

Exploring rental business models as a way to extend furniture lifetime

Establishing rental furnishing service for students in Lund

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Abstract

The European furniture industry is driven to change from linear to circular business models. Product-service systems (PSS) are considered to offer promising solutions that may enable the transition towards the circular economy. In the furniture industry, one example of a product-service system is the furnishing rental service. However, understanding of how such a service could be developed and implemented is lacking. This research seeks to fill this gap by studying a case in Lund, Sweden, where several companies expressed interests in developing rental furnishing service for students. A mix-method of quantitative and qualitative research is used in this study. Firstly, based on the concept of PSS, the drivers, barriers, and ideal scenarios of the key actors in the case of Lund are explored through in-depth interviews and discussions. Secondly, based on the concept of network tactics proposed by Reim et al. (2015), four scenarios are then developed and their feasibility is assessed. Thirdly, based on the concept of stakeholder theory, potential consumers' acceptance and perceptions on developing such a service is also explored through an online survey and follow-up interviews. This thesis concludes that a more comprehensive PSS is a promising solution in addressing the problem of inefficient use of furniture in student accommodations. More proactive collaborations between institutional actors as well as consider consumers co-creator are encouraged in order to establish a rental furnishing service that can reach financial, environmental, and social sustainability. In order to accelerate the speed of the development of such a service, further research is required in two directions, namely test upon the ideal scenarios in a real-life context and research into the role of other types of the stakeholders, such as policymaker, local government, or financier.

Keywords: Business model, Sustainable consumption and production, Product-service system (PSS), Rental furnishing service for students, Furniture and furnishing industry

Executive Summary

Problem definition

The European furniture industry is transitioning towards the circular economy. One group of promising business models to enable this transformation is rental furnishing service. Renting furniture could potentially extend furniture life, increase utilisation rate of furniture and intensity of use, and divert or postpone bulky waste from ending up in landfills or incineration plants. In this way logging of virgin resources, i.e. trees, and their consumption can also be reduced. However, rental furnishing services are not yet widespread in many parts of the world. Europe, for example, is lagging behind in the level of penetration and acceptance of the rental furnishing services, compared to the mainstreamed furniture rental businesses in the US or the rising markets in Asian countries. In these markets, rental furnishing service is popular among highly mobile groups of customers, who live in different places temporary.

Academic research on rental furnishing services is very limited. Theoretically, it falls within the product-service systems (PSS) literature that explores how PSS can be designed and how they can deliver on sustainability promises. However, even this literature is largely conceptual (Beuren, Gomes Ferreira & Cauchick Miguel, 2013) or focuses on office furniture (Besch, 2005). Calls for more empirical studies have been heard, including calls for better understanding of consumer behaviour towards PSS (Gullstrand Edbring, Lehner & Mont, 2016), and calls for insights into the complex nature of actor-networks for delivering product-service systems (Baines, Lightfoot, Evans, Neely, Greenough, Peppard, Roy, Shehab, Braganza, Tiwari, Alcock, Angus, Bastl, Cousens, Irving, Johnson, Kingston, Lockett, Martinez, Michele, Tranfield, Walton & Wilson, 2007).

Many literature sources mention the importance of empirical research based on case studies that not only study but actively co-create new types of product-service constellations and new business models with actors. Tukker & Tischner (2006) highlight that “... *stimulating wider diffusion of PSS would be supported by designs that enhance rather than limit customer experience and, from the firm’s perspective, by improved insights into how the risks from a transition from a product-centered firm to a PSS-centered firm can best be managed*” (Tukker, 2015, p. 88). At the same time, Reim, Parida & Örtqvist (2015) and many others highlight the challenges that companies are facing when developing PSS business models and identify the need for new approaches that do not only study what PSS is but how to facilitate its implementation in companies based on a deep understanding of their drivers, barriers and consumer insights. The state-of-art of the market and the academic literature both point out that employing PSS to accomplish the transition of the circular economy is in need of more exploratory research of empirical cases. This research seeks to contribute to filling this gap.

Research Questions and Methodology

This thesis aims to explore how PSS can contribute to the transition of the furnishing industry towards the circular economy. From an academic point of view, PSS is a promising solution for improving the circularity of the furniture and furnishing products; however, in reality, take-make-waste type of linear economy still dominates the industry. A compelling case is found in Lund, Sweden, where several companies have had similar ideas for developing rental furnishing service for students. Against this context, the following research questions (RQs) are formulated:

RQ1: What are the drivers and barriers for renting furniture and furnishing items to students?

RQ2: What are the potential scenarios for a rental business model that could address some of the barriers?

RQ3: How feasible are the scenarios for rental furnishing service from actors' and consumers' point of view?

This research is exploratory in nature and employs mixed qualitative and quantitative methods to answer the RQs. Literature is reviewed in order to understand the drivers and barriers of developing PSS and rental business models. Knowledge gained from the literature review is used to guide the development of scenarios for a furnishing renting service and for collecting and analysing empirical data. Qualitative methods comprise interviews and discussions with 5 practitioners and in-depth interviews with 15 consumers. Quantitative method consists of a consumer survey of 150 students in Lund, who are asked about their preferences in relation to furniture renting service.

Main Findings

The main findings of this research are the following: 1) Using rental business models to extend the life of furniture is possible in the context of rental furnishing service to students as confirmed in interviews and discussions with practitioners. 2) Based on the discussion and analysis regarding the four scenarios, the level of collaboration and forms of actor engagement will affect the development as well as the performance of the system. 3) Furthermore, the quality of the design of the system will affect the profitability of the system. The better design the system, the more possibility in reaching financial, social, and environmental sustainability. A good design phase here means the needed infrastructure and the actor-network should be built along with active communication between key actors. 4) The analysis of consumers' survey and interviews showed a promising demand in the market of students in Lund. This market is therefore full of potential in successfully developing a sustainable rental furnishing service that can fulfil the multiple interests of stakeholders. However, this goal cannot be reached without the early involvement of potential customers.

Conclusions and Recommendations

Resource-use efficiency is a global challenge and many actors are involved in finding solutions for resource efficiency. The United Nations has also specified resource efficiency and circular economy as one of the ways towards reaching SDG#12 on sustainable consumption and production. The furnishing industry is trying to transition to the circular economy and improve resource efficiency by exploring rental furnishing solutions. This research aims to contribute to this topic by exploring the rental business models for students in Lund. Drivers and barriers for key actors to develop such a business model are explored from reviewing the literature and interviewing the practitioners. Four scenarios (Figure 4-1) for developing rental furnishing service with a focus of ways of collaboration in the key actors' network were established based on the theories and the context of the studied case. The feasibility of the scenarios is assessed by in-depth interviews with key actors and potential consumers. It is found that a more comprehensive PSS is a promising solution in solving the inefficient use of the furniture and furnishing items exists in the student accommodations and increase the welfare of all the key actors in the focal market. More proactive actions in collaboration are encouraged as this research shows a promising sign of bringing a better outcome.

Recommendations for the rental furnishing actors to developing a successful rental furnishing service that could increase the competitiveness of the company, fulfil consumers' need, and, at the same time, reduce the environmental and social impacts are 1) proactively planning for collaborating with other actors; 2) establishing networks and identifying expectations, interests and potential area of conflict of interest; and 3) knowing your target audience – in-depth

investigation into the needs, preferences and expectations of the targeted consumers and end-users are crucial for the design of this system.

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Abbreviations

AFB	Stiftelsen AF Bostäder
B2B	Business-to-business
B2C	Business-to-consumer
CBM	Circular business model
C2C	Consumer-to-consumer
DIY	Do it yourself
EPR	Extended producer's responsibility
GHG	Greenhouse Gas
LUA	LU Accommodation
PSS	Product-service system
RBM	Rental business model
RQ	Research questions
SBM	Sustainable business model or business model for sustainability
SEK	Swedish kronor

1 Introduction

This chapter introduces the research topic and the significance of this thesis. From the beginning, the key focal research area is introduced; that is the circular economy in the business field. Within the field, problems are observed, further narrowed down to the scope of research, and the research questions are then formulated. In addition, ethical considerations, targeted audience, and disposition are also explained.

Earth Overshoot Day date each year when humans used up the amount of the ecological resources and services equal to what Earth can regenerate in a given year. Each year the date has moved earlier; in 2019, the Earth Overshooting Day was earlier than ever and had been put forward two months earlier than it was twenty years ago (Global Footprint Network, 2019). Humans had used up the stock of nature for one year in seven months, and the rest of the year we lived in deficit and piled up the wastes, which most are turned into the form of carbon dioxide in the air. More than half of the total greenhouse gas (GHG) emission attributes to material loss during production activities (Organisation for Economic Co-operation and Development [OECD], 2020). In the OECD countries, within 680 million tonnes of total municipal waste only 22 % are treated with recovery operations (OECD, 2020). As technology has advanced, world population has surged, and the demand on the resource has increased; the resource, however, is limited. It is thus evident that the humans are consuming more resources in increasing speed and do not have a fine system for resource utilization - the world is facing a challenge of resource exhaustion and the problem comes from the production and consumption patterns that fail to take sustainability into account.

In response to this concern, the United Nation calls for sustainable consumption and production (SDG#12), including improving resource efficiency, to align with the plan of global sustainable development (United Nations Global Compact [UNGC], 2015). The global sustainable development goals are to increase economic competitiveness, reduce the economic, environmental, and social costs, and reduce poverty (UNGC, 2015). Additionally, SDG#12 also seeks to improve the quality of life while reducing resource consumption, degradation and pollution to increase the net welfare that economic activities provide (UNGC, 2015). The achievement of SDG#12 requires the participation and cooperation of all the actors in the entire value chain from the production to the final consumption (UNGC, 2015).

A concept to operationalise sustainable consumption and production is the circular economy. The circular economy promotes the shift away from a linear economy towards one in which resources are circulated to prevent the over-extraction of virgin materials (Ellen MacArthur Foundation, 2015). From the perspective of production, in principle, there are two ways to realise the circular economy; one is to extend the life of the product, making the product, therefore the resource, stays within the system longer, another one is to redefine the function or the usage of the product, increasing the use frequency of the product (Bocken, Olivetti, Cullen, Potting & Lifset, 2017). The former way refers to methods such as reuse, remanufacturing, refurbishing, and recycling, the latter points to sharing or design for multiple uses (Bocken et al., 2017). Through creating a new route, prolonging the route, or increasing the use efficiency, these methods utilise the resource more efficiently, aiming to create new value out of the product and thus contributing to the economy more than before (Ellen MacArthur Foundation, 2015). The circular economy is estimated to be able to contribute 1.8 trillion euro by 2030 for the economy of the European Union (EU) (Ellen MacArthur Foundation, 2015). Different industries have different paths to the transition of the circular economy based on their different nature of the business, but it is clear that companies

nowadays perceive the circular economy as an important guideline for their future development (Bocken et al., 2017).

In order to understand how business actors contribute to and benefit from transiting into the circular economy, it is necessary to introduce the concept of business model. A business model is a set of logic which describes how companies create, deliver, and capture value (Osterwalder & Pigneur, 2010; Richardson, 2008; Teece, 2010). Various types of business models have been invented to communicate how business can reach its goal. The conventional type of business models, however, typically sees the production and consumption as two separate systems and believes in a single type of value creation, which is very much focusing on economic value, to its shareholders (Ellen MacArthur Foundation, 2015). In this way, the relationship between the two systems are characterised by short-term planning, material reliance, and one-way communication. This type of business models may gain more economic benefit through increasing the quantity of output but will sacrifice the resource-use efficiency (Ellen MacArthur Foundation, 2015).

In contrast, the business models that take circularity into consideration take the use phase and the end-of-life (EOL) phase of the products into account when designing the products. In addition, they consider the value that can benefit all the actors involved in the value chain. These types of business models suggest that value creation can be raised by both the demand side and the supply side and competitive advantage can be multi-sourced (Massa, Tucci & Afuah, 2016; Mont, 2004). In this case, the scope of participation and beneficiaries of the value creation of the business models is expanded from shareholders to stakeholders. Theoretically, this can only be achieved by applying systematic thinking and internalising the environment and society costs (Ellen MacArthur Foundation, 2015).

There are many different business models trying to contribute to the circular economy by incorporating systematic thinking and internalising the environmental and social costs. One of them is the product-service system (PSS), which is the focal business model for this research. PSS emphasises a shift away from focusing on the value creation of selling a physical product to that of selling a product combining with a service or 'a result' (Mont, 2002a). Since the content of the transaction is extended from the product to relevant service, the relationship between the product or service supplier and the consumer becomes long-term cooperation, breaking the dichotomy of production and consumption systems (Meier, Völker & Funke, 2011; Tukker, 2004). Intuitively, in this case, the product or service provider has to bear more responsibility other than assuring the quality of the product (Vermunt, Negro, Verweij, Kuppens & Hekkert, 2019). The prerequisite that incentivises the companies crossing the line of two systems, therefore, is for the companies to be able to acknowledge and gain more and multi-types of value out of it.

The European furniture sector is an important industry for Europe as well as for the whole world. It is one of the main industries of Europe and stands around one-fourth of the world furniture production (European Furniture Industries Confederation, 2020). The European furniture industry consists of around 120 thousand companies, which provides over one million job opportunities and generates 96 billion euro each year (European Furniture Industries Confederation, 2020). This industry is by nature labour-intensive, consists of mostly small and medium-sized enterprises (SMEs), and has a complex and fragmented supply chain (Renda, Zavatta, Tracogna, Tomaselli, Busse, Wiczorkiewicz, Mustilli, Simonelli, Luchetta, Pelkmans & Bolognini, 2015).

In addition, bulky furniture waste has become a problem in the EU and society expect the producers to take on more responsibility in treating the products they produced. The EOL management of this type of product is found negligent in the EU (The Erasmus + FURN360 project, 2018); around 90% of the furniture waste is landfilled or incinerated which causes an increase of the GHG emission (Forrest, Hilton, Ballinger & Whittaker, 2017; the Erasmus + FURN360 project, 2018), decreasing the society's effort in lowering their carbon footprints. As France has become the first country to impulse extended producers' responsibility (EPR) on the furniture sector (OECD, 2016), it is evident that more stringent or new policy instruments for the furniture waste based on the concept of EPR can be rolled out in the near future (Zero Waste Europe, 2015). The role of producers on furniture waste management is deemed to become more important (Forrest et al., 2017).

The furnishing industry is going through its pivotal period of transitioning into the circular economy (European Furniture Industries Confederation, 2019). Literature has suggested two main directions to solve the issue of furniture waste, one is to improve the design of the furniture to be more recyclable, another is to prolong the furniture lifetime (Besch, 2005). According to the literature, design for the material recovery of the furniture is yet to be economically feasible with the current level of technology (Besch, 2005). Besch (2005) thus argued that prolonging the furniture lifetime, for instance, developing a rental service, is more plausible for the industry under a voluntary circumstance because of the financial feasibility.

Renting is no new service for furniture and furnishing products and it is a sensible means of consumption on some specific occasions. Furniture rental can be dated back as early as in the 18th centuries of Europe (Miquel, 2011). In the contemporary era, the development of rental furnishing service is more vigorous in the United States of America (US) (Cooluris & Winn, 1984; Lyles, 2008). New markets for rental furnishing service are like cities in India and in China where attract a lot of workers and the economy is booming (Research and Markets ltd, 2019). Among consumers' goods, renting is especially preferred in the circumstances "*when the consumers only want to use for a limited period of time of the products they do not want to own*" (Behrendt, Jasch, Kortman, Hrauda, Pfitzner & Velte, 2017, p. 21). Rental furnishing service, therefore, is suitable for a certain type of consumers - the mobile generation. Due to globalisation and urbanisation, the mobility of human has increased (Castles, 2002); this new trend has created a new demand for rental furnishing service (Research and Markets ltd, 2019). For this generation, renting pieces of furniture and furnishing items can be accelerated to 'renting a solution to living'. The commonalities of this generation related to renting the furniture are relocating for short terms, having a higher tendency to save their money for living, and thus have less sense of permanent ownership towards their furniture. Meeting these features but have relatively simplified living conditions, college students are thus a suitable group of study.

1.1 Problem definition

The European furniture industry is transitioning towards the circular economy. One of the promising business models to enable this transformation is rental furnishing service. However, Europe is lagging behind in the level of penetration and acceptance of the rental furnishing service, compared to the mainstreamed furniture rental businesses in the US or the rising markets in Asian countries. In theory, rental furnishing service is popular for certain types of customers, who live in different places temporarily. This trend can be seen from the cases in the US and Asia. It is observed from the fieldwork that very few companies integrate circularity or sustainability into their business models among the companies in the US or Asian market. In the cases where companies emphasise environmental or social benefits of their business models, the development of the service remains limited (for example, furniture rental NL).

Therefore, the contribution of the existing rental business models in the furnishing industry to sustainable development remains to be seen.

From the perspective of PSS, developing rental furnishing service can help to accelerate the development of the circular economy (E. Manzini & Vezzoli, 2003). However, certain requirements must be met when designing the system (Mont, 2002a). The market trend has shown the opportunities to develop this service, but it does not guarantee that the rental business model can help the industry to become circular or sustainable (Mont, 2002). The root of the issue is that systematic thinking and multi-value creation symbolises a much-complicated framework of collaboration for all the actors involved (Baines et al., 2007). The communication and collaboration between the main actors are difficult to balance and also very dependent on the context of the case.

Many literature sources mention the importance of empirical research based on the case study in the development of PSS. Tukker & Tischner (2006) stated that for PSS to be able to successfully address the issue of circularity or the sustainability in the field of business, it is necessary to include the aspects of consumers' acceptance and business sense. Therefore, case studies play an important role in analysing the drivers and barriers of PSS from practitioners and consumers' points of view. In addition, Beuren, Gomes Ferreira & Cauchick Miguel (2013) stated that the development of PSS in the academic field largely falls on the theoretical level; few pieces of research have been focused on empirical cases. Despite that, the young consumers are the customer segment with great potential for developing rental business model, there is very little relevant research specifically investigating this group of consumers (Beuren et al., 2013; Gullstrand Edbring et al., 2016). For around two decades of the development of this concept PSS has been seen as a promising solution in contributing to sustainable consumption and production, the fact remains that linear models still dominate economic landscapes. It is therefore important for both academia and business to look into the reasons behind this. The state-of-art of the market and the academic literature both point out that utilising PSS to accomplish the transition of the circular economy is in need of more exploratory research of empirical cases. This research seeks to contribute to filling this gap.

1.2 Aim and Research Questions

Based on the above discussion, this research aims to explore how PSS can contribute to the transition of the furnishing industry towards the circular economy. From an academic point of view, PSS is a promising solution for improving the circularity of the furniture and furnishing products (Besch, 2005). However, in reality, take-make-waste type of linear economy still dominates the industry. A compelling case is found in Lund, Sweden, where several actors have had similar ideas in developing rental furnishing service for students. Based on this context, hoping to contribute to accelerating the speed of the society stepping into a more sustainable future, the research questions (RQs) are formulated as follow.

RQ1: What are the drivers and barriers for renting furniture and furnishing items to students?

RQ2: What are the potential scenarios for a rental business model that could address some of the barriers?

RQ3: How feasible are the scenarios for rental furnishing service from actors' and consumers' point of view?

1.3 Scope and Delimitations

As the problem of resource scarcity has become more prevalent, the study of the circular economy has become a vast subject. This study field evolves quickly and expands into different domains. This research focuses on how PSS can contribute to the circular economy, taking rental furnishing service for students as a case study, with a special discussion on developing the framework of collaboration between key actors. Several points related to the scope of the research are clarified as below.

Focus of the study

A case is chosen as the focus of the study to collect data to answer the research questions. In Scandinavia, where the rental furnishing service is yet to become the mainstream of means of furniture consumption, the particularity of Lund in Sweden makes this municipality becomes a starting point for companies establishing rental furnishing service for students. Lund is a so-called ‘campus town’ where over one-third of its population are students studying in Lund University (LU) (LU, 2018). Although unable to obtain the actual number, it is most likely that most of the students are coming from outside of the town¹. In addition, around half of the employees and researchers of LU are international citizens (LU, 2020). It can be understood that the citizens in Lund have relatively high mobility and could thus be suitable for establishing rental furnishing service. The providers of the rental furnishing service for students in Lund are chosen as the subjects of the study, used in the simulation of the scenarios of collaborative development of rental business models.

This research, in the end, receives insights from almost all the key actors within the rental furnishing market for students in Lund (Figure 1-1). This includes 5 interviews with 4 rental furnishing service providers, 15 students, and 150 valid responses of the internet consumer survey. The duration of the data collection is approximately two and a half months.

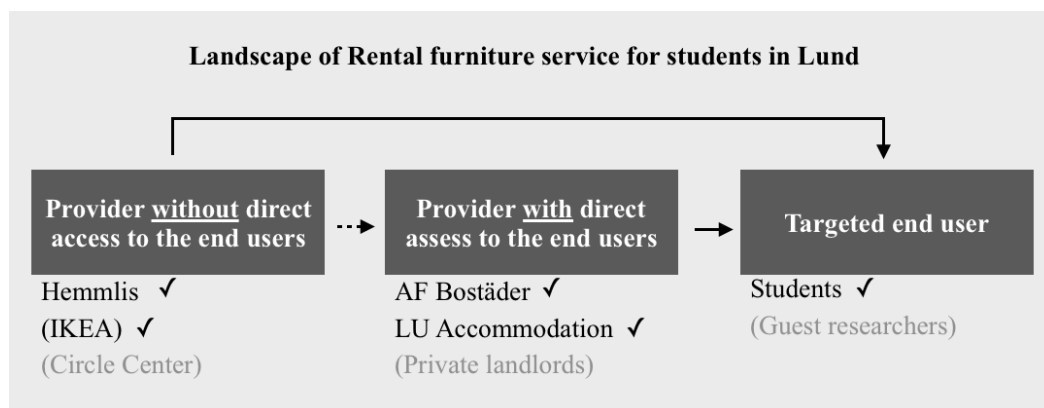


Figure 1-1 Current landscape of rental furnishing market for students in Lund

¹ According to LU, the number of students coming from outside of Lund or Skåne is not obtainable because the information is not collected. Alternatively, it is known from the Swedish higher education authority (Universitetskanslersämbetet, UKA) that each year LU has about 12,052 new students (UKA, 2020a) and 2,676 of them are from Skåne (UKA, 2020b). Thus, about 78% of the new students are coming from outside of Skåne.

‘Leasing’ and ‘rental’ furnishing service

In the focal research areas of circular economy and PSS, ‘product rental’ and ‘product leasing’ are often used interchangeably (Schallehn, Seuring, Strähle & Freise, 2019). The main differences between these two modes of business are the financial implication for commercial lessors and the time duration of the contract period. Since the scenarios developed in this research includes different modes of transaction, both leasing and renting are included in the scope of rental business model.

Home furniture and office furniture rental

This research focuses on the rental furnishing service for students; in this case, referring to the home furniture and furnishing products or the furniture and furnishing items for non-commercial use. Office furniture rental, on the other hand, is a more common practice business-to-business (B2B) market, and it mainly involves accounting methods. For these reasons, office furniture rental has a different pattern of development and is therefore excluded from this research.

1.4 Ethical considerations

This research was conducted without being funded by any organisation or company. Although the research cannot be completed without the inputs of several key stakeholders, the data was analysed independently by the author. All the ideas and materials that were not produced by the author are properly cited. Regarding the data and information collected from the research activities, it is in the author’s best effort to honestly and neutrally translate and analyse the findings and draw conclusions.

In relation to consent and courtesy, the communication between the author and the participants of all the research activities followed the guidance² provided by the International Institute of Industrial Environmental Economics (IIIEE, or hereinafter referred as ‘the institute’). Names of the participants thus are not disclosed in this research. Instead, their positions are provided, indicating their relevancy for the study. The participants were invited to join research activities voluntarily, and all relevant information about the study was communicated in advance. No potential harm or disadvantages to the participants were identified, either to the individuals or to their organisations.

By analysing the drivers, the barriers, and the possible scenarios of developing a rental furnishing service in a chosen case, this research is expected to contribute to the development of a circular business model. The outcome of the research fills the gap of knowledge in the field of PSS. It is not the author’s intention to belittle the contribution of existing business activities, nor does the author try to advocate the improvisation of the innovative business idea without careful assessment. This research is made public according to the rule of the institute, including the analysis of data. The raw data is kept safely by the author and shall not be transferred to any third party without the consent of the research informants. The design of this research has been reviewed against the criteria for research requiring an ethics board review at LU. It has been found not to require a statement from the ethics committee.

² Information for research participants: <https://etikprovningmyndigheten.se/for-forskningsperson/>

1.5 Audience

This research intends to draw the attention of researchers and business actors who are interested in exploring the potential of PSS to transition to the circular economy. In particular, this research hopes to bring research value to academia by analysing an actual business model. Many papers in the field of PSS have pointed out that since this theory emphasises the integration of the production and consumption systems, it is required that the theory be tested upon many empirical cases, in order to effectively contribute to the circular economy (Baines et al., 2007). In addition, Tukker & Tischner (2006) pointed out that rarely does research look into cases that encountered challenges, and that may not yet be successful.

The two specifically targeted groups of the study were the (potential) service providers and young consumers (students). Both of these groups are representative actors in developing rental business models (Gullstrand Edbring et al., 2016). The research utilises the theory of PSS to develop scenarios of rental furnishing service and then tests the scenarios and solicits feedback from the practitioners and targeted consumers. This research method shall also shed some lights on the path for the researchers who want to conduct empirical research on PSS.

For non-academic readers, this research seeks to provide insights on developing rental business models to extend the products' life. Business strategies related to sustainability often claim to provide a 'win-win solution' for the companies and all other stakeholders. However, communication and collaboration are never straightforward. By having in-depth conversations and investigation with the key actors, this research makes a deep dive into the core of the issue of shaping the business model - bringing value to stakeholders.

1.6 Disposition

Chapter 1 (Introduction) presents the topic of this research and discusses the significance of addressing identified gaps. Chapter 2 (Literature Review) presents organised knowledge from reviewing relevant literature. This knowledge is to become the theoretical basis for developing the research questions, the scenarios in question, and the learnings of the research. Chapter 3 (Research Methodology) provides a comprehensive framework for research design and explains which and how methods were employed in this research. Chapter 4 (Findings) presents the findings from the research activities, namely, the rental furnishing service for students in Lund and the derived scenarios. Chapter 5 (Analysis) presents the finding based on the previous chapter in a structured way and answers the research questions. Chapter 5 (Discussion) talks about the ideas and learnings relevant to the topic and Chapter 6 (Conclusion) summaries the main findings, implications and future research areas.

2 Literature Review

This chapter aims to present the knowledge gained from reviewing previous literature that is helpful in understanding or answering the research questions. This chapter also serves as a basis for the development of the scenarios for the focal case study.

This chapter is divided into three sections. In the first section, the theoretical background is introduced. This includes the product-service system (PSS) and rental business model (RBM). The former theory highlights a shift away from mass production to a service economy, suggesting product rental as a way to extend the product's lifetime to promote circularity. In some circumstances, the RBM can be seen as a type of PSS. In the second section, drivers and barriers of developing the RBM or PSS in the case of furniture are presented. In the third section, three main learnings that can help overcome some of the barriers are identified and form the foundation for the scenario development.

2.1 Product-service system (PSS)

PSS is first defined as *“a marketable set of products and services that can jointly fulfilling consumers’ need”* (Goedkoop, 1999, p. 3). From this definition, fulfilling consumers’ needs no longer solely depends on the physical amount of production but can be mixed with different levels of dematerialised services, which is normally to be established through changing the ownership structure (Mont, 2002a). This definition has further been developed as *“a system of products, services, supporting networks and infrastructure that is designed to be competitive, satisfy customer needs and have a lower environmental impact than traditional business models”* (Mont, 2002a, p. 239). PSS is then portrayed as a type of commercial system that changes the concept of doing business. The major changes are, for producers or service providers, shifting from selling the product to selling the *use* of the product and, for consumers, shifting from paying to obtain the product to receive the *access* of the product. For the society, this is to promote a lower environmental impact of the business activity, and a sustainable development of humans without compromising the utility of consumption behaviour (Mont, 2002a). Two key features of the PSS are highlighted from this description.

The first feature of this business model is the multiple goals PSS aims for. Bertoni, Rondini & Pezzotta (2017) examined 64 articles discussing the value proposition of PSS and concluded that all these papers emphasise at least three goals established from the basic definition of utilising PSS. As defined, companies utilising PSS aim 1) to be more competitive, 2) to fulfil consumers’ needs and at the same time, 3) to reduce the environmental impact.

Firstly, competitiveness is increased since the efficiency of resource-use is improved by shifting the focus of value delivery, from a product to a combination of solution. In the long run, costs of the system can be reduced, increasing the revenue margin. The relationships between the company and its consumers and suppliers are strengthened, improving the company’s position in the value chain (Tukker, 2015; Tukker & Tischner, 2006; Wise & Baumgartner, 1999). From a practical perspective, PSS can provide differentiation of products offered with a high level of specification and customisation (Annarelli, Battistella & Nonino, 2016; Baines et al., 2007).

Secondly, fulfilling consumers’ need interpreted by Manzini, Vezzoli & Clark (2001) is to improving one’s quality of life. An important assumption behind this premise is that the purpose of consumption for the consumers is to reach a certain level of utility to improve quality of life, instead of owning specific products (Ezio Manzini et al., 2001; Tukker, 2004).

Thirdly, it is considered that PSS can minimise the environmental impact of consumption and reach sustainable development by closing material loops, reducing excessive consumption, and increasing material-use efficiency (Mont, 2002a). One example of closing the material loop is the take-back scheme and remanufacturing design of Xerox International, in which products were sold with a guaranteed price 'per copy' (Baines et al., 2007; Mont, 2002a). Another example of reducing excessive consumption is DuPont Flooring Systems' modular design of products, which allowed the consumers to prolong the use of the products (Baines et al., 2007; Mont, 2002a). Car sharing, such as Uber, increases the efficiency of material-use by making use of the idle capacity of the private cars (Annarelli, Battistella & Nonino, 2019). By shifting the focus from the product to the service combined, PSS decouples the business value and the demand for natural resources; the efficiency of resource-use is increased, providing an opportunity to reach sustainable development (Mont, 2002a; Tukker & Tischner, 2006).

The second feature highlighted by many researchers in defining PSS is the systematic thinking (Annarelli et al., 2016; Azarenko, Roy, Shehab & Tiwari, 2009; Goedkoop, 1999; Mont, 2002a, 2004; Tukker & Tischner, 2006). The concept of a system in the case of PSS indicates that PSS is not as simple as a combination of products and services, but an offer where tangible and intangible elements are mixed together (Annarelli et al., 2016; Meier et al., 2011; Tukker, 2004). What is highlighted in the 'system' in Goedkoop (1999) is the relationship between the elements, which Mont (2002a) further pointed out includes supporting networks and necessary infrastructure. Annarelli et al. (2016) explained that supporting networks and necessary infrastructure are particular important parts of PSS's nature for it to be able to reach its full potential since these elements enable a focused supply chain to be formed. PSS is considered to have the potential to solve sustainability issues of business activities from a lifecycle perspective, but a systematic thinking must be applied in order to reach this potential (Goedkoop, 1999; Mont, 2002a; Tukker & Tischner, 2006). A systematic thinking of PSS requires companies to consider the impacts of production beyond economic measures as well as beyond the production phase.

In light of this systematic thinking, Mont (2002a) suggested developing a system-based solution is the core issue of developing PSS. System-based solutions mean that companies should see consumption and production as one system and think from a life-cycle perspective because the environmental effects in other phases of the product lifetime can still influence the performance of the company (Mont, 2004). In addition, system-based solutions also comply with the trend of new types of business models in which companies are exploring the possibility to extract more or new value, or increase the profit margin from other phases of the product lifetime, for example, from providing maintenance, upgrading, EOL services and so on (Mont, 2004). Seeing production and consumption as one system is how PSS is able to fulfil consumers' needs and, at the same time, minimise the possible damage brought to the whole system. When designing PSS, therefore, it is necessary for the developers to understand the interests, values and benefits of all actors as PSS emphasises the necessity of stakeholder's collaboration in reaching the multiple goals of PSS.

A well-recognised classification of PSS is to distinguish these business models through the level of service component involved, as suggested in Figure 2-1 (Annarelli et al., 2016; Baines et al., 2007; Tukker, 2004, 2015). The three archetypes of PSS are product-oriented, use-oriented and result-oriented PSS. Additionally, Tukker & Tischner (2006) suggested that the different levels of service components among the classification indicate the different levels of sustainability potential.

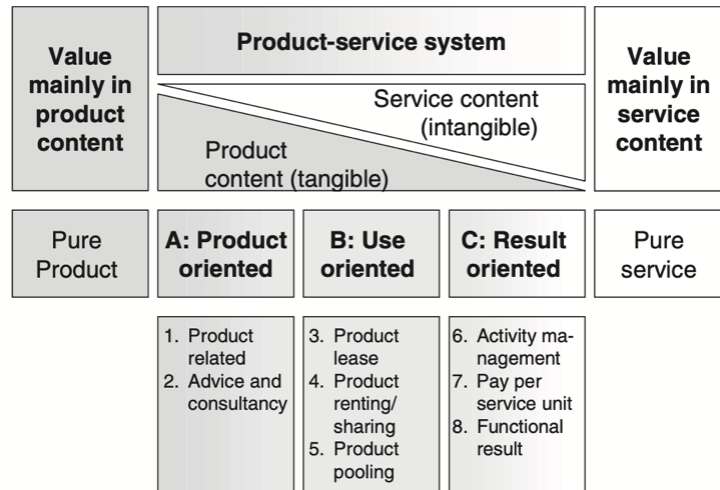


Figure 2-1 Main and subcategories of PSS
(adapted from Tukker, 2004, p.248)

Product-oriented PSS combines selling products and related services, which are for instance consultancy, warranty or installation service (Reim et al., 2015; Tukker, 2004). In this case, value is created mainly by selling the products and the ownership of the products is transferred to the consumers (Reim et al., 2015; Tukker, 2004). IKEA could be an example of a product-oriented PSS, in which the ownership of the products are transferred to the customers while the company is able to provide a wide range of supporting services, such as consultancy of design and measurement, support with delivery and assembly, and product return and guarantee, as part of their offer (Annarelli et al., 2019). Whereas in the case of use-oriented PSS, consumers pay for the access to the product; value is created by providing the services and the ownership of the products remains with the service providers (Reim et al., 2015; Tukker, 2004). Carpooling or car leasing is the most mentioned case of this type of PSS (Behrendt et al., 2017; Schallehn et al., 2019). In the case of result-oriented PSS, consumers were guaranteed with a certain result or outcomes, instead of specific products or services, such as housing moving services (Reim et al., 2015). In a way, the service providers bear the most responsibility in the transaction (Reim et al., 2015). Rolls-Royce, a company used to sell jet engines, shifted their business strategies from selling physical products and maintenance to selling the engine operation, in which the customers were guaranteed the performance of the products and pay for that by contract (Annarelli et al., 2019). These differences among the three types of PSSs can be well described by utilizing a business model’s approach (Reim et al., 2015). As shown in Table 2-1, different types of PSS create, deliver, and capture the value in different ways (Reim et al., 2015).

	Product-oriented	Use-oriented	Result-oriented
Value creation	Provider takes responsibility for the contracted services.	Provider is responsible for the usability of the product or service.	Provider is responsible for delivering results.
Value delivery	Provider sells and services the product sale and service (e.g., maintenance or recycling).	Provider assures the usability of the physical product along with service.	Provider actually delivers result.
Value capturing	Customer pays for physical product and for the performed services.	Customer can make continuous payments over time (e.g., leasing).	Customer payments are based on outcome units; that is, they pay for the result.

Table 2-1 Comparison of PSS using a business model’s approach
(adapted from Reim et al., 2015, p.66)

PSS is considered a promising solution in bringing values to all the stakeholders; however, researchers stated that such an ideal scenario is difficult to reach (Tukker & Tischner, 2006). PSS tries to break the boundary of the existing production and consumption system, creating a win-win situation for both sides; however, “(sometimes) one simply has to accept that win-wins not always exist” (Tukker & Tischner, 2006, p. 1555). In addition, researchers argued that it remains debatable to what extent PSS can be more sustainable or circular than conventional business models. For instance, value created in the scheme of product-oriented PSS still depends on the quantity of the product sold, and use-oriented PSS could promote fast consumption culture and stimulate excessive consumption (Reim et al., 2015; Tukker, 2015). Result-oriented PSS has the most potential in reaching sustainability; however, it is also the most radical scheme that requires stakeholders to actively change their perceptions or even the culture of consumption and production (Reim et al., 2015; Tukker, 2004, 2015). PSS does not by default bring about sustainable outcomes; it could even end up resulting in negative effect to the society if it focusses too much on economic benefits (Barquet, Seidel, Seliger & Kohl, 2016).

2.1.1 Rental business model (RBM)

A business strategy highly related to PSS is the rental service. In the classification of PSS as introduced in previous paragraph (Figure 2-1), RBM is a subcategory of use-oriented PSS. In fact, depending on the context, RBM could even be classified as result-oriented PSS (as the example of Rolls Royce). The rental service is frequently mentioned as a representative strategy for a product-oriented company to shift toward a service-oriented business (Baines et al., 2007; Chun & Lee, 2017; Tukker, 2004). The fundamental element of a rental service is that the ownership of products remains with the service providers, which align with the spirit of PSS (Khumboon, Kara, Manmek & Kayis, 2009; Mont, 2002; Vermunt et al., 2019). Therefore, in some literature where a broader scope of topic, such as circular economy or sustainable business models, is discussed, PSS, sometimes being generalised as product-as-a-service, is referred to as an RBM (for example, Vermunt et al., 2019). Typically, the company that provides the rental service takes ownership of the product and responsibility for maintenance (Khumboon et al., 2009). In this case the legal basis of the transaction is literally a rental or leasing contract (Vermunt et al., 2019).

In fact, no transfer of ownership in business activity is a fundamental distinction between providing services and selling goods (Judd, 1964/2018; Rathmell, 1966/2018). The concept of “non-ownership” is proposed by Lovelock & Gummesson (2004, p. 34) as a way to strengthen the development of the service’s marketing based on the same premise of service provision. In this literature, the rental service is defined as “services in a form of rental in which customers obtain benefits by gaining the right to use a physical objects, to hire the labour and expertise or personnel, or to obtain access to facilities and networks” (Lovelock & Gummesson, 2004, p. 34). Under this definition, five types of rental service are identified, namely 1) rented goods services; 2) place and space rentals; 3) labour and expertise rentals; 4) physical facility access and usage; 5) network access and usage (Lovelock & Gummesson, 2004). The rented goods services (for example, renting furniture), with a possibility of extending to place and space rentals (for example, renting a furnished room) as well as network access and usage (for example, furnished living experience) correspond to the definition of RBM in this research.

Rental services or leasing services, as RBM, create a profit by providing consumers access to a product for an agreed period of time (Behrendt et al., 2017; World Business Council for Sustainable Development, 2018). The service providing company provides access to the product to receive income (the rent) from the renter (Behrendt et al., 2017). Through paying the rent according to the contract, the renters receive the right to use the products (Behrendt

et al., 2017). Leasing can be simply understood as rental services agreed for a longer period of time (Behrendt et al., 2017). Another major difference between these two concepts is the financial implication of leasing; leasing is often considered beneficial from a financial management's perspective because of the different recognition principles in accounting, and thus this is more frequently used in the B2B situation (Behrendt et al., 2017). In the focal research areas of circular economy, renting and leasing are often mix-used or mentioned together (Schallehn et al., 2019). Furthermore, in this research, both B2B and business-to-consumer (B2C) modes of transaction are discussed but with a focus on the interaction between key actors including businesses and individual consumers, not on the financial implication. A broader definition of RBM based on Lovelock & Gummesson (2004) that includes rental and leasing situations is adopted in this research.

A main characteristic of RBM is that the income is typically created not entirely at the point of selling (Vermunt et al., 2019). This characteristic implies an extended relationship between the consumers and the service providers based on the contract (Reim et al., 2015; Vermunt et al., 2019). During the contracted period of time, the capital is tied-up (Linder & Williander, 2017; Mont et al., 2006; Reim et al., 2015) and the financial and operational risks are increased (Azarenko et al., 2009; Mont et al., 2006; Tukker, 2004). In regard to this iconic condition of RBM, consumers' perspectives (Reim et al., 2015) and the design of the formal contract (Vermunt et al., 2019) are highlighted in designing the RBM.

The design of the formal contract needs to be able to capture the flexibility of renting for the consumers as well as give the risks and responsibility-bearing firms enough incentives or compensation. A longer term of the relationship implies the transaction becomes more consumer-specific (Behrendt et al., 2017). Understanding the targeted consumers' needs and wants becomes more relevant to the success of the RBM over time (Behrendt et al., 2017). In the first place, it is considered challenging to create consumer identification because the sense of ownership is more dominant in most cultures around the world (Tukker, 2015). Furthermore, since used products are generally expected in the renting scheme, renting is also considered less appealing than the conventional type of consumption (Mont, 2002a). In addition, since rental products are expected to have a longer lifespan, the early design of the products could easily be out-of-date compared to the latest fashion trends (Behrendt et al., 2017).

Similar to PSS, RBM is seen as a promising solution in decreasing the chance of consumption, but it is also not inherently better than the conventional business models in terms of environmental and social aspects. On one hand, RBM can reduce the chance of consumption and increase material-use efficiency. On the other hand, RBM can promote the use of products, thereby increasing the overall amount of materials used. For instance, through renting, renters are able to enjoy the products they would otherwise not be able to afford and, in this sense, overall production and consumption of the product is increased (Mont, 2002a). ...

RBM in the case of furniture

Just like in a lot of other industries, RBM is frequently related in the furnishing industry as a way to shift to a service-oriented business. IKEA, the world's largest furniture retailer, is testing a rental furnishing service in their branches around the world with different contexts in order to transition into a circular economy (IKEA Group, 2019b). According to business reports, the market of the rental furnishing service is steadily growing (for example, Research and Markets Ltd, 2019). It is estimated that the global rental furnishing market reached USD 7,788 million in 2018 and is expected to double by the end of 2025 with a compound annual

growth rate of 11.75% (Research and Markets ltd, 2019). Markets in continental Europe and in northern America are relatively mature whereas some Asian countries, for instance India and China, where urbanisation and tourism flourish, have the largest potential to grow rapidly (Research and Markets ltd, 2019).

The current landscape of the rental furnishing market, however, shows a pattern of resource-intensive and geographical scope reliance. From the literature, very few companies in this market emphasise the sustainable or environmental aspect of rental service in the furnishing industry in their communications. The majority of companies market their services as convenient, customised, and affordable (CORT Furniture Rental Corporation, n.d.-b; Furlenco, n.d.; In-lease, n.d.). After reviewing literature on public media, rare cases were identified such as the case of a Netherlands rental furnishing company, which stated how their business can contribute to the circular economy (Meyersan Furniture Rental Netherlands, n.d.). In terms of geographical scope reliance, take the US market as an example, where the development of the rental furnishing market is more mature; there are only a few large companies that can offer nation-wide services, such as Rent-a-Center (Rent-A-Center, n.d.), most of the other companies in this sector operate only on a regional scale, such as Aaron's in southern America (Aarons, n.d.). Although the idea should be plausible, rental furnishing companies that can operate internationally is rarely seen. One of the biggest companies in this sector, CORT, for example, offers international service by collaborating with In-lease, a partner company based in continental Europe (CORT Furniture Rental Corporation, n.d.-a). This phenomenon has possibly led to a trend of start-ups targeting this market (The Associated Press, 2020).

2.2 Drivers and barriers of developing rental furnishing service

From PSS's perspective, rental furnishing service has the potential in extending the life of furniture, reaching resource-use reduction, and increasing the competitiveness of the company. Including this research, however, examples can be seen that developing this service is favoured but also challenging, in a way, to the companies. In fact, the rental business model in the home furnishing sector is yet to become the mainstream of the business world. Understanding the important factors that enable the development of the rental furnishing service is helpful in breaking through this gap. There is a lack of literature solely investigating rental furnishing services. In this section, drivers and barriers for the companies to develop rental furnishing service are presented from the perspective of PSS and RBM. Consumers' perspectives are then introduced in an individual paragraph.

2.2.1 Drivers and barriers of developing PSS and RBM

Drivers of developing RBM can be discussed from three aspects. Firstly, it is to prepare for the impact of new policies. From policy makers' point of view, the role of producers on furniture waste management is deemed to become more important in the future (Forrest et al., 2017). Future policies are very likely to affect the producers in terms of their business performance and even their power distribution in the furniture industry (Forrest et al., 2017; OECD, 2016). It thus drives the companies to prepare in advance. Secondly, it is to develop new revenue sources out of market trends. Due to globalisation and urbanisation, the mobility of human has increased (Castles, 2002); this new trend has created new demand on rental furnishing service (Research and Markets ltd, 2019). For possible actors that are seeking to initiate this service, the driver is to meet consumers' demand and create revenue. Thirdly, it is for branding and to improve performance. As environmental and social awareness of the society increase, more responsibility has been put on the corporates in this regard (Jimenez &

Pulos, 2016; Yoon & Chung, 2018). Studies have shown that better corporate social responsibility reporting has positive effects on consumers' brand recognition and trust, which are considered an important enabler for consumers to accept the provided rental services (Catulli, Lindley, Reed, Green, Hyseni & Kiri, 2013; Gullstrand Edbring et al., 2016). By presenting to the public how the environmental and social practices in the value chain have improved, companies gain a better image as well as a stronger business profile.

Mont (2002b) investigated the drivers and barriers of developing PSS by reviewing literature and interviewing companies. The research divided the important factors into external and internal factors and identified that the main drivers of developing the PSS are consumer demand, favourable policy framework, top management support, and individual catalysts (Mont, 2002b). Based on a similar categorising framework as Mont (2002b), Annarelli et al. (2016) concluded on the drivers and barriers by reviewing 224 literature in the field of PSS. In this research, the drivers are interpreted as the reasons that incentivise companies to develop PSS (Annarelli et al., 2016). The literature pointed out that the incentives all have a focus on marketing; for instance, to explore new markets or to better meet the consumer demand; to cope with regulations in terms of business or environmental policies; and to better utilise assets and strengthen supplier engagement (Annarelli et al., 2016).

Barriers of developing RBM can also be discussed from three aspects. The first barrier is the increased level of responsibility and (financial) risks. The extended relationship between the service providers and the consumers of the rental service implies that 1) the overall level of responsibility of the supplier is increased by providing additional services during the contract; at the same time, 2) the risks are increased because the financial and material flows of the RBM require a high up-front investment and a high demand on capitals; the income, however, pays back in a comparatively smaller flow from the beginning and over a longer term (Besch, 2005; Vermunt et al., 2019). The second barrier is involved with the organisational problem, which is defined by Vermunt et al. (2019, p. 896) as *"the legal, administrative, and financial aspects related to ensuring the firm retained ownership of products"*. In RBM, the networks and relationships become more complex than that of conventional business models because the transaction does not end at the point of selling (Behrendt et al., 2017; Vermunt et al., 2019). The complexity makes the arrangement of the offer difficult in the sense of balancing the interests and the risk-bearing levels of both parties (Behrendt et al., 2017; Vermunt et al., 2019). The third barrier is about consumers' perspectives, which mainly refer to the dominance of ownership (Vermunt et al., 2019). The sense of ownership is often pointed out as the major barrier for developing rental services because it involves changing the mindsets or the habits of consumption (Besch, 2005). Behind this mindset are the cultural or social-economic values which are difficult to alter (Vermunt et al., 2019). In addition, Gullstrand Edbring et al. (2016) pointed out that consumer perception is dynamic, difficult to interpret and predict.

The important factors identified by the studies that can influence the development of PSS are very much overlapped as in the RBM (Vermunt et al., 2019). Vermunt et al. (2019) concluded the barriers for developing RBM as organizational; financial; markets, and institutional. Barriers for developing PSS are consumers' acceptance, lacking favourable regulatory framework, and companies' lacking knowledge in planning, implementing, and assessing the investment of developing PSS.

Firstly, consumers' acceptance is most frequently mentioned as the main barrier. The studies stated that the rental products or access-base services are in general less appealing to the consumers than conventional ways of consumption (Mont, 2002a). Baines et al. (2007) pointed out that for some culture, the purpose of consumption is to retain ownership of a

product. In this sense, the need of the consumer *is* to own the product. The claim of the importance of product ownership in consumption is also supported by Tukker & Tischner (2006), in which the paper stated that the product ownership has high intangible value to the consumers and in the case of PSS this value is 'sacrificed'. Tukker (2015) argued that this could be the reason that the development of PSS in the B2C scenario is more limited than that of B2B because the sense of surrendering private ownership is more direct to the individual consumers in the former case.

Secondly, lacking favoured regulatory frameworks is also considered an important factor that hinders the development of PSS (Baines et al., 2007). Around 90% of the furniture waste is landfilled or incinerated which causes an increase in GHG emissions (Forrest et al., 2017; The Erasmus + FURN360 project, 2018). Regulatory power is thought to come from the perspective of current EOL treatment of these products jeopardising the effort to decrease the carbon footprint, yet relevant policy instruments, such as EPR on the furniture wastes, have not yet been put on the agenda (Zero Waste Europe, 2015). Tukker (2004) suggested that the development of PSS should be supported at the beginning with the help of regulatory frameworks because PSS aims to create radical change to existing production and consumption systems. Besch (2005) suggested that developing PSS is a plausible solution for producers in terms of financial and technical feasibility but the importance of regulatory frameworks should not be neglected.

Lastly, companies' lacking knowledge of PSS is another key barrier for developing PSS. This aspect covers the preparation, the design, and the assessment of developing PSS. First of all, Mont (2002b) pointed out that the main barrier is a lack of knowledge in assessing the business and environmental opportunities that can be brought to the companies by developing PSS. Later, Baines et al. (2007) pointed out that there is a lack of knowledge in designing the PSS and preparing for this transition, which would cause a systematic change within the company. Two main barriers for the company investing into this institutional change are the high up-front costs and the resistance of company culture (Annarelli et al., 2016; Vermunt et al., 2019). Tukker (2015) also marked that since PSS will establish more complicated networks, the transaction cost of PSS is likely to be higher than the conventional business models as well. In the end, what refrains the companies from developing PSS, is that they can no longer rely on producing more products to make a profit but need to sustain a certain level of quality and efficiency in delivering the outcomes (Lovins & Lovins, 2000; Mont, 2004; Tukker & Tischner, 2006).

2.2.2 Consumers perception

Consumers' perception is a critical factor for RBM to succeed (Gullstrand Edbring et al., 2016). Lidenhammar (2015) identified that consumers have a promising level of acceptance for rental furnishing service. Main drivers for consumers to consider renting instead of buying products are affordability (Desai & Purohit, 1999; Schallehn et al., 2019), trends (Moeller & Wittkowski, 2010; Schallehn et al., 2019), and less-frequent or time-limited use (Behrendt et al., 2017; Gullstrand Edbring et al., 2016). Convenience of renting is the ultimate reason behind these drivers; consumers are becoming more used to the concept of enjoying the use of the products at the time needed or without the need to worry about the consequences (Moeller & Wittkowski, 2010; Schallehn et al., 2019). Main barriers that can prevent consumers from renting are the strong root habit of ownership (Lidenhammar, 2015), concerns about insurance and the responsiveness of the company (Catulli, 2012), hygiene as well as quality related issues (Bardhi & Eckhardt, 2012); and the renting process (Catulli, 2012; Gullstrand Edbring et al., 2016; Schallehn et al., 2019). The last concern refers to the worries of

unfamiliarity with the rules or fear of damaging the products (Gullstrand Edbring et al., 2016; Schallehn et al., 2019).

A study investigating young consumers' attitude towards access-based business models is exceptionally relevant to this research. Gullstrand Edbring et al. (2016) conducted a survey to find out the drivers and barriers for the young generation to rent or share home furniture. In terms of motivations, around one-third of the respondents reported the reason of flexibility (31%) and economic (28%) and 20% due to temporary use (Gullstrand Edbring et al., 2016). In terms of the reasons that refrain them from renting furniture, 43% reported the sense of ownership; 18% reported hygiene reasons and 15% reported being unfamiliar with the concept of renting or sharing (Gullstrand Edbring et al., 2016).

Gullstrand Edbring et al. (2016) also tested the attitude of young consumers towards second-hand consumption. Since second-hand furniture can be a source of renting schemes, the results are also valuable to explore. From the survey, consumer's perception towards buying second-hand furnishing products are motivated mainly by economic reasons (47%), and for the self-identity (25%); and the obstacles for consuming second-hand furnishing products are mainly hygiene-related (90%).

This study concluded that consumers' perception towards renting varies. Consumers have a positive attitude towards short-term renting but are **sceptical** about long-term renting (Gullstrand Edbring et al., 2016). The author explained the change of attitude through time could be out of the sense of ownership, which is thus considered a main barrier for renting (Gullstrand Edbring et al., 2016). The study further pointed out that in addition to the offering, the dynamics, especially a relationship with trust, between the provider and the consumer stands an important part for the rental furnishing service to succeed (Armstrong et al., 2015; Catulli et al., 2013; Gullstrand Edbring et al., 2016).

2.3 Important learnings for PSS to overcome the barriers

Seeing RBM from a PSS's perspective, it has a potential in reaching financial, environmental, and social sustainability. After the previous two chapters, this section is to discuss what are the learnings for PSS, RBM in this case, to be able to overcome at least some of the barriers. Starting from the beginning of the development of PSS, Mont (2002a) marked the importance of the networks and infrastructure for the PSS to be able to reach its potential. This research intends to investigate the ways of collaboration between key actors as a guideline to establishing suitable networks that can be beneficial for developing a PSS. Therefore, three important approaches with a focus on the network establishment in the field of PSS are concluded in this section, namely, the value co-creation from a stakeholder's perspective, the network tactics, and the importance of consumers' perspective.

Learnings 1. Value co-creation from a stakeholders' theory

One approach that was not fully explained so far is the stakeholders' approach of PSS bringing the potential of this business model to be able to create more or multiple value (Mont, 2004). Business model is defined as a logic of how a company creates and delivers value to its customers and captures value from this routing (Osterwalder & Pigneur, 2010; Richardson, 2008; Teece, 2010). The conventional approach implies a distinction between stakeholders who help to achieve the value creation and who receives it (Freudenreich et al., 2019), whereas, from a stakeholder's perspective, value creation can be brought by all the actors along the value chain, and competitive advantage can be multi-sourced (Massa et al., 2016; Mont, 2004).

In this case, the scope of participation and beneficiaries of the value creation of the business model can be expanded to more, if not all, stakeholders. The system-based solution, in this case, solves problems from multiple aspects not just for the final users but also for multiple actors along the value chain (Mont, 2004).

According to Freeman (2010a) who developed this theory in 1982, the stakeholder theory was rooted in the discussion of “*what holds stakeholders interest together*” (p. 7). It is arguably an idea of how to make the business work (Freeman, 2010a). Three principles of this approach are highlighted by the author. Firstly, stakeholders’ interests are joint together instead of against each other; trade-offs are therefore a sign of a necessity to *reframe* the value proposition; secondly, the business is to create the maximum level of value for the stakeholders; on the other hand, value is to be co-created by the stakeholders as well (Freeman, 2010a). Engaging more stakeholders is thus considered a way to increase the possibility of creating more value (Freeman, 2010a). Lastly, the author reminded that humanity should not be lost during the collaboration and communication between stakeholders (Freeman, 2010a). That last principle highlighted the importance of the relationship management within business field.

Many researchers highlighted the competence of incorporating stakeholders’ perspective can contribute to the business model for sustainability (Bocken et al., 2013; Schaltegger, Lüdeke-Freund & Hansen, 2016; Stubbs & Cocklin, 2008). Stakeholder collaboration necessitates the systems that can solve the sustainable-related issues through co-creating and contributing to the joint goal (Freeman, 2010b; Hörisch Jacob, Freeman & Schaltegger, 2014). Analysing the relationships and the value flows between stakeholders is the key to successfully addressing sustainability-related issues through business models (Freudenreich et al., 2019).

Learnings 2. The network tactics of developing PSS

For PSS to reach its multiple goals or for RBM to qualify as PSS, in principal, the essence of this business model is to alter the dynamics and interactions between the existing consumption and production systems and see the two systems as a whole in order to resolve sustainability problems (Tukker & Tischner, 2006). A difficulty for the producer or the manufacturer, in this sense, is that establishing PSS involves many elements that lie between the realm of consumption and production systems, which can rarely be covered by the competence of one single company (Baines et al., 2007; Luiten et al., 2001; Mont, 2002a). It is thus important for involved actors to collaborate (Baines et al., 2007; Luiten et al., 2001; Mont, 2002a). A practical way to narrow down the scope of stakeholder’s collaboration is to start by considering the network partner, or the key actors as referred in this research, of the scheme.

A tool establishing and managing the interaction among key actors when developing PSS is the network tactics suggested by Reim et al. (2015) as summarised in Table 2-2. This paper suggested that different types of PSS have different ways of establishing networks to ensure the successful design of the system. The paper stated that the network tactics need to be considered in three aspects: 1) Whom are we working with? 2) What kind of relationships are we expecting to have? 3) How can we do this together? These tactics can serve as a guideline of establishing the core network with key actors when developing PSS.

Key aspects	Key references	Product-oriented	Use-oriented	Result-oriented
Type of partners	Azarenko et al. (2009) Gao et al. (2011) Mont et al. (2006) Sundin et al. (2010)	<ul style="list-style-type: none"> ■ Dealer and providers are intermediates between manufacturer and customer. 	<ul style="list-style-type: none"> ■ Third-party provider. ■ Financial institutions. 	<ul style="list-style-type: none"> ■ Direct contact with customer. ■ Some tasks can be completed by third-party providers.
Type of relationships	Halme et al. (2007) Maxwell et al. (2006) Ng et al. (2009) Schuh et al. (2008)	<ul style="list-style-type: none"> ■ Direct contacts with customers are handled by dealers or providers. ■ Manufacturer needs to establish close relationship with dealer. 		<ul style="list-style-type: none"> ■ Focus on co-creation. ■ Close to vertical integration. ■ Based on trust.
Sharing and coordination activities	Krucken and Meroni (2006) Mont (2002) Stoughton and Votta (2003)	<ul style="list-style-type: none"> ■ Establish methods to coordinate tasks, focus on formalization. ■ Legal considerations. 		<ul style="list-style-type: none"> ■ Much personal communication. ■ Implement new working routines.

Table 2-2 Summary of the aspects related to the network tactic

(adapted from Reim et al., 2015, p. 70)

The first aspect is to consider the type of partners to collaborate with. A basic product-oriented PSS consists of a service provider and a product provider (Azarenko et al., 2009; Reim et al., 2015). Standing on the product provider's point of view, it is necessary to pay more attention to the information flow of the network if it does not have direct access to the end user (Reim et al., 2015). The importance of fluent information flow also applies to the use-oriented PSS. In the latter case, however, the revenue is generated throughout the contracting periods instead of at the point of selling. Therefore, the product provider may obtain the financial power over the scheme and thus can be more dominant in offering the service (Reim et al., 2015). The paper uses a case of baby pram leasing studied by Mont et al. (2006) to emphasise that a partner to manage reverse logistics is also necessary. The structure of a result-oriented PSS is different from the previous two; according to Reim et al. (2015), it is similar to vertical integration and what holds the network together is the access to the consumer. In this case, the collaboration with other types of stakeholders, such as financiers, waste managing and logistic companies, start-ups, complete the system (Azarenko et al., 2009).

In the network tactics proposed by Reim et al. (2015), the second aspect to consider is the type of relationship. For product-oriented and use-oriented business models, the service provider normally has direct contact with the consumers, and the product provider, who does not have direct access to the consumer, should maintain very close relation with the service provider in order to have control over consumer's needs and wants (Reim et al., 2015). For result-oriented PSS, as access to the consumer is consider the most important element to bring the actors together, it is suggest that the service be provided based on "an existing, trusted relationship" (Reim et al., 2015, p. 71). To reduce ineffectiveness, actors in this type of PSS need to have a very tight connection, and the networks need to be well managed (Ng, Maull & Yip, 2009; Reim et al., 2015; Schuh, Klotzbach & Gaus, 2008).

The third aspect is to consider the means of transferring information within the network. For the product-oriented and use-oriented PSS, which normally have a wide range of consumers, online platform is frequently mentioned as a main communication and transaction tool; nevertheless, the legal implications when utilising such system need to be taken into consideration (Reim et al., 2015; Schuh, Boos & Kozielski, 2009). For the result-oriented PSS, the number of consumers normally is less than the previous two, and the communication between the service provider and the consumers is more personal. In this case, not only should the communication be more proactive, but details of the communication, for instance the responsibility, the means, and the content, should also be more carefully considered and clarified between both parties.

Learnings 3. Involve consumer's perspective in the early stage

Lastly, the importance of including consumers' perception is worth highlighting as a standalone section. The starting point of the theory of PSS is based on the lifecycle thinking adopted by the supply chain of the industry, and thus propose a shifting focus mainly in the use phase (Mont, 2004). Baines et al. (2007) emphasised that a successful design of the PSS has to involve consumers' perspectives from the early stage. This is essential for the service provider to be able to deliver precisely what consumers want and need (Baines et al., 2007). Furthermore, both Luiten, Knot & Horst (2001) and Rocchi, Silvester, Rotte, Gardien & Kyffin (2005) suggested that users should be treated as innovators in the process of value co-creation. Based on this idea, the position of the end-users shifts from the position of receiving the offers to the position of actively designing the offer (Baines et al., 2007; Luiten et al., 2001; Rocchi et al., 2005). As mentioned, the dominance of ownership in the culture are identified as possibly the biggest barrier for developing PSS. Mont (2002a) suggested that a wider range and in-depth conversation with consumers could be a solution to this barrier. In addition, to understand consumer's perspective is also a way to understand how the network of the PSS should be designed because shifting towards a long-term relationship is a major challenge for managing the system (Schallehn et al., 2019). After all, the system provided is to "*enhance rather than limit customer experience*" (Tukker, 2015, p. 88).

3 Methodology

The chapter of methodology is divided into two parts. Firstly, research design as well as research approach are explained along with a flowchart of the research process (Figure 3-1). Secondly, details of the research activities, for instance the approach of design and the method of analysis, are introduced.

3.1 Research design

The structure and the process of this research are based on the architecture of research design developed by Blaikie & Priest (2019) and illustrated as Figure 3-1. The flowchart on the left is the structure of the research. On the right is the process of research in detail where each step can be parallelly linked to its corresponding position in the structure. Important decisions in shaping the research are explained following the concept of four primary tasks of research design, namely 1) focusing, 2) framing, 3) selecting, and 4) distilling.

In the focusing phase, from the top of the process chart, a funnelling process of reasoning is used to introduce the topic, forming the chapter of the introduction. Stemming from two research fields and a focal industry, the problem is identified after scoping down to a specific context, which is the case of rental furnishing service to students. The case study is used here to decide 'what to be studied' instead of a methodological choice (Blaikie & Priest, 2019; Stake, 2005). The significance of the problem is then clarified and research questions (RQs) are formulated.

The next level is the framing phase. The approach taken in answering the RQs is the inductive logic of inquiry, which is based on the assumptions of realism and conventionalism (Blaikie & Priest, 2019). Following this approach and the assumptions behind it, answers of the RQs are drawn by limited generalisation, which is concluded by the data collected from chosen aspects (the drivers and barriers, the consumers' acceptance and expectation, and feedback on the scenarios).

The selecting phase involves decision-making related to the concepts and/or theories used and the data collection (Blaikie & Priest, 2019). The secondary and tertiary data are collected through the literature review. In reviewing the literature, the concepts of relevant types of business models, the theoretical drivers and barriers, and the important criteria are studied and presented. Activities of primary data collection include five in-depth interviews with practitioners, a consumer survey and consumer interviews. In light of understanding consumer demand, a mix-method of qualitative and quantitative approaches are used in the spirit of triangulation (Blaikie & Priest, 2019). An explanatory procedure is adopted where the quantitative phase (consumer survey) is followed by a qualitative research activity (consumer interview) to complement the results (Blaikie & Priest, 2019). Details of these research activities are disclosed in the next section.

The last phase is the distilling phase, where it is clarified how the RQs are to be answered by the research (Blaikie & Priest, 2019). The first part of the analysis (ANS1), derived from the literature review and the interviews with practitioners, answers RQ1. ANS1 also triggers the necessity to understand consumer demand, which contributes to complementing the answers of RQ1 as well as links to the establishment of RQ2. RQ2 is answered (ANS2) on the basis of the literature review, the analysis of the consumers' questionnaire and the interviews, and the feedback from practitioners. Answers to RQ3 are analysed from the insights acquired from the research activities.

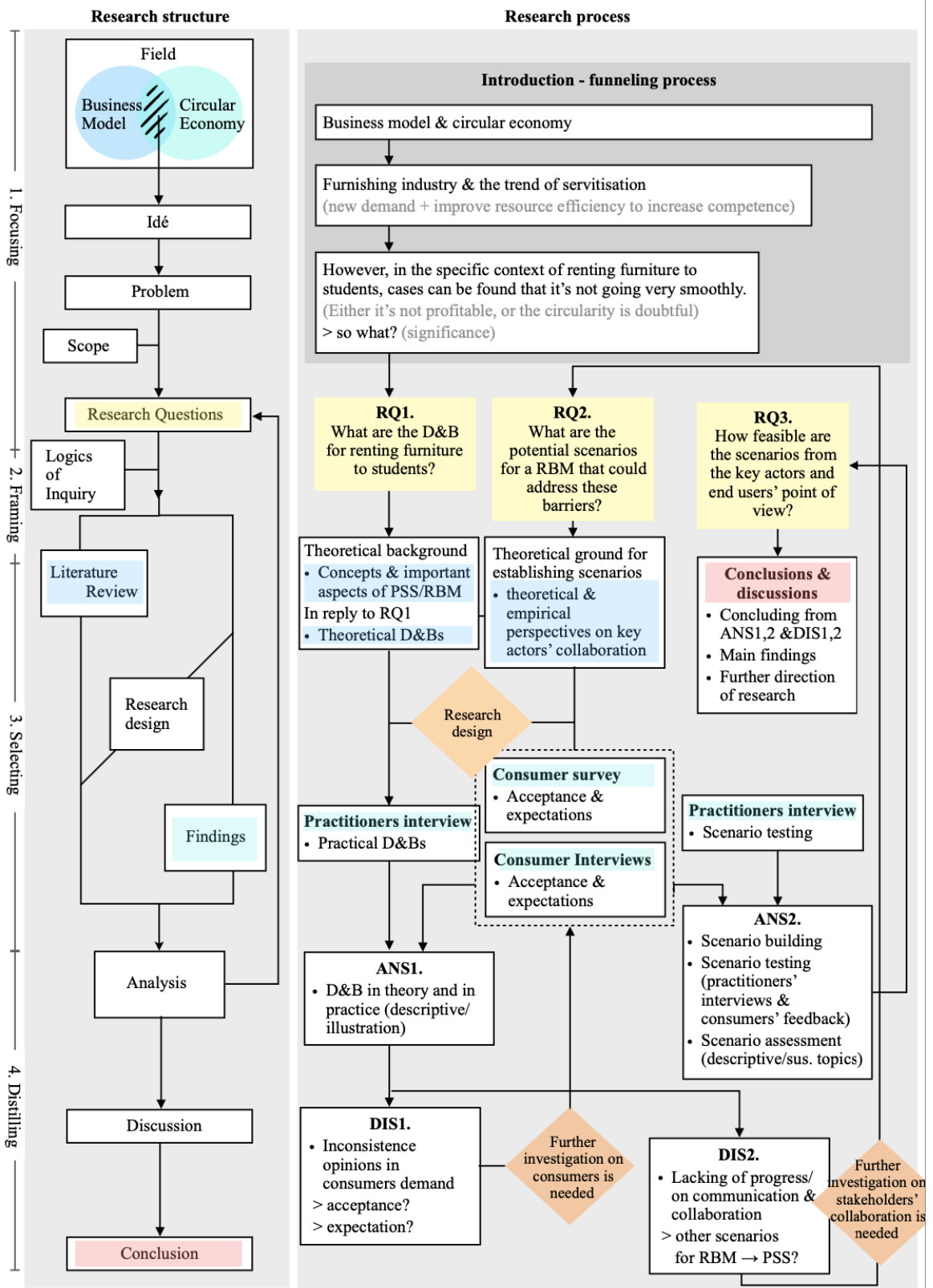


Figure 3-1 Flowcharts of research design

3.2 Research methods

In order to answer the RQs, four research activities are conducted, namely the literature review, practitioner's interviews, a consumer's survey, and consumer's interviews. Their design and use are explained in the following sections.

Literature review

According to Blaikie & Priest (2019), the review of the literature is to "*indicate clearly what is known from previous research about each of the research questions, or what could be anticipated in the light of existing social theory*" (p.20). In this regard, the review of the literature for this research is conducted from three perspectives. Firstly, the theoretical background must be introduced before going into answering the RQs. This is to be familiar with the relevant theories and to declare the selected aspects of the study. This part of the literature review includes in-depth studies about two focal types of business models, namely the PSS and the circular business model (CBM), and the fundamental concepts of them that are relevant to the upcoming research, for instance, the stakeholder theory and the value creation. Secondly, academia's point of view on the drivers and barriers of implementing the rental business models are reviewed which is partially to answer RQ1 and partially to provide a theoretical ground of the practical drivers and barriers learnt from the practitioners' experiences. Lastly, the important criteria for the rental business models, or a PSS, to qualify as CBM is discussed in detail. The approach used to assess the different scenarios in relation to answering RQ2 is also clarified in this section.

The main type of literature reviewed is peer-reviewed journal articles; non-peer-reviewed literature is academic reports from governmental organisations, such as projects funded by the EU, or from organisations with a reputation in the field, such as the Ellen MacArthur Foundation. The sources of obtaining the literature are mainly the platform of Google Scholar search engine and the database of the Lund University Library (LUB), e.g. Scopus.

In conclusion, by reviewing the literature, the focal business models and important concepts, the theoretical drivers and barriers, and the approach of assessment for the scenario development are studied, summarised, and presented. The purpose of presenting these topics is to understand what has been known in the academic field (Blaikie & Priest, 2019). The functions are to first seek answers from the academic point of view and secondly to serve as a theoretical basis in developing the scenarios.

Practitioner interviews

Involving practitioners' perspectives is considered the most important task for academia utilising the PSS to successfully address sustainable issues (Tukker & Tischner, 2006). In the case of rental furnishing service for the students in Lund, two main purposes are covered in the in-depth interviews with practitioners. One is to understand, from stakeholders' experiences, the motivations and challenges of implementing rental business models in this context; another is to present and test the scenarios on the practitioners to collect feedback. Based on these purposes, interview questions are developed, and a sample of the interview question is shown in Appendix 1.

The interviews are semi-structured; almost all interviews are conducted in the form of distance meetings, such as on-line video interview, phone interview or email discussion, due to the special condition of the pandemic outbreak during the period of research. The interviewees are selected based on their current position in the focal companies or organisations related to

the case study. The interviewed companies or organisations are actors who are currently, have experience in, or investigating in providing rental furniture service in this market. As illustrated in Figure 1-1, the interviews have covered all the actors in the market, namely Stiftelsen AF Bostäder (AFB), LU Accommodation (LUA), Hemmlis, and IKEA Group (IKEA). A list of the interviewees and relevant information is listed in Appendix 2.

The process of analysing the interviews is adopted from the content analysis, in which the inductive logic of reasoning is highlighted. In this part of the data collection, the interviews are transcribed, the transcripts are coded, the codes are categorized and contextualized, and the outcomes are reported and analysed by comparing and contrasting the information extracted from the interviews. This process in principle follows the four stages of qualitative content analysis, namely the decontextualisation, the recontextualisation, the categorisation, and the compilation (Bengtsson, 2016). The content analysis is a technic of analysing qualitative data, which is widely used in the field of social science (Bengtsson, 2016). Findings and analysis are drawn by systematically and subjectively identifying meaningful content from the textual data (Bengtsson, 2016).

Consumer survey

From the findings of the literature review and interviews with practitioners, it is identified that potential demand of the market, to be more precise, the acceptance and the expectations of the consumers, is decisive in influencing the stakeholders' decision in devoting into the implementation of the business models. The consumer survey, therefore, is another important research activity in answering the RQs. A survey is an essential tool for describing a market from the consumers' perspectives as a way to evaluate or predict the outcomes of the business models; however, consumers' perspectives cannot be accurately captured without the surveys being well-designed (Brace, 2018). The design process of the survey follows the instructions of Brace (2018). Excluding questions asking about the demographical information, the survey consists of 23 open- and close-ended questions in total, and is divided into two parts, which are 'current living information' and 'opinions on renting furniture' (Appendix 3). The estimated answering time is within fifteen minutes, which, according to statistics, is a threshold for respondents starting to drop out (Brace, 2018). This online, self-administered, and anonymous questionnaire is designed through the Google Form. It is distributed through physical posters with a QR code, instant messages, internet platforms, and email. Pilot testing is conducted before the questionnaire is released to test on different platforms, to check for the readability, and to confirm the estimate answering time.

Considering the fact that the dynamics of this market, either the growing or changing pattern of the location (Lund, a medium-sized town in Sweden) or that of the population characteristics (university students), is relatively stable through time, the targeted group of respondents to understand the potential demand of this market is former or current students³ in Lund. According to the statistics revealed by LU, there are 28,000 students registered each semester (Lund University, 2020); thus, the population or the sample size is defined as 28,000. Random probability sampling is suitable for this case in order to acquire reliable outcomes. According to the sampling function proposed by (Dillman, 2000), given confidence level (α) equals 95%, and the questionnaire received 150 valid responses, in the end, the tolerated error, or the degree of precision, is $\pm 8\%$. The computation process is provided in Appendix 4.

³ During the process of distribution, after considering the similar purposes and living patterns between different groups of people, guest researchers are included in the inviting list to respond to the questionnaire. However, in the end, the data shows no track of the response from the guest researchers.

The objectives of conducting a questionnaire are 1) to determine the level of acceptance for students to rent furniture; 2) to determine the preferred service provider for students in the case of renting furniture; 3) to determine the prerequisite for students to consider renting rooms with furniture; 4) to determine the main concerns for students to avoid renting rooms with furniture; 5) to determine the level of price advantage or acceptance of rental furnishing service for students; 6) to understand the correlation between students' perceptions of rental furnishing service and their intended length of stay.

Consumer interviews

The consumer interviews include a set of private, in-person or distanced, semi-structured interviews with the potential consumers. This stage of the activities is conducted with the purpose of enhancing the depth of knowledge obtained from the consumer's survey. Based on this purpose, interview questions are developed, and a sample of the interview question is shown in Appendix 5. The targeted group is current students in Lund. The quota sampling method is utilized to select interviewees. The method is to select interviewees according to relevant characteristics. This method applies to the situation where it is "impossible, difficult, or costly to identify whole members of a population" (Blaikie & Priest, 2019, p. 172), and, with careful selection, is able to produce adequate outcomes conveniently (Blaikie & Priest, 2019). Thus, in order to present the population to a better extent, interviewees are selected based on two aspects, one is to balance the demographics distribution, and the other is to balance the different personnel backgrounds. The result of the selection is illustrated in Figure 3-2. In particular, for this topic, the proportion of students from environmental-related majors are carefully selected to prevent leaning opinions; only three interviewees are broadly related to environmental-related majors. The interviews are conducted on a rolling basis, and, at the same time, the collected data is synthesized and analysed through a process in principal the same as the interviews with practitioners. In the end, fifteen sets of data are collected.

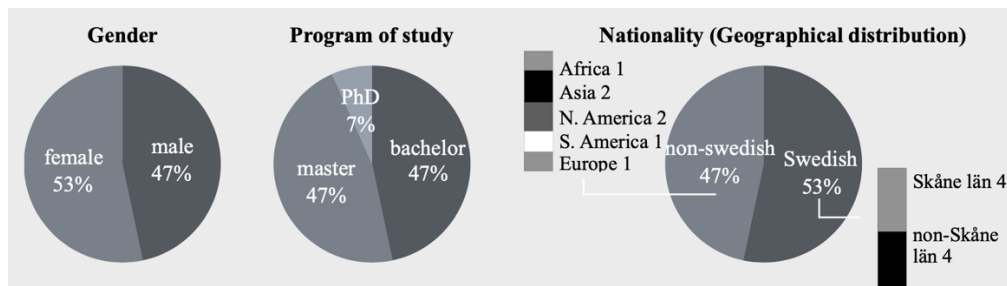


Figure 3-2 Distribution of demographical information of the interviewees

3.3 Limitations

During the research, it is found that few attentions are put in the field of renting furniture to students. This has caused limitation to the result of the research activities because, without previous experiences, the design of the research could not be better designed to fit into the student's context. More literature in renting office furniture is discovered, however, a focus on the financial implication of furniture leasing is given in this case, which is not suitable for the case of students. In addition, in order to receive enough of the sample from the survey, the insights from graduated students who had lived in Lund for a period of time are included. This could cause bias to the result that seeks to understand students' perspectives because they had been graduated for a while.

In this research, key actors and consumer's perspectives were collected by the research activities, but what is missing from a stakeholder's perspective to investigate the full potential of PSS is the other types of stakeholder's opinions, for instance, financier, NGOs (in this case, for example, Circle Center, a renting library in Lund who rents out living goods to students), or municipality who is responsible for the bulky furnishing wastes. Without collecting the insights from these parties, the full potential of developing rental furnishing service for students in Lund cannot be fully captured and thus the analysis is limited.

4 Results

This chapter presents the result of the field study and the research activities. In Section 4.1, an overview of the targeted market and a deeper understanding on its potential are given. In Section 4.2, the developed scenarios and their strong and weak sides of establishing rental furnishing services for students in Lund are presented.

4.1 Rental furnishing service for students in Lund

Lund is a municipality in Sweden close to a medium sized town. It has a population of 124,935 people at the end of 2019 (statistikmyndigheten SCB, 2020) and is expected to continue increasing to 145,000 by the end of 2030 (Lunds Kommun, 2020). More than one third of the citizens in Lund are students of Lund University (LU) (Lunds Kommun, 2020). LU is one of the most populated universities in Sweden (Kahlroth, 2019) with a steady number of approximately 28,571 students registered each semester for the past three years (UKA, 2020) and around 40,000 students registered annually (Lund University, 2020). It is expected that most of them are coming from outside of the town.⁴ In addition, it has around 8,000 employees and 5,000 of them are professors, researchers or research students, of which half of them being foreign nationals (Lund University, 2020).

An important actor for furnishing rental is the rental housing agencies because they have direct access to the potential end-users. The rental housing agencies for students here refer to the student accommodations.⁵ The main suppliers in the student housing market of Lund are Stiftelsen AF Bostäder (AFB), LU Accommodation (LUA), thirteen student nations and smaller or individual owners of accommodation. AFB is the biggest student accommodation in Lund and in Sweden with the capacity of hosting 6,000 students (Lagunas Rosén & Sundqvist, 2019). LUA is an organization or a department of LU, hosting maximum 1,000 international students and guest researchers (LU Accommodation, 2015). Student nations are estimated to be able to host around 1,646 students collectively (BoPoolen, n.d.). Lastly, smaller rental housing units or individual landlords are also active in Lund.

The students in Lund face more challenges in finding suitable accommodations than students in other areas. One challenge is that the student housing market in Lund is constantly under excessive demand and the situation is more severe than that of other Swedish cities where universities are located (Lagunas Rosén & Sundqvist, 2019; Studentbostadsföretagen, 2019a). It is reported that students in Lund need to queue for approximately ten months to rent a corridor room and thirty months to rent an apartment from AFB (Lagunas Rosén & Sundqvist, 2019). Another challenge face by the students is to furnish their apartments. Most of the students in Lund have to acquire their own furniture when moving into the rental rooms since around 75 % of the rental rooms for the students in Lund are unfurnished⁶. Since the number of rental rooms in the market is much fewer than the number of students coming to Lund, most of the student has to accept the rooms even if the furnishing condition is not meeting their needs. In conclusion, the potential of developing rental furnishing service in the targeted market is shown from the fieldwork. The potential of Lund has attracted some business actors who are interested in exploring the idea of establishing rental furnishing service. These are IKEA and Hemmlis.

⁴ See explanation in Footnote 1 (p.6) of this research.

⁵ In this research, the definition follows the Student Housing Association (Studentbostadsföretagen): “a student housing is a residential apartment for a person enrolled in a study grant-eligible post-secondary education. The student housing must be rented with tenancy rights and on conditions of limited tenure, which is linked to the tenant's continued studies” (Studentbostadsföretagen, 2019b, p. 58).

⁶ Own estimation: furnished rooms (AFB 1,300 + LUA 1,000) / approximate total rooms (around 9,000) = 25%

4.2 Developing scenarios for rental furnishing service in Lund

Based on the literature review and the context of the case study, four scenarios of rental furnishing service for students are developed with a focus on key actors' collaboration. In this section, four levels of the collaboration between the key actors are described and analysed; how the furniture is looped in the value chain are illustrated in Figure 4-1. Beyond these four scenarios is the C2C transaction mode, in which consumers trade between each other through different means; for instance, peer-to-peer trading platform, Facebook page or Blocket⁷. No business or institutional actors are involved in this case and are thus outside of the scope of this research.

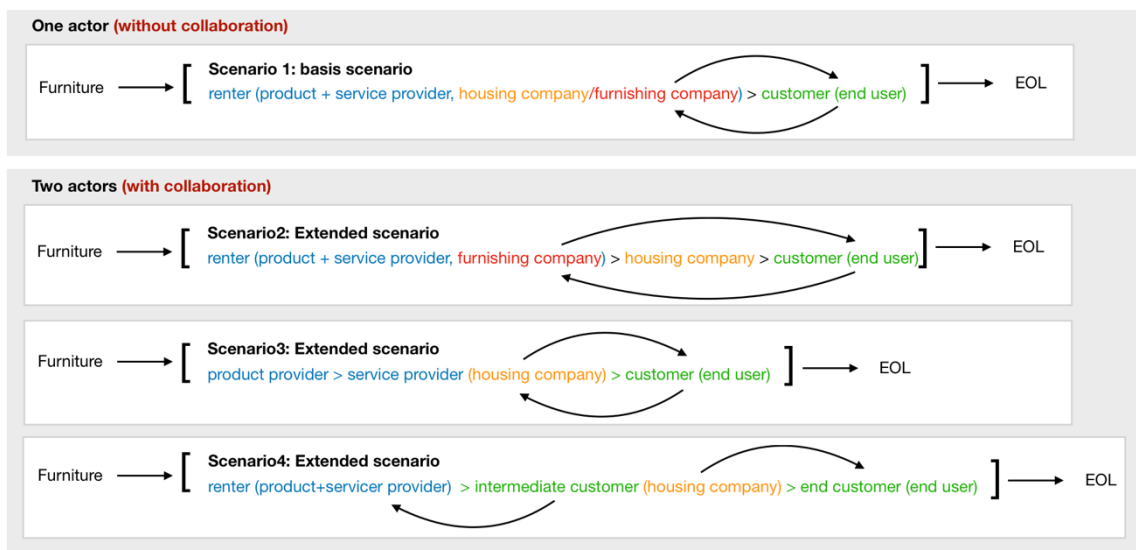


Figure 4-1 Four scenarios of extending furniture lifetime

It can be seen from the figure that all four scenarios have the potential to increasing the use of furniture. How the furniture circulated in each scenario was symbolised by the arrows. The interactions, including the material, financial, and information flows, between the key actors, and the strong and weak sides of the scenarios are examined below.

Scenario1: basic scenario - B2C

⁷ A secondhand peer-to-peer trading platform in Sweden.

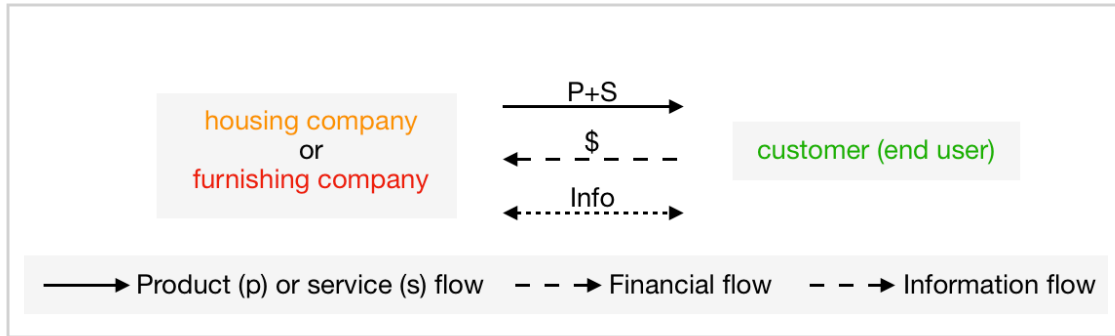


Figure 4-2 Scenario1: basic scenario - one actor, B2C

The first scenario (Figure 4-2) is a conventional transaction model of B2C. One institutional or business actor delivers the products and the services to the customers, who are also the end-users in this case. The major characteristic, also the main benefit, of this scenario is simplicity. A relatively simple network of PSS could lead to a low transaction and administrative costs. The possible drawback can be a limited range of products or services due to the limitation of one single company. Related to the limited competence of one single company, it is doubtful that if the company can deliver a quality service while paying sufficient attention to the environmental and social impacts of the system at the same time. Furthermore, the company is expected to be challenged when shifting its original business to provide this service, either in the case of the furnishing company or the housing company. For the furnishing company, the challenge is to obtain a stable and long-term or more in-depth relationship with the end-users. For the housing company, the main challenge is to deal with managing the furniture. In addition, this scenario is also the reflection of most of the actors' current situation, such as AFB, LUA, and Hemmlis. More than one interview suggested that it is not guaranteed that the product and service provider can benefit from this type of direct information flow in terms of understanding their customers. The reason is that a fluent information flow requires time and other efforts to be managed proactively by the company, which in this case may consider this task too much to be well-managed by the company itself. Communication issue or having difficulties understanding what consumer wants or needs were expressed by more than one interviewee in their current situations.

Scenario2: extended scenario - B2C

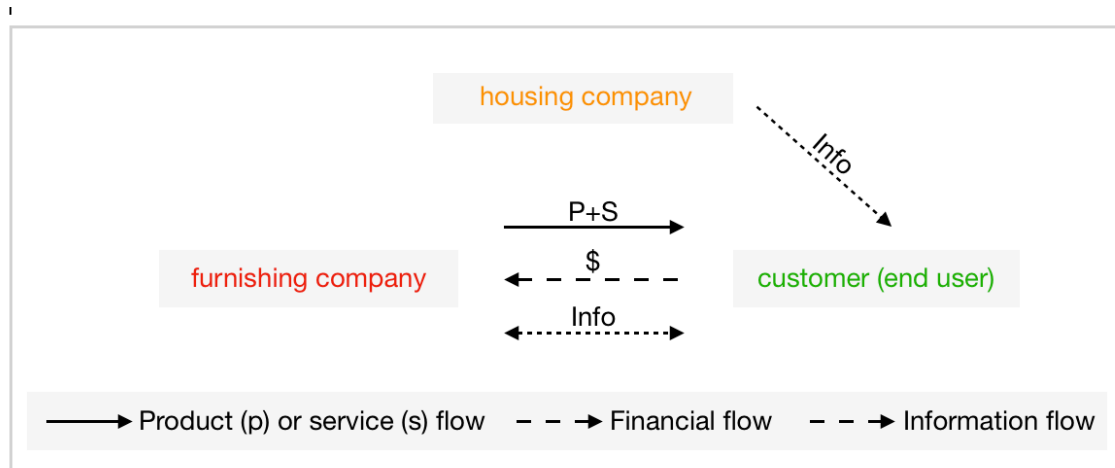


Figure 4-3 Scenario2: extended scenario - two actors, B2C

The second scenario (Figure 4-3) is also a B2C transaction adding a basic level of collaboration in terms of distributing the information, in other words, marketing. The housing company prefers to ‘completely outsource’ the rental furnishing service to a furnishing company, while the furnishing company could provide rental furnishing service with a little help of the housing agency, especially in overcoming the difficulties of accessing to the customers. Almost all of the interactions are done between the furnishing company and the customer. In this scenario, the housing company only assists in spreading the information about the service and/or helps the customer to pick a qualified provider.

There are two main benefits to this scenario. Firstly, similar to the first scenario, the simplicity of the system symbolises a straightforward division of work. From the housing company’s point of view, it seems responsible-and-risk-free because it is not formally involved in the transaction. Limited communication or information sharing between the housing company and the furnishing company may reduce the transaction and administrative costs. Secondly, by collaborating in marketing, the flow of information in the system is slightly improved compared to the first scenario. The housing company passes on the information of the service providers to their student tenants; this involves a basic level of actively filtering or verifying qualified providers, in other words, the verified service providers have more possibility in fitting the need of the consumers. The consumers thus benefit from having a more convenient and trustworthy source of service providers, and the service providers benefit from ‘being referred’ by the housing company. However, in this case, the housing company does not receive any concrete form of benefits in terms of business. Furthermore, it could end up bearing more operational risks from promoting such a service. It is, therefore, unclear whether the scenario is feasible in terms of balancing the risks, the responsibility and the profit between these key actors, although, as mentioned, a clear benefit for the consumers can be expected. This scenario is beneficial because it is easy to conduct as it involves an only basic level of communication, but it also has a clear shortcoming that the risks and profits may not be easily balanced between two actors, which might lead to an unsteady status of the system, limiting the outcome of reaching multiple goals.

Scenario3: extended scenario - (B2)B2C

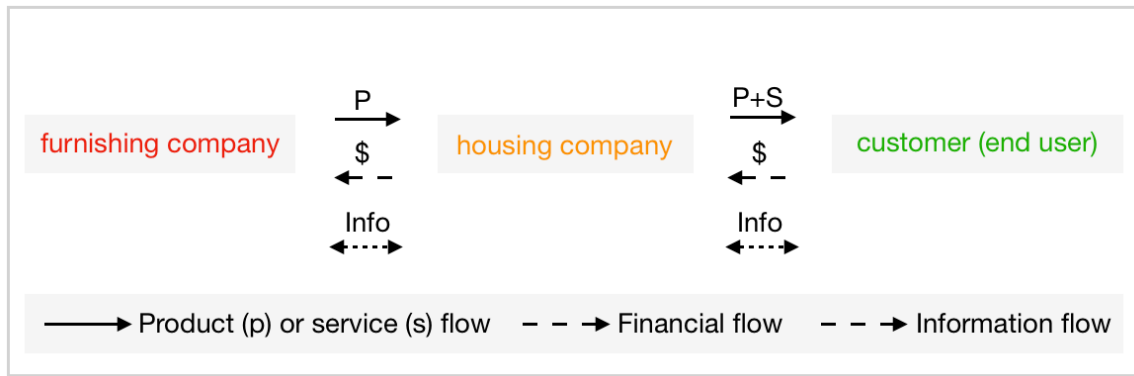


Figure 4-4 Scenario3: extended scenario - two actors, (B2)B2C

The third scenario (Figure 4-4) is where the housing company is the main actor that delivers the products and the services while the furnishing company can assist in providing a customised package for the service. In this case, the ownership of the products is transferred to the housing company and the housing company provides both housing and rental furnishing service to their tenants. The difference between the first scenario and this one is the level of collaboration between two business/institutional actors. In the first scenario, the housing company delivers the service, including purchasing and managing the furniture, according to their own knowledge; in the third scenario, the housing company delivers the service through the help of the furnishing company. The two companies share the information and design the package and the service together.

Depending on the level of collaboration, it is expected that the professional knowledge of furnishing company can help the housing company to provide a better service without directly facing the end-users. Both parties and the consumers are expected to benefit from the quality service and less of extra efforts or lower requirement on infrastructures are required in building up this system. As both of the companies are operating within their original field of business, the risks of investment for them are potentially low. The weak point of this scenario is that the prolonged information flow may lead to inefficiency and higher transaction costs; meanwhile, the rental furnishing service for students is sensitive to the offered price as most of the students are under budget. In this case, this scenario is possible to obtain quality service and reach multiple goals as a PSS, but it could be that it is not financially feasible or not financially appealing to the customers.

Scenario4: extended scenario - two actors, B2B2C

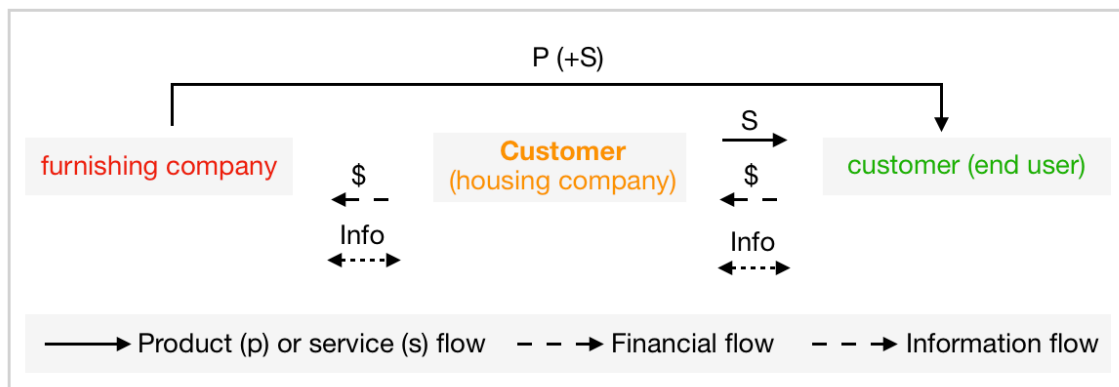


Figure 4-5 Scenario4: extended scenario - two actors, B2B2C

The fourth scenario (Figure 4-5) is where the furnishing company is the main actor who provides the rental furnishing service while having a contract with the housing company. In this case, the furnishing company provides the furniture to the end-users through renting them to the student housing company. Based on the contract, the furnishing company takes care of the products and the service related to the products themselves, such as, delivery and maintenance; and the customer (in this case, the housing company) takes care of the other services related to maintaining the use of the products, such as, regular checking and tracing, and feedback collection.

The major benefit of this scenario is the potential and flexibility of providing the service, which are increased by the more comprehensive network of the system. In this case, the quality of the service is more related to the design of the system, and less directly influenced by the frequency of usage of the end-users. The housing company benefits from an upgrade of their service offered by the furnishing company, and thus more profits can be added on their existed business at the same time better fulfilling tenants wishes. For the housing company that intends to provide furnishing service, it is also a way to increase the efficiency of their investment. The furnishing company benefits from gaining access to a base of subscription flow and chances to develop a new business area. There is a potential in fitting the rent-to-buy option or the leasing concept into the transaction. The successful experience of renting to the students through student housing agency could be replicated to other types of business customers.

The challenges of such a scenario are high up-front costs in terms of time and money, causing a high level or inestimable uncertainty to the developer. This scenario is close to a result-oriented PSS and the key to success relies on the design of the system at the beginning as well as the efficiency of the work in the long-run. The more refined system it has or the more efficient workflow it can reach, the lower the costs for all actors. The system is tightly connected between each actor in terms of the material and information flows. The network of the system is the most complicated, and thus it is expected that an integrated platform or management system need to be developed to reduce the operational and transactional costs, and a learning effect will take place to maintain the operation of the system.

5 Analysis

This chapter analyses and systematises data collected through interviews with practitioners and consumers and from the consumer survey run among students in Lund. In the first section, the drivers and barriers for the practitioners to provide rental furnishing service are presented. In the second section, an analysis of the developed scenarios with a focus on the feasibility is presented based on the interviews with key actors. In the third section, the data of consumers' survey is analysed in the division of two parts. This section starts with decrypting the current situation of students renting furniture, and then to consumers' attitudes toward such a service. In the last section, survey results are enriched with insights into consumers' needs and wants regarding renting furniture that are mapped out drawing on findings of interviews with potential consumers.

5.1 Drivers and barriers for key actors to provide rental furnishing service

This section analyses drivers and barriers that practitioners claim to have when exploring possibilities or running rental furnishing service as a (potential) provider. For each actor, the background of the organisations is described and the state of the art of their business relevant for rental furnishing services is presented. The drivers and barriers are then outlined and summarized for all the actors at the end of the section.

AFB

AFB is a non-profit foundation that provides housing service for students of LU. AFB was established by the student organization, Akademiska Föreningen i Lund, in 1830 (AF Bostäder, 2019a). Currently they have around 6,000 rooms for renting to students, 1,200 of which are furnished. Apart from the furniture that is built into special interior design of some accommodation areas, the furniture AFB is renting was bought in a few batches. The furniture was chosen to be of good quality and extra sturdy to fit into the student's living style. This also means that the design could be out-of-date from today's aesthetic point of view. The level of maintenance work for the furniture should be low due to good quality, but also because there is a limitation in terms of a feasible workload for caretakers who are to take care and sometimes to repair the returned furniture. AFB does not have sufficient storage space and therefore does not own much spare furniture or spare parts. Since the furniture has been gradually worn out and the number of functional pieces of furniture is decreasing, AFB is discussing whether they want to continue providing this service.

What has driven AFB to start providing furnishing service to students was the willingness to address student tenants' need. Interviewee 1 explained that students normally belong to a low-income category and often have difficulties dealing with the need for furniture on their own. AFB therefore receives request for furnished rooms quite often. One additional reason for the demand for renting furnished rooms is that a lot of student tenants see AFB as a temporary living place; they tend to move out soon so having furnished room is convenient for them during their stay in AFB (Interviewee 1, Sustainable Manager of Stiftelsen AF Bostäder, personal communication, 3 December 2019). According to interviewee 1, half of the tenants of AFB move out in a year.

As mentioned above, AFB at the crossroad, discussing whether it should continue providing furniture rental services to some students or not. One important driver for AFB is the seeming

sustainability of the offer itself and the potential to contribute to sustainable development (Interviewee 1, Sustainable Manager of Stiftelsen AF Bostäder, personal communication, 3 December 2019; Interviewee 2, Property Manager of Stiftelsen AF Bostäder, personal communication, 4 March 2020). The organisation aspires to provide sustainable services to students and facilitate sustainable practices among their tenants. As the organisation is expected to continue growing in the future, it also recognises benefits of going through a systematic change to be more sustainable in an early stage (Interviewee 1, Sustainable Manager of Stiftelsen AF Bostäder, personal communication, 3 December 2019). This includes improving their current practices of providing rental furnishing service so that the process could be more sustainable, reducing bulky wastes of the furniture left by graduating students and promoting environmental and social sustainable development of the society (Interviewee 1, Sustainable Manager of Stiftelsen AF Bostäder, personal communication, 3 December 2019).

The first barrier is thus the consumers' need that AFB is aware about, but which it cannot satisfy. Firstly, the organisation received feedback about the student tenants who would like to have a more flexible system of rental furnishing services. What is offered by the AFB is basically an option of un-furnished or furnished room. However, tenants cannot customise the offer in terms of the types of furniture that comprise a furnished room. If a student does not like or need the rented furniture, (s)he can only store it within her/his room until the end of the rental period. This situation causes tenants' inconveniences, but currently, there is limited improvement AFB could provide with the resources of its own.

Another barrier for AFB to continue providing this service is mainly a lack of knowledge and resources in managing the furniture. Furthermore, under the circumstance AFB considers itself not to have sufficient and necessary capabilities to run this service to its ideal scenario. The organisation is unsure how they can meet tenants' need in a better way (Interviewee 2, Property Manager of Stiftelsen AF Bostäder, personal communication, 4 March 2020). In the end, AFB does not see the development of renting furniture to students as a financially feasible option (Interviewee 2, Property Manager of Stiftelsen AF Bostäder, personal communication, 4 March 2020).

Hemmlis

Hemmlis is a start-up established by a group of students of LU. It provided rental furnishing service to students in Lund during its operational period from 2017 to the end of 2018. Hemmlis started with renting only second-hand pieces of furniture and shifted to semi-second-hand pieces of furniture after the volume of their operations increased. The organisation had the capacity to furnish 50 rooms and they had maximum served around 25 rooms at the same time (Interviewee 4, Co-founder of Stiftelsen Hemmlis, personal communication, 22 March 2020).

The main driver for the founder is to promote sustainability and, at the same time, to take the business opportunity of providing this service in Lund (Interviewee 4, Co-founder of Stiftelsen Hemmlis, personal communication, 22 March 2020). The interviewee is a co-founder of Hemmlis, who was also a student of Lund, and had interest in upcycling furniture. She observed that students demand and want to get rid of similar items at the same time (in the beginning or the end of a semester), but a free-trade second-hand market, which refers to a student trading platform on the Facebook, is not enough to digest these specific time-based heavy demands.

Hemmlis is considering coming back to the market with a new business strategy. In terms of consumers' preference, the organisation observed that students want to have a flexible choice, but they also typically have low income. In response, Interviewee 4 believes, Hemmlis should develop a new strategy with more flexible choices but this strategy should not increase the operational cost of the organisation in the long run. An example of this idea is no-man picking-up points. This type of new strategy symbolised a future challenge of up-front costs higher than before in building up its stocks or/and investing in infrastructures. Other challenges Hemmlis encountered include difficulties of reaching out to potential customers prior to their arrival to Lund.

IKEA

IKEA is the world largest furniture retailer with a turnover of 41.3 billion euro in 2019, which increased by 6.5% compared to 2018 (IKEA Group, 2019c). Until 2019, it has 274 stores in over 30 countries around the world (IKEA Group, 2019c). IKEA aims to reach zero net GHGs emission by 2030 and one of its directions to reach this goal is to transit in circular business (IKEA Group, 2019a). Following this direction of development, establishing rental furnishing service has been put into their agenda and the company have/had tested several furniture leasing projects on a small scale in 2019 (IKEA Group, 2019b). Examples are a rental furnishing service for students in the Netherlands, an office leasing project for business customers in Switzerland, and a rental furnishing service with a mix of new and used furniture in Sweden (IKEA Group, 2019b).

What drives the company to explore the rental furnishing services is the need to explore new revenue sources to stay competitive, to increase material-use efficiency in order to reduce costs and to improve branding (Interviewee 5, Circular business manager of IKEA, personal communication, 22 March 2020). From the company's point of view, developing rental furnishing service is a popular concept that aligns with its goal of development as well as social expectation. It perceives Sweden to be a mature market that is ready for testing this business idea. The company has also noticed the potential of students as a targeted group of consumers. From the pilot projects IKEA conducted in 2019, especially the rental furnishing service for students in the Netherlands, the company noticed that the acceptance of such idea among potential customers is high, but there is a number of supporting elements need to be put in place before the idea can be realised.

The detail of establishing the network and infrastructure for this service is going to influence the outcome and the company aim for the most cutting-edge type of system that can fulfil their customers as well as bring a new era to the retail furnishing industry. As the scope of the investment of IKEA on developing rental furnishing service is much bigger than other case actors, the process of evaluation and integration become more complicated. As a pioneer of the industry, a challenge reported by the interviewee on their way developing this service is to conduct quick tests on these detailed innovative ideas and it also requires a lot of knowledge and financial investments in developing and refining the relevant systems, such as the financial system, the reverse logistics and digital tools. At the same time, the company aspires to design a suitable or attractive offer for the consumer. Thus, a balance needs to be found between financial feasibility, business offer, resource efficiency goals and consumer preferences.

LUA

LUA is the student housing organisation developed by LU, which is the second largest student accommodation in Lund. It provides all furnished rooms, including basic pieces of furniture

and necessities, to international students and guest researchers. It manages around 1,058 rooms in all three campuses of LU, and most of the time they are almost fully rented out (Interviewee 3, Housing Manager of LU Accommodation, personal communication, 19 March 2020). LUA considers furnishing service to be a necessary part of its housing service since it targets to serve international students. They have planned to provide more furnished accommodation in the future as they can see the demand is growing.

The drivers for LUA to provide such service is to increase the international image of the school (Interviewee 3, Housing Manager of LU Accommodation, personal communication, 19 March 2020). According to Interviewee 3, LUA recognises the need for international students to rent furnished rooms since they often come from different countries and normally are less-privileged (financially) compare to local students. Currently, the interviewee believes, content-wise, LUA has provided enough of service in terms of fulfilling student tenants' need.

LUA does, however, faces a challenge to develop a more efficient system of managing the returned furniture. The interviewee mentioned that it is really hard to keep on track with the condition or the size of the inventory. It was suggested that this situation has led to an increase in own costs, and in part leads to higher pricing. A comparatively high cost of renting furnished rooms has been identified by consumers as an obstacle. Another reason is because of the high labour costs of Sweden and the relatively small scale of the service. Consumers also want to have access to more flexible choices of the furnishing service, similar to that of AFB.

Table below (Table 5-1) summarises drivers and barriers identified by case companies identified in the empirical study.

	Drivers	Barriers
Literature	<ul style="list-style-type: none"> • Prepare for the impact of new policies. • Develop new revenue sources out of market trends. • For branding and to improve performance. 	<ul style="list-style-type: none"> • Increased level of responsibility and (financial) risks. • The organisational problem (design of the system that balance the risks and responsibility) • Consumers' perspectives (the dominance of ownership)
AFB	<ul style="list-style-type: none"> • Meet student's need • Sustainable development (in general, and to reduce the burden of taking care of the bulky waste left by graduating students) 	<ul style="list-style-type: none"> • Not able to provide flexible choices • Does not have the knowledge of managing the furniture • Does not have the capability in managing the furniture by themselves • Not financially feasible
Hemmlis	<ul style="list-style-type: none"> • Improve circularity of the furnishing products • Business opportunity • Meet students' need 	<ul style="list-style-type: none"> • Not able to provide flexible choices • Difficult to access to their potential customers at the right point of time • Lack of a unified goal among team members
IKEA	<ul style="list-style-type: none"> • New business opportunity • Improve resource-use efficiency • Better branding (increase reputation) 	<ul style="list-style-type: none"> • Developing innovative ideas – experience accumulation • Developing innovative ideas – resource investment

		<ul style="list-style-type: none"> • Optimise design of the offer • Inefficient in approaching individual customers
LUA	<ul style="list-style-type: none"> • Increase international reputation • Fulfil special need of international students 	<ul style="list-style-type: none"> • Management of inventory • High operational costs

Table 5-1 Drivers and barriers for key actors in Lund to provide rental furnishing service for students

The table shows that, although described from different angles, the drivers and barriers for all key actors are surprisingly similar. For student housing agencies, such as AFB and LUA, the main driver is meeting student tenants’ need. For furnishing companies, IKEA and Hemmlis, who see students as a targeting group of consumption, the main driver is the business potential of furnishing rental. In a broader picture, all of the actors mentioned the increasing awareness of sustainable development within the companies and among consumers and the society as an incentive as well as a pressure for them developing such a service.

The main barrier for the case organisations to develop such a service is the need to provide flexible and suitable offers to low income consumers. In addition, all of them revealed difficulties in designing the system on their own, stemming from lack of knowledge on managing the flow of the system. Lastly, both furnishing companies revealed difficulties in dealing with consumers. For Hemmlis, it was more of a marketing issue, mainly refers to inform and convince the consumers to try their service, while for IKEA, it is more of an efficiency issue. In the next section the feasibility of the scenarios for different actors is tested.

5.2 Testing the feasibility of scenarios for different actors

The scenarios developed in the previous chapter (Figure 4-1) served as a starting point in the discussion with the practitioners, who were then asked to describe their ideal scenario for a rental furnishing service. The ideal scenario and alternative details and options for its implementation were discussed with the practitioners.

AFB

The main concerns for AFB to develop rental furnishing service is a lack of knowledge and capability to manage the furniture with its own resources. Therefore, AFB is open to explore possibilities to collaborate with other companies or organisations. AFB has already been searching for partners who could help provide the service. The partners should have the capacity to manage at least 1,200 furnished rooms and to fulfil, at least to a certain extent, the student tenants’ preference for more flexible choices of furnishing packages and additional services. In their imaginary scenario, AFB is entirely free from the responsibility and risks associated with providing such a service. This is close to Scenario 2 (Figure 4-3), in which a product and service provider have taken on most of the work in delivering the value of rental furnishing service directly to the students, while the housing agency has responsibility for reaching out to the prospective tenants with information about the service. At the same time, AFB realises that in this case, there are not many (financial) incentives for AFB to promote such a service or to run the system jointly.

Nevertheless, AFB is open to collaboration in developing such a system. In this case, it is likely to become a service provider offering only limited services, in which AFB wishes to be able to fulfil student tenants’ need as much as possible within their current capability. This means

that as a service provider, AFB supports the development of digital management system to reduce its own workload. This includes integrating the furnishing option and supporting services into the current housing system. AFB prefers to provide budget-limited offers and reduce the choice of additional services, such as exchange of furnishing or maintenance services.

In this case, the organisation's concern is a stable source of furniture supply. AFB would prefer to collaborate with an independent furniture provider or a provider of second-hand furniture, in order to promote (social and environmental) sustainability. However, such actors may not be able to provide furnishing items for the 1,200 rooms that AFB manages. Should the furniture provider be a large company, then the question is whether the collaboration would be financially feasible, both for the furniture provider and for AFB. In addition, using second-hand furniture is always associated with concerns for hygiene and potential problems with bedbugs regardless of the size of the company that supplies furnishing products.

Hemmlis

Hemmlis is a professional rental furnishing service start-up that does not produce their own furniture but assembles furniture packages and rents them to students. As a start-up obtaining knowledge of managing the rental furnishing service, Hemmlis is relatively flexible in terms of the position in building up a PSS of providing such a service. Hemmlis, who is still developing their business, had explored the possibility of collaborating with different types of the company.

The first type of organisation Hemmlis chose to work with is the second-hand furniture provider. Hemmlis had tried to collaborate with two local second-hand stores, who provide furniture. The idea was to advance the delivery system by developing the digital systems or other solutions to improve the management of furniture flow. This case should be similar to Scenario 3 (Figure 4-4), where the furniture provider (second-hand stores) is to provide suitable furniture to the service provider (Hemmlis). Beyond the pros and cons analysed previously about the scenario three, however, it is a lack of an incentive that ceased the discussion. Further development seemed difficult as these stores are non-profit and operate with limited resource.

The second type of organisation Hemmlis sought to collaborate with is the student housing agency. The idea was for the student housing company to outsource the furnishing service to Hemmlis. This is an example of Scenario 2 (Figure 4-3). Here both parties were satisfied with their positions in providing this service, but the discussion ceased mainly because the form of business of Hemmlis is a foundation (*en stiftelse*) instead of a formal business enterprise. In this case, the collaboration is limited.

The third type of organisation Hemmlis had tried to collaborate with is the furniture producer. In this case, Hemmlis contributes to promoting rental furnishing service as a professional managing agent. This collaboration portrays a more complicated scenario involving more actors, which should give more possibility in developing such a service. However, both parties are lacking direct access to potential customers, which, in their opinion, is more important for testing this idea. The plan was abandoned as the counterparty went collaborate with a housing company instead. Hemmlis has, on the other hand, explored the possibility to design and manufacture modular furniture and came up with a module furniture package. However, offering this package to end consumers has not been financially feasible yet.

From these experiences, it is understood that the establishment of rental furnishing service in the case of Hemmlis is more limited by its own status than anything else. For example, a sound organisational structure and a legal form of business could better constitute a steady or/and long-term business collaboration. Therefore, restructuring and reorganizing the company is the most important task for Hemmlis.

On the other hand, Hemmlis has realised the necessity to collaborate with other types of actors to establish a PSS for rental furnishing service. Based on the interview, Hemmlis could make a profit from its original business model where it stays at Scenario 1 (Figure 4-2). However, it has recognised the benefit to collaborate with other actors in building up the system of providing the rental furnishing service and has been actively proposing for different types of collaboration. Based on the analysis of the developed scenarios, Scenario 4 (Figure 4-5) should be most beneficial for Hemmlis; because by working as an agent of management, it would be able to efficiently deepen its profession which mostly in need of accumulating through experience. However, the power structure is potentially imbalanced in Scenario 4 (Figure 4-5), which means that it would be for the counterparty to decide if they can see Hemmlis as a valuable partner.

IKEA

As a big company, its advantage lies in the potential to choose and build up the scenario that is most ideal to it and the disadvantage is the high standard of it on the commercialization and integration of realizing such an innovative idea. Based on the interview, IKEA has realised that it is more efficient for it to approach the business customers instead of individual consumers. Therefore, the company is looking for establishing a key actor's network to provide furnishing rental service with actors having direct access to the individual customers, which, in this case, are the student housing agencies. IKEA has accumulated experiences from conducting several pilot projects in developing the rental furnishing service. According to the interviewee, the company has developed a cutting-edge business idea that is similar to Scenario 4, but in terms of feasibility, at least three aspects are in need of further assessment.

Firstly, in the ideal scenario, IKEA is facing two types of customers: business customers – student housing agency, as well as end-users. The student housing agency and the students have different preferences, and therefore IKEA needs to develop a value proposition to the two different customer groups. Being a company that traditionally targets end-users, IKEA now needs to develop understanding and preferences of business customers in order to devise an efficient and effective network and infrastructure to support this rental furnishing idea. Another challenge is to understand the preferences of end-users and what implications their relationship with student housing agencies might have for the constitution of the network and design of the supporting infrastructure.

Secondly, the company has established two directions for the operation of the rental furnishing service. One can be conceptualised as 'the Netflix for furniture' or 'furniture streaming', which is to provide furnishing solutions to landlords - a subscription system that can fulfil a wide range of tenants' demand related to furnishing. Another one is conceptualised as 'the white canvas', which aims to provide a furnishing solution that has a higher level of flexibility, offering the possibility to end-users to create an identity through furnishing package. Both of the ideas are innovative and ambitious in terms of the state-of-art of rental furnishing service. The former one would require an extensive logistics system to make sure the items circulate as planned, while the later one is testing the idea of consumption not based on ownership.

Lastly, to reach its ideal scenario, the company is undergoing a series of development for the supporting systems. According to Interviewee 5, this includes (and are prioritised as the following order) the financial system, the reverse logistics and digital tools (relevant software and hardware facilities), and the external partnerships. The interviewee mentioned that the company sees students in Sweden/Lund as a market of potential but there is no concrete plan of approaching to the student housing agency (i.e. the external partnership) until the first two supporting systems are put in place. Based on this order, it is understood that has a clear roadmap of realising a result-oriented PSS similar to Scenario 4 (Figure 4-5); at the same time, it also reveals a blindspot of this plan that by investing these infrastructures before approaching to possible partners, the company is bearing certain level of the risks of the upfront costs all alone. In this case, the feedback of the configurations of the infrastructure cannot be efficiently collected as they were not tested in a real environment.

In conclusion, IKEA has developed a plan for developing a rental furnishing service similar to Scenario 4 (Figure 4-5); in its plan, however, discussions with targeted customers or markets (including the student housing agencies and the students) are relatively neglected. The interviewee admitted that although students were expected by the company and the investors to be a promising group of customers, they have not yet concluded a profitable commercialised model from the experiences of testing this targeted market. More actively establishing discussions even collaboration with either of the actors proposed by this research while developing the infrastructures would be beneficial in receiving timely feedback. The ideal scenario of a result-oriented PSS where IKEA dominating the landscape of the system is feasible but so far conversation among key actors seems lacking and it is, after all, the reaction of those actors to decide if the investment of the infrastructure is fitting to their needs and wants.

LUA

Managing the furniture and furnishing items have not been an easy task for LUA. LUA has been providing fully furnished rooms to their tenants; in some cases, e.g. in a studio, even kitchenware is included. The main task of the management includes to provide a satisfying quality of the furniture and furnishing items and to make sure that whoever over-exploit the furniture pays for the cost of replacing the items. The bed is a typical example that is reported such a careless use situation exists. LUA has to replace it more frequently than it was supposed to last, and this is a sign of inefficient use of the current system.

LUA is seeking to improve its management system of the furnishing inventory with its own resources. It is more reluctant to the idea of collaborating with other organisations to establish a joint system. One reason is that LUA believes that managing the rental furnishing service for low-income students is a comparatively limited case that cannot be (financially) feasible for the service provider. LUA, therefore, sees the collaboration with such a service provide could be risky, in terms of stability. Another reason is that it sees that arranging the furniture and furnishing items for their tenants is one of LUA's primary responsibility. Therefore, it is not necessary that LUA has to own and manage the furniture on its own; it is more about the need of international student tenants to have a trustworthy organisation arranging and providing the rental furnishing service for them. The organisation has therefore taken the responsibility to store the spare parts and to deal with after-service. Although this means higher costs and relatively limited services provided, LUA believes it satisfies the need of its student tenants.

LUA identified the following benefits of collaborating with a rental furnishing service provider: provision of more flexible choices of furnishing solutions to student tenants; something that student have wished for, and reduced LUA's resources on managing the furnishing items. According to LUA representative, they would be interested in discussing such an idea with their existing partners. LUA also recognises that rental furnishing service is a good idea from an environmental point of view. This leaves room for developing into Scenario 2 (Figure 4-3) or Scenario 3 (Figure 4-4). However, the scenario where LUA can guarantee a satisfying result for its tenants without managing the furniture flow on its own is not feasible for the organisation at this moment.

5.3 Consumers attitudes toward renting furniture: results from the survey

Developing scenarios for furnishing rental services is not possible without an apparent demand from students and without an in-depth understanding of their needs, wants and preferences of relevance to these kinds of services. Therefore, an online survey of students in Lund was conducted to explore consumer attitudes toward renting furniture. The first part of the survey is to find out the current situation of students renting furniture as presented in 5.3.1, and the second part of the survey is to find out the consumers attitudes toward renting furniture as presented in 5.3.2. In total, 150 valid responses were collected. The result of the survey is analysed in this section.

5.3.1 Current situation of students renting furniture

As mentioned in the background introduction of the case study (Chapter 4.1), the majority of the students need to acquire their own furniture when coming to study in Lund. The survey showed that 36% of the respondents purchase their furniture from wholesale stores⁸, 26% from second-hand shops, 14% from family and acquaintances, 12% from retail shops⁹, and 6% from the on-line second-hand trading platform (C2C).¹⁰ It is understood that the process of acquiring furniture for students in Lund is costly and troublesome. A mindset of temporary stay during the period of study was stated by 24 respondents; these respondents thus consider the costs and efforts related to the transportation of the furniture extra problematic and see furnished rooms or rental furnishing choices are beneficial for them.

Nevertheless, this survey captured the feedback of students on existing rental furnishing service. Among 150 respondents, around 90% of them reported that they had stayed/stay in rental rooms furnished in different levels. Among these respondents who have (had) experiences in renting furniture, 47% of them were not satisfied with the rented furniture. The main reasons are furniture design (12%), too old (10%), unsatisfactory function (10%), and dirty/smelly/visible stains (7%).

The existing rental furnishing service described by the respondents has following features. According to the survey, the main items provided are a bed, a desk, a chair, a lamp or lightening, and a drawer/shelf or a bedside table. The provided furniture is not brand new but considered in a fair condition for 46% of the respondents. 21% of the respondents reported

⁸ In the survey, the respondents were given the example of Jysk and IKEA, two of the furniture wholesales stores in Lund.

⁹ In the survey, the respondents were given the example of Åhlens and Lagerhaus, two of the furnishing retails stores in Lund.

¹⁰ Another 6% of the respondents replied not applicable; the main reason is that their rooms are fully furnished so they did not buy anything.

that they do not need to purchase anything more; 45% spent less than 1,000 Swedish kronor (sek) on furnishing their rooms and another 20% spent between 1,000 to 3,000 sek.

In the end, 67% of the respondents replied that they did not receive a choice of whether they would like their room to be furnished or not when they rented it. 63% of respondents want to choose whether to provide furniture when renting a room.

5.3.2 Consumers attitudes toward rental furnishing service

The level of acceptance of furniture rental by students in Lund

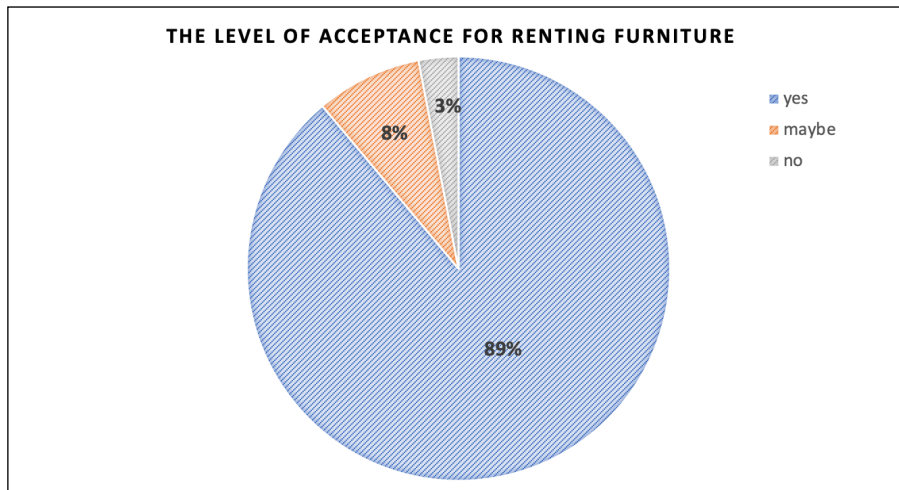


Figure 5-1 The level of acceptance of renting furniture by students in Lund

The overall level of acceptance of renting furniture by students in Lund is high: 89% replied yes, 8% replied maybe, and only 3% (5 people among 150 valid responses) are not interested in renting furniture (Figure 5-1).

The preferred service provider for students in the case of renting furniture

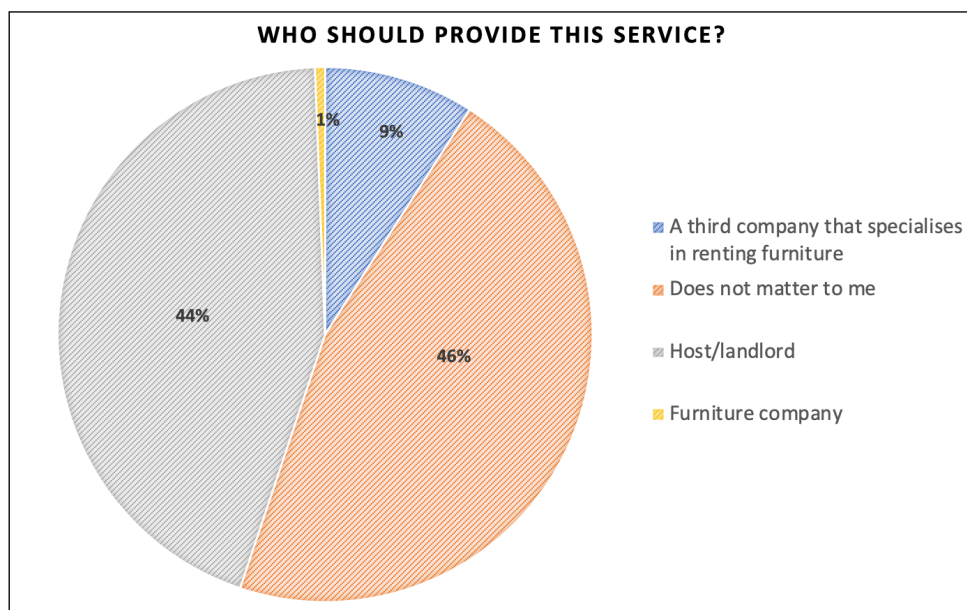
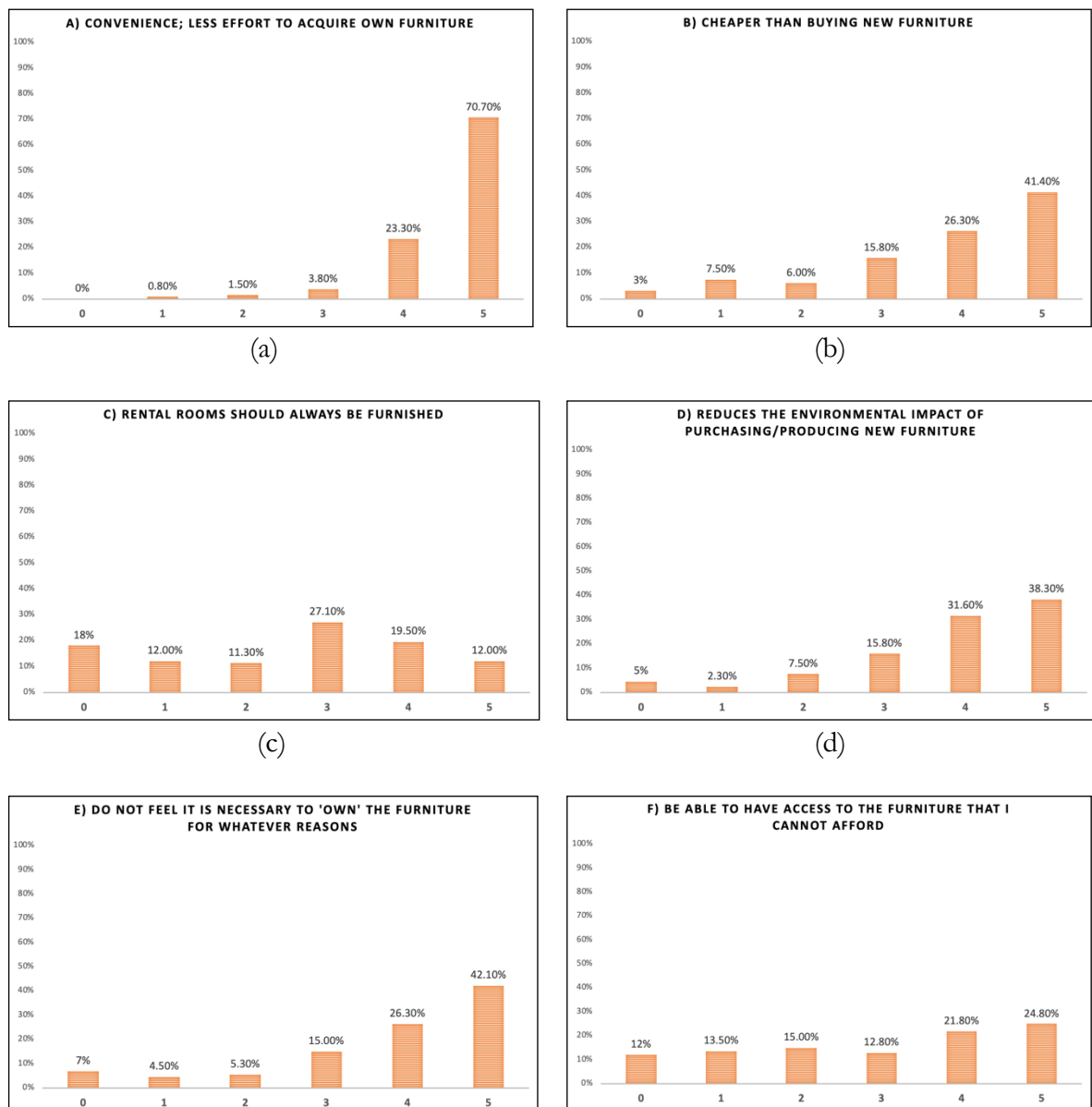


Figure 5-2 The (service) provider of the rental furnishing service

44% of respondents prefer the landlord to be the provider of the rental furnishing service, while 46% do not have an opinion about who the provider should be (Figure 5-2). This could be because a high proportion of the respondents lives in student accommodation and thus, they can more relate to the situation they are familiar with.

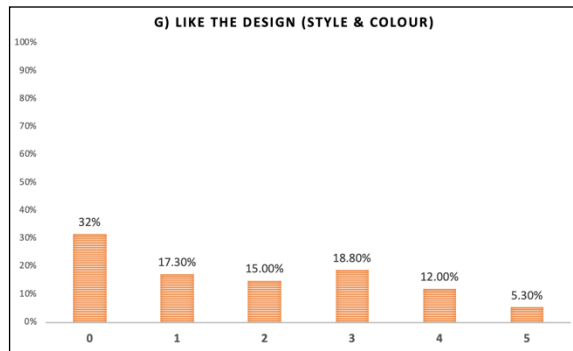
Reasons for students to consider renting furnished rooms

To understand why students may consider renting furnished rooms, respondents were given seven reasons to rank (from 1 – for irrelevant to 5 – for most related). The respondents were also given a choice to elaborate or propose other reasons so that they can completely express their ideas. The given reasons were: a) convenience; less effort to acquire own furniture; b) cheaper than buying new furniture; c) rental rooms should always be furnished; d) reduces the environmental impact of purchasing/producing new furniture; e) do not feel it is necessary to 'own' the furniture for whatever reasons; f) be able to have access to the furniture that I cannot afford; g) like the design (style & colour). The results are provided below (Figure 5-3).



(e)

(f)



(g)

Figure 5-3 Reasons for students to consider renting rooms with furniture

94 respondents (71%) ranked (a) the convenience as the most important reason to rent furniture. The second most common reason (42%) was shared between reason (b) cheaper than buying new furniture, and (e) do not feel it is necessary to own the furniture. 39% of the respondents think that renting furniture is good for (d) reducing the environmental effect of buying/producing new furniture.

Concerning reason (c) “rental rooms should always be furnished”, diversity of opinions is found among the respondents. More prevailing is neutral opinion and respondents who did not consider this reason as especially relevant for them. Around one-fourth of the respondents indicated that they would rent furnished rooms as (f) a way to use the furniture that they would not be able to afford otherwise. However, the distribution of the vote is approximately even throughout the scale.

Fashion and design (g) did not resonate with respondents as a reason to rent furnishings. About one-third of the respondents think the aesthetic design is irrelevant for making decision about renting a furnished room.

The main concerns for students to avoid renting rooms with furniture

For people who replied that they would not want to rent a furnished room, they were also given seven reasons to rank as well as a possibility to state their own reasons. The seven reasons are, a) already have a furniture; b) not necessary cheaper to rent furnished rooms; c) like to own furniture for whatever reasons; d) the furniture do not suit me; e) do not like to style or the colour; f) concern about the hygiene of the furniture; g) concern about the condition/status of the furniture. Only five people replied that they do not want to rent a furnished room, and among them the most important reasons are (a) they already have their own ones and (c) a sense of ownership, both are ranked more relevant (5) by three respondents.

The level of price advantage or acceptance of rental furnishing service for students

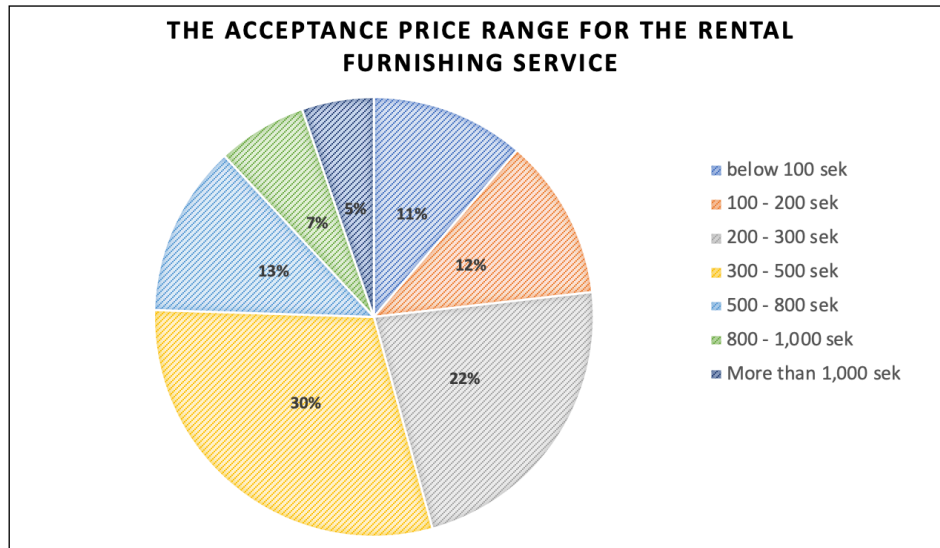


Figure 5-4 The acceptance price range for the rental furnishing service

Regarding the acceptable price range, the responses is quite diverse. 30% (45 votes) of respondents agreed on paying between 300 and 500 sek, 22% agree on paying between 200 and 300 sek, and 12% to 13% agree on paying between 100 and 200 sek and below 100 sek respectively. As more than 95% of the respondents are interested in the idea of renting furniture, the equal disperse among the options (below 200sek, 200 - 300sek, 300 - 500sek, more than 500sek) further showed that this idea is attractive to students regardless of their financial status.

The correlation between students' perceptions of rental furnishing service and their intended length of stay

One of the objectives of conducting this survey is to investigate if there is a correlation between students' perceptions towards rental furnishing service and their intended length of stay. Unfortunately, no apparent patterns can be seen from the survey since most of the respondents said they are open to the idea of rental furnishing service regardless of their period of stay. Nevertheless, as mentioned, the possibility of relocation in a short period of time and the notion that this is a temporary stay for study are frequently mentioned in the additional comments for the reasons to consider renting furniture. In addition, around one-fourth of the respondents specified particular reasons for choosing to rent a furnished room. The inconvenience of moving and the fact that they were living in the current place for a limited time were the most frequently mentioned reasons. These results are considered a certain level of implications that the length of stay does have influences on the willingness of using rental furnishing service.

Consumer attitudes towards renting second-hand furnishing

Last objective of this survey is to find out consumer's attitude towards the condition of the furniture and furnishing items. First, approximately 70% of the respondents replied that if they were to use the rental furnishing service, they expected the items to be used but function well (Figure 5-5). 27% of the respondents think the furniture should be in like-new condition. Very few people (3%) think that it should be brand new or could be heavily used. After the respondents were asked about their reasons for renting furniture, they were asked if they would

change their answer if the furniture provided in the scheme was ‘used’ furniture¹¹. About 86% (130 responses) said ‘no’.

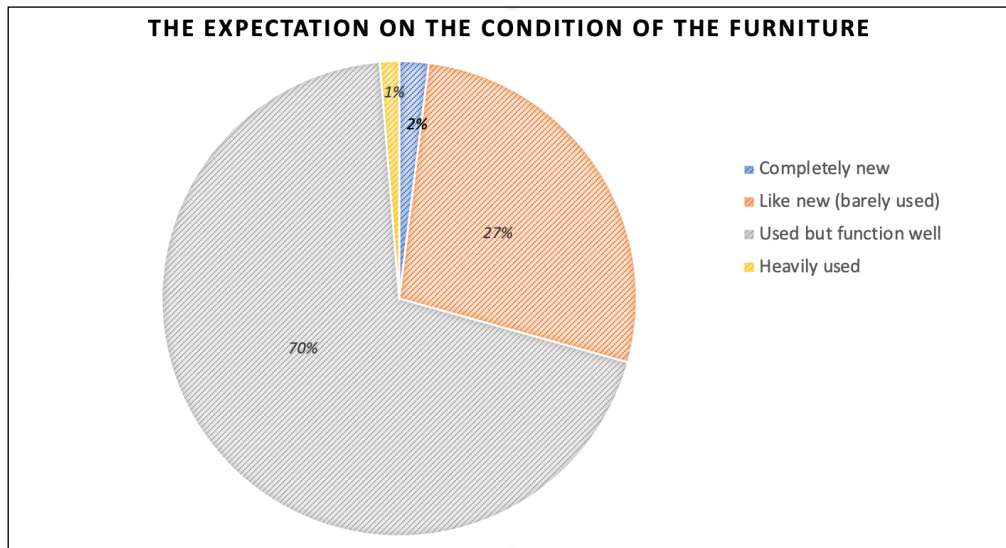


Figure 5-5 The expectation on the condition of the furniture

5.4 Mapping consumer needs and wants regarding renting furnishing

The online survey of students in Lund provided a good overview of student attitudes toward renting furniture. However, the form of survey does not present the opportunity to gain in-depth insights about students’ perceptions and to uncover their views on different elements of an ideal furnishing rental service. Therefore, 15 of students who participated in the survey were asked for a follow-up interview. Similar to the request to the interviewed practitioners, the students were asked to describe their ideal scenario of rental furnishing service. Then open-ended questions were asked to guide them in discussing their insights on specific details of the scenario. The same guidance was given to all the interviewees if they had difficulties imagining their own scenario or thinking through its details. The analysis is divided into three parts, starting from the kinds of furniture and furnishing products the students imagined they would rent, to what kinds of services they would want to be included in the furniture renting service, and to what constitutes the basic structure of the rental furnishing service that would appeal to them.

5.4.1 The product component of the imaginary scenario

The product component includes the types and the condition of furniture and furnishing items for renting.

Regarding the furniture that should be provided in the rental furnishing service, all the interviewees mentioned the essential pieces should be provided. These included a bed, a desk, a chair, a bedside table, and a bookshelf or a drawer. These pieces of furniture were referred by the interviewees as ‘big stuff’ (for instance, interviewee 17) or ‘the basic things’ (for instance, interviewee 14) as they are necessary to student’s life and, at the same time, they are big in the size, more expensive, or troublesome to acquire by a student. In particular, most of the

¹¹ In the survey, ‘used’ furniture is defined as “any possible ‘used’ condition that makes sense to you, just that it is not brand new.”

interviewees mentioned that, for these pieces, the functionality and a reasonable range of choices, such as different sizes suitable for different renters or spaces, should be guaranteed when renting furniture. Other frequently mentioned furniture items were the couch, the armchair and the lightening/lamp. Same reasons were given from the interviewees that students would want to create an area in their rooms that is for relaxing purpose instead of for practical purposes, for instance, to study or to sleep.

Regarding furnishing items that some interviewees referred to it as ‘small stuff’ (for instance, interviewee 7), such as a blanket, a table lamp, or posters or photo frames, interviewees described them as relatively less essential and inexpensive. Thus, most of the interviewees prefer buying instead of renting them. Only three interviewees expressed the preference to be able to rent *“everything they want and need”* (for instance, a piano for Interviewee 10).

At least half of the interviewees agreed that furnishing items are nice options to have access to but are not vital for them to have in their study life. Nevertheless, two interviewees stated that as international students, furnishing items, especially decorative items, are necessary for their mental health. As they are away from their home countries, having a balanced social life or having an opportunity to decorate their places occasionally is consider helpful in maintaining their mental health. The hygiene issue is highlighted when some interviewees expressed their opinions on renting fabrics, such as curtains or bed sheets. Three interviewees who would not mind renting fabrics mentioned that they imagined the condition of these type of items to be *“like “living in a hotel, where everyone knows that all the things were used, but they were professionally cleaned and look very new”* (interviewee 12).

All of the interviewees thought rental furnishing services would not provide 100% brand new products. However, there were divided opinions on the overall condition of the products between ‘like-new, no visible stains’ and ‘look used, can have small stains and scratches.’ One idea is that it could be a mix of the condition of the items (brand new or used). Despite the diverse opinions in the condition of the provided furniture, almost all of the interviewees stated that the condition of the products should be communicated beforehand and should be reflected in the total price. *“I don’t mind if it looks old or has scratches or stains, but I want to be able to choose; I want to know about it (the traces of use) when I choose it (the furniture), and the price reflects the condition (of the furniture)”* (Interviewee 8). A platform, mainly referred to a website, was suggested by the majority for this purpose.

5.4.2 The service component of the imaginary scenario

The discussion regarding service component included such issues as how the essential services could be provided and what perceptions the interviewees had on some of the supporting services.

In relation to how this rental furnishing service should be (physically) delivered, all of the interviewees agreed that most likely the service provider would be in charge of it because transportation is one of the critical features for students when considering renting furniture. Some interviewees added that the delivery/pickup service should have been included in the price of the renting package (Interviewee 13). Interviewee 14 thinks that *“whatever is difficult to be carried by bicycle should be covered in terms of transportation by the service provider”*.

Nevertheless, many interviewees (for instance, interviewee 6, 8, & 17) expressed that depending on the location or the circumstances, it is reasonable for the service provider to charge extra money for providing the delivery service. A self-pick-up/-drop-off point was proposed by more than one interviewees out of budget-saving concern or convenience. Some

interviewees related this situation to the thought that it would be sensible or cost-efficient for the landlords to provide rental furnishing service to their student tenants because the landlords would have the possibility to reduce the need of moving these items and reduce the risk of damaging them. For example, they could have owned a storage place nearby the accommodation area, or, in some cases, they could just leave the items in the rooms for the next tenants.

In addition, many interviewees express that, regardless of the ways of delivery or picking-up, they consider an in-person confirmation at the beginning and an inspection at the end of the contract more important features of renting service. *“I am fine with paying if I break something or cause some use marks when I am leaving, but I would like it to be discussed or communicated face-to-face. It seems fairer in this way”* (interviewee 13). This thought might have stemmed from the dissatisfaction regarding the fact that currently, the rental furnishing service provided by some of the student housing agencies does not include an in-person confirmation/inspection so the tenants receive bills afterwards.

In terms of how this service can be marketed, most of the interviewees expressed that they would prefer to be informed about the service before or on the day they arrive in Lund. Several of them expressed how important it was for them that the housing agencies or LU would inform them about the existence and contacts to the furnishing rental service prior to them arriving in Lund. This would reduce their worry about acquiring the furniture or furnishing their rooms. In addition, some interviewees expressed that since they needed to arrange the furnishing before moving to Lund, yet they were not familiar with the area, they would be more sceptical if the information was not passed to them by official and trustworthy channels, such as actors related to LU (interviewee 9 &14). This is especially important to them since the furnishing rental service is often a long-term contract.

In terms of how this service should be communicated, most of the interviewees preferred it to be marketed through an internet-based platform, integrated into an existing platform, such as accommodation websites. Some interviewees expect technology to solve most of the communication issues, such as repair application, booking services, or items' display. A popular feature of the online services imagined by the interviewees was the 3D simulation function when choosing the items on the platform (for instance, interviewee 8 &10). Interviewee 14 suggested that there should be some interactive functions on the platform that would promote the atmosphere of sharing. The interviewee expressed that this function could promote careful use of the items among customers. *“eBay is not enough. If you read the description, people sometimes still do not know how the condition of the items is and could not relate to it. It should be like Airbnb where people can share their experience of using accommodations, so people feel more attached to the things they are going to rent. This also makes the description more credible”* (Interviewee 14). Three interviewees mentioned the service should also have its pickup point or warehouse looks like a showroom, so that *“it is like IKEA where you get the sense of how cool it is to use this service, and you get the sense of shopping from going there and pick up small stuff that you like, but you are actually only renting them”* (Interviewee 12).

When asked about other supporting services the interviewees would value, three examples were given, namely, self-fixing or self-decorating/assembly rights, do-it-yourself (DIY) options, and exchange clauses. Opinions around these three topics were given by the interviewee. Regarding self-decorating rights, such as self-fixing or DIY options, these ideas were considered attractive by some people. However, they did not think it was feasible in terms of the circulation of the products in this renting system. Interviewee 17 stated that *“The self-fixing or self-decorating option looks nice but then I do not know how the next user would think about my*

work". All the rest of the interviewees were reluctant to engage in DIY or self-decorating. Firstly, they believed that reasonable maintenance and repair service should be included in the rental service so they would not need to fix or assemble the furniture by themselves. Secondly, there was a similar mindset stated by the interviewees that since the furniture and furnishing items were rented, they should be kept as they were.

Many interviewees found the idea of exchanging the items during the contract period attractive, especially when considering renting furniture for an extended period. Interviewee 14 stated that *"it would be very attractive to me if I could continue using this service regularly instead of a temporary thing. I think it worth it if I can change all the furnishing stuff like every 5 years or so and do not need to worry about any consequences"*. However, in the context of student life, all of the interviewees believe that such an exchange service should be rather limited and very regulated, "otherwise it will add on a lot of costs" (Interviewee 9). *"It would not be reasonable to change things all the time as I think it as a budget-saving service in favour of students' special financial condition"* (Interviewee 6). Related to this topic, some people proposed a seasonal or yearly exchange options and thought that this would be a very good package for students to choose from (for example, Interviewee 12 & 20).

5.4.3 The system component of the imaginary scenario

Most of the interviewees think that it was the most sensible for the student accommodations to provide or be involved in providing such a service because they are most likely to stay in touch with such organisations when they first come to Lund. Additional advantages mentioned by the interviewees regarding this idea is convenience and credibility. Professional furniture producers or rental furnishing companies were also mentioned because they could provide more options and services.

In terms of the duration of the furnishing rental contract, most of the interviewees preferred an extendable short-term rental contract in order to stay flexible for their future choices. Renting furnishing suited well for both international students and Swedish students, especially at the first place they stay in Lund. Some students expressed that it should be flexible for the students to choose what items to rent, and, in their imaginary scenario, they could gradually return the items from the renting list as they slowly managed to acquire those items by themselves. *"University students in Sweden need this service very much because it is too expensive to buy everything at once"* (Interviewee 13). For the first-year students, who might not have lived independently before, such a service could ease their financial burden and improve their quality of life during this transitioning period. Lastly, in terms of defining the duration for 'a temporary use', the perceptions among interviewees varied significantly. However, the majority defined temporary use to be about one year.

Regarding the price range of the ideal rental furnishing service, several interviewees gave a concrete number of around 3,000 sek for renting furnishing for a year (for example, Interviewee 11, 19 & 20). A possible logic of this price range was given by Interviewee 16 - *"I can imagine that it would be reasonable for me to be given a price for the furniture that equals around or below one month rent (approximately 3,000 – 4000 sek). It would be too expensive for me to end up paying 14 months of rent for my accommodation."* According to Interviewee 16 who lives in a furnished corridor room in AFB, this is approximately the same price s(he) is currently paying. In addition, more than half of the interviewees believed that people calculate and compare the price of renting to the price of buying (for example, Interviewee 7, 10, & 17). Some specific answers were: *"it needs to be less than 50% of the buying price to make sense to rent them"* (Interviewee 10). Interviewee 11 who lives in LU accommodation thinks the furniture provided by LU must be the reason why the rent is higher than in other student housing units.

The most important features of the furnishing renting service recognised by the interviewees were the convenience of the renting process, sufficient but not unlimited choices, and the functionality of the items provided. *“The functionality or the quality of the items should be the most basic criteria because I think it is the same with any types of consumption, we want what we bought to be worth the price”* (Interviewee 17). The least important features are related services, such as DIY, and decorative items are also considered not essential to several interviewees. In conclusion, all of the interviewees viewed rental furnishing service as helping them improve their quality of life during their studies in which they have a limited budget. Therefore, despite different scenarios of the system were mentioned in the interviews, the majority of the interviewees agreed that such a service should prioritize fulfilling basic needs.

6 Discussion

This chapter provides reflections on the findings and results of the analysis that were presented in the previous chapters. It starts by discussing the main findings and then the results and analysis. It proceeds to reflect upon the use of conceptualisations and theories that guided this work. Then the chapter moves on to discussing the mix-method approach used in this study, reflecting on the usefulness of the methods for providing answers to the research questions. The chapter finishes by discussing the applicability and generalisability of results for other contexts.

Main findings

1) Using rental business models to extend the life of furniture is possible in the context of rental furnishing service to students as confirmed in interviews and discussions with practitioners. All four key actors participating in the Lund case mentioned that the linear value chain of furniture and furnishing products is one of the main drivers for them to consider developing rental furnishing service. For LUA, limitations in its inventory management lead to premature disposal of well-used or damaged furniture well before the end of its useful life because repairing it would add the operational costs of the organisation.

2) Based on the discussion and analysis regarding the four scenarios, the level of collaboration and forms of actor engagement will affect the development as well as the performance of the system. All four scenarios were covered by the case companies from different perspectives, which means that there could be no optimal scenario. Nevertheless, in theory, the more depth of collaboration the system has, the more potential of reaching multiple goals. The key lies in the coordination and the communication between key actors should be initiated from the start to ensure that all the key actors could reach their own goals in participating in such a system and to eliminate or mitigate potential conflicts of interest among the involved actors.

3) Furthermore, the quality of the design of the system will affect the profitability of the system. Profitability is frequently mentioned by the interviewees as the key factor of promoting collaboration in the first place. From the analysis of the scenarios, it is understood that the biggest obstacle to designing a PSS for the rental furnishing service is the upfront investment cost that is hard to ignore; these are the needed infrastructure and the actor-network, which are the groundwork of the development. On the other hand, once the groundwork is built and the system starts working, it is the efficiency of the flow within the system that decides the costs of operation and the speed of cost recovery, i.e. the profitability. At the same time, built upon mutual interests, the relationships of the key actors in the network are closely tight together than in other conventional types of business collaboration, it is thus less likely for the system to fall apart.

4) The analysis of consumers' survey and interviews showed a promising demand in the market of students in Lund. This market is therefore full of potential in successfully developing a sustainable rental furnishing service that can fulfil the multiple interests of stakeholders. However, this goal cannot be reached without the early involvement of potential customers.

One concern about a well-documented phenomenon in consumer behaviour – the discrepancy between what consumers express and what consumers actually do (Jackson, 2005) was raised by two interviewees. Expressed high acceptance among end-users does not guarantee a market with stable potential. However, in the case of this research, firstly, it is not just a high acceptance that is identified from the survey; clear insights were expressed by most

of the interviewed student tenants in terms of how the service should be positioned and could be provided in order to help them improve the quality of this special period of life. Secondly, as suggested in the developed scenarios, collaboration between key actors should increase the possibility of having control over the changing pattern of consumers preferences. For example, big data of consumer's behaviour can be obtained through well-designed customer interfaces.

Results and analysis

In terms of the case study, students in Lund were considered a suitable group of study for a few reasons. In the first semester of 2019, 55% of the Swedish student has student loans, 70% of the Swedish students have student grants. Sweden has a relatively higher standard of living compared to other countries in the world, at the same time, more than half of its university students live their life relying on their own finance, including the student loan. The Swedish student aid is around 10000 sek per month means that these full-time university students are able to live a normal and quite fixed standard of living. As LU is one of the most populated university in Sweden, this group of the study shows 1. a high self-consciousness in terms of how to live their life and 2. a relatively controllable scale of desired items and services. In conclusion, students in Lund is a suitable yet extreme case to test upon this idea in a research scale - if the result was found difficult, the reasons are worth finding out because it could be more difficult to test it in other places.

Most of the drivers stated by the key actors in this research correspond well to the drivers identified earlier in literature except for one - regulatory pressure or upcoming policy was rarely mentioned by the interviewed experts as a direct driver. Two drivers frequently mentioned by the practitioners were to fulfil the end-users (students) need as well as to increase resource-use efficiency or reduce the environmental and social impact of renting furniture to students. The latter might be explained by the fact that half of the focal businesses are non-profits. The barriers identified in the literature were all confirmed by most of the key actors. One new barrier mentioned by Hemmlis was the challenge to build a dedicated team of employees who have unified goals. This might be explained by the distinctive situation of business Hemmlis is at as - a start-up in the early stages of its development with many employees working part-time. Other than this, most of the concerns of practitioners were connected to the complex nature of PSS, such as designing the system with a good balance between risks and gains.

All the practitioners agreed that the way to overcome some of the barriers is through collaboration with other actors. Both Hemmlis and IKEA are interested in collaborating with student housing units. However, the two companies envisioned very different scenarios for such collaboration and different schemes for value creation, delivery, and capture. Hemmlis' expertise is providing access to furnishing products, which can be defined as a use-oriented PSS. IKEA aims to offer furnishing solutions to both end-users and landlords, in which case, it could be defined as a result-oriented PSS. One possible explanation could be due to the difference in the sizes and the resources of the companies. For example, Wong (2004) mentioned that result-oriented PSS requires a high upfront cost in the early stages and thus may only be of interest to large companies. How this barrier can be overcome so that more actors, especially innovative start-ups, could develop result-oriented PSSs is a good topic to further research.

Regarding the young consumer's acceptance of the rental furnishing service, this research confirms that a sense of ownership indeed prevents potential consumers from considering using rental furnishing service. Findings from the consumer survey and consumer interviews

demonstrate that there is a trend to own less especially among young people, as suggested by Annerelli et al. (2016). This suggests that rather than fighting against cultural roots of the ownership, provider of rental services needs to find the right time to approach a special group of consumers when they do not own much or they are interested in owning less, such as the typical Swedish students in their first year of the university life.

The result of the consumers' interviews mostly aligns with the result of the survey. This conclusion has enhanced the analysis related to consumers in this research. These two research activities portrayed a unified pattern of consumer's preferences on rental furnishing service, for instance, 1. high acceptance to the idea of renting furniture 2. mostly out of convenient and budget concerns 3. recognised the benefits of landlords providing/involving in the service. A major difference is the expectations on the price range. In the survey, the acceptable pricing is equally distributed between four ranges from below 200 sek to 1000 sek. However, during the interview, the answers are much concentrated between 100 sek to 500 sek, even quite centralised around 250 sek. A possible explanation on this difference could be that the selection of the interviewees is not random enough as a majority of them currently lives in a student corridor. The type of accommodation where the interviewee lives should be taken into account when selecting the interviewees if there would be another round of interviewing potential consumers.

Reflection on the theories used

Three main learnings from the literature on PSS and RBM were used as the starting point for this research. These are 1. the stakeholders' perspective and value co-creation, 2. network tactics for developing different types of PSS, and 3. consumer perspective needs to be considered in early stages of the business model development. Firstly, the stakeholder perspective or the stakeholder theory is connected to the concept of business model, which explains how businesses create, deliver, and capture value (Massa et al., 2016). Stakeholder perspective suggests the importance of collaborating with external actors if one wants to create higher value (Freeman, 2010a). Secondly, for developing business models like PSS, the difficulty is in creating the network, which integrates the products and services into a system. Here, even though the notion of stakeholder's perspective is widely recognised, network tactics developed by Reim et al. (2015) is needed, which refers to the collaborating methods between key actors. It assists in designing the basic framework of the PSS. Thirdly, theories of PSS emphasise the need to incorporate consumer's perspectives in the design phase of the business model. Essentially the users then are turned into co-creators of value and even a business model, since it is the users who know best their wants and needs and how these demands could be best met.

Reflection on the methods employed

The stakeholder theory and business model conceptualisation were used as a starting point for collecting data. The main research activities included: 1) investigating the state-of-art of rental furnishing service by reviewing literature; 2) confirming, comparing and mapping drivers and barriers in literature review and in interviews with practitioners; 3) developing scenarios for furnishing renting in Lund and testing them in interviews with practitioners and 4) investigating consumer's acceptance of the scenarios by conducting a survey with 150 students in Lund and exploring conceptualisations of furnishing renting service in 15 interviews with students in Lund.

The 5 in-depth interviews with key actors are able to examine the drivers and the barriers discovered in the literature as well as to analyse the feasibility of the scenarios developed from the theory. With regards to understanding the consumer's acceptance and perceptions, a mix-method of qualitative and quantitative research is used to enable triangulation. The survey quantified the consumers' acceptance and the drivers and barriers to renting furniture. Based on the results, interviews with consumers explore the same topic by asking the interviewees to express their imaginary scenarios and justify the reasons for such expectations. Utilising these methods, the research questions are answered.

However, one of the objectives of conducting the survey was not attained, which is to draw the correlation between the duration of stay and the willingness of renting furniture. The problem occurred because the questions were designed with too simplified options, making it impossible to draw a linear relationship. For this reason, if a second round of the survey were to be rolled out, the questions could be designed in a more comprehensive manner, for instance, considering designing the options that can be suitable to analysed by linear regression models.

Generalizability of results for other contexts

The results of this study are useful both for academia and for practitioners. This study engaged practitioners in a co-creation process of developing an ideal scenario for rental furnishing service, which they can utilise further in their work. Furthermore, many of them will find useful to glimpse into the insights from other practitioners, who are currently active on the furnishing provision market to students and those who might become potential partners in the network of actors for providing the furnishing rental service in the future. In addition, this research has renewed interest in furnishing renting among some of the practitioners, who now showed determination to fulfil the three goals of developing such a service: 1) to explore business opportunities of creating a feasible business model for rental furnishing service in Lund 2) to provide the services that respond to the expressed needs by the student tenants, and 3) to keep consideration of social and environmental impacts of the service in response to students' concerns for the sustainability of their lifestyles.

For academia, this study provided interesting insights into the processes of developing a business model, identifying potential stakeholders who can be providers of such a service and gathering valuable data about student preferences regarding rental furnishing service. Utilising the network tactics, analysis on the ideal scenarios of key actors explored potential directions for the business model development and identified potential role for the different actors in different scenarios. The analysis shed some lights on the potential benefits and drawbacks of these scenarios and provided a guideline for the business strategy for practitioners and for further studies for researchers in this field.

Although the results of this research are generated from studying a local case with not yet very successful outcomes in terms of reaching financial, environmental and social sustainability, it is believed by the author that the results and analysis should also be of interest for other cases of developing PSS, including other industries or countries.

7 Conclusion

Resource-use efficiency is a global challenge and many actors are involved in finding solutions for resource efficiency. The United Nations has also specified resource efficiency and circular economy as one of the ways towards reaching SDG#12 on sustainable consumption and production. One industry that is transitioning towards the circular economy is the furnishing industry, which has traditionally been low-tech, linear and resource-intensive. One opportunity for the industry to transition to the circular economy and improve resource efficiency is to explore renting furnishing instead of selling it to consumers. However, understanding of how such a business model can be designed is lacking both in academia and among practitioners. This thesis aims to address this gap. Three research questions have been formulated as follow.

RQ1: What are the drivers and barriers for developing furniture and furnishing items to students?

RQ2: What are the potential scenarios for a rental business model that could address some of the barriers?

RQ3: How feasible are the scenarios for rental furnishing service from actors' and consumers' point of view?

For RQ1, the drivers and barriers for developing rental furnishing service to students were explored by literature review, practitioner interviews, and consumer survey and interviews. Majority of the drivers identified in the literature review were confirmed in practitioner interviews, with the regulatory driver being the only exception. Drivers that were often mentioned by practitioner were the desire to fulfil students' need and to increase resource-use efficiency or to reduce the environmental and social impact of providing furniture to students in this case. The barriers identified in this study also largely confirmed the barriers found in the literature. In literature, a lack of consumer interest in renting solutions was highlighted. However, the survey revealed a high level of acceptance of furnishing renting among Lund students. This finding shows the importance of involving end-users in the process of value co-creation when developing and implementing PSS.

In reply to RQ2 and RQ3, four scenarios (Figure 4-1) for developing rental furnishing service for students were established based on the theories and the context of the Lund case. The scenarios are built with a focus on ways of collaboration in the key actors' network. All four actors find the first scenario – delivering furnishing rental service within their own competences – to be the most feasible, but also acknowledge limitations in internal capabilities. Therefore, they have also explored or are open to discuss the possibility to move to other scenarios, which are based on collaboration with other actors. The second scenario, where the housing company assists in matching the service provider and the student tenants, is found more plausible to AFB, the non-profit student accommodation organisation. The third scenario, where the housing company is the main actor of delivering the products and the services by the help of furnishing company with designed packages, can be interesting for LUA, the student accommodation department of the university. The fourth scenario, where the furnishing company is the main actor who provides the rental furnishing solutions to the housing company and its student tenants, is favoured by IKEA, the leading furnishing retailer. Hemmlis, an innovative start-up who offered a professional rental furnishing service to students in Lund over some time, has discussed collaboration with different actors. All of the interviewees acknowledged the benefits of collaborating with other actors in developing this service. Still different levels of commitments are found when benefits and drawbacks were discussed during the interview.

The general acceptance of the furnishing renting idea is high among the respondents. 44% of the respondents think their landlords should be the main actor in providing this service, while

it does not matter who provides the service to 46%. A similar pattern was revealed during the interviews with consumers. Many of them emphasized the need for collaboration between professional furnishing company and landlords. The consumers identified two main benefits of collaboration 1) improvement of the overall quality of the service provided, and 2) an increase in the level of trust when using such service. All four scenarios were mentioned by the consumers in their imaginary scenarios and, from their description, they were all feasible in terms of balancing the risks, the responsibility and the profitability. However, the feasibility of the scenarios needs to be quantitatively assessed in further investigation.

The main findings of this research are the following: 1) Using rental business models to extend the life of furniture is possible in the context of rental furnishing service to students as confirmed in interviews and discussions with practitioners. 2) Based on the discussion and analysis regarding the four scenarios, the level of collaboration and forms of actor engagement will affect the development as well as the performance of the system. 3) Furthermore, the quality of the design of the system will affect the profitability of the system. The better design the system, the more possibility in reaching financial, social, and environmental sustainability. A good design phase here means the needed infrastructure and the actor-network should be built along with active communication between key actors. 4) The analysis of consumers' survey and interviews showed a promising demand in the market of students in Lund. This market is therefore full of potential in successfully developing a sustainable rental furnishing service that can fulfil the multiple interests of stakeholders. However, this goal cannot be reached without the early involvement of potential customers.

Recommendations for the actors to develop a successful rental furnishing service that could increase competitiveness, fulfil consumer needs, and, at the same time, reduce the environmental and social impacts are: 1) proactively plan for collaboration with other actors; 2) establish actor networks and identify actor expectations, interests and potential area of conflict of interest; and 3) get to know your target audience – in-depth investigation of needs, preferences and expectations of the targeted end-users is crucial for the design of the PSS.

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Appendix 1

A sample of interview questions for practitioners

Interview questions for <i>A</i> company	
Interviewee	name (position)
Time/venue	DD/MM/2020 / TT:TT - TT:TT; Online interview
Purpose	<ol style="list-style-type: none">1. Understand about <i>A</i> company's experience in running a rental furnishing project2. Gain knowledge regarding his/her perspective about the market of Lund3. Discuss about the scenarios, collect opinions and discuss about the pros and cons of them

Greeting, Self-introduction, Inform about recording/usage of the interview

Topic 1. The student renting project of *A* company

1. Can you briefly walk me through this project?
 - a. How/When did the idea of renting furniture to students came to discussion?
 - b. How much of an effort did you spend to put this idea into action?
 - c. In what country(ies) have you been running the project?
 - d. How's the progress so far?
 - e. How do you operate/ manage the material flow? Do you rent second-hand furniture or first-hand? (why?)
 - f. Do you have any partner(s) in running this project?
 - i. Who is/are your partner(s)?
 - ii. How do you collaborate in running this project?
 - iii. Is it possible to interview them? (contact?)
 - g. Have you done any survey or interview with your consumers? What are the feedbacks do you receive?
2. Plan to expand to Lund?
 - a. Do you have a plan for this project to come to Lund? (when?)
 - b. What is your targeted market/potential customers? (What do you think about Lund as a potential market to test running this project?)
 - c. Who will be your potential market and potential partners if you were to expand this project to Sweden/Lund?
 - d. Have you observed any difference between this new market and the market you've tested in? What kind of preparation or adjustment will you do before entering this market?
3. After all, what triggers *A* company to explore renting service for furniture in the first place?

- a. What is the different meaning of running this project to you from other related initiatives, such as office furniture renting?
- b. What is the goal that you trying to achieve from running this project?
- c. How do you envision this project to be in the future for your company?

Topic 2. Renting business models

Material1: What are the **choices** (slide) of different business models that are suitable to reach this goal? > from the possible scenarios, in the case of students of LU, several visualised **scenarios** (slide) are developed.

Material 2: SWOT analysis (slide) for A company to participate in renting furnishing service to students

> from materials above, Which scenario or what are the traits/features that are more plausible/not plausible to A company?

> from the chosen scenario, possible business activity could be break down into steps within a lifecycle, by using **circular business model planning tool**(slide).

> According to the result of utilising the circular business model planning tool, what are the pros/cons from other perspectives?

-Ending-

Appendix 2

The list of interviewees – practitioners

Code name	Position	Company/ Orgainsation	Interview time	Interview form
Interviewee 1	Manager of sustainability	AFB	03/12/19	In-person interview
Interviewee 2	Manager of Property	AFB	02,04,05/03/20	E-mail discussion
Interviewee 3	Manager of housing	LU Accommodation	19/03/20	Phone interview
Interviewee 4	Co-founder	Hemmlis	22/03/20	On-line video interview
Interviewee 5	Circular business designer	IKEA	26/03/20	On-line video interview

Appendix 3

A draft version of consumers' survey

(Part A. background information)

1. Gender (ticking box)
2. Age (scroll bar)
3. Are you a student? (ticking box)
4. For how long do you intend to stay in Lund for your study? (ticking box)
 - a. Below 6months
 - b. Between 6months - 1year
 - c. Between 1year - 1.5years
 - d. Between 1.5years - 2years
 - e. Between 2years - 3years
 - f. Between 3years - 4years
 - g. Between 4years - 5 years
 - h. More than 5years
5. Do you intend to stay longer in Lund after finishing your study? (yes/no/maybe)
6. For how long do you intend to stay after finishing your study? (short answer)
7. Do you live in student housing or private housing? (ticking box)
8. If you live in one of the student housing areas, please specify the name of the area.
E.g. Vildanden, Delphi, etc. (short answer? Ticking box?)

Part B. current living information

1. How was your current accommodation furnished when you moved in? (ticking box w/ short answer, as below)
 - a. Ticking box: not at all; bed, desk, chair, drawer, bedside table, lamp, bookshelf,
 - b. Short answer: specify 'others'
2. What was the condition of the furniture if you had any? (multiple choice)
 - a. Better than expected
 - b. Fair
 - c. Not satisfying
 - d. Comment
3. If you were not fully satisfied with the furniture provided, what was the main issue? (multiple choice w/ short answer)
 - a. Not functioning well because it seems old
 - b. Function does not suit your need
 - c. Design or aesthetics (style or color, etc) does not match you
 - d. Other issues (please specify)
4. Approximately how much did you spend on buying the furniture and main furnishing products* when moving into your current accommodation? (multiple choice, as below)
 - a. Below 1 000 sek
 - b. 1 000 sek - 3 000 sek
 - c. 3 000 sek - 5 000 sek
 - d. 5000 sek - 10 000 sek

- e. More than 10 000 sek
5. How did you acquire your current furniture and furnishing products? (multiple choice, as below)
 - a. From retail furnishing stores e.g. Åhlens, Lagerhaus
 - b. From wholesale furnishing stores e.g. Jysk, IKEA
 - c. From family and acquaintances e.g. your childhood rooms, friends or former tenants
 - d. From second-hand stores e.g. Erikshjälpen
 - e. Other channels (short answer)
6. Were you given a choice to have your room furnished when you rented the room? (multiple-choice, yes/no/ other comments)

Part C. opinions regarding the BM

1. Would you like having an option to rent a furnished room? (yes/no/maybe)
2. What would make you want to rent a furnished room? (ticking box, as below)
 - a. Convenience: less effort to acquire own furniture
 - b. Economic concern: cheaper than buying new furniture
 - c. Intuitive thinking: rental rooms should be furnished
 - d. Environmentally sound option: reduces the need to purchase (and produce) new furniture
 - e. Other: specify (short answer)
3. If you ticked more than one option in #2, please rank them (linear scale, 0=not at all; 5=very much or first priority)
 - a. Same options with linear scale
4. What would make you NOT want to rent a furnished room? (ticking box)
 - a. No need: already own some furniture
 - b. Sense of ownership: want to be able to own my furniture
 - c. Customisation: might not like the design of the furniture offered (function-wise, style, colour, etc)
 - d. Concerns about the quality: hygiene, durability, etc.
 - e. Other: specify (short answer)
5. If you ticked more than one option in #4, please rank them (linear scale, 0=not at all; 5=very much or first priority)
 - a. Same options with linear scale
6. Would you consider renting a room with used furniture? (multiple-choice, short answer, as below)
 - a. yes/no/maybe,
 - b. Other, and specify if you choose maybe (short answer)
7. What would make you want to rent a room furnished with used furniture? (ticking box)
 - a. Style: Like the vintage or feeling of items with history
 - b. Economic concern: is cheaper than buying new furniture
 - c. Environmental concern: is more environmentally sound option than buying new furniture
 - d. Sense of ownership less critical with rental rooms: I am renting for a limited period of time, so it's ok not to buy my own furniture
 - e. Convenience: less of an effort for me than acquiring new ones (assembly, transporting etc.)
 - f. others: please specify (short answers)

8. If you ticked more than one option in #7, please rank them (linear scale, 0=not at all; 5=very much or first priority)
 - a. Same options with linear scale
9. What would make you NOT want to rent a room furnished with used furniture? (ticking box)
 - a. Quality concern: hygiene, durability etc.
 - b. Origins concern: don't want to use used ones
 - c. Functionality concern: function-wise difficult to find suitable furniture on the second-hand market
 - d. Design concern: troubled to match up the styles of the furniture by myself
 - e. Economic concern: to buy used furniture is not cheaper than to buy new ones
 - f. Other: please specify
10. If you ticked more than one option in #9, please rank them (linear scale, 0=not at all; 5=very much or first priority)
 - a. Same options with linear scale
11. How much more would you like to pay **per month** for a furnished room compared to unfurnished? Imagine the room comes with all the main furniture* and possibly some furnishing item*. (multiple choice, as below)
 - a. Below 100 sek
 - b. 100 - 200 sek
 - c. 200 - 300 sek
 - d. 300 sek - 500 sek
 - e. 500 sek - 800 sek
 - f. 8 00 sek - 1 000 sek
 - g. More than 1 000 sek
12. Would you prefer staying with a host that offers a fully or partly furnished place included in the rent and why?
 - a. Yes/no/maybe (multiple choice)
 - b. Why (short answer)

Appendix 4

Calculation of random probability sampling

Assume the sample $(x_1 \dots x_n)$ distribution are identically independently distributed according to Bernoulli distribution; the probability density function (pdf) is

$$f(x) = p^x(1-p)^{1-x}, \quad x = 0, 1$$

According to the rule of thumb, since here we have large population, set $p=0.5$,

Set confidence level $(\alpha) = 95\%$, thus $Z_{\alpha/2} = 1.96$, confidence interval $(\epsilon) = 0.08$,

Sample size (n_p) : 28,000 (total amount of student every semester),

$$\begin{aligned} \epsilon &= Z_{\alpha/2} \sqrt{\frac{p(1-p)}{n_s}} \Rightarrow \left(\frac{\epsilon}{Z_{\alpha/2}} \right)^2 = \frac{p(1-p)}{n_s} \\ &\Rightarrow n_s = \frac{p(1-p)}{\left(\frac{\epsilon}{Z_{\alpha/2}} \right)^2} \end{aligned}$$

$$\hat{n}_s = \frac{n_s}{1 + \frac{n_s - 1}{n_p}}$$

Thus, $\hat{n}_s = 149.2678 \cong 150$

Appendix 5

A sample of the interview questions for consumers

Interview questions for students

Greeting

Inform about the recording, the usage of the interview and the recording file, the purpose of the interview and the research, and the description of the questions

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Imagine that you can choose your own furniture and furnishing items when renting a room for your stay in Lund or you are able to rent these items when you come to Lund, how would this option look like?

I-2-1 Who would provide the service?

I-2-2 What furniture items would you be able to choose for rent? Why?

I-2-3 What furnishing items would you be able to choose for rent? Why?

I-2-4 How should this service be communicated/presented to you? (channels/platforms)

I-2-5 How should the items be delivered/taken away at the end of the contract?

I-2-6 In what condition would you like your furniture/furnishings to be?

I-2-7 Any other supporting conditions that appeal you? How/why/why not?

- Would you like to have an option to be able to return and change them during the renting period? In what conditions?
- Would you like to have an option to be able to decorate or fix them by yourself?
- Free delivery? ...anything you could think of.

I-2-8 For how long do you think you would want to use this service? Why?

I-2-9 How much would you like to pay for renting furniture you mentioned? Why?

I-2-10 How much would you like to pay for renting furnishings you mentioned? Why?

I-2-11 With all the features you've mentioned above, what is the most important /least important one to you?