enhance the experience of the appliances, they can be employed to monitor the usage of the products and notify if an appliance is not used as it usually is. This was mainly referenced to be used for lone dwellers. The caregivers or the user's relatives can then follow up on potentially deviating usage to find out the reason behind it. Meanwhile, the offer would generate environmental benefits by adhering to and promoting more sustainable consumption of kitchen household appliances by focusing on greater and more efficient use of resources.

4.1.2 Value Delivery of the Subscription Model

The three value delivery elements customer segments, customer relationships, and channels as discussed in the interviews will be presented in the following sections.

4.1.2.1 Three Viable Customer Segments

During the interviews, three first-hand key customer segments to address emerged where a subscription offering with new and refurbished appliances would have the greatest appeal to the customers. These were customers who required temporary living arrangements, housing corporations as well price sensitive customers. For the first segment, people seeking temporary living arrangements, the predominantly identified

parties were students and ex-pats. For these groups, the solution-oriented nature and their demand for flexibility were deemed to offer high potential. For the second segment, housing corporations, the main appeal was deemed to lie in offering a solution that does not require the housing corporations to invest as heavily initially but to instead defer costs over time while simultaneously signing up for maintenance and other services. For the last segment, price sensitive customers, leveraging a subscription-based offering of new and refurbished appliances was deemed to expand the market opportunities as the company would now be able to sell to customers who may have been dissuaded by the high price tag but can now defer the cost over time.

4.1.2.2 Closer Customer Relationships

As for the company's relationship with its customers, two general trends emerged as part of the interviews in that first customer power will increase and second that the interactions with customers will increase. In regard to customer power, facing the customer directly as part of a subscription model will entail losing the element of leveraging retailers to steer purchases. As for increased interactions, the move towards being solution-oriented as part of a subscription offering entails increased touchpoints along two dimensions. First, as you move towards selling a solution, expectations from the customers increase that you will be constantly accessible via for example contact centres. Second, the D2C sales process, as elaborated on in the following section, will entail closer relationships to increase brand awareness and steer customers towards a purchase.

4.1.2.3 A Move Towards D2C Channels

During the interviews, the belief was stated that delivering a subscription-based offering would require a D2C channel. The need for a direct link emerged from the aforementioned closer relationships with customers along with a belief that a B2B constellation would not be viable in today's market. The latter being because most retailers were thought to not be interested in selling new and refurbished appliances through a subscription solution. The reasoning hinged on two arguments; first, that most retailers today are very traditional and would therein resist to alternative approaches of selling the products. While some retailers were identified as potentially being open to participating in the new model, the few retailers that were thought to be willing to cooperate were deemed to introduce an element of risk. That is, introducing a great dependence on those few retailers. Second, that a subscription offering would, at least initially, require significant education of customers on the benefits of the solution provided, an effort that was deemed to best be kept in-house to properly control the process. Keeping and managing the sales process internally was additionally thought to be a necessity as a consequence of moving into selling connected appliances as the new digital capabilities of the products would require further efforts of educating the customers of the value provided.

A channel that emerged as being of growing importance during the interviews was online. The online channels were thought to be an important contributor to the competitors of the company having greater brand awareness. An element that would be

highly important when moving into D2C. Furthermore, internal analysis had shown that 80 percent of customer journeys begin online therein further highlighting its importance.

While moving to D2C was deemed a necessity by most accounts in selling new and refurbished products via subscription, two individuals raised opinions of dissent. The two issues that they identified were in terms of creating channel conflicts and introducing a sales process contrary to customers' preferences. First, the argument was raised that if the company were to move into D2C it would introduce a conflict with its current retailers. However, others raised the argument that the D2C channel would offer a solution entirely different from the transactional sales model offered via retailers and that it therefore would not be a direct competition between the two models. Second, there was a belief that consumers enjoy the availability of different offers provided via retailers and that therefore a D2C model would not adhere to consumers' shopping preferences.

4.1.3 Creating Value Through a CEBM

This section will cover the findings related to key activities, key resources, and partnerships.

4.1.3.1 Value Adding Activities of the CEBM

Four areas stood out as recurring subjects through being cited as prominent enablers of the CEBM. These four areas were linked to the design of the appliances, the forward supply chain, the importance of maintenance throughout the PLC, and the reverse supply chain.

The design of the appliances has been acknowledged as an important activity within a company which produces appliances meant for the customer market aiming for a circular economy. One reason for this according to a business model researcher (EXT5) is that the design often is one of the aspects that makes the product look and feel obsolete before the product has reached the actual end of its lifetime. Another reason is to enable refurbishment as the design of the kitchen household appliances would have to be adapted to enable exchange and reuse of materials and components. The design of the appliances today at the focal company mainly focuses on facilitating the assembly process, with a low focus on enabling reuse of materials or components and modularity. Many components are today e.g., glued together as stated by a designer (PD1). This has led to the consequence that when only a small part of an appliance is broken, there is a risk that the entire appliance needs to be replaced with a new one and where the old product in turn is scrapped without reusing any parts of it, as stated by one sales and marketing employee (SM4) and a supply chain respondent (SC2). Hence, a lot of the products produced now that are not designed to enable refurbishment would have to be re-designed to enable this process according to the same designer (PD1). Moreover, the appliances would have to be designed in a manner which enables a change of the visual appeal of the product to make refurbished products look modern. Furthermore, related to the design of the products it was stated that it today is of greater value to the

environment to increase the lifetime of products instead of mainly focusing on energy efficiency. That is because they have already been improved to such an extent that the current efficiency updates do not improve the absolute efficiency of the appliances significantly compared to the impact that continually using new materials to produce products have.

It is argued by an industry expert (EXT3) that as companies move from a linear economy to a circular economy, everything needs to be considered, both thinking of the forward supply chain as well as the reverse supply chain to be able to form a closed loop of the products produced. Producers have to take into account what materials are being used from the beginning as well as how the initial design is adapted to enable future reuse and looping of the products to close the loop. Furthermore, inspection of incoming goods is stated to be of great importance to notice if anything is damaged as it is delivered to the focal company's warehouse. This is mentioned to be of importance as quality is essential for the focal company. Moreover, the planning for the outbound logistics is also considered a key activity and is as such motivated by a supply chain interviewee (SC1) to be placed in-house to be able to guarantee a premium delivery of the appliances. It is lastly stated in the interviews that consolidation of the appliances at an internally operated warehouse is essential as different kitchen appliances are sold jointly to customers but manufactured at different sites around Europe. Hence, the significance of the, also currently employed, centralised warehousing structure is emphasised as an enabler to the company's operations to provide customers with complete kitchen solutions instead of distinct appliances.

To be able to increase the lifetime of the kitchen household appliances, it is a common opinion that it is achievable through maintenance. This type of maintenance during the life cycle of the product can be divided into two different categories, either advanced or light maintenance. For the advanced maintenance operations, it is argued that there is a need for trained professional engineers to perform these types of services as it implies handling of advanced products to ensure the quality of the maintenance. For the simpler operations, such as cleaning or basic maintenance, the same technical knowledge and know-how is argued to not be necessary and can thus be performed by less educated personnel. Dividing the maintenance operation into two categories is further motivated by the belief of a supply chain respondent (SC3) that the professional engineers would not be interested in performing the cleaning services because of their higher education, a concern highlighted which could lead to unmotivated workers and resignations. Moreover, the cost of the professional service engineers is stated to be high, something that would further motivate dividing the maintenance work.

The respondents raised the possibility of introducing preventive maintenance which would require a forecast model to plan when maintenance is needed for the different appliances. Using such a model, the maintenance was stated to be forecasted based on historical and current data. This forecast can be supported by technology through, e.g., sensors in the appliances, which can notify the company when a product is in need of maintenance and hence avoid downtime, an argument raised by a supply chain interviewee (SC1). This type of technology could also help the maintenance team to

determine whether a customer experiences a problem caused by the kitchen household appliance or if the problem originates from another source.

> *"[The focal company] Has a lot of problems with service calls regarding malfunctioning dishwashers. Is the blockage in the dishwasher or in the drain? [The focal company] is able to – through a sensor – check, if there is normal pressure in the dishwasher, and therefore does not have to send an engineer, if the problem is outside of the dishwasher" (PD2)*

Through forecasting and the use of sensors, the planning of the maintenance is believed to be facilitated as well as it enables the company to better plan the reuse of components from returned products, reducing the need for new components.

The focal company is stated to currently have the professional skill within the company to perform the advanced maintenance operations as they have a group of after sales service engineers already doing that type of work ad-hoc. Hence, either cleaning and light maintenance personnel would have to be hired or outsourced to a partner company. Furthermore, they already have the ability to forecast when an appliance will break based on historical data, but according to the interviews, this could be further improved through using sensors and connecting the devices to get access to an appliance's actual current status.

Regarding the activities related to the reverse supply chain of the kitchen household appliances, several factors were mentioned. The activities were related to controlling product return flows, the return transport of the appliances, the inspection and decision on the best refurbishment option, and the actual refurbishment operation.

First, with regards to controlling product flows, these are in reference to activities that aim to control the timing and the quality of appliances when they are returned. In terms of controlling the timing, two levers were mentioned, one to extend the product's time at the customer, and one to shorten it. In extending the time at the customer, two approaches emerged during the interviews. First, respondents mentioned a minimum contract period and second using a protection fee to steer when products can be returned. In terms of shortening the time at the customer, incentives such as the ability to switch out the appliance was thought to help the company get products back when it is environmentally beneficial to replace them. With regards to the quality of returned products, the aforementioned activities related to offering maintenance was thought to be beneficial to both the customer and the focal company. For the customer it is, as previously described, an integral part of the value proposition. Meanwhile for the focal company it would aid in ensuring higher quality of the products returned.

The subsequent step of the reverse supply chain is the transportation of the products to the refurbishing facilities. Appliances that would return into the supply chain of the company would have to be collected at the customer. It is expressed that this process has to be done in both an economically viable and a sustainable way. To enable an economically viable reversed logistics flow, it is stated by a supply chain employee (SC3) and an supply chain researcher (EXT4) that the scale of the flow would have to

be of such an extent that economies of scale can be reached, meaning that e.g., a truck picks up several households' appliances on the same route instead of only one at a time, and hence the operations reach a higher potential to not become too expensive on a per product basis. Moreover, the same supply chain researcher states the following:

> *"The trade-offs between transportation emissions versus material recovery, material recovery is always more valuable. So, it is worth the transportations" (EXT4)*

Thus, it is argued that the environmental benefits of reusing the products and the materials the appliances are built of, is to be higher than the negative effect from increased transportation to the refurbishment facility. It is further stressed that as the technology within transportation evolves, creating more sustainable solutions and alternatives, this will further tip the scales toward the benefits of returning products. An identified risk, however, with the reversed logistics flow is to accidentally damage the appliances as they are transported from the customer to the location of further activities. Moreover, it is stressed by a supply chain respondent (SC1) at the focal company that the use of technology, such as RFID, could facilitate the reverse logistics operations. Through this, the products could be traced in the reverse flow on its way back to the refurbishment facility.

When a product has reached the company facility, inspection of the product's status is needed to decide on the most appropriate action according to a supply chain respondent (SC4). This process should be fast to quickly inform about the product's status and facilitate the decision making regarding what possibilities there are for refurbishment for each individual appliance. In this stage, RFID technology could be used as well to inform about what previous changes the product has undergone to know the specific conditions of the product to facilitate the refurbishment decisions. However, while fast processes are stated to be important, another supply chain interviewee (SC1) argued that the need does not arise from the products as they do not diminish quickly in value.

Based on the current state of each product, the products would be refurbished in a manner that fits the condition of each individual appliance. This means that the products depending on the individual status could after thorough cleaning according to hygiene standards, e.g., be directly reintroduced to the market, undergo remanufacturing or be recycled. With regards to the refurbishment process two separate categories emerged that could be described as functional refurbishment and design refurbishment. These two categories are seen as essential to be able to extend the lifetime of a product as stated by a product and design interviewee (PD3). The functional refurbishment would focus on the components which enable the technical functionality of the appliances. The design refurbishment on the other hand refers to restorations and changes to the aesthetic design of the product. This would enable a continuous modern design which was stated to ensure that it is appealing to the customer in the new cycle. As such, dividing the refurbishment into two categories would make sure both the technical and design aspects would be updated.

The focal company currently has the infrastructure to manage a return flow of the products according to the interviewees. As there is already a small return flow of products when they are damaged, the reverse infrastructure already exists in which a driver picks up the appliances from the customer and brings the products back to the facility of the company. There also consists a logistics network of after sales services engineers which could support the current flow and provide a foundation for the new reverse logistics. Moreover, it is stated that the company currently performs basic quality inspections for the products that are returned to the warehousing department and as such, the company also has capabilities to perform inspections of the returned products to determine what further operations to perform, though on a small scale. However, one concern is that the refurbishment activity would not be able to be done at the current site due to lack of space. Hence, it was stated that the company would need a new facility. It is also argued in the interviews that additional personnel is required when scaling up the reverse supply chain activities.

4.1.3.2 Three Key Resources of the CEBM

The use of sensors in the kitchen household appliances to collect different types of data regarding the use of the products and their status are expected to increase as well as the connectivity of these towards the internet. This has led to the data collected from the appliances to be viewed as an important resource to enable the circular flow as well as to develop the products further to increase the value for the consumers through e.g., more personalised experiences.

Furthermore, it is expressed that the brand is a resource of great value. Brand awareness among the customers is important, especially as the power of the customers is believed to increase at the expense of retailers' power, and hence great brand awareness in the competitive industry of kitchen household appliances is stressed to make the customers choose the focal company's products instead of a competitor's.

It is stressed in the interviews that the competence of the personnel is important. The knowledge especially valued connected to the enablement of a CEBM is e.g., related to the maintenance and design of the products. Through the competence of these different roles, the lifetime of the products produced will be able to be extended through smart design solutions created by the designers as well as by great maintenance expertise. It is further argued by an industry expert (EXT3) that design competence is further increased as a move is made towards circular economy, where not only the aesthetics is valued, but also how the products are formed to enable future refurbishment. Hence, the human capital in a company pursuing a CEBM is considered to be of great value.

4.1.3.3 Partnerships Are Increasingly Important but Comes With Risks

Partnerships were stated by the respondents to have an increasing role in the circular economy to leverage the capabilities possessed by other actors. Activities and operations in which partnerships are discussed by the respondents are in relation to innovation, refurbishment, maintenance and logistics. Partnerships with other

companies and universities are determined to be of importance to develop and innovate the appliances as well as processes to refurbish the products.

A common aspect regarding the reverse supply chain and the refurbishment of the products is whether it should be done in-house at the company's own facility or be outsourced to an external partner, a decision highlighted as a challenge. Different views regarding this have been found and the following statements refer to three of the refurbishment activities; reuse, remanufacturing, and repair. An opinion raised by a supply chain interviewee (SC1) is that by having the refurbishment activities in-house, it enables the use of the refurbished components to be faster available in the company's stock again to subsequently be used in the production of new products instead of having to wait for components to be delivered from the partner company. It would as such also be more easily integrated with the purchasing function knowing what components are available or not. Furthermore, it is argued that through taking care of the materials in-house, better reuse will be enabled of the materials as the focal company has the expertise regarding how materials and components can be used. While concerns were raised in terms of keeping the operations in-house would result in extensive transports, by using an external logistic partner, the expertise of the partner could be leveraged to operate a more efficient and environmentally friendly logistics operation. However, if a partner could handle the refurbishment with more local presence, the outsourced alternative would use less transportation for the products. Furthermore, regarding the refurbishment, it is mentioned that the current facility lacks space, which would lead to the need to either invest in a new facility to fit the refurbishment operations or partner with an external company. Moreover, it is also highlighted that there is a risk that the reverse activities would result in increased costs if it were to be done in-house. Regardless whether the refurbishment is to be performed in-house or by a partner, it is believed that as the products are designed and manufactured today without concern for the refurbishment activity, it will be an expensive process.

In regard to the remaining two activities of refurbishment, recycling and disposal, the interviewees were in agreement on the need for using a partner. These two activities are argued to be of complex nature demanding specialised competencies and physical resources, something the focal company lacks and is thus stated to be beneficial to have outsourced to a partner which possesses those resources of importance.

A concern highlighted is that as the focal company is a premium brand offering premium quality products, it is of high importance that this is reflected in all operations performed by the company, and as such, it is viewed as a risk to outsource different operations, such as the refurbishment and maintenance. Therefore, if the focal company finds it viable and necessary to partner with an external company to perform activities linked to these critical operations, it is of importance to make sure the partner company performs high quality services and work to convey the feeling of a high quality, premium brand. However, this was mentioned to not encompass the aforementioned basic maintenance, as this would represent a low-risk activity.

The move towards a servitization model entails a transfer of ownership of the appliance from the customer to the vendor. This was mentioned at multiple interviews as causing challenges in terms of the vendors ability to manage the increase to the balance sheet. In response, two interviewees suggested partnering with a financial service provider. This partnership would help the focal company finance the increase in company owned assets.

4.1.4 Capturing Value From the Subscription Offering

The arguments raised in capturing the value in a potential subscription offering are presented in the following sections regarding revenue streams and cost structure.

4.1.4.1 Enhanced Revenue Streams

The revenue model investigated was for a subscription-based offering wherein the customer would pay a monthly fee. It was suggested during the interviews that this fee could be offered in tiers based on the number of life cycles endured by the product. This form of value capture was believed to allow the company to skim the market's price sensitivity, allowing for a greater share of the market. More specifically, the move towards a subscription-based offering was thought to provide revenue enhancements through two dimensions. First, that it would allow the company to capture a greater market share as customers who did not afford the original purchase may be persuaded when they can attain the product through a lower monthly fee. Second, by developing additional services that are sold alongside the product, the company would introduce new revenue streams. More specifically, the latter would both enhance revenues and provide a means of diversification.

An additional and lesser source of revenue, besides the monthly instalment of payment, was thought to arise from the inclusion of protection fee provision in the contract if the customer wants to cancel the subscription at a point that is decided as prematurely economically viable. A second means mentioned that the company could use to protect its revenues from early cancellations, is through minimum contract periods for the subscriptions. Both of these concepts are further detailed in the section on challenges of the CEBM.

In reference to the impact that a subscription model will have on company revenues, the most prominent aspect was that of the time periods at which the company captures the cash flows. In the company's current transactional model, the time at which the costs are incurred, and revenues are generated takes place more closely. However, with a subscription model, revenues are dispersed over time and costs may even have increased in using more sophisticated materials and production to allow for the longevity of the product which would ensure that the product generates cash flow over a longer period of time. The combination of the two would greatly affect both the income statement and balance sheet and makes liquidity a central question of the business.

4.1.4.2 New Cost Structures

In relation to the impact that the subscription model would have on costs, three groups were highlighted as having the greatest importance. These were costs for refurbishment, recycling, and reverse logistics. While a great number of the respondents, predominantly inside the company, shared the view that the additional costs incurred within these three groups would make the venture unprofitable, some industry experts highlighted a different reality. That is, an increased focus on greater efficiency and reuse of materials and resources would promote another level of cost efficiency within the company. Additionally, the aforementioned opportunities for enhancing revenue were thought to be ample enough to offset, if any additional costs were incurred.

If costs, however, were assumed to increase with moving into CEBM, the point was made by a supply chain researcher (EXT4) about who should bear that cost. While new business models may offer enough value to customers to allow for a greater price, thus ensuring that levels of profitability are maintained, the question was raised if it should be the burden of the customer to bear these. The point was made that if costs were to increase, would these then not more appropriately be shared between the customer and the business. So, while some costs are deferred to be carried by the customer, some of it remains with the company in the form of lower margins as negative externalities then would be accounted for.

4.2 Challenges for Kitchen Household Appliance CEBMs

As part of the interviews, a number of challenges facing the industry in general when moving into CEBM or offering a subscription-based model emerged. These challenges highlighted were related to the hygiene of the refurbished products, early returns of appliances sold via a subscription offer, finances, and inadequate piloting and resources.

4.2.1 Concerns Around Hygiene

A concern regarding refurbishing of kitchen household appliances highlighted is how to make them hygienic enough so that they are accepted and appealing to the customers. This concern is shared by several interviewees and is considered by the respondents of the focal company to be a complicated and time-consuming activity. It is also of importance as there are legal regulations in the company's current market that restrict them from selling refurbished products unless they have been thoroughly cleaned, a process which is described as costly and which only few companies in the company's market can do at the moment. The hygiene of the used appliances was expressed as a concern by the focal company interviewees and how the used and refurbished appliances would be accepted by the customers if not thoroughly cleaned. One of the internal interviewees (SC3) raised that there are several situations in which this is not considered an issue. The need for professional and thorough cleaning is often not considered when renting a house during a vacation or when moving into a new house or apartment. The need for cleaning is always present, but the urge for specially trained staff to perform the cleaning is questioned if it is needed from a health perspective. The

degree of cleaning is also discussed in the interviews to differ depending on how it is used. That is for example whether it is an oven or an induction hob that is to be cleaned in which an oven might be more of a concern than an induction hob as the odour may be more difficult to get rid of.

4.2.2 Early Cancellations of the Subscription

As part of the appliances being sold as a subscription service, a concern was raised regarding how the company would handle eventual early returns of products, meaning only a couple of months after starting the subscription. This was raised as there is a concern that people would like to always change to the newest and most appealing product. To circumvent the issue two main forms of solutions were proposed. First, having predetermined contract periods wherein the customer cannot cancel the subscription within a certain period of time. However, in response the concern was raised by a sales and marketing interviewee (SM2) whether long contract periods makes the offer of a subscription model unattractive for the customers. A second solution raised to avoid the risk of having too many products returned too early is to apply a model similar to how the banks do with loans. If the customers decide to return a product earlier than that stipulated in the contract, they would incur a protection fee. Hence, it would still be a flexible solution for the customers, but the protection was thought to likely deter customers from terminating their contracts prematurely.

4.2.3 Financial Concerns

A third issue specifically related to offering a subscription-based model is around the financial impact it bears on the company. Transforming into offering a subscription-based model lowers the liquidity of the company as revenues are deferred over time while costs are still incurred in the current time frame. This poses a complete paradigm shift to how the company views and generates its cash flow and would hence lead to a need to change the mindset regarding the cash flow in a subscription-based payment solution. Furthermore, changing the point of ownership of appliances from the customers to the company increases the size of the balance sheet. An example given during the interviews to handle the increase in company assets is through funding from external capital which would require partnership with a financial institution. A business model researcher (EXT5) argued during the interviews that the funding could be generated through loans, but to be able to be granted a loan, the company pursuing a CEBM using a subscription model would have to be able to motivate the value of the used products in some way as the focal company's appliances would be the banks' securities if the loans cannot be paid back.

4.2.4 Inadequate Piloting and Resources

A further challenge is linked to the creation of a new business model. It is mentioned by two external experts (EXT2, EXT5) that there is a risk that projects with the purpose of formulating a new business model are not sufficiently tested and iterated on. If testing of a specific business model is not thoroughly executed, it is believed to not make the new business model justice and thus risk that it is incorrectly evaluated. It is also

acknowledged by a business model researcher (EXT5) that there is a challenge that when implementing a new business model, the new model is downgraded in priority because it initially provides less revenues compared with the established business model, something that is disadvantageous for the new business model to enable it in the long run. Furthermore, it is stressed that it is of importance to allow personnel to work with developing a new business model full time, not on the side of their regular work tasks, to be able to handle the extensive work of developing a new business model and to have qualitative results.

5 Results – Recommendations for a New CEBM

Based on the insights and findings from the interview and literature study, the authors would like to recommend a new CEBM to the focal company, described below. The proposed new business model is detailed by first covering the value proposition, second describing the elements for value delivery, and third the elements for value creation. Lastly, the recommended means for structuring the value capture is presented.

The proposed value proposition is a servitized solution to satisfy customers' kitchen household needs. The solution is a Flexible Market Offering provided on the basis of a set of core products, i.e. a series of smart kitchen household appliances offered jointly with services. Ultimately, the offering generates value to the customer along four key dimensions; the subscription solution that we propose, the core products themselves, additional benefits connected to services, and social and environmental gains. An overview of the value proposition is shown in Figure 5. Offering the solution via a subscription-based payment model would enhance value by providing the ability to defer the cost over time, instead of having to pay a one-time large sum. Additionally, paying a monthly fee for access to the appliances would create flexibility through the transfer of ownership. If the customers wants to dispose of the product they could simply cancel the subscription according to certain contract terms agreed rather than having to go through selling the item or properly disposing of it.

In terms of the core products, the provision of functional, connected and ease-to-use appliances with a modern design that are manufactured for durability would all serve to create value for the customers. While, as next described, maintenance of the products would be included in the subscription, durability remains important as it enables longevity of the appliance for all the stakeholders, including the customer.

With respect to services these come in two forms, first those are included in the core subscription, and second the provision of additional "pick & choose" services are proposed to be offered. As for the first category, these are services for cleaning and maintenance as well as software updates for steadily sustaining a functionally modern feel of the appliance. Additional "pick & choose" services refer for example to services that serve to further simplify the cooking experience such as e.g. providing recipes based on food preferences and the capabilities of the appliances. The "pick & choose" feature offers the possibility for the customers to pick from a selection of services which best serve their needs. These services, as well as the ability to view the status and use of the appliance are proposed to be provided through a software application that could be downloaded on the consumer's smartphone. Not at least, the offering would aid customers in living more sustainably as the model hinges on more efficient use of resources. Additionally, the offering carries the potential for social value creation. This is provided by the ability to monitor the use of appliances among people whose habits it is important to maintain. This is primarily in reference to lone dwellers whose caregivers could monitor the habits of them to ensure their wellbeing.

Figure 5: Details the four dimensions of the value proposition for the customer.

The described value proposition is thought to best serve the needs in the following three identified market segments; (i) customers who require temporary living arrangements, (ii) housing corporations, and (iii) price sensitive customers. The four value drivers of the value proposition hold promise in serving the unique demands of these segments with the key point of value creation for each segment being highlighted in Figure 6.

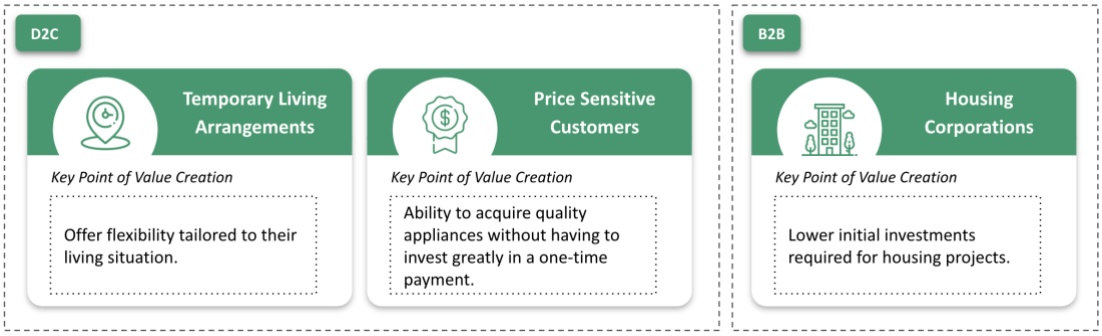

Figure 6: Shows the three identified market segments and the key point of value creation for each of these.

To reach out to the customers with the most suitable subscription offering, it is recommended that the focal company moves to construct a dedicated D2C channel strategy as the greater complexity of the servitization offering is found to be best managed in-house. Additionally, the D2C strategy allows for closer customer relationships, thereby supporting the company in continually developing the offering to match the requirements of the market. The D2C strategy aligns with directly targeting two of the three proposed segments, more specifically, temporary living arrangements and price sensitive customers. For these two, sales are suggested to be conducted through the use of company owned stores and a website. As for the third segment, housing corporations, this represents a continuation of the focal company's current B2B channel strategy. Hence, channel practises exist for this segment today, and a continued use of the sales force is to be recommended. Regardless of the channel architecture, be it D2C or B2B, the business model represents fundamentally closer relationships with

customers. The model entails a shift from largely one-time interactions to ongoing interactions. The expectations of customers would be managed through self-service capabilities on the website or the mobile application and, most importantly, customer support. Jointly, these would serve the requirements of the customers and build the ground for a closer relationship. Moreover, as the interactions with customers are believed to increase along the shift from a transactional sales model to a subscription-based CEBM, it is advised that the focal company increases the brand awareness among the customers. This is proposed as it is foreseen that the influence from retailers will decrease in this shift, while the power of customers will increase simultaneously. This implies that to increase sales, awareness among the customers must be higher than today. Hence, the shift leads to the focal company's brand to become an asset of great importance.

To enable the value proposition, certain activities and resources are deemed to be important to support it. These are to enable a circular flow of the appliances and therein a transition to a CEBM. The activities and flow of the products are visualised in Figure 7. An important activity, which builds the ground for all activities shown in Figure 7 is the design of the products and services. This activity is critical to enable a circular flow as the initial design decisions will set the standard for how complex further activities will become, such as the ability to efficiently refurbish products. As the design activity is believed to further increase in importance alongside the move to a CEBM, designing for the circular economy, including both use and re-use of the appliances, becomes a core capability and resource to the company. To further innovate smart product solutions which enable a CEBM, the focal company should continue to partner with universities and other companies to engage in mutual innovation initiatives.

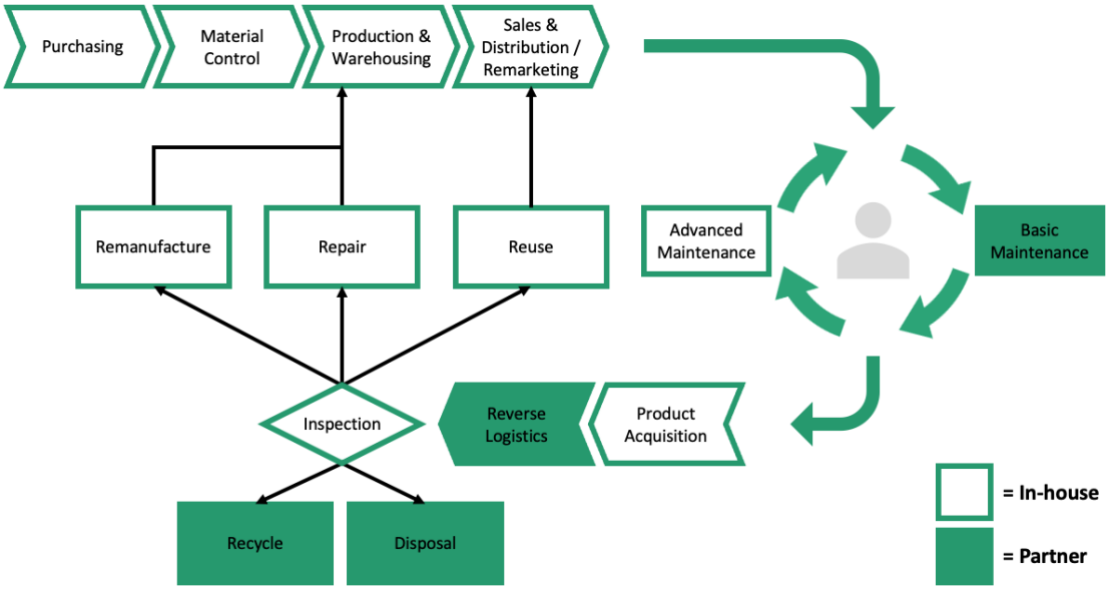

Figure 7: Shows the activities in the CLSC and whether they are recommended to be performed in-house or by a partner.

As for the forward supply chain, with regards to purchasing, it is recommended to focus on the procurement of materials that facilitate later processes in the supply chain in a sustainable way, such as through procuring more durable materials. It is also advised to have a central warehouse, as this enables consolidation of the incoming goods from different suppliers located around Europe.

As the appliances will be delivered to the customers through the channels previously proposed, continuous maintenance of the appliances should be offered to increase the lifetime of the products. This includes both preventive maintenance through forecasting, to ensure appliances' uptime as well as reactive maintenance if an appliance experiences a failure. This activity thus includes monitoring the condition of the appliances and maintaining them during the time they are placed at the customers'. It is recommended that the activities related to maintenance are divided into an advanced and a basic offer to capture the maximum value from this process. Advanced maintenance should be an internal activity since it is suggested to include complex activities, such as the changing of filters in an appliance, and thus demands greater knowledge of the product. Basic maintenance, such as cleaning of the appliances beyond the customer's responsibility, is on the other hand proposed to be outsourced to a partnering company, as it is regarded as a non-core activity in which the competence within a partnering company could be leveraged.

During the time the appliances are used by the customers, data should be collected regarding the usage of the appliances. This is deemed to be an important resource to enable continuous development of offers to the customers such as personalised services and improved product features as well to gain the necessary information used in aforementioned forecasting models for maintenance and R&D.

For the focal company to enable the recapture of the products' value through offering a subscription based CEBM, a key activity becomes the acquisition of the products from the customers back to the company. This activity is recommended as it is of importance to ensure a controlled flow of returned products both regarding the quality of the products returned, the quantity and when they are to be returned. Through applying minimum time contracts combined with continuous monitoring of the products as well as from the maintenance activity, to validate the product's condition, the right time for acquiring the products from the customers can be planned. The continuous maintenance also ensures a greater quality of the products that are returned.

Regarding the physical movement of products both to the customers and from the customers back to the focal company's central facility, it is proposed for the focal company to use a third-party logistic partner. This is suggested to enable economies of scale in this operation and to leverage the partnering company's core competence.

As the products have reached the company facility, the status of the incoming appliances should be analysed to decide on the most suitable refurbishment activity. To allow for high-quality value recapturing of the products, it is proposed that all types of refurbishment activities, apart from the recycling and eventual disposal of products, are advised to be performed by the focal company. This is suggested in order to take

advantage of and further develop the internal product expertise as it is seen as a core capability of the model. The refurbishment activities, recycling and disposal, should be outsourced as they are complex processes that are non-competency areas within the focal company. It is as such believed that through outsourcing these activities to a partner, the value captured in these two operations will be higher than if performed internally. Following the refurbishment, the products are recommended to be remarketed using the existing channels as previously mentioned.

As the proposed CEBM is believed to increase the balance sheet of the company along with a changed cash flow, it is advised for the focal company to engage in a financial partnership. The reason for this is to have a financial partner which can provide the company with financial support in carrying the greater value of assets on the balance sheet.

To sum up, a tiered subscription-based model is proposed to the focal company, which captures value from the aforementioned offering and activities: customers would pay a fee in monthly instalments for the provision of the product-service offering. To avoid early cancellations and ensure revenue streams, the subscription is to be offered with a minimum cancellation period. The model is built up in tiers to first leverage the different price sensitivities of customer segments, and second to incentivise customers to purchase later stage life cycle appliances. The tiered pricing model to be applied is suggested to be based on the circular status, meaning if the products are first or second life cycle items etc. This is visualised in Figure 8.

Figure 8: Shows the tiered pricing model offered based on the life cycle stage of the appliance.

In addition to the revenues from the core subscription, the previously described "pick & choose" style selection of additional services provides additional revenue opportunities and diversification of revenues. Counter to the revenue end of the value capture, the cost structure is to be based more on a value driven model to mirror the customer focus. While cost leadership remains important in the kitchen household appliance industry, the move towards the servitization model requires greater effort in adding value to promote purchase rather than focusing on lowering price.

6 Discussion

In the following chapter the previously stated results will be discussed in regard to the research questions and put in relation to previous research.

Insights gained from both the literature study and the interview study yielded a holistic detailing for how the logic of the firm could be constructed to fit the circular economy paradigm using a subscription-based model. Thus, the results of the thesis provided a mapping for how a subscription model could be configured for kitchen household appliances in the circular economy. Furthermore, the focus on how to organise the supply chain revealed valuable understandings of the practical role that it plays in the CEBM. The proposed model hinges on a fundamental transformation of ownership, product flows and value capture, representing a stark shift from the current business' operating model, which raises the subsequent question of how it should be used and incorporated by the focal company. One aspect that emerged in the findings was the large belief that the new model did not represent a real channel conflict with the existing one. From that standpoint, neither spinning the model off entirely nor committing to a complete transformation of the current business into the new model was seen as a prerequisite. With the wide scope of possibilities that are open for how the focal company best should adopt the subscription-based model, subsequent investigations will need to focus on which of these would be the most suitable path forward. Such an investigation would need to, amongst others, consider the risk profile of the company, opportunities for synergies, and need for separation of the businesses to focus efforts. The latter specifically in reference to the aforementioned challenge of CEBMs in that new models are frequently not prioritised within companies in gaining access to needed resources. Nevertheless, the answers to the research questions provided a design for how to configure a subscription-based business model for kitchen household appliances into the circular economy paradigm. Following, the components are delved deeper into and put into context with previous research.

6.1 A Subscription-based Model for Kitchen Household Appliances

The proposed value proposition is a servitization of the kitchen experience with a set of core products, i.e. kitchen household appliances sold jointly with services. The selling of a complete, functional, and ease-to-use designed kitchen solution was thought to provide customers with an easy and flexible experience which would heighten perceived customer value, something which also is stated by Granstrand (2018) in order to support triggering the purchase process. The additional attribute of products that are built to last with great durability is deemed as another enhancer of value. Beyond the durability being of value to the customers, making appliances that are built to endure will lessen the required maintenance of them. Strengthening the durability dimension of the appliances could hence also aid in ensuring the economic viability of providing maintenance as part of the subscription offering. Furthermore, the increased durability generates environmental benefits as the materials and resources employed to produce

the appliances are used over a longer period. Providing customers with the ability to perform updates on their appliances through connected appliances would tailor to the reported growing needs of customers to feel that the relevance of the product is maintained in a subscription model (Baxter, 2016). The relevance of allowing continuous updates of a product is furthermore acknowledged by Bocken et al. (2016) as it is stated to increase the lifetime of the products.

The additional provision of a selection of services would further make the offering more personalised as customers can "pick & choose" to create the offering that best tailors to their wants and needs. As expressed by the respondents, such additional services can serve to further simplify the cooking experience by providing e.g. recipes based on preferences and the capabilities of the appliances. The service of delivering recipes to the consumer would then be further improved upon as the system learns about the preferences of the user. The increased precision in the personalisation of this service would then serve to instal a switching cost for the consumer which would serve to deter them from cancelling the service (see even Schenkel et al. 2015; McKinsey & Company, 2017; Michalik et al. 2018). Providing the Flexible Market Offering would further be tailored to keeping the product line constant across markets while providing a differentiated set of services based on local preferences, a need also confirmed in the interviews. The proposed value proposition has the advantage of offering customers the flexibility of creating the package best suited to their needs. Leveraging the scale of core products further enhances the producing company to offer the service at a lower price. Additionally, focusing on delivering a core offering of products and services that attend to the needs of the customers enables the company to avoid succumbing to Green Marketing Myopia as argued by Anderson et al. (2009). Lastly, in agreement with McKinsey & Company (2017) offering the products and services through a subscription bestows the customers with greater flexibility of ownership along with the ability to defer the cost of acquiring the service over time, instead of making a one-time substantial investment.

Supported by both the empirical findings of this thesis and argued by Bocken et al. (2014) and Baldassarre et al. (2017) is the importance of conveying environmental and social value in the value proposition. In agreement with Schenkel (2015), the study-findings show that deploying a CLSC has the potential to provide significant environmental value opportunities. The environmental component was thought to be delivered by differentiating the offering through promoting better and greater use of resources, also argued by Bukhari et al. (2017), with the purpose to increase the value to customers to the extent of positively impacting the purchase decision.

The value proposition remains the critical component of the business model (Lewandowski, 2016). If no value is delivered, the remaining elements turn inconsequential. The value proposition is hence of great value to iterate on and pilot. The importance of iteration in developing new business models is supported by both the respondents in the interviews and Frishammar and Parida (2019) as they stress that this allows the organisation to adopt the components that have a desired outcome and neglect the ones that do not.

6.2 Increased Interactions in New Channels

The proposed business model suggested by most interviewees indicated a move towards constructing a D2C channel. The two arguments raised against the notion was that it would institute conflict with the current set of B2B customers as well as introduce a channel structure that is not preferred by customers. The first counterargument to the model was, however, not deemed to pose an issue by the majority of respondents as they believed that the subscription model would be sufficiently different from the offering in the B2B channel to not constitute a direct conflict. The second counterargument voices that a core demand of customers is around one of the advantages raised by Anderson et al. (2009) in the use of intermediaries. This being that customers prefer the ability to choose their product after reviewing a wide assortment of options. However, the rebuttal to this remains the same as to why a D2C was argued pertinent in offering a subscription model. The subscription model would decidedly be a more complex offering compared to the transactional sales of the product. This complexity is further enhanced by the appliances becoming more connected. When the market offering is of complex nature, having the customers require more support from the manufacturing company, Anderson et al. (2009) argue for the use of a D2C channel. The direct channels would also be important in clearly communicating to the customer what is the core offering and what are optional add-ons as stated by Anderson et al. (2009) to be a key action for the success of a Flexible Market Offering. Beyond the technical elements of the products, moving to direct interactions with customers can allow the company to tackle the challenge described around the hygiene of refurbished products. This was cited as a great challenge in selling second-life cycle appliances but only in terms of the perception among customers as adequate cleaning solutions exist in restoring them to a condition where it does not pose an issue. Having a direct relationship with the customer when selling the refurbished products can cement a greater degree of credibility to ensure that customers are properly educated around the actual hygiene aspect of the products. In conveying the credibility of this messaging strategy, the company's brand becomes a resource of greater importance (Santos-Vijande et al., 2013). Having a strong brand image would enhance the company's ability to educate customers on the various aspects of the offering. Building the brand would be an integral part of moving into D2C as getting it in front of more customers will build recognition and awareness around what the brand constitutes. Key channels for getting the brand across would be through the advocated use of stores and the website but could also move to include marketing strategies in other channels. The website also becomes a key channel for the company to employ as it was stated that 80 percent of customer journeys begin online. Therein highlighting its importance in driving customers' purchases of kitchen appliances.

The construction of the D2C targeting is determined to greatly enhance the relationships with the customer through increased interactions. The points of interaction extend beyond those centred on the physical products to an increased flow of information between the two parties as additional services are supplied and devices become connected. These increased interactions increase the role of customer support and

managing the relationship. These activities could be further supported by properly leveraging data which was described as a point of strong potential for differentiation to the company (McKinsey & Company, 2020).

There are three segments that are identified as promising. These are customers who require Temporary Living Arrangements, Housing Corporations, and Price Sensitive Customers. Thompson et al. (2019) argued for three principles for determining the potential of a segment; ability to measure it, ability to reach it, and its capacity for generating profits. While the first and third segment may provide some overlap in their associated attributes, the distinct nature of the first being specifically around students and ex-pats provide grounds for means of adequately partitioning the two segments for measuring. In terms of ability to reach, the second segment, housing corporations, hold the greatest potential here, as channels already exist for this segment. To properly target the remaining two, a new D2C would need to be erected. As for the last of Thompson et al.'s (2019) principles, capacity for generating profits, investigating the size of the potential size of the profits lay outside of the scope of this thesis and will need to be further investigated in subsequent efforts. However, the subscription offering is deemed to offer substantial value to, especially, both the temporary living arrangements and housing corporations segments which provides the potential for great profit generation. Both these, temporary living arrangements and housing corporations, offer potential key segments for pilot testing of the business model. The greater homogeneity of both of these segments allow for more focus on efforts and messaging. Furthermore, with respect to the housing corporation segment, these are already being engaged with by the focal company today, meaning that existing relationships can be leveraged to pilot the new subscription model.

Moving into D2C to ultimately interact further with customers provides both strong advantages and challenges to the focal company. On the one hand, extending the scope of the firm reduces reliance on retailers, enabling the company to exercise greater control (Thompson et al. 2019). Furthermore, through more interactions with customers, more could be learned of these to stay ahead of the competition and deliver greater value that mirrors the needs of the customer (Lewandovski, 2016). On the other hand, extending the scope of the firm increases the risk as more activities fall within the scope of the firm (Thompson et al, 2019). Furthermore, keeping the D2C sales in-house limits the ability to scale the business as an expansion is limited by the available resources that are at the disposal of the firm. Therefore, as the offering becomes more mature and for example the educational need decreases, it may prove warranted to reinstate the use of intermediaries for the sales operations. However, based on the current market outlook and stage of the industry life cycle, keeping the sales in-house was thought to best adhere to the prevailing circumstances.

6.3 Extended Scope of Value-Creating Activities

To enable an effective CLSC and a CEBM, it is stressed by Bocken et al. (2016) to have a design that allows continuous updates regarding both the design and technical performance. This is also highlighted in the interviews as of great importance. Through

enabling continuous aesthetic updates it slows down the feeling of obsolescence, something that is stated in the interviews to be a major reason for people to exchange their appliances for new ones. The initial design also plays a major role in how easily the recapturing of an appliance's value will become, which is argued by Bocken et al. (2016). That could mean that if an appliance is designed in a way that facilitates refurbishment, it will de facto result in a higher degree of refurbishment to be done. Such design solutions could thus lead to better performance with regards to sustainability and reduce costs for the refurbishment activity as it will simplify the process. To further innovation regarding solutions that will facilitate and improve the CEBM, partnerships with universities and other companies should take place. Ellram and Cooper (1990) states that through such partnerships, mutual innovation capabilities exist, and the same view is shared by the focal company which also stresses the importance of partnering with the previously stated actors. Frishammar and Parida (2019) also states that these types of partnerships can result in mutual innovation capabilities to further develop the CEBM and improve environment, societal and economic objectives.

By focusing on purchasing materials of a certain quality, the initial step in the forward supply chain as described by Stevens (1989), and as such use materials that will last longer than the materials used today, more durable products can be produced. This is stated in the interviews to be important as it can make sure the products can be used longer and be included in the loop for a longer time before they need to be either recycled or disposed of. Focusing on the downstream processes in the CLSC already in the initial phase of a product's lifetime, i.e not only considering the forward supply chain, is further stressed by both Bocken et al. (2016) and Schenkel et al. (2015) as they state that decisions made in the forward supply chain affects the reverse processes. For the CEBM, it is further proposed that the focal company operates a central warehouse to enable consolidation of the incoming goods from suppliers around Europe to provide delivery of the complete kitchen solution to the customers. Moreover, operating a central warehouse would be advantageous for a later activity in the CLSC, namely the inspection activity in the reverse supply chain. As it was stated in the interviews that the appliances have a slow decrease in value, the use of a centralised inspection is supported by Blackburn et al. (2004) to operate an efficient reverse supply chain. By doing so, the focal company could capture as much value as possible at a minimum cost through reaching economies of scale in this activity rather than a responsive reverse supply chain which could result in increased costs instead. This could also ease the concerns highlighted by interviewees in the company that the reverse operations would come at too high a cost. Combining the benefits of consolidation and efficient inspections, therefore indicate that the use of central warehousing would be beneficial for moving into a subscription-based CEBM as it would lead to efficient inspection operations as well as enhanced services to the customers, offering delivery of complete kitchen solutions. However, the recommendation for having a centralised warehouse is influenced by the region that the focal company operates in which may be considered relatively small. This means that the same recommendations might not apply for a

company pursuing a similar business model in a larger region as then a decentralised structure might be more advantageous to e.g., be closer to the customers and hence enable reduction of transportations.

Along the PLC, the ability to have continuous maintenance operations is argued by Bianchini et al. (2019) to enable a longer lifetime of the products, which is agreed upon in the interviews. As previously stated, it is recommended to divide the activity into advanced and basic maintenance, as these operations are deemed in the interviews to be of different focus. The advanced maintenance should include the technical complex processes and should as such be performed in-house by the focal company's personnel. The basic maintenance on the other hand, such as cleaning is suggested to be performed by an external operator as it is not a core competence within the focal company. An advantage to having this non-core operation outsourced is to take advantage of the third-party provider's expertise, as stated by van Weele (2018). Hence, using a partner could lead to increased quality in those operations rather than if they had been performed in-house. The reason to keep the advanced maintenance in-house would be to lower the technical risk as mentioned by van Weele (2018). This is also expressed in the interviews regarding outsourcing critical operations to a partner, especially as the focal company operates a premium brand that thus should ensure top quality operations. It is additionally stated that the focal company currently possesses that specific competence within the company, further motivating such a recommendation. The increased costs that the maintenance would imply, as stated in the interviews, questions the need for such extensive maintenance. As the maintenance consists of manual labour to a large extent and the professionals are determined to be costly, the maintenance would have to be made more efficient to motivate for additional maintenance services. A more efficient maintenance activity could be enabled through using technology and forecasting models. Preventive maintenance can thus be facilitated through using forecasting models based on historical and sensory data to determine when an appliance will fail. This is something the company believes will improve the maintenance, and Bianchini et al. (2019) state the use of technology devices such as sensors to be an enabler of such preventive maintenance. Furthermore, the connected appliances could also aid in determining when an appliance should be returned to the company for refurbishment, a possibility stated by Bianchini et al. (2019). As such, unnecessary maintenance visits could be kept at a minimum, decreasing the total cost. Apart from the focal company being responsible in maintaining the appliances, the customer also plays a role in maintaining these through e.g., regular cleaning.

It is stressed in the literature that through the maintenance activities, the company can identify when an appliance should be exchanged to ensure that the most efficient products are used therein continuously working to minimise the environmental impact (Bianchini et al., 2019). This would hence lead to appliances being used in the best way possible, and would also give the company better control of the appliances, ensuring high-quality standards and better knowledge regarding components that will be available in the refurbishment process. Moreover, it is also stressed in the literature by Iung and Levrat (2014) that in the shift towards a CEBM, maintenance has increased in

its status and is now expected as being a part of the offer. Thus, not offering the maintenance services could be disadvantageous if the customers expect the focal company to offer it.

As stated in both the literature (e.g., Govindan et al., 2015) and in the interviews, to enable a circular flow of products in a CLSC, the forward supply chain needs to be extended with the reverse supply chain to create a CLSC. The activities that are acknowledged from the interviews highly correspond with the activities included in the reverse supply chain, as described by e.g., Blackburn et al. (2004).

As previously stated, the maintenance and connectivity of products will enable investigation of the status and quality of the products. This supports better decisions to be made regarding the first stage in the reverse supply chain as stated by e.g., Blackburn et al. (2004), *product acquisition*. The customers could also help in facilitating the decision for when an appliance need to be exchanged by notifying the focal company when there is an issue with an appliance. The need for well planned product acquisitions is stressed by He (2017) to decrease the uncertainty regarding both quantity and quality of incoming products. Sufficient planning could moreover facilitate the concern raised by Wang et al. (2018) regarding the complexity of having new and refurbished products sharing resources.

To enable a returned flow of the products, the *reverse logistics* operation was deemed as an important part of the reverse supply chain and the CEBM in general as the products otherwise would not be able to be refurbished or reintroduced to the market. A concern highlighted in the interviews is the cost the reverse logistics flow would give rise to. Through using a third-party logistic company, this concern could be facilitated as economies of scale could be reached since the partnering company would not only transport the focal company's products, but also others'. The consolidation of transports could also ease the burden on the environment as several appliances could be transported by the same vehicle instead of using several vehicles. Partnering with another company with greater capabilities than the focal company is stressed by van Weele (2018) as advantageous since it could lead to better quality in those operations as well as greater flexibility can be achieved. Hence, using a partner for the logistics operations could also result in more sustainable transports if the partner possesses those qualities. Moreover, a great enabler for the reverse logistics flow that was stated in the interviews to be the use of technology. RFID technology was stated as an example that would facilitate the flow as it would enhance the traceability of the appliances, and therefore could facilitate the planning of the logistics and further operations, such as the inspection (Gupta, 2013). Employing technology for inspections, a key activity to determine the best possible refurbishment option, would allow information on the status of the products and previous operations done to them, to be immediately used. As stated in the interviews and argued by Blackburn et al. (2004) and Bianchini et al. (2019), this would increase the quality of the inspections.

The *refurbishment* activity of the reverse supply chain was stated as a core capability to develop in closing the loop as argued by Guide Jr and Van Wassenhove (2009) and

stated in the interviews. An adverse aspect of having the reuse, repair and remanufacturing parts of refurbishment in-house, would be the lack of space currently available, as stated in the interviews, which would lead to needed investments in a new facility. This could lead to increased risk for the focal company, both financially and operationally as stated by Ellram and Cooper (1990) and van Weele (2018). A benefit that could come from outsourcing these refurbishment activities, as stated in the interviews, could be if the partnering company has a better local presence, which could lead to shorter transportations and decrease in the environmental impact. It is however stated in the interviews that the value of refurbishment is greater than the emissions from transportation and as greater efficiencies can be achieved in the centralised reverse supply chain, as stated by Blackburn et al. (2004), this structure could lead to better environmental performance.

In contrast to the previous stated arguments, by keeping these refurbishment activities internally, the focal company avoids the risk that a partnering company lacks the knowledge needed to handle the premium appliances the focal company produces, as categorised as a technical risk by van Weele (2018). Keeping those core activities internally would moreover reduce the commercial risk stated by van Weele (2018). While these risks could be handled through different types of contracts in the case of outsourcing, that would imply that a third eventual risk could appear, namely the contractual risk. As it was stated in the interviews, another major reason to have these refurbishment activities within the focal company is that it could facilitate other activities as well in the company. It is stated by Schenkel et al. (2015) that through adopting a CLSC there would for example be less dependency on raw material inflow from suppliers. This is because less new components would need to be bought, saving both money, reducing the economic risk of operating a CEBM, and reducing the environmental footprint. The refurbishment operations could be directly integrated with the purchasing function, facilitating the decision making process for what to order and not, as components are, furthermore, directly available for reuse in production. This is possible as it is stated in the interviews that the focal company has a forecasting model which can predict when an appliance will break and as such know when certain components will become available. Conclusively, as these three refurbishment activities, reuse, repair and remanufacturing, are argued to be core activities and the risk is believed to decrease by not outsourcing them, these are recommended to be in-house activities in the CEBM.

The remaining two refurbishment activities, recycling and disposal, are proposed to be outsourced on a permanent basis since these activities are stressed in the interviews to better be performed by a professional partner because of, e.g., the knowledge and capabilities needed in these complex processes. This is supported by van Weele (2018) which states that increased quality could be reached using a partner for such non-core activities. It would also mean the focal company would not have to invest in expensive machinery to perform these activities but the partnering company would carry that risk, a benefit mentioned by Ellram and Cooper (1990).

The aforementioned separation of the refurbishment activity into having reuse, repair and remanufacturing internally and recycling and disposal outsourced represents a best case using current available infrastructure. However, initially the company could seek to partner up with another actor, forming an alliance or joint venture to operate the activities for reuse, repair and remanufacturing. This would enable the focal company to build the necessary capabilities while leveraging the other party's skills and resources to share the risks of the venture along with better visibility of the costs related to the refurbishment, a benefit stated by Ellram and Cooper (1990). As more knowledge regarding the processes are gained and it is proved to be economically viable, it could be backsourced to the focal company. Partnering with one or several competing firms to perform these refurbishment activities along with other potential activities, such as the inspection of the incoming goods, could be beneficial to spread the risk and mutually develop best practice operations. There is though some risks associated with such a decision such as the commercial risk as mentioned by van Weele (2018). By exposing its products to competitors, specific knowledge and intellectual property within the company could be leaked to the partnering companies. Therefore, such partnerships would need well defined contracts to decrease the commercial risk (van Weele, 2018).

Regardless if the refurbishment would be outsourced or not, it is of great importance to have the appliances and components cleaned thoroughly, something that is highlighted both in the interviews and by Gullstrand Edbring et al. (2016). Not the least because of the current legal framework raised in the interviews. This process should be transparent to the customers to prove the cleaning has been done adequately, as stressed by Catulli and Reed (2017). Furthermore, to enable the greatest amount of value recapture, it is stressed in the interviews that both technical and aesthetic refurbishment should be performed. The division between the two, however, only remains a conceptual matter as in practice the two would be performed jointly.

6.4 Opportunities and Challenges of a Subscription-Based Pricing Model

The means for the focal company of capturing value from the aforementioned offering and activities is through a tiered subscription-based offering. Introducing the subscription model was considered to offer the company means of generating greater revenue. First, it was stated that the subscription offering allows the company to capture a greater market share as customers who did not afford the original purchase may be persuaded when they can attain the product through a lower monthly fee. Playing to the price sensitivity of customers along with further incentivising customer purchase was thought to be achieved by introducing a tiered pricing model based on if the products were e.g. first- second, or third life cycle items. This idea builds on the notions of (Lewandowski, 2016) who argued for how products can be reintroduced into the market to enhance the company's ability to capture value from its output. This new source of revenue was previously stated as the targeting of the customer segment, price sensitive customers. Second, the provision of additional services was stated as providing a strong

source of revenue enhancements while simultaneously allowing for the advantage of diversification. The tiered component, wherein, the subscription is offered at multiple levels based on the services included and the life cycle of the appliance was further stated as allowing the company to skim the price sensitivity of the market and thereby extract more value from the offer provided. However, a subscription model presents challenges in terms of how cash flows are captured in relation to when costs are incurred as also raised by Frishammar & Parida (2019). The dispersion of these flows of capital represents a challenge to ensuring liquidity. A potential means of remedying the issue was through partnering with a financial institution. The same category of partnership would also be leveraged to finance the expansion of the balance sheet as ownership of the appliance is transferred to the producing company in the servitization provision of the kitchen. As such, this further exemplifies the wide ranging areas for partnerships that are stated in literature (e.g. Frishammar & Parida, 2019) too often entail CEBMs.

With regards to offering appliances of different life cycles, such as through the proposed tiered model, it remains of further interest to investigate the supply and demand dynamics of the offering. That is, specifically honing down on the actual demand characteristics of each tier to develop a corresponding supply. In dealing with this challenge, the proposed closer relationships of the model along with deployment of a CLSC is argued by Lewandovski (2016) to aid in pull production. However a second challenge is presented as for example both the second- and third life cycle tier supply of products is dependent on the dynamics of product flows in the first tier, the supply will not only be dependent on the demand but also on the company's ability to appropriate appliances from earlier tiers in subsequent ones. This concern is also highlighted by He (2017) who emphasises the uncertainty that this creates for the company. Gobbi (2011) also asserts the need for determining the demand characteristics of each life cycle appliance to avoid used product demand being bypassed by a continuous demand for new products. Ultimately, both of these challenges of the model represent important areas for continued investigation to better outline the supply and demand dynamics of the offering. In doing so and in accordance with how Frishammar and Parida (2019) stipulates the need for iterating the model to hone down on such characteristics, the aforementioned role of partnerships looms great. As also argued by van Weele (2018), using partners when iteratively further developing the model can make the company less vulnerable by imposing greater flexibility to act on emergent developments.

In overcoming the challenge of early returns, wherein, customers would use the provision of cancelling the subscription at a point that is prematurely economically viable it is recommended that the company should include a minimum period during which the subscription cannot be cancelled. As an alternative means, it was also suggested in the interviews, that protection fees should be employed to deter customers from ending the subscription. However, the former alternative could provide a stronger means of ensuring that the products stay at one place longer, and as such is in better accordance with the objectives of the circular economy. Nevertheless, it is advocated that market reactions to both alternatives should subsequently be investigated.

Conversely, on the cost side of the equation, the circular transformation was thought to increase costs along three key dimensions; reverse logistics, refurbishment and recycling. All three of these cost categories emerge as a longer lifetime of the product is expected and with it, costs over time. This stands in accordance with the arguments of both Anderson et al. (2009) and Jansen et al. (2016) for the need of calculating the full lifetime cost of the offering to acquire a true picture of its economic performance. The former, especially highlighting its necessity when providing a Flexible Market Offering. Based on what the full lifetime cost ultimately results in, diverging opinions were expressed in the interviews what the profit equation generated would ultimately result in. On one hand, the increase to the costs was thought to not be adequately weighed up by the associated enhancements to revenue, while other opinions held was that it would sufficiently do so. In reference to the last argument, it was furthermore stated that the increased value to customers along with increased focus on the re-use of resources would promote additional enhancements to profits. This latter argument being in agreement with Schenkel et al. (2015) who argued for CLSCs ability in even delivering cost reductions. With relation to costs, however, as argued by van Loon et al. (2020), administration and repairs represent significant costs of a CEBM that are often overlooked. The latter of these two, repairs, emerged as a key cost dimension, as encapsulated earlier, while administrative costs did not appear during the interviews. Therein, the need for subsequent investigations of the quantitative reality of the model would be needed. Such an investigation would, as argued, then also have to be built on a careful mapping of all relevant costs to not miss any. As was frequently cited to be done with administration (van Loon et al., 2020). This would furthermore aid in putting the additional costs of a CEBM in relation to the savings of remanufacturing instead of producing new products. Which is a key challenge of CEBM as cited by van Loon and Van Wassenhove (2020).

In regards to how the bottom line is ultimately shaped, it was stated during both the interviews as well as expressed by Ellen MacArthur Foundation (2015) how companies must take ownership and responsibility for the impact that their business bears on the environment. Adhering to the principles of the circular economy allows companies to reduce the negative externalities of their practices and the cost of doing so represents a more accurate picture of the business' performance.

7 Conclusion

The aim of the thesis has been to design a subscription-based CEBM for household appliances. Furthermore, within this context, it set out to delve more specifically into how to construct the supply chain to enable the business model. To achieve this goal, a literature study was conducted along with a case study at a company operating in the Benelux Union, where senior employees were interviewed. The data collection also extended to include external subject matter experts within the circular economy, supply chains, and the kitchen household appliance industry.

The empirical data gathered through the interview study revealed valuable insights into the construction of CEBMs. As one of the key findings retrieved from the interviews, three potential segments that may encompass the market could be identified: customers who require temporary living arrangements, housing corporations, and price sensitive customers. While the focal company of the thesis case study today operates under a B2B model, another important key finding from the interview study, in accordance with existing literature is the recommendation for the focal company to construct a D2C structure. This mainly stemmed from the strengthened relationships to the customers of the new model along with ensuring the education of customers around the greater complexity that the offering encompasses. As further key findings, in order to create value to these customer segments, a number of critical elements could be identified: *maintenance* was found to be of importance to enable as long use of the appliances as possible. Additionally, *refurbishment* regarding both performance and design would hinder the feeling of an obsolete product. The *importance of data* was further stressed as a great resource for enabling the company to monitor individual appliances' status both to decide on the best suitable actions to ensure premium performance and to be able to offer personalised services. Furthermore, to enable the subscription-based CEBM, the implementation of a *reverse supply chain* to create a CLSC was emphasised to guarantee that the value of the appliances was captured to the greatest extent. In relation to this, *partnerships* were acknowledged as important enablers as it would take advantage of other actors' know-how and resources to enhance the focal company's offering. The prominent topic around capturing value from the subscription-based model was the dispersion of cash flows. The paradigm shift that this represents further reiterated the aforementioned greater need for partnerships in the circular economy operating model.

Combining the findings from the investigation with the analytical framework revealed a potential layout and design of a subscription-based circular economy business model for household appliances. The proposed CEBM represents a closed-loop system where customers gain access to new and refurbished products through a monthly subscription payment. Jointly with the subscription, customers are offered a selection of additional services to provide the greatest amount of flexibility and tailoring to their needs and wants.

Since little attention has previously been paid to investigating the design of CEBM within the context of specific industries, such as the kitchen household appliance

industry (Ferasso et al., 2020), this thesis contributes to existing research by contextualising strategies for constructing a CEBM, specifically targeted for the kitchen household appliance industry. More specifically, it has explored the viability and potential of a servitization of the kitchen through means of offering a subscription-based solution. With its many successful applications in other industries (Bressanelli, 2018), this thesis has provided insights into how such a model could be designed for the provision of kitchen household appliances in the circular economy.

7.1 Managerial Implications

The scope of the CEBM extends what is under the purview of the focal company thus carrying with it a greater need for managerial attention to be paid to the full ecosystem around the business. As stated in the results, there is greater recognition needed around partnerships to perform the full scope of activities required by the CEBM. As these predominantly arise in relation to the reverse operations of the supply chain, an area of the market that is currently in the developing stages, great uncertainty exists around the specific characteristics and opportunities. To aid developments, managers may therefore need to aid in directing efforts, with greater initial investments in the relations, to ensure their long-term viability. Furthermore, the risks in contrast with the advantages that come with engaging in partnerships along the supply chain and the following dependency on other parties should be carefully weighed before entering a partnership and as such should be recognised by managers. At the same time, these risks might not be obvious in the beginning, something that further stresses the complexity of such a decision whether entering a partnership or not.

Beyond building and fostering relationships in delivering value, managers must invest in their relationships to customers. As stated in the findings, the interactions between the provider and customers are expected to increase along with a growing power in the hands of the customer. To deliver on these developments, managers must nurture its customer relationships, attaining to their needs with care. Here, additional customer-centred research is needed (see even Section 7.2).

Furthermore, national policies and regulations, such as hygiene restrictions for second hand markets could come to affect and, perhaps to some extent, complicate future decisions around CEBMs. As the circular economy is a relatively new concept, quick decisions regarding regulatory changes might appear, something that managers must carefully follow and try to influence to stay compliant.

It is moreover described that data will facilitate and enable many processes in the CLSC as well as enhancing the company's value proposition in the CEBM. The use of data does not only incorporate possibilities but could also induce complications regarding what data is relevant or not. Analysing the right things with the wrong type of data and vice versa could thus prove counterproductive. Therefore, managers must acknowledge these difficulties and carefully invest in developing capabilities related to the use of technology.

Finally, the provision of a subscription-based offering is derived to provide great potential for manufacturers to tap into, in delivering kitchen household appliances. In this effort, the model outlined in this thesis could be employed.

7.2 Future Research

As little attention had previously been paid to contextualising CEBM in industries, and more specifically for kitchen household appliances, this thesis has aimed to bridge that gap. The fact, however, that the findings of the thesis are tentative as long as they rest on qualitative inquiries made through a single case study, entails the need for further complementary investigations. As such, a number of potential avenues for further research are identified as follows. First, as the focus of the thesis has rested on the modus operandi of the focal company in delivering the subscription-based CEBM, little concern has been with the susceptibility of customers to various elements of the model. To gain a comprehensive and complete understanding of the practical implications of the model also on the customers side, subsequent studies would need to focus on bridging that gap to hone down on the specific elements with the greatest value add as well as to identify the most suited messaging, and channels, to reach customers. Second, as the thesis, as previously stated, focused on inquiries of a qualitative nature, subsequent research would need to focus on the quantitative implications of the model. This represents an avenue of great interest and value to validate the practical implications and to further explore the impact around the dispersion of cash flows. Lastly, as indicated by the results of the thesis, partnerships within different areas of the supply chain are seen as an important part in moving from a linear to circular business model. Given their importance, they provide a valuable area for deeper investigation, for example detailing the characteristics of these partnerships to further enable the transition towards a circular economy.

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9 Appendix 1

Following, the two interview outlines used in the interview study are presented. One of the outlines was intended for employees of the focal company while the second was used with the external experts.

9.1 Interview Outline – Internal

The following questions were used as the outline when conducting interviews with subjects working at the focal company.

Introduction

1. Presentation of the researchers, treatment of anonymity and our thesis.
2. Presentation of the interviewee, their background and role.

General inquiries related to circular economy business models:

1. *What are your thoughts regarding servitization models (subscription-based) for kitchen appliances?*
    1. *opportunities?*
    2. *challenges?*
2. *Have you previously investigated the subject and what did you learn?*

Questions related to value proposition:

1. *Can you describe the current market offering and the points of differentiation?*
2. *Which products do you think are best suited for a subscription-based model and why?*
3. *What opportunities do you see for value-adding services?*

Questions related to value delivery:

1. *What is the structure of the current distribution channels?*
2. *What are your current touchpoints with customers and consumers?*
3. *What are the customers' decision criteria for purchase?*
4. *What do you think about the customer's susceptibility towards subscription-based models for kitchen household appliances?*
5. *What potential markets do you see for refurbished products?*
6. *How can the customers be incentivised to stay with the subscription?*
7. *How do you believe the distribution channels would be impacted by a subscription business model?*
8. *How do you view the impact that a subscription model would have on your customer touchpoints and customer relationships?*

Questions related to value creation:

1. *What is the current structure of the supply chain?*
2. *Is there currently a return flow of products from the consumers/customers?*
3. *How can the supply chain be organised to enable a circular flow?*
4. *How do you view connected appliances and the role of data within the company?*
5. *How should appliances be designed to facilitate refurbishment?*

6. *How do you view the role of partnerships in delivering a circular economy business model?*
7. *Is there a department in the focal company that you work more closely with?*
8. *Is there any external party that you work regularly with?*

Questions related to value capture:

1. *How do you view that a change to subscription-based revenue can impact the company?*
2. *How do you view that costs will be impacted by a change to a subscription-based model?*

9.2 Interview Outline – External

The following questions were used as the outline when conducting interviews with external experts.

Introduction

1. Presentation of the researchers, treatment of anonymity and our thesis.
2. Presentation of the interviewee, their background and role.

Questions related to the circular economy:

1. *What are your thoughts on the circular economy?*
2. *What are the current challenges in transitioning to a circular economy?*
3. *What are important success factors to transition to a circular economy?*
4. *What is the role of customers, companies, and society in transitioning to a circular economy?*

Questions related to the circular economy business models:

1. *What are your thoughts on circular economy business models?*
2. *What are your thoughts regarding servitization models (subscription-based) for kitchen appliances?*
    1. *opportunities?*
    2. *challenges?*
3. *What are some important considerations when designing business models for the circular economy?*
4. *What do companies often get wrong when designing business models for the circular economy?*
5. *What is the role of the supply chain in a circular economy business model?*
6. *What role do partnerships play in a circular economy?*
7. *How do you view that a change to subscription-based revenue can impact the company?*
8. *How do you view that costs will be impacted by a change to a subscription-based model?*

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