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FURNITURE AS A SERVICE TO REDUCE THE IMPACT OF THE INDUSTRY

Exploring how a subscription model can democratize access to high quality furniture while reducing lifecycle's footprint in Latam

Master's thesis

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The aim of this thesis is to explore the conditions under which a furniture-as-a-service (FaaS) business model could offer a sustainable alternative to the current furniture industry in Latin America. Specifically, it seeks to answer how a subscription model can offer access to sustainable, durable, high-quality furniture in the region. The research and analysis encompass the regional context, an in-depth exploration of the business model - from customer perspectives to scalability challenges - while addressing the issue at its roots.

While previous studies have primarily focused on the environmental impact of furniture by calculating the carbon footprint of manufactured products, there has been limited research on the impact of product lifespan. Few studies have examined how the rise of fast-furniture has shortened product lifespans, leading to increased manufacturing demands and greater environmental consequences.

The theoretical framework focuses on business models and solutions of Servitization and circular principles to address the environmental challenge, while unveiling context and regulations worldwide and in Latin America that provide a context and a base line in which the business model is based on.

This thesis establishes a framework of conditions for implementing a furniture-as-a-service business model, based on a case study that includes interviews with key industry stakeholders and a survey to assess potential demand for the service. The findings reveal that furniture manufacturing accounts for up to 80% of the environmental impact throughout a product's lifespan, and there is significant consumer openness to exploring furniture rental services. Developing a business model grounded in circular economy principles offers a promising solution to the environmental challenges posed by the industry and could be feasible under specific circumstances.

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1   Introduction

Since the 1950s, our society has undergone a transformation that brought about considerable enhancements in the living standards of millions. Nevertheless, this advancement came with a substantial cost, characterized by the significant degradation of ecosystems and an unusually rapid decline in biodiversity. (European Environment Agency, 2019). The UN marks the industry sector as the single largest contributor to global emissions when considering direct and indirect emissions (United Nations Environment Programme, 2022).

The furniture industry has a significant impact on the environment throughout the product's life cycle, highlighted that furniture is among the household goods with the largest environmental footprint. Furthermore, raw material sourcing and manufacturing phases has been identified as the most significant contributors to this impact through its entire lifecycle, while its usage phase has negligible effects (Castellani, 2021). Global material extraction has consistently exceeded the rate of population growth. Specifically, per-person material usage has increased by a factor of 1.7 since 1970 (Circle Economy, 2023b). In the past 6 years our average of raw material extraction reached 582 billion tonnes, nearly the same amount consumed during the entire 20th Century (Circle Economy, 2024).

Our economic system is driven by a linear production in the furniture industry this means that virgin raw materials are used for manufacturing of products which are dismissed after its usage period. In addition, society is willing to change furniture more frequently, adopting the trend of what it's called "fast furniture", replicating the model of fast food and fast fashion. In a context of growing population this means faster depletion of natural resources and the generation of greater amounts of waste since 80% of furniture is thrown to landfills (US EPA, 2017).

By the year 2050, the global population is projected to reach 9.8 billion people. Given the current rapid rate of consumption, it is necessary to shift towards more sustainable models of consumption and production. Failing to do so would mean meeting our growing demands would require resources equivalent to three Earths (United Nations, 2023). As António Guterres, Secretary-General of the United Nations, states in the foreword of the SDG´s Report: "Unless we act now, the 2030 Agenda could become an epitaph for a world that might have been" (United Nations, 2023).

1.1 Background of the study

Acceleration in the development of the furniture industry enabled accessibility to furniture both in variety and with lower prices for consumers, while for the retailers the opportunity to grow their business and the same for the economy of the industry.

Traditionally furniture was meant to last not only for the family that owned it but also for the next generations. It's easy to find in auctions or antique shops furniture that have been used for 100 years and are still in good quality.

In the past years, like fast food and fast fashion industries, furniture industry is willing to accommodate "fast" as a norm as well. Although there is no single definition for "fast furniture", it can be defined as a concept (or trend) that allows cheaper and faster access to furniture. In other words, fast furniture can be defined as massive production of furniture focused on affordability and appearance and normally lacking of environmental responsibility (Rompas et al., 2023). For definitional clarity, the term "fast furniture" encompasses furniture items crafted from engineered wood-based materials, including oriented strand board (OSB), medium density particle board (MDP), and medium density fibreboard (MDF). Additionally, these products incorporate non-wood materials such as resins and adhesives. In contrast, "traditional furniture" is designed for those products crafted from solid wood. In traditional furniture, non-wood materials, such as glues or screws, are employed to bond various components of the furniture piece. (Bianco et al., 2021)

Fast furniture prioritizes the production of affordable and trendy furniture quickly and in large quantities to meet consumer demand. This model relies on intensive production and low-cost materials looking to maximize turnovers. Fast furniture products are often characterized by their short lifespan, low quality, and a high replacement rate, which result in significant extraction of raw materials, waste, and thus a high environmental impact. (Bianco et al., 2021)

Fast furniture is linked to social issues such as the loss of skilled craftsmanship, carpentry shops and local employment, as well as health concerns arising from adhesives, coatings or finishings containing harmful chemicals that impact human health, such as volatile organic compounds (VOCs) and formaldehyde. Beyond that, in economic terms form user perspective, due to a lower lifespan, fast furniture can be more expensive than traditional one due to the replacement rate needed. However, this thesis primarily focuses on the environmental aspects of fast furniture.

1.2 Presentation of the business case

The business case analysed in this research is based on a circular business model designed to provide access to high-quality and sustainable furniture through a furniture-as-a-service model. This model specifically targets the Latin American market and offers a marketplace for local manufacturers to produce and repair furniture according to designs carefully crafted under circular guidelines. These guidelines ensure that the furniture is durable, repairable, and minimizes environmental impact throughout its lifecycle.

This business case has been developed specifically for the purposes of this thesis, aiming to address the significant challenges identified within the furniture industry. It is inspired by existing market solutions and seeks to offer an innovative approach to sustainable furniture design and manufacture and therefore for consumption in Latin America. By focusing on local production and repair, the model not only supports the regional economy but also promotes environmental sustainability, aligning with the broader goals of reducing waste and conserving resources.

1.3 Research question and objective of the thesis

The furniture industry is growing at an unprecedented pace, especially in developing regions like Latam. However, this growth is accompanied by a significant environmental impact and degradation of local work in communities, as fast furniture production and consumption have become a norm. With the increasing population and demand for more and affordable furniture, the need for sustainable alternatives is more critical than ever before. This study aims to explore the framework that enables a furniture subscription business model that provides access to high-quality furniture in the Latam's market in a sustainable approach.

How can the furniture industry address rising demand in an increasingly resource constrained world? Are there solutions to cover the current demand that is willing to replace furniture with high frequency and at the same time provide high quality products with longer lifespan and with lower environmental impact? These are some of the questions that this thesis is addressing.

Therefore, the main research question that this study aims to address is: How can a sustainable and subscription model provide access to durable high-quality furniture in Latin America?

To answer this main question, the study will also address several sub-questions: What business model enables such a solution? Which population segments are the target for this

type of business? What is the regulatory context in the region? What are the most effective actions to address the problem fundamentally rather than superficially? How can this solution be scalable?

This question arises from the observation that the production of fast furniture has a high environmental footprint, while the market size of furniture in Latam is big enough and growing beyond the world rates, with a growing population. Alternative business models have the potential to offer sustainable options to the fast furniture model by enabling more accessible products with a higher lifespan and reducing waste. The study will investigate the feasibility conditions for product-as-a-service business model and explore barriers and opportunities by conducting interviews with different stakeholders within this business.

The primary objectives of this study are to provide a general overview of relevant literature and the theoretical framework, explain the chosen research methodology, present the findings from the practical research analysis, and offer recommendations that address the research question.

The study will contribute to the literature on sustainable business models providing an approach of a new concept that is furniture-as-a-service (FaaS) within a marketplace model, meaning that the furniture is made and offered directly by manufacturers through an e-commerce platform.

2   Theoretical frameworks

This chapter aims to define concepts relevant to addressing the research question and proposing solutions.

It begins by presenting key research, relevant concepts, and by providing context of regulatory and political situation. This framework enables the further discussion of the exploration of circular business models.

2.1   Literature review

This chapter examines academic literature and expert reports on product-as-a-service business models, focusing on studies that offer environmental benefits compared to business as usual. While extensive research exists on subscription services—such as those that popularize access over ownership like Netflix and Spotify—specific studies on Furniture-as-a-Service are limited. Despite this, the concept of product servitization has been well-established across various industries for decades. This literature review is centered on

business models itself, and does not explore the economics of the businesses, particularly pricing strategies, which, although is key to assess its feasibility, fall outside the scope of this research.

Business models can mitigate the impact of fast furniture by moving away from ownership-centered economies. This involves decoupling economic growth from resource consumption by promoting efficient material use and encouraging the adoption of second-hand goods, which extends the lifespan of products and reduces the need for new purchases. To strengthen this approach, it is essential to highlight the benefits to consumers. Additionally, fostering a sustainable ecosystem through collaboration among customers, suppliers, partners, and other stakeholders is vital. By focusing on refurbishing, reusing, and repairing furniture, businesses can actively contribute to a more sustainable industry. (Cheng et al., 2023)

Product-as-a-Service (PaaS) are business models centred on the customer and not on the product, that enhance value through various processes for the product, the customer, and the business itself. They achieve this by expanding services and innovations, maintaining control over the product lifecycle, fostering long-term relationships, reducing environmental impact, and generating additional profits. (Golinska-Dawson, 2024)

When transitioning to PaaS models, one of the challenges that B2C retailers find in the financial field, are related to the barrier of the price of the product. When the price of the product surpasses a specific price bar, PaaS becomes especially suitable. And from the retailer's perspective, has the challenge of being highly intensive in terms of upfront costs requirements, and typically financing is a barrier as well for B2C segment. (Koers et al., 2024)

Business models where consumers pay for usage rather than product ownership are often associated with improved environmental outcomes. This approach encourages consumers to be more conscious of their consumption habits, while companies assume responsibility for the product's lifecycle. However, these benefits are only realized when the business model is specifically designed to achieve such impacts. For example, a study examining the environmental benefits of the pay-per-use business model through the case of the startup HOMIE, which offers household appliance subscriptions, demonstrated that these models can promote sustainable consumption. The findings revealed that when customers are charged based on the number of laundry cycles and washing temperatures, they tend to reduce both, leading to more sustainable usage patterns. Additionally, since HOMIE retains ownership of the equipment, the company is incentivized to design appliances that are

durable and repairable, further extending their lifespan and enhancing sustainability. (Nancy M.P. Bocken et al., 2018)

2.2 Circular economy

The predominant worldwide economic system operates on what is called a linear economic model, characterized by the linear flow of extract-produce-use-waste of materials and energy ('Circular Economy as an Essentially Contested Concept', 2018). The unsustainability of linear systems and its contribution to the ongoing climate crisis, lies mainly on the impacts of extraction, production, and waste generation that cannot naturally be reversed at a speed aligned with the rate at which humans generate them. Linear model relies on mass production to achieve cheap outcomes designed for early and planned obsolescence (Circular Economy, 2023).

On the contrary, the Circular Economy (CE) brings a different approach to the way we produce, use and consume things. Although there is no concrete or sole definition of CE, and it is not a recent finding either, the first circular economy approaches have been developed and diffused in the 1960s and 1970s ('Design for Circularity – Identification of Fields of Action for Ecodesign for the Circular Economy', 2023).

The European Parliament defines the CE in a simple way as a "model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended." (Circular Economy, 2023)

A more comprehensive definition by Ellen Macarthur Foundation (EMF), one of the leaders and promotors of the transition to a CE, describes it as "a systems solution framework that tackles global challenges like climate change, biodiversity loss, waste, and pollution", and it is based on three principles: eliminate waste and pollution; circulate products and materials (at their highest value); and regenerate nature. (Ellen Macarthur Foundation, n.d.)

EMF enlightens design as a key factor for success of the three pillars. Through upstream design, waste can be avoided (Eliminate Waste and Pollution, n.d.); manufacturing products to maximize their lifespan for their original purpose by facilitating easy maintenance and repair, while also contemplating the potential uses of sub-materials after the product's life cycle, which ideally won't be as waste (Circulate Products and Materials, n.d.); and additionally, a shift from an extraction paradigm to a regeneration-centric approach (Regenerate Nature, n.d.).

To better explain the concept of CE, EMF developed the butterfly diagram that helps to rethink the ways we interact with nature and the way we use and consume. This diagram enlightens the stages involved within the lifecycle of a product or service, based on two cycles: technical and biological as it can be seen in Figure 1.

Figure 1 - The butterfly diagram from Ellen Macarthur Foundation (The Butterfly Diagram, n.d.)
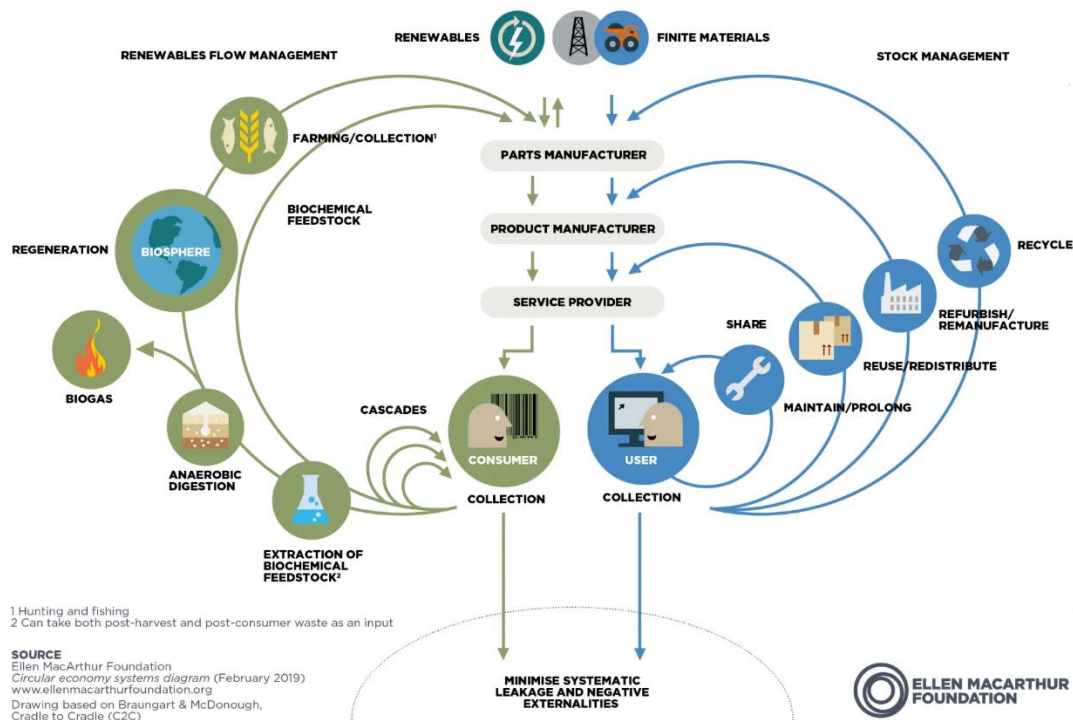
The technical cycle represents the processes to keep products and materials at their highest value for their designed purpose, through processes such as reuse, repair, remanufacture and lastly recycle. Technical cycle is meant for products or materials that can't be consumed such as metals, plastics and wood. For the biological cycle, EMF considers biodegradable materials that can be safely returned to nature to regenerate it. This cycle considers processes such as composting. (The Butterfly Diagram, n.d.)

Based in Amsterdam with global reach, The Circle Economy Foundation has an approach to the transition to a CE in line with the EMF. It is based on four key strategies to obtain more value out of less materials: 1. Narrow (use less), 2. Slow (use longer), 3. Regenerate (make clean), and 4. Cycle (use again) (Circle Economy, 2024).

IKEA, a Swedish global furniture manufacturer with the ambition of becoming a circular business by 2030, incorporates the concept of standardization into its circular principles. This

addition accelerates processes, making them more efficient and facilitating the retention of maximum value throughout the product lifecycle. Under these standardization initiatives, IKEA promotes modularity, the seamless exchange of components, and effective repair solutions, emphasizing compatibility to enhance sustainability and circularity (IKEA, 2023).

The Ellen MacArthur Foundation and the Circle Economy Foundation share a common purpose in promoting and accelerating the transition to a circular economy from the traditional linear model (take, make, waste). While their specific strategies or principles may vary, both share the common view of an economy where resources are used more efficiently, products are designed for longevity, waste is minimized through recycling and reuse (or even avoidance), and a commitment to fostering a sustainable and regenerative approach to economic and industrial practices. Furthermore, the UN defines within the important actions to accelerate transformation of the industry that national governments should promote the flow of circular material and businesses create circular supply chains - to increase lifespan, reusability and recyclability capacities (United Nations Environment Programme, 2022).

In the Circular Gap Report the share of secondary materials is used as a measure of circularity. In a context of absolute growth in production of goods, our economy increased the use of virgin materials for their production – reporting a decrease in the use of secondary materials from 9,1% to 7,2% from 2018 to 2023 (Circle Economy, 2024).

Despite the fact that "nature's carrying capacity is eroding" (Megatrends 2023, 2023), as reflected by trending topics such as global warming, biodiversity loss, uncertainty of resource availability, and an increase in waste generation, our economy is lacking the adoption of sustainable models at a rate that would enable us to stay within safe boundaries.

Globally, our initiatives and efforts to combat the climate crisis have predominantly centred on transitioning to clean energy sources and phasing out fossil fuels. While energy emissions contribute to 55% of the climate crisis, there is a critical need to address the remaining 45%, originated from the productive sector, encompassing the production of vehicles, clothing, food, and various consumables. The Circular Economy presents a holistic and systemic approach to transform the way we produce and use goods to overcome this challenge and meet our climate targets. (Ellen MacArthur Foundation, 2019).

2.3 Business model

A business model describes the rational of how an organization creates, delivers and captures value (Osterwalder et al., 2010).

The business model should provide a practical solution to tackle fast furniture designed under circularity principles, promoting sustainability and reducing waste.

2.3.1 Business model Canvas

According to Osterwalder and Pigneur, a business model can be described through nine building blocks, as shown in Figure 2, that represent the four main areas crucial for generating income: customers, offer, infrastructure, and financial viability (Osterwalder et al., 2010).

To achieve this, they developed a visual tool which they called the Business Model Canvas, that simplifies the understanding of how an organization's business model operates.

Figure 2 – The Business Model Canvas (Business Model Canvas – Download the Official Template, n.d.)
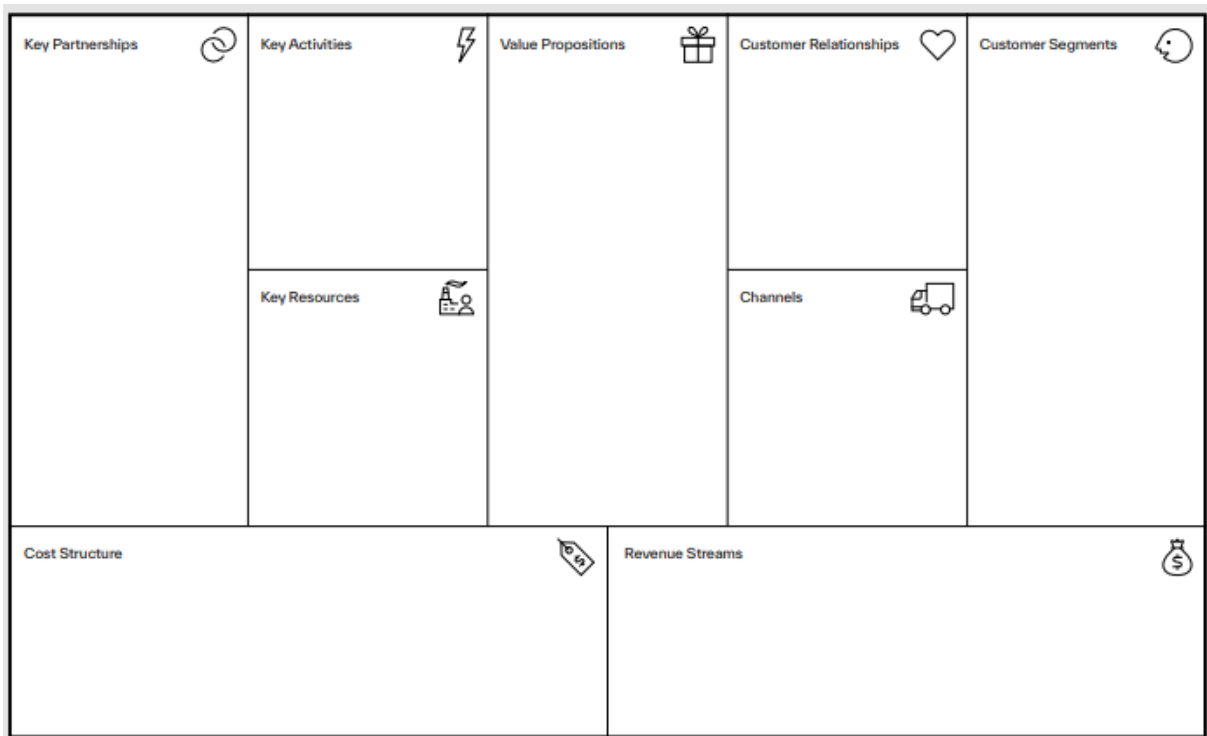
This tool defines the four areas as follows: 1) Customers (on the right): Includes customer relationships, customer segments, and channels. 2) Offer (in the centre): Comprised of the value proposition. 3) Infrastructure (on the left): Consists of key partners, key activities, and key resources. 4) Financial Viability: Encompasses the cost structure and revenue streams.

In the Business Model Canvas, the value delivered by a proposition is typically driven by market demand or the creation of a new necessity. This concept encourages companies to consider how they can adapt their business models to address environmental and social issues. 3 Vectores, a B-certified company, adapted the Business Model Canvas into a purpose-driven tool called the B Canvas. This adaptation aims to better suit purpose-driven businesses and is patented under the name B Canvas.

The B Canvas, illustrated in Figure 3, retains the same four main areas but introduces three new blocks within the offer and financial viability areas to reflect a purpose-driven business model. In the offer area, it starts with identifying the problem and delivers a value proposition through a purpose, or the reason for the impact. In the financial viability area, alongside the traditional cost and revenue blocks, a new block for impact metrics has been added to incorporate environmental and social impact within the business model.

Figure 3 – B Canvas adapted by 3 Vectores of the original model from Osterwalder (3 Vectores, 2016)
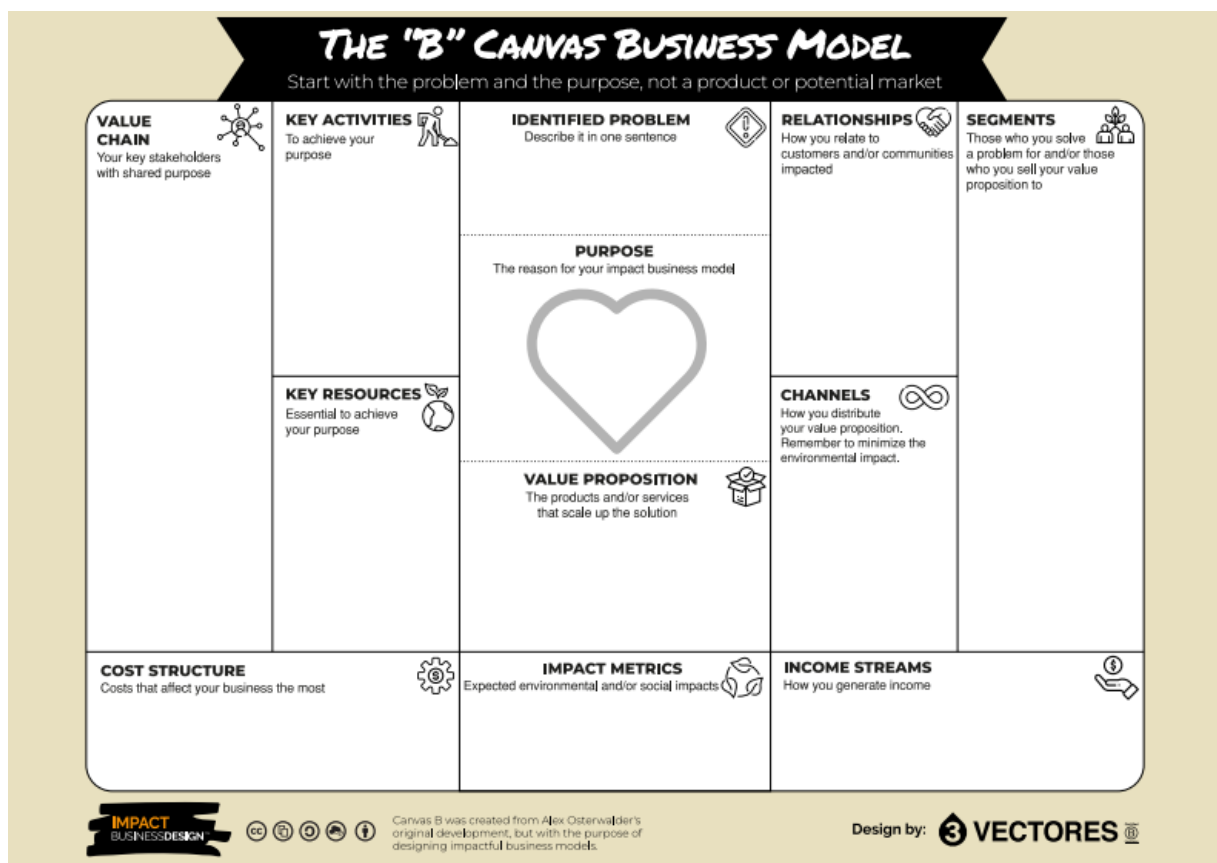
2.3.2 Servitization

Servitization is a business strategy focused on providing services rather than products as the primary offering. Numerous examples date back to the 1960s, like Xerox's pay-per-use printing services and Rolls Royce's "pay-by-the-hour" engine rental model, marking a shift from product-centric to service-centric approaches (Kowalkowski et al., 2017).

Furthermore, this shift towards service-centric models has continued to evolve, giving rise to innovative concepts what was later named as "X as a Service".

X as a service

X as a Service (XaaS), also known as Everything as a Service, represents a broader paradigm shift towards service-centric models rather than product-centric ones. This approach is particularly prominent in the software industry, where users pay for software usage through subscription models like Software as a Service (SaaS) (Classen et al., 2019).

Product-as-a-service (PaaS) is a particular concept of XaaS and is associated with usership of products instead of its ownership, meaning that consumers purchase a result instead a product. Typically implemented through a subscription-based model, users pay a predetermined fee for a set period. The product owner then refurbishes the product, making it ready for another rental cycle (Product-As-A-Service, n.d.).

Furniture as a service

A specific example of PaaS, which falls under the umbrella of XaaS, is Furniture as a Service (FaaS). This model revolves around providing access to furniture usage rather than ownership of the product. Circuly, an innovative software company facilitating rental businesses, defines Furniture-as-a-Service (FaaS) as a business model wherein furniture is leased through a recurring fee for the duration that a customer requires access to it. (Furniture-As-A-Service, n.d.)

The main advantage of FaaS, as recognized by Circuly, lies in its flexibility. This advantage holds true for both households, in downsizing or expansion scenarios, and companies embracing hybrid working schemes. (Furniture-As-A-Service, n.d.)

In a broader context, FaaS represents a particular case of Product-as-a-Service (PaaS) within the subscription economy framework. This model involves providing access to a product, service, content, or software for a specified period through the payment of a

recurring fee. PaaS, or service-based businesses, change their value capturing way from a one-off sales transaction to a recurring lower revenue (Bocken & Konietzko, 2022).

In essence, it means a shift from a traditional ownership model to a more dynamic approach centred around access and usage (Heinonen et al., n.d.). In the FaaS model, where the manufacture serves as the product owner, the incentive for optimizing profits encourages the design and production of highly durable and easily repairable products. This aligns seamlessly with the principles of the Circular Economy (CE) discussed in chapter 2.1: to circulate products and materials (at their highest value).

Extending the lifespan of products not only fosters its utilization but, from an alternative perspective, it requires fewer units to serve the same customer base. Consequently, this business model significantly mitigates waste and pollution, aligning with the first principle of the CE (chapter 2.1), by reducing manufacturing quantities. As highlighted in chapter 1.1, raw material extraction and manufacturing contribute to 90% of a furniture's environmental impact; therefore, reducing the volume of manufactured pieces reduces the overall environmental footprint.

The CE currently contributes 7.2% to the economy, revealing a decline from its standing at 9.1% in 2018. The decline is not only about not having enough CE business models; but also a result of the increasing extraction of new materials, which translates into an increased supply of new goods for our economy. (Circle Economy, 2024)

2.3.3   Online marketplace

Marketplaces itself existed for centuries, as bazaars and malls. As from early 1990's technology allowed to transform them in a new way of shopping. In its simplest definition, an online marketplace is an e-commerce connecting sellers with buyers to sell and buy products or services (Hänninen et al., 2019). E-commerce refers to buying and selling products or services online (Dayna Winter, 2024), while in this context a marketplace is a single platform in which multiple sellers offer their products or services having solved by the platform services such as payment processing, marketing efforts, fulfilment services, maintenance of the overall website (Alonso, 2022).

Adoption of online marketplaces got very popular withing different industries with companies like Amazon, Mercado Libre, Airbnb, app's stores (Google Play and App Store), Uber, DoorDash, among others. These companies operate not only in different markets and industries, but also with different business models. Marketplaces may have their revenues

from diverse models, such as: sales model (buying and selling products or services), subscription model (revenues come from recurring subscriptions), advertising model (advertising deals), among others (Dayna Winter, 2024).

Online marketplace's have been not only used as transactional places but also as information source. In Uruguay for example, as much as 82% of internet users research brand and products at Mercado Libre, whereas only 57% does the same in the company's web site (Grupo Radar, 2021).

2.4   General context of regulations and governmental initiatives

2.4.1   The Planetary Boundaries Framework

The Stockholm Resilience Centre from the Stockholm University updates on a regular basis the concept of the Planetary Boundaries Framework that was first proposed by 29 international scientists in 2009. (Planetary Boundaries, 2012)

The Planetary Boundaries Framework introduces nine boundaries that delineate the limits within which humanity can sustainably develop and thrive over the long term. These boundaries represent interrelated processes within the biophysical Earth system. Consequently, solely concentrating on climate change, or biodiversity loss, is insufficient for assuring sustainability. (Planetary Boundaries, 2012)

Figure 4 – Planetary Boundaries 2023 (Richardson et al., 2023)
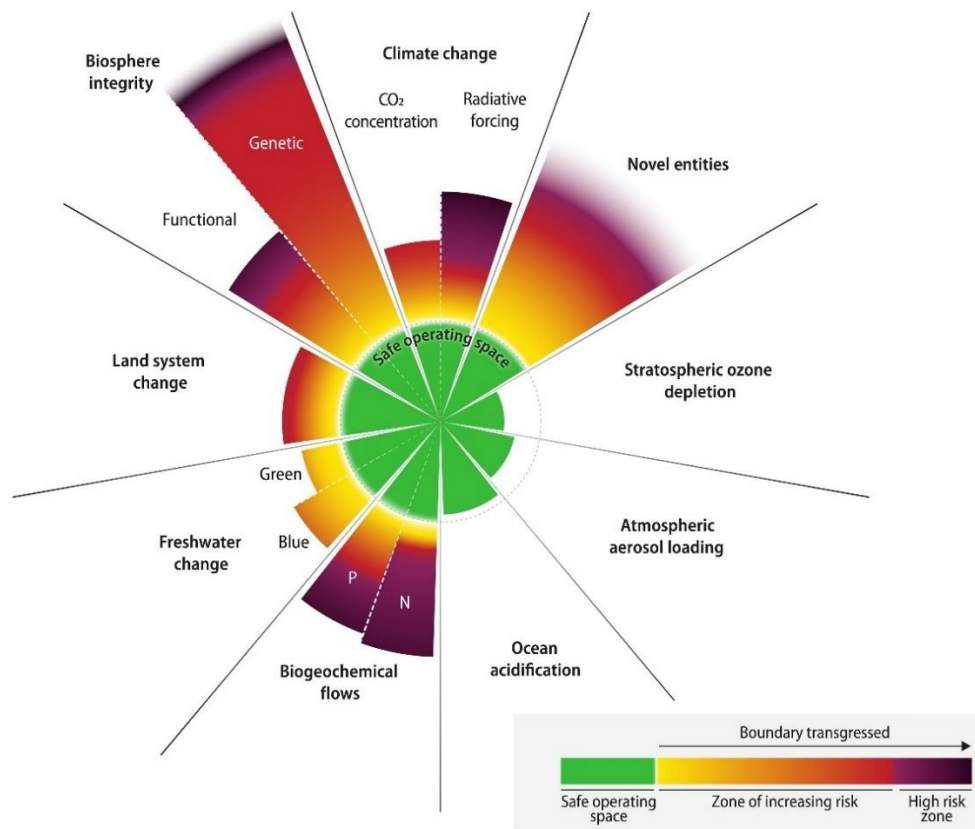
Crossing these boundaries increases the risk of triggering significant irreversible environmental changes. While such transformations may not occur abruptly, collectively, these boundaries signify crucial thresholds that elevate risks to both human populations and the interconnected ecosystems we inhabit. (Planetary Boundaries, 2012)

In the most recent update from the Stockholm Resilience Centre, it is reported that human activities have resulted in an overshoot, with six out of the nine boundaries being transgressed, as illustrated in Figure 4. (Planetary Boundaries, 2012)

This framework is key to understanding the impact of intensive extraction economies. In particular, the furniture industry pushes directly boundaries such as biosphere integrity, land system change, and climate change, mainly through activities like deforestation for monoculture purposes, deforestation of native species, and the increasing production and generation of waste. Those affected boundaries are also within the six that have transgressed the safe thresholds (Planetary Boundaries, 2012).

2.4.2 Sustainable Development Goals

The 17 Sustainable Development Goals (SDGs) (United Nations, 2023) established by the United Nations propose a strategic and imperative framework for addressing the diverse but interconnected challenges outlined in the 2030 Agenda for Sustainable Development.

The defined problems are connected to SDGs related to climate action and the way we use products, addressing solutions to SDG's number 12. Responsible consumption and production; and 13. Climate action. Identifying and addressing existing and potential challenges is necessary to understand what type of solutions would align with SDGs and therefore to solve part of the biggest challenges our world is facing. (United Nations, 2023)

Up to 80% of the environmental impact of a product is defined in its design stage (European Commission, 2020). This means that main responsibility lies in regulations and how businesses produce and offer their products, while the use phase has a negligible impact as mentioned in previous chapters and is backed up also by the European Commission (EU Green Public Procurement criteria for Furniture, 2017).

Promoting responsible consumption faces challenges due to limited sustainable alternatives in the market. Even with recycled or organic materials, the emphasis often prioritizes appearance of being sustainable over real sustainability. Fast furniture's short lifespan significantly impacts sustainability, regardless of materials used. The opportunity of a furniture-as-a-service model, where manufacturers own products, lies in promoting quality, durability, and repairability, fostering a more sustainable approach. (Cheng et al., 2023)

The challenge of minimizing furniture production depends on maintaining usage demand while extending the lifespan of goods. Product-as-a-service models, not only prolong furniture lifespan but also reduce raw material extraction, minimizes the environmental impact of processing, transportation, and manufacturing, and curtails unclassified waste, inherently promoting positive climate action. Manufacturers, working under this paradigm, prioritize creating durable products. (Cheng et al., 2023)

2.4.3   Regulation on Deforestation-free Products (EUDR)

Dedicated to mitigating its worldwide influence on deforestation, forest degradation, greenhouse gas emissions, and the depletion of global biodiversity, in May 2023, the European Parliament and the Council of the European Union (EU) officially endorsed measures to promote the consumption of wood products certified as deforestation-free (Regulation (EU) 2023/1115 of the European Parliament and of the Council, 2023). This is commonly referred to as the Regulation on Deforestation-Free Products, or by its acronym, EUDR.

The purpose of this Regulation is extensive, aiming to tackle deforestation associated with a range of relevant commodities, where the processes involved in obtaining them are linked to

deforestation. Wood, in its various forms and applications, is among the listed products, alongside cattle, cocoa, coffee, oil palm, rubber, and soya. The scope of the Regulation is broad in its geographic reach, as it establishes regulations governing the introduction and accessibility of relevant products in the Union market, as well as their export from the Union (Regulation (EU) 2023/1115 of the European Parliament and of the Council, 2023).

Especially for Latin America, this has a significant impact on the agriculture sector, particularly for the Mercosur countries - comprising Argentina, Brazil, Paraguay, and Uruguay - where the agricultural industry dominates ('EU Deforestation Law Presents a Major Test for South American Farmers', 2023). In this area, the number of cattle surpasses the human population, with a ratio of 1,12 cattle per person, significantly higher than the global average of 0,19. (Food and Agriculture Organization of the United Nations – processed by Our World in Data, 2023).

Nations exporting items listed under the EUDR will be classified based on their deforestation risk. Evaluation of countries with a high deforestation risk will involve geolocation data, satellite monitoring, and DNA analysis to track the origin of products. Non-compliance may result in companies facing fines proportional to their processed volume (Alexandra Popescu, 2023).

While wood used for furniture is not among the primary contributors to deforestation in Latin America, the EUDR significantly impacts the furniture industry and its stakeholders, both directly and indirectly, by prohibiting illegal timber in the Union market, imposing due diligence for first-time operators and traceability for traders (Regulation (EU) 2023/1115 of the European Parliament and of the Council, 2023). The export sector faces challenges, as (1) wood manufacturers seeking to trade with the EU must procure deforestation-free wood, and (2) furniture manufacturers targeting the European market must ensure their products have deforestation-free certification. The import sector may experience price increases, attributed to the use of certified-traceable-wood products, which will be competing with non-certified products. Ultimately, the furniture industry at large is influenced by the European Union as a key player in the global market, actively leading with new regulations for a more sustainable production chain.

2.4.4 Right to repair

Europe has achieved a consensus on establishing common rules to promote the right to repair for consumers. These new rules will advance the circular economy, aligning with the Sustainable Development Goals (SDGs) of sustainable consumption and waste reduction.

The 'right to repair' initiative obligates manufacturers to provide repairing services, while prohibiting the use of contractual, hardware, or software mechanisms that impede consumer repairs. This initiative aligns with circular economy principles, striving to prolong the lifespan of products through repairs, contributing significantly to waste and pollution reduction. (Regulation (EU) 2023/1115 of the European Parliament and of the Council, 2023)

While 'right to repair' initially targets specific categories of electronic goods within the European Union, it marks a crucial step towards a broader transformation in the manufacturing industry. The focus on design trends that prioritize repairability indicates a shift from business models where higher profits come mainly from increasing manufacturing products. With a worldwide impact, the initiative involves stakeholders across the global production chain, including raw material suppliers and manufacturers, therefore, in the long term it will affect also Latin America. (Regulation (EU) 2023/1115 of the European Parliament and of the Council, 2023)

Encouraging repairability not only shapes new revenue concepts within businesses, incorporating elements like refurbishment, spare parts, and rentals, but also extends the lifespan of products, thereby fostering circular business models such as renting.

2.4.5   Forest Stewardship Council (FSC)

The Forest Stewardship Council (FSC) is a non-profit organization that provides a sustainable forest management solution. It became a pioneer in forest certification by developing solutions for responsible sourcing, conservation, and restoration of forests. In its 30 years of history they have certified over 150 million hectares of forest worldwide (Forest Stewardship Council (FSC), 2023a).

The FSC offers three distinct labels, each fostering transparency in the conservation of various processes ultimately working towards forest preservation (Forest Stewardship Council (FSC), 2023c):

1) FSC 100% guarantees that products with this label originate from FSC-certified forests, ensuring responsible management.

2) The FSC Recycled label supports deforestation reduction by ensuring products are sourced entirely from recycled materials.

3) FSC Mix represents a blend of FSC-certified forests, recycled materials, and/or FSC-controlled wood (materials minimizing the risk of unsustainable sources, even though lacking FSC certification).

A GlobeScan research conducted for FSC unveiled that 70% of consumers prefer products that do not contribute to climate change, while 86% actively avoiding items that harm biodiversity. The study underscores the significance of independent certification, as nearly 80% of consumers express the belief that sustainability product information should be certified by an independent organization (GlobeScan, 2021).

The furniture industry plays a critical role in timber utilization and the threat of illegal logging, which not only contributes to deforestation and biodiversity loss but also undermines responsible forest management, impacting the income of producing countries. Various regions, such as the European Union, USA, and Australia, are combatting this issue through legislation banning the trade of illegally harvested timber. FSC's certification reduces the likelihood of encountering illegal timber, but it also aligns with consumer preferences, as people increasingly seek transparency in product sourcing. Such certifications become critical, particularly in regions like Latin America where regulations may be less stringent. Thus, FSC not only safeguards against the risks of illegal logging but also fulfils the increasing demand for products that are ethical and transparent. (Forest Stewardship Council (FSC), 2023b)

2.5 Context in Latin America

2.5.1 General context

Having only 8% of the worldwide population, the region of Latin America and the Caribbean (LAC) is responsible for over 11% of global raw material extraction. In 2023, The Circle Economy Foundation released a report highlighting the circularity metric, which represents the proportion of secondary materials in the total consumption of the global economy. The findings revealed a global circularity rate of 7.2%. However, in the Latin American and Caribbean (LAC) region, this crucial metric lags significantly, standing at below 1%. As per the Gap Report, the domestic extraction of raw materials from the natural environment for use in the economy in LAC region is notably high, standing at 16,6 tonnes per capita, being 36% higher than the global average. The predominant factor contributing to the extraction rate are biomass products, which account for 49% of the overall extracted materials (Circle Economy, 2023a).

Under the coordination of UNEP, an initiative was launched in 2021 to accelerate the transition to a circular economy in the LAC region, to empower SMEs by facilitating their access to financing. Furthermore, the coalition is actively engaged in shaping public policies that advocate for the adoption of circular economy practices and the promotion of sustainable consumption and production. (Circular Economy Coalition, 2023)

Key strategic partners providing ongoing support to the coalition include renowned organizations such as the Ellen MacArthur Foundation (EMF), the World Economic Forum (WEF), and UNEP. This collaborative effort signifies a crucial step towards fostering sustainable practices and economic models in the LAC region, leveraging expertise and resources from influential partners in the global sustainability landscape. (Circular Economy Coalition, 2023)

While Latin America faces environmental challenges like industrial agriculture-induced fires in Argentina (Yvette Sierra Praeli, 2023) or the substantial contribution of soy and cattle to over 97% of illegal deforestation in Brazil (MapBiomas, 2023); certain countries are actively engaged in circular economy initiatives.

2.5.2 Chilean initiatives

Chile, one of the leading nations in Latam in regard to circular initiatives, published in 2021 its Roadmap for a Circular Chile by 2040, promoted by the Ministry of Environment, and in collaboration with the Ministry of Economy. (Ministerio del Medio Ambiente, 2019)

This roadmap envisions a regenerative circular economy propelling Chile toward sustainable, equitable, and participatory development. It places a strong emphasis on people's well-being by prioritizing the preservation of nature and its inhabitants, ensuring responsible and efficient management of natural resources, and fostering a society that engages in sustainable and conscious consumption, production, and use. (Ministerio del Medio Ambiente, 2019)

The plan is designed to be achieved through a series of interconnected goals, all aligned to the long- term goal: ensuring the progress in the right direction. The seven-point agenda starts with the creation of green jobs, followed by targets to reduce waste, enhance productivity, improve recycling rates, and culminate by recovering 90% of the territories previously used for illegal waste disposal. (Ministerio del Medio Ambiente, 2019).

Chile demonstrates its commitment to Circular Economy action plan through already implemented initiatives such as the release of its EPR law (Extended Producer Responsibility) in 2016 (Ley 20920 - Responsabilidad Extendida del Productor, 2016).

2.5.3   Uruguayan initiatives

Uruguay started its energy transformation initiative back in 2010, marked by the strategic shift from fossil fuels to renewable sources in its energy matrix. By 2022 and 2023, over 90% of Uruguay's energy generation was derived from renewables, as illustrated in Figure 5 (ADME, 2023), being noteworthy in a period characterized by droughts, where Hydropower stands out as a prominent energy source alongside wind, biomass, and solar sources.

According to the World Energy Council (WEC), Uruguay is placed as the top country in Latin America, and 14th worldwide in considering levels of energy security, energy equity and environmental sustainability rank. The following Latin American country is Chile, which is ranked world widely as the 26th country. (World Energy Council (WEC), 2022)

Figure 5 – Share of source energies in Uruguay, (ADME, 2023)

Year 2023

Year 2022

Wind - 4743 GWh - 39%   Solar - 412 GWh - 3%
Biomass - 1137 GWh - 9%   Hydraulic - 3431 GWh - 28%
Thermal - 940 GWh - 8%   Imports - 1398 GWh - 12%

Wind - 4763 GWh - 37%   Solar - 438 GWh - 3%
Biomass - 939 GWh - 7%   Hydraulic - 5522 GWh - 43%
Thermal - 1282 GWh - 10%   Imports - 24 GWh - 0%
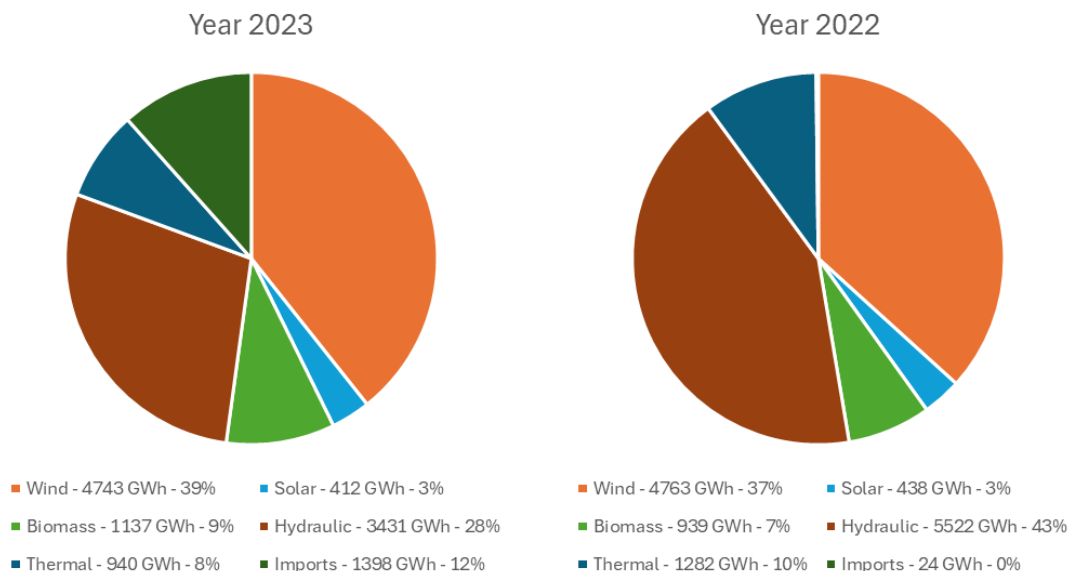
While Uruguay is progressing through its second phase of the energy transition initiative strategically focused on decarbonizing its transportation and industrial sectors (Ministerio de Industria, Energia y Mineria (MIEM), 2023), it also introduced the Circular Economy National Plan in 2019. The primary objective of this plan is to propel sustainable economic development of the country by embracing circular economy principles. It outlines specific goals such as generating systematic information to inform circular economy-centric public

policies, fostering research and innovation in the field, implementing early measures to drive circular economy practices, promoting awareness of business models aligned with circular economy principles, and encouraging the adoption of practices and processes oriented towards circular economy principles (Ministerio de Industria, Energia y Mineria (MIEM), 2022).

3   Methodology and Research

A case study can be approached through either empirical data or conceptual frameworks, according to the methodology and strategy outlined in Mapping Research Methods. Empirical data involves collecting and analyzing real-world evidence, such as interviews and surveys, to gain insights into the research object. Conversely, conceptual frameworks explore abstract theories and models to understand underlying principles and contexts, such as theories or modes of thinking. When a study focuses on a particular case, it aims to gain a comprehensive understanding of its unique context and the intricate relationships it has with the environment such as key stakeholders. (Lähdesmäki et al., 2010)

There are two primary approaches in research that have been widely debated: qualitative and quantitative methods. Qualitative research focuses on interpretation and understanding of phenomena through detailed, subjective insights. It emphasizes the context and processes involved, using methods like interviews and observations to collect data in abstract forms such as words or images. Quantitative research, on the other hand, deals with data that can be quantified and analysed statistically. It is usually characterized by using numerical data and aims to be objective and able to be generalizable, often utilizing surveys, experiments or databases. (Kohlbacher, 2006)

The ongoing debate between these methods has led to some researchers to acknowledge complementary strengths. Mixed methods research combines qualitative and quantitative approaches to enhance their respective advantages. By integrating numerical data with contextual insights, mixed methods provide a more comprehensive analysis, bridging the gap between what has been traditionally seen as opposed approaches. This combination allows researchers to address research questions from multiple angles, offering a richer and more balanced understanding of the topic. (Kohlbacher, 2006)

As the main objective of this thesis is to explore the feasibility and potential environmental benefits of a business model within the specific context of Latin America, and under the framework of sustainability and accessibility, this research employs a single-case study approach. This approach focuses on one particular business case to provide an in-depth analysis of its unique context. The study relies on empirical data, including interviews and

surveys, to assess the feasibility conditions of the FaaS business model in Latin America. By concentrating on a single case, the research allows for a detailed examination of a specific instance, enabling a comprehensive understanding of the intricate relationships between the business model and its environment, including key stakeholders of the industry.

This research employs mixed methods, combining qualitative and quantitative data. This combination allows the study to approach the research question from multiple angles, including qualitative data of the market while combining alongside diverse perspectives from various stakeholders.

3.1 Research philosophy and methodology

This research adopts a qualitative approach to explore the potential of a sustainable Furniture as a Service subscription model in Latin America. Employing a single-case study methodology, the research focuses on gaining a deep understanding of the FaaS business model within the specific socio-economic context of Latin America.

The study integrates interviews and survey as primary data collection methods, capturing insights from key stakeholders in the industry and the consumer perspective. This qualitative data is crucial for developing a business case that addresses the central research problem. The combination of qualitative data from interviews with theoretical frameworks enables a holistic analysis, ensuring that the research findings are both deeply contextualized and aligned with existing literature. (Aims — Jyväskylän Yliopiston Koppa, n.d.)

This approach ensures that the research not only explores the theoretical aspects of FaaS but also provides practical insights into its implementation and potential in the Latin American context.

3.2 Data collection

Data collection is a fundamental phase in the research process, providing essential information for analysis and subsequent conclusions. This chapter outlines the methods employed to gather data for this study. Surveys have been utilized to capture the perspective of the demand side of the market, offering quantitative insights into market trends and consumer preferences. In addition, semi-structured interviews play a pivotal role, as they allow for in-depth, first-hand accounts from key stakeholders in the industry. These interviews provide qualitative insights, addressing relevant questions to enrich the research and complement the survey data with the perspective of the supply side.

3.2.1   Survey

Surveys are utilized as a crucial data collection method to capture the perspective of the demand side of the market. They can provide quantitative insights into market trends, consumer preferences, and attitudes towards Furniture as a Service (FaaS).

Through a survey, this research seeks to gather information about respondents' behaviour and approach to their relationship with furniture. While open-ended questions can provide rich and detailed information, they have not been used in this questionnaire due to the challenges they present for quantitative analysis. Instead, the survey employs a variety of question types, including multiple choice, rating scales, and ranking questions. This approach ensures the collection of data that is both comprehensive and feasible to quantitative analysis. (Rubenfeld, 2004)

The objective of the survey is to gain insights into actual furniture purchasing behaviors, attitudes towards renting furniture versus buying it, and personal considerations towards sustainability in purchasing process decisions. It aims to understand preferences regarding how furniture is acquired, the factors that influence these decisions, interest in rental services, perspectives on sustainability, and to gather qualitative feedback on these topics.

The survey consists of four main blocks: I. Demographics; II. Behavior towards purchasing; III. Behavior towards renting; and IV. Behavior towards sustainability. Depending on responses, the survey includes up to 19 questions presented in multiple-choice or ranking formats, designed to be completed in under 5 minutes. Originally written in Spanish and later translated into Portuguese to reach all Latin American countries, and finally translated into English for the purposes of this thesis.

The survey questions are included in Appendix 2, providing a detailed view of the specific inquiries.

3.2.2   Semi-structured interviews

Semi-structured interviews were selected as a crucial method for this research to gain insights from key organizations about the current state and advancements of Furniture as a Service on a global scale. This qualitative data collection method balances structured questions with the flexibility to explore new insights, ensuring key topics are covered while allowing interviewees to introduce new perspectives relevant to the research focus. By combining open-ended questions with questions based on theoretical frameworks, semi-

structured interviews gather data rooted in the participant's experiences while also aligning with established concepts of the research objectives (Galletta & Cross, 2013).

Incorporating semi-structured interviews into the strategy of data collection aims to capture valuable perspectives and experiences for a comprehensive understanding of the topic. The insights gained from these interviews are used in Chapter 4.3 to analyze and reveal what these organizations are doing in FaaS, contributing to the broader field of study.

Interviews were conducted personally through online platforms, guided by a structured list of open questions designed to obtain detailed insights about the business model and answer the research question while leaving space for interviewees to expand on topics that were relevant for the organization. The same set of questions was used for all participants, with minimal adaptations for the Ellen MacArthur Foundation, given its role as an articulator between retail and multiple actors rather than a retailer itself. The list of questions used in the interviews is provided in Appendix 3.

The individuals interviewed for this research are key stakeholders from relevant companies within the furniture industry, either due to their role in organizations within the retail industry or by their influence in the design and commercialization of products. The companies represented are IKEA, Martela, Mercado Libre, and the Ellen MacArthur Foundation. The representatives of each organization are listed below.

1. Bernardita Correa Díaz, Sustainability Leader for IKEA Chile, Colombia and Peru. Interview took place on April 18th of 2024.

2. Tahir Naqvi, Strategic Partnerships Manager and Diego Bermudez, Senior Research Analyst in the Finance Initiative, both from Ellen Mac Arthur Foundation. Interview took place on April 16th of 2024.

3. Daniel Haltia, Global Circular Strategy Associate Director at IKEA. Interview took place on April 25th of 2024.

4. Guadalupe Marin, Sustainability director at Mercado Libre. Interview took place on June 24th of 2024.

5. Eerikki Mikkola, Head of Service & Business Design of the Martela Group. Interview took place on June 26th of 2024.

4 Business case analysis

This chapter aims to outline a business model designed to address the environmental challenges facing the furniture industry. It will explore potential solutions and highlight specific challenges and opportunities that may arise during implementation in the Latin American (Latam) region. Examining these aspects, intend to provide a comprehensive framework to guide sustainable practices and foster innovation within the industry.

4.1 Furniture's impact on environment

4.1.1 Life cycle assessment

The Life Cycle Assessment (LCA) will be used to break down the environmental aspects of the fast furniture industry. An LCA for the same product may differ significantly based on variables such as - but not limited to - where and how the materials have been sourced, the manufacturing process (including, for example, how energy is sourced), associated shipping, and end-of-life treatment. market share is 5,9%, The first furniture LCA study for Brazil confirmed that the greatest impact on the environment were found to be in the raw material supply and product distribution. This LCA study was calculated in accordance with ISO 14040 and 14044 documents with a scope of cradle to gate for a wardrobe (Iritani et al., 2015). Another LCA study in Spain, was conducted for children furniture with a scope of cradle to gate, showed that the most relevant contributor categories for environmental impact were production of the wooden boards and the electricity. (González-García et al., 2012)

The life cycle of the products can be divided into the following 5 stages to assess an LCA of furniture (Cordella & Hidalgo, 2016):

1. Production and supply of materials: Sourcing raw materials for the manufacturing stage, with its environmental impact directly related to the materials used. This phase is energy-intensive, constituting the primary contributor to the overall environmental footprint.
2. Manufacturing: Stage where products are assembled and finished, this phase holds the second-highest environmental impact. Within manufacturing, processes such as painting, coating, and drying emerge as the most substantial energy consumers, as well as the use of adhesives and solvents.
3. Distribution: Although distribution stage is highly dependent on the distance to be covered, in the hypothesis of the study was found that its impact is comparable to manufacturing stage.

4. Use and maintenance: Usage stage depends on the user and the required maintenance and cleaning for the product, nevertheless it resulted to be negligible in terms of environmental impact.

5. End of life: The environmental impact will depend on the applied treatment – landfill, incineration, recycling. Actions like reusing parts con considerably affect positively the environmental impact.

According to the study based on the LCA analysis of 72 cases, phases 1 and 2 – production and supply of materials and manufacturing – are accountable for over 90% of the environmental impact of the furniture pieces (Cordella & Hidalgo, 2016); use and maintenance of the product has been accounted for 0% of the impact while the rest is due to the impact of distribution and end of life.

4.1.2 Environmental impact through design

As described in chapter 4.1, sourcing of raw materials and manufacturing are one of the most environmentally damaging activities, therefore, the optimization of resources could be one of the most effective measures in order to diminish environmental impacts in furniture, and claims that design is a key factor. (Cordella & Hidalgo, 2016)

When examining furniture from a broader perspective that goes beyond its life cycle and encompasses considerations of usage intensity, the concept of "design to last" becomes significantly relevant. An LCA study across 16 impact categories for commonly used household goods, highlighted furniture as one of the highest impact groups (Castellani, 2021). While furniture may not be as consumption intensive as certain other household items (e.g., detergents, clothing, or paper), its classification in the higher-impact category results from a combination of significant consumption and a notably impactful environmental profile.

Literature exposed in chapter 4.1 confirmed that usage and maintenance phase has a negligible impact on the environment. Those studies were carried out under the ISO 14040 and 14044 standards which primarily focus on providing a framework and guidelines for conducting life cycle assessments (LCA), but they do not explicitly specify product lifespan as a factor. Instead, they concentrate on assessing key stages of the life cycle, from raw material extraction to final disposal, with the aim of quantifying associated environmental impacts. Therefore, if maximizing the lifespan of the product, the overall impact in absolute terms of footprint per usage could be lower.

An LCA calculation tool created by (Bianco et al., 2021) provides a simplified way to measure the environmental impact of furniture pieces. To understand the magnitude of impact on the lifespan of furniture, this tool has been used to run a comparison between a desk manufactured under fast furniture and traditional furniture approaches.

A simple and classic desk as shown in Figure 6 – Classic desk design has been used for this comparison. The tool has been applied to the same desk made of different materials: desk A - Fast furniture – made from MDP of 15 mm thickness; and desk B - Traditional furniture – made out of eucalyptus clear of 2" (50,8 mm). Results are of the calculations are available in Appendix 1.

Figure 6 – Classic desk design

The LCA calculations confirmed that Global Warming Potential (GWP) (excluding biogenic carbon) measured in kg of CO_2 eq. accounted for the material sourcing and manufacturing phases were 91% for desk A and 90% for desk B. Despite the materials used in both cases, those figures are aligned with results of literature mentioned in chapter 4.1.

Due to the wood density and the thickness used, desk A's weight is 0,21 times lighter than desk B (30 kg vs 144 kg, desk A vs desk B respectively), having a direct impact on the results of the calculation of the tool that accounted an impact in GWP for desk A as 0,23 times the one of desk B (33,1 vs 141,8 kg of CO_2 eq., desk A vs desk B respectively).

Limited evidence exists regarding the lifespan of furniture, primarily attributable to the complexity involved in its calculation and objectivity in comparisons, due to variations in furniture design, user behaviour, and maintenance practices. Despite these challenges, for the purpose of this analysis, it is assumed that desk A has a lifespan of 4 years, whereas desk B is estimated to have a lifespan of 40 years. Under this hypothesis, desk A has to be replaced 10 times to serve its function for 40 years, meaning that its environmental impact is also 10 times higher. This inverts the overall impact, that in a 40-year period, fast furniture's

desk is 2,3 times higher than traditional one (331,3 kg of CO2 eq. vs 141,8, desk A vs desk B respectively).

Beyond the environmental impact, there is the economic factor that could be calculated as the money spent on desk solutions in 40 years for both scenarios. While in desk A it has to be considered shipping and assembly factor, for desk B maintenance has to be considered, which has been seen as negligible (Cordella & Hidalgo, 2016).

The higher impact on the environment of fast furniture, is not necessarily due to the way its produced, but because of the increase in the consumption intensity compared to traditional furniture that has a longer lifespan. Therefore, reducing its lifespan increases the overall environmental impact.

4.2 Size of the market

The present chapter provides a context of the volume of the furniture market in Latin America (Latam) in respect to the worldwide market, the presence of e-commerce in this sector, and their trends.

When discussing about the furniture market, it will be addressed in the following aggregators, that are the ones typically categorized in selling shops: Living-room & dining-room furniture; Bedroom furniture; Lamps & lightning; Kitchen furniture; Others (bathroom furniture, Kids & baby's furniture, floor covering).

According to market reports of Statista, the total value of the furniture market in 2022 was 696,8 BUSD worldwide and 41,1 BUSD in LATAM[1] region (Statista, 2023b), as represented in Figure 7. LATAM's market share is 5,9%, while population share is 6,7% (World Bank Open Data, n.d.). Regarding the trends of the market, furniture industry is projected to increase its volume worldwide by +29% from 2022 to 2026, while LATAM region by 39%.

Particularly, the furniture e-commerce market in the same year rose to a total value of 200,7 BUSD worldwide and 8,1 BUSD in LATAM region (Statista, 2023b), as shown in Figure 8.

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[1] Due to the available data, LATAM region considered the following countries: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, Costa Rica.

These values derive in that the share of e-commerce is 29% worldwide and 20% for LATAM. Nevertheless, e-commerce in LATAM show higher grow rates, highlighting an increase for LATAM of +97% compared to a worldwide variation projected to be +76% for the same period (2022 – 2026). The increasing growth indicates that by 2027, e-commerce is expected to have a 39% market share worldwide and 28% in LATAM (Statista, 2023a).

Figure 7. Digital furniture market outlook. (Statista, 2023b)
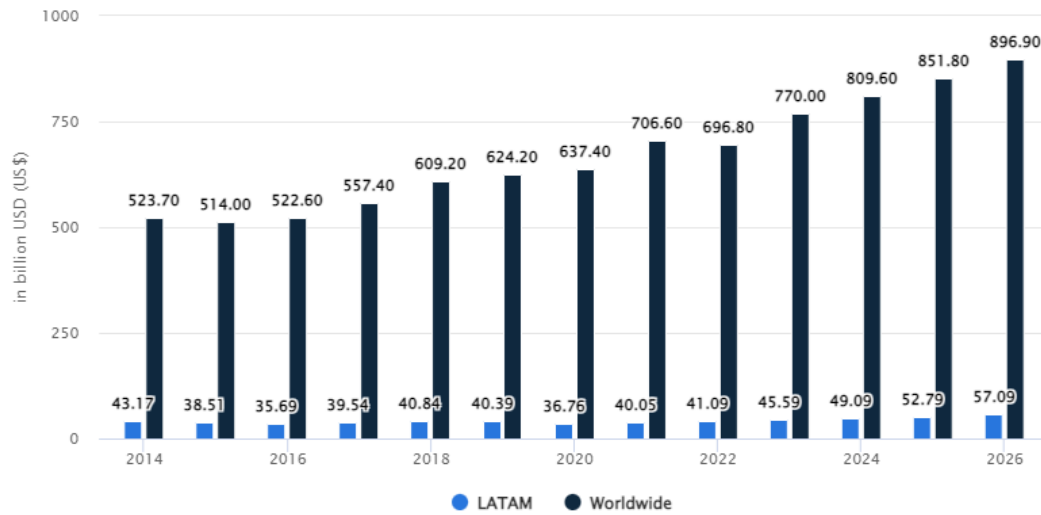
Figure 8. Digital furniture market outlook. (Statista, 2023a)
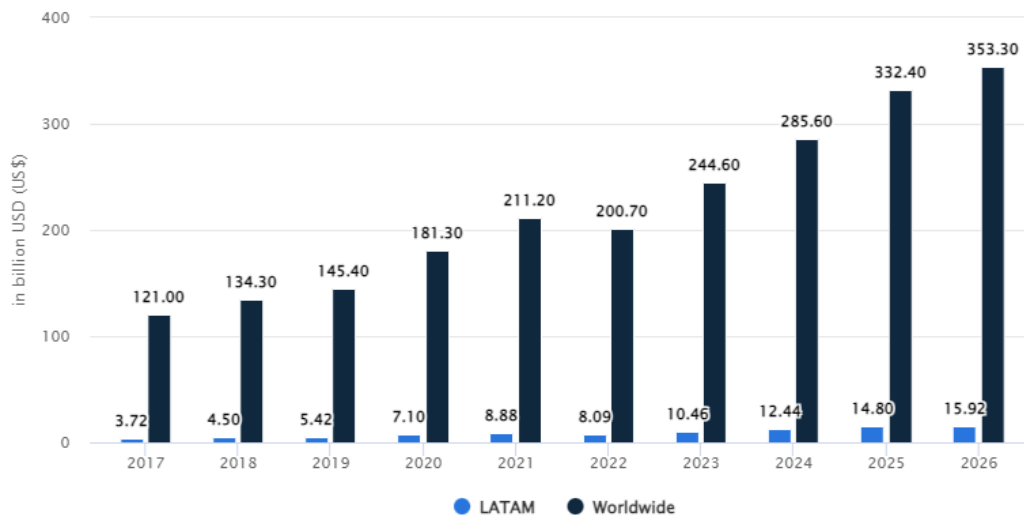
By 2026, the projection leaves LATAM region with a market share of worldwide industry volume of 6,4%, meaning a gain of 0,5pp respect current value.

4.3   Benchmarking the industry

The following chapter focuses on businesses directly related to the furniture industry. Information was collected from various sources, including corporate and sustainability reports, publicly available corporate data, and interviews with key employees of these organizations.

4.3.1   IKEA

General and Business model

IKEA is a global furniture brand known for its ready-to-assemble furniture, home accessories, and kitchen appliances. Originally from Sweden, it has since expanded globally, offering affordable, stylish furnishings and innovative design solutions for homes and offices. IKEA is renowned for its flat-packaging and self-assembly concept, making its products accessible to a wide range of customers worldwide. (Interview with Daniel Haltia on the 25th of April 2024).

Design principles

Five fundamental principles govern IKEA's product design, and each must be present in every product before its release to the market (Interview with Bernardita Correa Díaz on the 18th of April 2024).

1. Aesthetic appeal: Meticulous attention is paid to the visual design of each product to be attractive. From sleek lines to elegant curves, every detail is carefully crafted to enhance the overall aesthetic appeal. This goes beyond mere superficial attractiveness; it encompasses a deep understanding of design principles, colour theory, and user preferences.
2. Functionality: Products are engineered to perform their intended function with utmost efficiency and effectiveness. Functionality is at the core of every design decision, from the layout of storage compartments to the ergonomics of seating arrangements.
3. Affordability: A core objective of IKEA is to ensure furniture affordability, achieved through large-scale production while optimizing packaging and logistics.
4. Quality: Durability is a core attribute to IKEA's products, allowing for extended warranties on furniture of up to 25 years.
5. Sustainability attribute: Each IKEA product incorporates at least one of three sustainable attributes.

- Product materiality: components of the product are sourced from conscious and sustainable sources such as FSC-certified forests, or low-water-consumption cotton.
- Production: IKEA values and empowers small artisan communities. One of their iconic products is the Soare, a place mat made from local communities in Vietnam.
- Impact on the home: Recognizing post-purchase impacts, IKEA includes initiatives such as water-saving faucets, rechargeable batteries, or LED lamps.

Though there is no mandatory level of sustainability integration, it's generally recommended to have at least a 30% sustainability component (interview with Bernardita Correa Díaz on the 18th of April 2024).

In 2019, Ingka Group, franchisee of IKEA, embarked on testing the rental program tailored for all non-consumable items. According to Daniel Haltia, global circular strategy associate director for IKEA, this initiative compelled IKEA to prioritize the quality and repairability of their products while also redefining their new target clients and audience. This initiative began as a business-to -consumer (B2C) service for students in Netherlands, later evolving into a business-to-business (B2B) model in Sweden, and subsequently expanding to Italy. (interview with Daniel Haltia on the 25th of April 2024).

Along this journey, IKEA has stepped with several challenges, such as financial solutions for renting required to sustain a business model that has a different workflow from traditional retail. While IKEA is mostly a linear retailer, characterized by predictable revenue forecasts from their franchises, transitioning to a subscription model presents new financial obstacles. In response, IKEA collaborated with different banks to address the challenge and test new financial services to secure funding for subscription model activities. (Interview with Daniel Haltia on the 25th of April 2024)

Another significant challenge is how to maintain the quality of products, an area where IKEA upholds high standards. Meeting IKEA's service level standards requires adjusting or introducing new services, such as maintenance and repair. As Haltia emphasizes, this remains an ongoing learning process. (Interview with Daniel Haltia on the 25th of April 2024)

The pricing of rentals is a critical aspect of the model as well. According to Haltia, three key factors dictate the pricing structure: durability, affordability, and the ratio of product lifecycles to the quantity of rentals. Throughout this process, with a keen eye on sustainability, numerous questions surfaced. Among them, a pivotal inquiry emerged: Would the

introduction of this business model truly increase the utilization of each furniture piece, consequently reducing the additional new products needed to serve the same number of customers in a rental model? Alternatively, could this model lead to more demand, and thus to an increase of both quantity and diversity of products and potentially triggering an undesirable rebound effect? (Interview with Daniel Haltia on the 25th of April 2024)

Understanding their customers on a deeper level is crucial for IKEA to enhance their products. That's why IKEA is also delving into understanding customer behaviour in a rental model: Are customers returning furniture? Are they swapping items more frequently? Since the pandemic, there has been a surge in demand for office chairs as people need one for their workplace and another for home. As Haltia noted, behaviour on a large scale is different and largely unknown. (Interview with Daniel Haltia on the 25th of April 2024)

Another challenge in testing phase is the fact that in a proof-of-concept model, manufactures also need to modify their business model. Therefore, Haltia states that in a concept phase the requirements of the subscription model must align with existing furniture pieces. Consequently, some of the products offered won't be expressly designed for rental purposes. (Interview with Daniel Haltia on the 25th of April 2024)

These topics pose questions that IKEA's sustainability team is actively working to address through their test models. This testing phase is crucial to ensure a sustainable business model when it's time to scale up. Among all the questions that may influence the design of this new business model, Haltia still works to answer an underlying question that stands out as perhaps the most challenging for his team: How can we genuinely validate the sustainability of the model, given the multitude of factors involved and the difficulty in defining metrics that accurately measure long-term impact? (Interview with Daniel Haltia on the 25th of April 2024)

4.3.2 Martela

Martela is a design and manufacturing company that started in 1945 in Finland as a furniture manufacturer. Now it defines itself as a partner for workspace and study environment solution provider (Martela Oyj, 2020b). Their purpose is to provide responsible solutions for their customer's workplaces and learning environments through their lifecycle model accomplished by offering a service they call workplace-as-a-service (WaaS) (Martela Oyj, 2022a), that is a broader concept of FaaS, by integrating their expertise in workplaces. They manufacture and offer furniture for the B2B segment by selling or renting it.

Materla's scope includes design, manufacturing, maintenance, refurbishing and recycling, their most significant environmental differentiator lies in helping their customers use their facilities more efficiently and reducing their climate effects with their lifecycle model (Martela Oyj, 2022a). Martela designs, manufactures, and owns products through their whole lifecycle, promoting circular economy.

In an interview with Eerikki Mikkola, Head of Service & Business Design at Martela Group, he elaborated on how Martela implements circular design thinking strategies to improve sustainability and circularity initiatives within the organization. Besides adhering to European standards that ensure a minimum of 10 years of product durability, Martela is committed to surpass these benchmarks in terms of durability. In this sense, they developed a digital passport system to track and monitor key indicators, enabling them to understand and manage product wear over time. This is a relevant aspect, not only because of their sustainability commitments, but also because while renting products it is their interest to maximize the lifespan of them. (Interview with Eerikki Mikkola on the 26th of June 2024)

Mikkola stated the importance of visual appearance in their design process, believing that products should not become obsolete from a fashion perspective. Therefore, they incorporate timeless design concepts to maintain aesthetic longevity. (Interview with Eerikki Mikkola on the 26th of June 2024)

From a functionality standpoint, Martela develops some of their products with a modular approach. This design philosophy has its roots in the 1950s, when Martela began creating standardized furniture that could be effortlessly assembled into configurations suitable for different types of workplaces. (Martela Oyj, 2022b) offering several advantages: it allows pieces of furniture to be easily expanded or downsized, facilitates assembly and maintenance, and simplifies cleaning and logistics. These efficiencies not only enhance competitiveness but also contribute to reducing environmental impacts.

From a logistics perspective, Mikkola mentioned that the impact largely depends on the distances to be covered. Martela operates locally within the Nordic countries, engaging in manufacturing, sales, and rentals. In the overall business context, materials are the most significant component, accounting for the largest share of the product's carbon footprint. Consequently, logistics has a relatively minor impact on sustainability, typically comprising less than 10% of the carbon footprint for Martela's products, according to the organization's carbon footprint analysis (Martela Oyj, 2020a). However, Martela acknowledges that the rental business increases logistical demands. To address this, they optimize routes as part of their service business model. When delivering new furniture to clients, they simultaneously

collect returns or unwanted furniture, optimizing logistics and enhancing efficiency. (Interview with Eerikki Mikkola on the 26th of June 2024)

Regarding business scalability, Mikkola acknowledges that Martela operates within a specific niche in the Nordic countries, catering to a particular B2B segment. In this region, where Martela operates directly in-house or through partners, logistics, including reverse logistics, do not pose significant challenges for growth. However, expanding into other countries would present a high challenge, requiring dismantling products, transporting them back to the workshop for examination, refurbishing, and returning them to the marketplace. Scaling up would require developing strong partnerships in foreign markets. (Interview with Eerikki Mikkola on the 26th of June 2024)

Commercially speaking, and operating in a niche market, another barrier to growth is the customer mindset. Customers are used to buying products instead of renting them. Therefore, one of the main challenges of Martela is being proactive while potential customers are in the decision-making process of buying or changing workplaces since they often consider only traditional sales retailers. Martela has identified and capitalized on a growing segment: home-office furniture. Initially, their typical customers were IT companies. However, during the pandemic, this segment expanded to include any industry that was allowing employees to work from home. This segment also includes fast-growing companies and start-ups. Nevertheless, the flexibility of businesses to scale their home-office needs up or down makes it challenging for Martela to forecast demand accurately. (Interview with Eerikki Mikkola on the 26th of June 2024)

Regarding pricing and profitability, Mikkola mentioned that both manufacturing and financial costs are crucial for Martela as they focus on providing long-term service. In setting the price of their service, they consider not only these costs but also the delivered value. This includes the quality of the furniture, the service provided, and the flexibility offered to the customer. (Interview with Eerikki Mikkola on the 26th of June 2024)

Martela states in their sustainability programme 2023-2035 their action plans, in which they have a goal of being carbon neutral with actions of reducing energy consumption and being circular. (Martela Oyj, 2022a).

Key indicators of sustainability to achieve this action plan, include material usage, energy consumption, carbon dioxide emissions, and waste management. Additionally, Eerikki Mikkola highlighted other critical indicators that Martela measures to enhance their sustainability targets, such as the resale share of used products, the share of furniture-as-a-

service within the business, and performance metrics like take-backs and the extent of repairs needed for returned items. According to Mikkola, one of the key measures of sustainability is product utilization. If a product is not being used, it is not sustainable. Therefore, measuring user experience is a critical KPI for sustainability purposes. (Interview with Eerikki Mikkola on the 26th of June 2024)

4.3.3 Mercado Libre

Mercado Libre is the leading e-commerce and digital payments company in Latin America, with a presence in 18 countries. The company has two defined business units: an e-commerce platform, which sold products worth nearly $45 billion USD in 2023, and a financial services ecosystem, which processed a total volume of over $180 billion USD (Mercadolibre & done!, 2024).

In 2023, Mercado Libre employed more than 58,000 people across the region, growing by over 45% compared to the previous year, and connecting nearly 85 million buyers. In its e-commerce business unit, Mercado Libre operates primarily as a marketplace, connecting supply and demand on a platform where sellers offer their products to buyers. Through technology, Mercado Libre optimizes the shopping experience by integrating payments and logistics into its platform. (Interview with Guadalupe Marín on the 24th of June 2024)

The marketplace comprises three units: products (sale of tangible goods), classifieds (listing of vehicles and real estate), and services (listing of professional services). The product unit is the most significant in terms of revenue and exposure. Due to the nature of a marketplace operation, Mercado Libre is not directly involved in the production of the goods sold. Sellers on the platform range from small businesses to large entities, typically engaged in reselling imported goods, locally sourced products, self-manufactured items, or a combination of these. According to the definition of emission scopes (US EPA, 2016), all activities related to product creation fall within scope 3 for Mercado Libre. (Interview with Guadalupe Marín on the 24th of June 2024)

Guadalupe Marin, the Director of Sustainability at Mercado Libre, acknowledges that the organization's efforts to improve sustainability are primarily focused on scopes 1 and 2, leaving scope 3, which involves their sellers and supply chain, largely unaddressed. Based on the sustainability team analysis, about half of Mercado Libre's CO_2 impact in scopes 1 and 2 is linked to product logistics, covering transportation from first mile (sellers to fulfillment centers) to last mile (delivery to final destination). The other half is associated with cross-

border trading (CBT), mainly logistics due to international air shipments. (Interview with Guadalupe Marín on the 24th of June 2024)

Some of Mercado Libre's sustainability actions include the electrification of both its energy matrix and its vehicle fleet. Currently, 44% of their energy supply comes from renewable sources, either through their own solar panel installations or certified clean energy providers, with 13 sites fully powered by renewable energy. The company also has a fleet of over 2,300 electric vehicles for logistics and is incorporating biofuels (Mercadolibre & done!, 2024).

Marin notes that the industry is not yet equipped to supply large-scale, cost-effective services or products to mitigate scope 1 and 2 impacts, such as advanced biofuel vehicles and sufficient electric car supply. According to their metrics, the impact of product packaging is minimal but remains a visible aspect for users. Thus, they are optimizing transport volumes and incorporating recycled, recyclable, and compostable materials. Like other industries, sustainable packaging still requires innovation and scaling to be a sustainable option and price competitive. (Interview with Guadalupe Marín on the 24th of June 2024)

The organization's sustainability report, based on GRI methodology, identifies "energy, mobility, and packaging" as the only material topics related to climate change. The report aligns with Marin's responses, emphasizing the development and implementation of sustainable mobility, energy management, and material circularity. Additionally, the report highlights a financing program called "Regenera America," aimed at the regeneration and conservation of Latin American biomes. Although this initiative is separate from the company's core business activities, it reflects Mercado Libre's broader commitment to sustainability. (Mercadolibre & done!, 2024)

These are some of the initiatives and measures Mercado Libre leads and invests in directly. Regarding their product supply chain, where one of the largest impacts is generated, Marin acknowledges that the focus is not yet there. However, they have a seller development program in partnership with Sistema B to promote sustainable purchasing. They select the top 10 sellers by volume and offer them a program called "Mide lo que importa" ("Measure What Matters"), where Sistema B consultants assist these organizations in transitioning to impact measurement under B Corp standards, eventually positioning them well for a future certification. (Interview with Guadalupe Marín on the 24th of June 2024)

4.3.4 Ellen Mac Arthur Foundation

Complementary to the previous organizations, Ellen MacArthur plays a vital role in developing and establishing standards for environmentally circular business practices. Although they provide a general and broad scope, their focus relies in three industries - Food, Fashion, and Plastic - known for their significant environmental impact. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

Furthermore, EMF collaborates with companies aiming to adopt circular practices, assisting them in enhancing their business operations. Tahir Naqvi, Strategic Partnerships Manager at EMF, acknowledges that the approach of some to EMF is to find circular practices for they operations or their business in general. But some others, mostly multinational companies, come across because they need to improve their public image related to environmental action, and a public connection with EMF provides a solution to it. EMF recognizes the true motivations behind companies seeking their assistance and deliberately adopts a strategy to collaborate closely with them. As Naqvi highlights, it's more effective to work within these companies, fostering incremental but impactful changes, rather than adopting a confrontational position against them. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

One way to measure the impact of their activities is by defining KPIs and maintaining a consistent record of them. Many of the companies they work with use these indicators as marketing tools, without truly integrating them into their core business operations. As Naqvi points out, when a company's sustainability team is composed entirely of marketing personnel, it indicates that sustainability is being treated as an image strategy rather than a genuine company goal. EMF works closely with these companies to guide them towards circular practices. For instance, companies like PepsiCo and The Coca-Cola Company initially focused on increasing the recycled materials in their bottles. Now, they are expanding their goals to include reusing packaging. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

Coca-Cola's key sustainability goals related to packaging, as outlined in their 2020 sustainability report, were to make 100% of packaging recyclable by 2025 and use at least 50% recycled content in their packaging by 2030 (The Coca-Cola Company, 2021). In the 2022 report, Coca-Cola maintained these goals and added a new target for reuse, aiming to have at least 25% of beverages sold in refillable or returnable bottles or in fountain dispensers with reusable packaging by 2030 (The Coca-Cola company, 2023).

This evolution is a clear example of EMF's efforts to drive high-impact companies towards positive environmental outcomes. Specifically, this progress is achieved through EMF's Plastic Initiative, acknowledge by Naqvi as one of the foundation's most significant programs alongside its Food and Fashion initiatives. Once a company begins working internally under one of these initiatives, EMF's strategy is to foster development in other areas. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

For EMF, collaborating with high-impact companies is strategically important. As Naqvi mentions, involving key players is crucial to effect meaningful change. EMF's strategy includes working with linear leader businesses to introduce circular practices and models. However, not all companies are accepted. EMF has a rigorous due diligence process that evaluates numerous indicators, such as the industry and the company's reputation. For instance, EMF does not collaborate with extractive industries like oil or mining. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

The linear model works today, but it carries significant risks for the future, as it may not be sustainable in the long term. In contrast, a circular model offers several benefits that strengthen the relationship between the customer and the company. With a circular model, companies can gather more customer data, leading to new business lines or improved service quality. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

Globally, the positive impact of circular businesses is not being adequately quantified, particularly in terms of reversing biodiversity loss and other environmental benefits. As a result, there are insufficient incentives for companies to pursue this path beyond embedding it in their core mission. According to Naqvi, the profile of companies approaching EMF typically includes very large corporations seeking to enhance their image and lead the way in sustainability within their industry. Additionally, startups with impact-driven business models and circular solutions bring innovation and recognize market opportunities. Unfortunately, for SMEs, the current context makes it very costly to invest in circular practices independently. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

One of the challenges of a subscription model is that, for it to be profitable, it must be scalable but also have an existing market penetration. An experience of The Ellen MacArthur Foundation within its Plastic Initiative suggests that addressing plastic pollution requires implementing a reuse model. The successful development of plastic reuse depends on creating a scalable system that operates over a shared infrastructure, enabling efficient collection, sorting, cleaning, and transportation within an economy of scale (Ellen MacArthur Foundation, 2023).

Similarly, for furniture, establishing an infrastructure of workshops that allow users to return or repair their products is crucial. This infrastructure is key to developing a scalable business that does not solely depend on the success of a single manufacturer. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

In the plastics industry, this initiative relies on the existence of standardized models for containers that enter the reuse circuit. Similarly, for furniture, there needs to be a certain standardization of products so that each workshop can receive a product they are familiar with building or repairing, with available blueprints to support these tasks. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

A marketplace, or a decentralized model of sellers, provides an appropriate space where market supply and demand are regulated. Sellers or manufacturers decide what types of furniture they want to produce or repair. Supply and demand will determine how attractive each piece of furniture is to both sellers and users. This method of manufacturing and repairing furniture creates opportunities for furniture design. Freelance designers can create designs based on circularity principles, which users can purchase, and sellers can manufacture and repair. This approach decentralizes efforts and provides a scalable model within cities and regions. (Interview with Tahir Naqvi and Diego Bermudez on the 18th of April 2024)

4.4 Business model in B Canvas

The business model Canvas, as referred in chapter 2.3.1, is described in this chapter within the adaptation of the B Canvas because it is better suited to describe purpose-driven businesses addressing climate challenges.

Addressing the question posed in the thesis, a potential solution to democratize access to high-quality and sustainable furniture is through a furniture-as-a-service model offered purely online with both rental and purchase options.

This business model targets mid-income individuals, families, and businesses seeking flexible and affordable furniture solutions without compromising on quality or sustainability.

Value is created by harnessing a community of freelance designers who contribute innovative ideas, combining AI technology to design standardized furniture pieces optimized for production and repairability. This approach ensures that the products are not only trendy and functional, but also sustainable in a broad sense, as they are designed for reuse and easy repair, promoting sustainability, and reducing waste.

This design serves as an input for manufacturers, functioning as a decentralized network to produce and repair standardized products on demand, which are then offered in the marketplace. These manufacturers form a community of sellers, unlocking new revenue streams not only from online sales but also from repair services. This model provides them with the flexibility to operate on demand, engaging in either manufacturing, repairing, or both, thereby optimizing their capacity and resource utilization.

Value is delivered entirely online, enhancing accessibility and convenience for customers. The platform uses AI-driven search tools to facilitate efficient and personalized product searches, making the customer experience seamless and intuitive.

Delivery is managed by third-party logistics providers, ensuring reliable and efficient service.

After-sales support is provided in collaboration with sellers, ensuring high customer satisfaction.

value for the business model is captured through transactional fees paid by sellers and advertising revenue from brands and sellers.

Finally, it contributes to a solution that aligns supply with demand by providing a framework for furniture designed under circularity principles. It meets the demand for high-quality furniture in a competitive landscape while also promoting sustainable consumption patterns and minimizing waste. This approach aligns with the business model's environmental purpose, fostering a more sustainable and responsible furniture market.

The building blocks of the B Canvas are described below.

4.4.1   Customers

Relationships

Self-Service: Customers independently search for products using AI-driven models that facilitate efficient and personalized searches.

CX (Customer Experience): A seamless and intuitive online experience for customers, emphasizing ease of use and satisfaction.

Manufacturers: Strong relationships with manufacturers to ensure adherence to sustainability standards and continuous product improvement.

Channels

Online Sales: Main sales channel is purely online, enabling access for a broader market.

Customer Awareness: Awareness efforts will be primarily digital, leveraging online marketing strategies to reach target segments effectively.

Evaluation and Communication: Value proposition will be communicated online, as well as detailed product descriptions, customer reviews, and sustainability impact data.

Acquisition: Customer acquisition will be driven by digital campaigns mainly.

Delivery: Delivery services will be handled directly by the manufacturer, or a third-party logistics service will be offered to ensure efficient and reliable delivery of products.

After-Sales Service: After-sales support will be provided in collaboration with sellers to ensure customer satisfaction and loyalty.

Segments

In this business model the market is segmented in three types of clients.1) Transitionals: Mid-income individuals in transitional homes, such as students, young professionals, and those with temporary work assignments, including newborns with changing needs. 2) Fashionists: Mid-low to mid-income individuals or families who desire trendy, high-quality furniture for frequent updates, with a focus on sustainability. 3) Businesses: Companies seeking flexible or long-term rental solutions, including corporate offices, hotels, and real estate agencies.

4.4.2   Offer

Identified problem

Access to high-quality furniture is often more expensive, leading consumers to choose for cheaper and/or lower-quality products. This results in frequent replacements of the piece of furniture, and contributes to increasing waste, pollution, and deforestation due to the short lifespan of such products.

Purpose

Transform consumption models to foster healthier and more responsible relationships with our environment by promoting sustainability and reducing waste.

Value proposition

Offer affordable access to premium, circular furniture with a lifetime guarantee. The service operates as an online marketplace, providing a subscription-based model for both renting and purchasing furniture.

4.4.3   Infrastructure

Value chain

Furniture Manufacturers: Produce according to sustainability standards and refurbish furniture to extend its lifecycle.

Furniture design will be driven by a community of freelance designers contributing innovative and decentralized ideas. This community will be enhanced by the integration of AI technology to optimize design, production, and repairability, ensuring sustainable and efficient furniture solutions.

Logistics: Aim for a net-zero carbon footprint in logistics operations, ensuring an efficient and eco-friendly transportation and delivery.

Promotion: Conduct marketing activities to boost brand awareness and attract customers.

Key activities

Product Design: Develop circular and universally applicable manufacturing practices to create affordable and sustainable furniture.

Seller Development: Establish a stable supply of products and refurbishment services by collaborating with sellers.

Customer Acquisition & Retention: Implement strategies to attract and retain customers through exceptional service and engagement.

Customer Service: Provide top-notch customer support to enhance satisfaction and loyalty.

Logistics: Manage efficiently logistics of heavy and bulky items, ensuring affordable returns.

Key resources

Financial: Cover upfront costs of developing the online platform and initial product offerings.

Human: Key Account Managers (KAMs) responsible for acquiring and retaining accounts, a Customer Experience (CX) team focus on providing excellent customer service, and the Design Team that develops sustainable and innovative product designs.

4.4.4   Financial viability

Cost Structure

Design Phase: Investments related to research, development, and the launching of the minimum viable product (MVP).

Logistics: Costs associated with the transportation and return of products.

Payment Methods: Fees related to processing transactional payments in the platform.

Support: Structure cost related to providing customer service and support.

Promotion: Investment in customer acquisition and retention through marketing campaigns.

Income streams

Transactional Fee: The fee paid by sellers in each transaction when selling in the platform.

Advertising: Revenues from brands and sellers for advertising their products on the platform.

Impact metrics

Forest Conservation: Measure the amount of wood saved by promoting sustainable furniture options.

Average time usage: Tracking the average lifespan of furniture pieces to ensure they are being used longer and reducing waste comparted to the average in traditional retail industry.

4.5 Perspective of the demand

Understanding the perspective of the demand is crucial for novel business models to understand compatibility of product or service within certain market and context. The objective of this analysis is to explore whether there is demand for alternative, sustainability-focused solutions in furniture products, and to identify whether this demand is driven by environmental values or economic reasons.

To understand the demand, a survey was conducted with customized questions designed to address the research question. The survey was distributed to a targeted group of potential customers in Latin America. Given the author's nationality, the primary respondents were from Uruguay and were contacted via WhatsApp in various groups, ensuring quick and easy access, which was created using Qualtrics XM for a mobile-friendly experience. Contacts from other countries were approached through LinkedIn, both as cold contacts and within relevant groups. The data collection period lasted three weeks. The survey questions are listed in Appendix 2, and the complete responses are detailed in Appendix 4.

The results provide insights into regional perspectives on how people view and act regarding the factors relevant to the research question. The survey aims to outline the key characteristics of the Latin American region.

The results of the survey are analysed in different steps to ensure comprehensive and insightful findings. First, a descriptive analysis summarizes the basic characteristics of the data, including frequencies and percentages related to demographics, purchasing and renting behaviours, and attitudes toward sustainability. Next, a comparative analysis identifies significant patterns and differences among various demographic segments, such as age groups, countries, and lifestyles, understanding the correlation of the variables to foresee behaviours of the potential users.

4.5.1 Demographics

In terms of the demographic participation the results are summarized in the Table 1.

A total of 94 complete survey responses were received, with a mayor participation of Uruguay (88%), with some representation from other Latin American countries such as Brazil, Colombia, Costa Rica, Chile and Mexico.

In terms of age distribution, most respondents are between 26 and 45 (80%), indicating a concentration in the working-age population. This age range typically represents individuals with higher purchasing power.

Finally, the household's distribution shows that 2-4 members is the predominant segment (80%), which suggests a common family size or shared living arrangements. Smaller and larger households are less common but still present.

Block I: Demographics	

1.1 Country of residence	
Uruguay	83
Brasil	3
Colombia	3
Costa Rica	2
Chile	2
Mexico	1

1.2. Age range	
less than 25	6
26 - 35	35
36 - 45	40
more than 46	13

1.3. Number of people in your household	
1	11
2 - 4	75
5 or more	8

Table 2 – survey results block I (Data collected from author's survey, 2024)

4.5.2   Behaviour towards purchasing

Results from block II questions related to how respondents behave towards purchasing decisions are shown in Table 3.

Most of the respondents (85%) of respondents define themselves with a moderate to high capacity to make non-essential purchases, indicating financial stability and disposable income. All respondents (100%) define themselves as decision-makers in their household purchases, suggesting a high level of autonomy of the participants in buying decisions. The predominant lifestyle among respondents is pragmatic (63%) prioritizing functionality and practicality, while aesthetics and trendiness are the most important factors when acquiring new furniture (97%).

When it comes to purchasing new furniture, respondents are primarily motivated by new needs (39%) and upgrades (34%), with a higher expectancy of having their furniture to last: between 5 to 10 years (54%), and over 10 years (30%). Online platforms are the most preferred for discovering new furniture, however physical stores and shopping malls remain the favourite for purchasing, highlighting the relevance of a tangible shopping experience.

Block II: Behavior towards purchasing	

2.1. How would you describe your ability to access non-essential purchases?	
Limited	6
Moderate	47
High	33
Very high	8

2.2. Are you or one of the decision-makers in your household for purchases?	
Yes	82
No	0
In some cases	12

2.3. Which best describes your current lifestyle?	
Fast-paced (Prioritize convenience and efficiency)	13
Pragmatic (Prioritize functionality and practicality)	59
Traditional (Prefer classic and timeless)	14
Trendy (Prefer staying up-to-date with the latest trends)	8

2.4. What generally motivates you to acquire new furniture?	
New need (e.g., a crib for a newborn)	37
Replacement (e.g., current item broke)	24
Upgrade (e.g., want to replace with something modern or more functional)	32
Other (please specify)	1

2.5. What are the most relevant factors you consider when acquiring new furniture?	
Aesthetics and trendiness	91
Functionality and future use	2
Quality and durability	1
Price	0

2.6. On average, how long do you expect a piece of furniture to remain in good condition before replacing it?	
Less than 2 years	0
2 - 5 years	15
5 - 10 years	51
+10 years	28

2.7. Where is your preferred place to discover new furniture options? (ranking)	
Online	1,7
Stores and shopping malls	2,5

Social media (Pinterest, Hometalk, Instagram, ...)	2,5
Friends' recommendations	3,3

2.8. Where do you prefer to purchase furniture? (ranking)	
Online	2,1
Stores and shopping malls	1,8
Carpentry (custom-made furniture)	2,6
Furniture auctions	3,5
Other (please specify)	4,9

Table 4 – survey results block II (Data collected from author's survey, 2024)

4.5.3   Behaviour towards renting

The results from block III questions related to how respondents behave towards renting are shown in Table 5.

30% of the participants are not willing to try a furniture subscription service instead of buying, while the rest are open to or could consider it (27% "Yes" / 43% "Maybe").

Among those open to the idea (70%), flexibility and lowering costs were the most valued aspects of the service, and the categories most considered for renting include living room furniture (22%), outdoor furniture (21%), dining room and office furniture (17% each), and children's and baby furniture (14%).

For those who were not interested in renting (30%), long-term commitment and fear of high prices ranked respectively in the first and second position as primary discouragements. When offered an alternative option of buying furniture with a return policy of 50% within two years, 43% remain not interested in renting, while 18% said "Yes and the rest (39%) said "Maybe".

Finally, and for the total of the participants, 72% reported never renting any personal items for more than one month, while 13% had rented cars, only 1% rented furniture, and the rest rented other products such as clothing (6%), technology (3%), tools (3%) or others (2%).

Block III: Behavior towards renting	
3.1. Would you try a furniture subscription service instead of buying?	
Yes	25
Maybe	41
No	28

 ------ If answer is "Yes" or "Maybe":

3.1.1 What would you value most in the service? (rank from highest to lowest)	
Flexibility (changes, lifestyle, ...)	1,7
Lower cost	1,9
Trying new products with short-term commitment	2,4
Other (please specify)	4,0

3.1.2 If you were to subscribe, select all categories you would consider renting.	
Living room furniture	51
Bedroom furniture	22
Dining room furniture	40
Office furniture	40
Outdoor furniture	49
Children's and baby furniture	33
Other (please specify)	2

------ If answer is "No":

3.1.3 What discourages you the most? (rank from highest to lowest)	
Long-term commitment	1,0
Fear of high prices	2,0
I want to own my things	2,9
Buying is simpler	3,9
Other (please specify)	4,9

3.1.4 If instead of renting, you could buy a piece of furniture and return it within 2 years for 50% of the purchase price, would you try it now?	
Yes	5
Maybe	11
No	12

3.2. Have you rented any of these personal items for more than 1 month? (chose the options that apply)	
Never rented	76
Furniture	1
Car	14
Tools	3
Technology (appliances or electronics)	3
Clothing	6
Other (please specify)	2

Table 6 – survey results block III (Data collected from author's survey, 2024)

4.5.4   Behaviour towards sustainability

The results from block III questions related to how respondents behave towards sustainability in purchasing decisions are shown in Table 7.

A combined 57% of respondents consider sustainability as somewhat relevant (42%) or very important (15%) in their purchasing decisions, while 30% do not prioritize it much, and 13% never consider it.

Among those who value sustainability ("Very important" or "Somewhat relevant"), the most popular actions to promote sustainable options include buying quality products, buying less, and buying products with sustainable certifications. While these 3 actions were ranked in average as the position 2.2, renting instead of buying was the least preferred option ranked in average in position 3.6.

Regarding the perception of durability in furniture marketed as "sustainable", most of the participants (70%) indicate they wouldn't know if it is more durable than conventional furniture.

Priorities towards sustainability aspects when buying furniture was fairly distributed, being environmental impact ranked as the most relevant (39%), followed by economic sustainability (35%), and social responsibility (26%).

Block IV: Behavior towards sustainability	
4.1. Is sustainability relevant in your purchasing decision?	
Never consider it	13
Not much	22
Somewhat relevant	42
Very important	15

------ If answer is "Very important" or "Somewhat relevant":

4.1.1 What would you do to promote sustainable options? (rank from highest to lowest)	
Buy less	2,2
Buy quality (even if more expensive)	1,9
Buy products with sustainable certifications	2,3
Rent instead of buying	3,6
Other (please specify)	5,0

4.2. Do you believe furniture marketed as "sustainable" is more durable compared to conventional furniture?	
Probably not	18
Not sure	0
Probably yes	11
I wouldn't know	64

4.3. What aspect of sustainability do you prioritize most when buying furniture?	
Environmental impact	46
Social responsibility (e.g., fair wages)	31
Economic sustainability (e.g., supporting small local businesses)	41

Table 8 – survey results block IV (Data collected from author's survey, 2024)

4.5.5 Insights of the demand

Interest in FaaS

Using K-means clustering, respondents were divided into two distinct groups based on their willingness to adopt Furniture-as-a-Service (FaaS) by answering "Yes" or "Maybe". The majority (70%) were classified as "renters," indicating an openness to FaaS driven by a preference for flexibility and cost reduction. Conversely, the remaining 30% were classified as "buyers" (answered "No"), expressing a reluctance to try FaaS mainly due to concerns about long-term commitment and high prices.

Renters group shows a higher interest among younger respondents, with 76% of those under 35 expressing willingness to rent, compared to 70% of those aged 36 and above. In terms of lifestyle, the fast-paced segment, which prioritizes convenience and efficiency, has a higher propensity to rent (17%) compared to those who prefer ownership (7%).

Furniture Longevity and Replacement

Buyers expect furniture to last over 10 years (50%), while renters expect shorter lifespans (only 21% expect 10+ years).

Renters are driven by the need for replacements or upgrades (67%), while buyers focus on new needs (54%).

Purchasing Preferences

Aesthetics and trendiness are overwhelmingly the single most relevant factor (97%), regardless of the preference for renting or buying.

Online channels are preferred for discovering furniture, while physical stores are favored for actual purchases. Carpentry is a popular choice for custom pieces.

Sustainability Considerations

Sustainability is important for the majority, with quality products seen as the most sustainable option to have in mind while purchasing, followed by buying less and buying products with sustainable certifications.

Renting needs better communication of its sustainable benefits, as it is currently perceived as the least sustainable option.

Cost Perception

Cost is a critical factor with ambiguous perceptions, being both a motivator for trying FaaS and a discourager for rejecting it. This indicates a need for clear pricing structures and value propositions in FaaS offerings.

Preferred Furniture Categories for FaaS

Living room and outdoor furniture are the top categories (77% and 74% respectively), with dining room and office furniture also significant (66%). Bedroom furniture is less preferred (33%).

4.6   Enablers and blockers of the model

4.6.1   Stakeholders

Manufacturers / sellers

Involving manufacturers as sellers is crucial in this business model. On the enabling side, the model offers the opportunity to add a new income source in a new channel by rentals and repairs. Having furniture designed by a freelance community, allow manufacturers to focus on production of with clear instructions and blueprints of standardized models, while providing trendy designs. Moreover, the ability to refurbish products multiple times provides opportunity to increase workload and income.

However, several blocking aspects must be considered. Renting instead of selling requires different financing structure, with initial lower profits compared to outright sales. The refurbishing process requires additional resources, labour, and logistics, that the manufacturer might not be efficient at.

Freelance designer community

The freelance designer community plays a pivotal role in driving innovation and standardization. Freelance designers bring fresh, diverse ideas that improve product appeal and differentiation. Utilizing a community of freelancers allows the company to scale design resources under a clear framework of circularity principles.

Despite these benefits, there are challenges associated to the control of the product models released by the freelancers, that must be reviewed by automatic and manual controls to ensure quality and circularity framework.

Consumers

Consumers are the core of the business model. The business model offers significant enabling aspects for consumers. It provides flexibility, allowing them to rent and return furniture as needed, which is particularly appealing to those with transient lifestyles or limited budgets. Renting high-quality furniture can be more affordable in the short term compared to purchasing. Additionally, environmentally conscious consumers are attracted to the sustainable aspects of the circular economy model.

However, there are also blocking aspects. Some consumers have a strong preference for ownership over renting, which could limit market adoption. Ensuring consumers trust the quality and hygiene of refurbished furniture is crucial for acceptance. Educating consumers about the benefits of renting versus owning can also be resource intensive.

4.6.2   Regulations

Regulations play a significant role in shaping the operational landscape of this business model. Supportive policies, including government incentives and policies that foster sustainable business practices, can accelerate the adoption. Environmental regulations can contribute as well to drive businesses toward circular models.

Although navigating complex regulations usually increases operational costs, being this business model based on a sustainable model should provide a competitive advantage in the market.

Delays in implementing environmental regulations specific to the industry, particularly in Latin America, may hinder this business model's ability to compete effectively against traditional furniture retailers.

4.6.3   Logistics

Logistics are a critical component of the business model due to the nature of furniture rental. Since products are standardized, in a stabilization of the offer and demand of the business

model, furniture pieces are to be provided by locally, therefore, logistics involved are mainly last mile.

Being last mile logistics for bulky items, manufacturers themselves can include the delivery in their scope. Nonetheless, there is an opportunity of working with last mile delivery companies with logistics management and technology to improve transportation and returns, reducing costs and improving efficiency.

However, the complexity of furniture logistics involves handling large, irregularly shaped items that often require multiple people for delivery, increasing costs. Furthermore, in a renting model, returns in short terms can have a high impact in cost due to the relation of the shipping and renting period income.

4.6.4   Scalability

Decentralized manufacturing network

As other e-commerce marketplaces, this business model is profitable only when reaching enough scale due to the income structure based on transactional fees. Chapter 374.3.4 backs up why scalability is crucial for the success of the business model.

From the seller's perspective, a decentralized manufacturing network provides flexibility, allowing for scalable production and repair that can quickly adapt to changes in demand. Having a critical mass of manufacturers selling in the marketplace ensures a stable offer capacity. Local production reduces transportation costs and environmental impact, aligning with sustainability goals.

However, developing this network of decentralized sellers requires high commercial efforts, that is traduced into costs and time. Furthermore, managing a decentralized network requires effective coordination and communication, which can be challenging. Ensuring consistent quality across multiple manufacturing sites is also difficult and resource-intensive, potentially hindering scalability.

Technology

Technology plays a vital role in enabling scalability. AI-driven tools enhance customer experience and streamline operations, making the model more efficient and scalable.

Leveraging data analytics helps predict demand, personalize customer experiences, improve design models among many other improvements.

Despite these advantages, implementing advanced technology can be expensive in a development stage.

5 Conclusions

5.1 Conclusions and discussions

Business models are a means to drive change, particularly when effectively utilized, as they can become powerful agents of change in addressing the challenges we face due to climate change. The central question posed in this research is: How can a sustainable business model provide access to high-quality furniture in Latin America? To answer this, the research focused on identifying the key impacts in furniture production and commercialization, understanding what the major industry players are doing, and then developing a theoretical business model based on the canvas model, which was ultimately compared with market demand through a survey.

From an environmental perspective, the primary impact of the furniture industry is tied to manufacturing. Under a fast furniture business model, this leads to significant waste issues. Using high-quality materials and sustainably sourced wood is crucial, but the critical factor lies in the design, which determines the furniture's lifespan. Maximizing product lifespan is essential to minimizing environmental impacts from both production and waste generation.

The business model analyzed is a circular servitization model, offering furniture in a subscription model. This model addresses the climate impact challenges associated with overproduction and waste generation, as its intrinsic goal is to maximize the rental duration and lifespan of each piece of furniture. While examples like Martela exist, the research found that this model is not widely replicated within the industry. There were no cases of direct-to-consumer furniture rentals, and companies like IKEA are only taking small steps to explore the rental market. In Latin America, there are no Faas (Furniture as a Service) options, and companies like Mercado Libre have not ventured into this area nor plan to.

It is important to consider several relevant factors when implementing a model like the one presented, as there are no clear specific regulations within the region that support this type of model. Additionally, given the nature of the region's infrastructure and the fact that furniture is bulky, there may be logistical challenges associated with such a business model.

On the demand side, there is significant openness to trying furniture subscription services. The vast majority are motivated by aesthetics and trendiness when looking to replace furniture. Categories such as living room, dining room, office, and outdoor furniture are the most favored for rental. Since these types of furniture don't necessarily need to be custom-made, there are opportunities to standardize offerings and create a catalog that caters to a market with a high frequency of replacements.

There appears to be a potential contradiction between a market of users open to trying Faas and a market of manufacturers focused on producing and selling under a fast furniture model. The economic factor may determine whether there is room for a Faas model or not. Additionally, the current industry directs all its resources towards production and commercialization within the prevailing fast furniture model. This creates an expanding market built on an infrastructure that lowers industry costs and raises barriers for alternative business models. Pricing strategy is a critical aspect of the business, though it was not the focus of this study. Although no converging information was obtained during interviews, Martela indicated that its rental pricing is determined by a mix of product and financial costs, and the margin is based on market elasticity. This suggests they operate with a comfortable margin in a niche market with limited competition.

In conclusion, a subscription-based business model for furniture in Latin America is an effective way to significantly mitigate the environmental impact currently generated by the industry. The viability of the business is tied to logistical and economic feasibility factors that could determine its sustainable development and have to be further explored.

5.2 Limitations of the analysis

Some of the limitations in the analysis, include the sample size constraints, regional representation, and that economic feasibility is not part of the scope of this research.

The demand analysis is limited by the small sample size and regional representation, as most respondents were from a single country. While this analysis can provide insights into market trends, these limitations should be considered when interpreting the results.

A comprehensive assessment of the viability of a potential Furniture-as-a-Service (FaaS) business model requires an examination of the economic and financial aspects that were not covered in this study. It is also essential to analyze market pricing and compare it with potential rental prices to explore different viability scenarios from both supply and demand perspectives, while considering cost structure.

Although this research considered global and regional regulatory frameworks, it did not include a detailed study of regulations for each country within the region. Such an analysis would be necessary to understand how existing regulations might support or hinder the proposed business model.

Additionally, the survey's self-reported nature introduces limitations. Respondents may be hesitant to disclose certain behaviors which can impact the accuracy of the data collected. (Rubenfeld, 2004)

5.3   Future research

To determine whether a FaaS business model is viable in Latin America, it is crucial to consider the feasibility of all key stakeholders. Future research could consider the supply side, investigating the interest of businesses willing to manufacture products to be marketed under a FaaS model.

On another aspect, Latin America is a region with low population density, and generally, compared to other regions like Europe or the United States, its geography is not easy for logistics purposes. Future research could consider this factor to assess and analyze which cities or regions are feasible for this model, given that the products will inherently require multiple logistics.

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Appendix 1: LCA comparison

In this case study the analysis made was comparing a desk made from MDP of 15 mm thickness (desk A), to the same one made from of Eucalyptus clear of 2" (50,8 mm) thickness (desk B). Results show that Global Warming Potential (GWP) (excluding biogenic carbon) measured in kg of CO_2 eq. of desk A is 33,1 while for desk B is 141,8. Case B (traditional furniture shows a rate of 4,3 times higher than desk B.

However, these values consider 1 year of use. To have a comparable basis it is assumed that desk A is meant to last between 1-4 years depending on the conditions that is used, mainly because of its materials, and its lack of repairability. Desk B, with a correct design may last over 40 years. This means that (in the most conservative scenario) solving the need of a desk would mean that in a period of 40 years, 1 desk of option B would replace 10 desks of option A. This results that GWP in 40 years for desk A is 331,3 kg of CO_2 eq. while for desk B it is 141,8 kg of CO_2 eq. - 2,3 times lower than desk A.

Figure 9 – GWP for desk A and desk B in 1 year
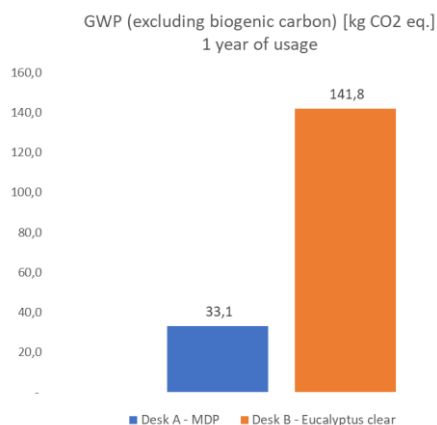
Figure 10 – GWP for desk A and desk B in 40 years
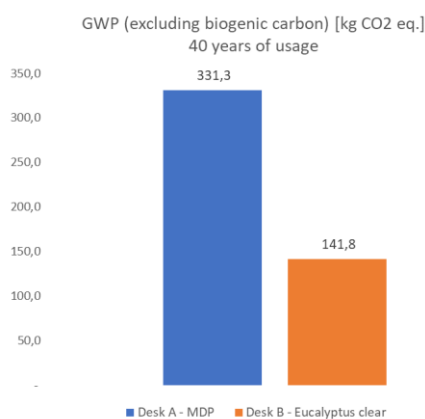
Appendix 2: Survey questions

1. **Block I: Demographics**
   1.1. Country of residence (chose one option of the list)
   1.2. Age range (chose one option)

   - less than 25
   - 26 - 35
   - 36 - 45
   - more than 46

   1.3. Number of people in your household (chose one)

   - 1
   - 2 - 4
   - 5 or more

2. **Block II: Behavior towards purchasing**
   2.1. How would you describe your ability to access non-essential purchases? (chose one)

   - Limited
   - Moderate
   - High
   - Very high

   2.2. Are you or one of the decision-makers in your household for purchases? (chose one)

   - Yes
   - No
   - In some cases

   2.3. Which best describes your current lifestyle? (chose one)

   - Fast-paced (Prioritize convenience and efficiency)
   - Pragmatic (Prioritize functionality and practicality)
   - Traditional (Prefer classic and timeless)
   - Trendy (Prefer staying up-to-date with the latest trends)

   2.4. What generally motivates you to acquire new furniture? (chose one)

   - New need (e.g., a crib for a newborn)
   - Replacement (e.g., current item broke)
   - Upgrade (e.g., want to replace with something modern or more functional)
   - Other (please specify)

   2.5. What are the most relevant factors you consider when acquiring new furniture?
        (chose one)

   - Aesthetics and trendiness
   - Functionality and future use
   - Quality and durability
   - Price

   2.6. On average, how long do you expect a piece of furniture to remain in good condition
        before replacing it? (chose one)

- Less than 2 years
- 2 - 5 years
- 5 - 10 years
- +10 years

2.7. Where is your preferred place to discover new furniture options? (rank from high to low)

- Online
- Stores and shopping malls
- Social media (Pinterest, Hometalk, Instagram, ...)
- Friends' recommendations

2.8. Where do you prefer to purchase furniture? (rank from high to low)

- Online
- Stores and shopping malls
- Carpentry (custom-made furniture)
- Furniture auctions
- Other (please specify)

3. **Block III: Behavior towards renting**

Instead of buying furniture, imagine you can rent it for as long as you like. At any time, you have the flexibility to change it or end the subscription by returning it or purchasing it (paying only the difference between the subscription and full price).

3.1. Would you try a furniture subscription service instead of buying? (chose one)

- Yes
- Maybe
- No

If answer is "Yes" or "Maybe":

3.2. What would you value most in the service? (rank from high to low)

- Flexibility (changes, lifestyle, ...)
- Lower cost
- Trying new products with short-term commitment
- Other (please specify)

3.3. If you were to subscribe, select all categories you would consider. (chose one)

- Living room furniture
- Bedroom furniture
- Dining room furniture
- Office furniture
- Outdoor furniture
- Children's and baby furniture
- Other (please specify)

If answer is "No":

3.4. What discourages you the most? (rank from high to low)

- Long-term commitment
- Fear of high prices
- I want to own my things
- Buying is simpler
- Other (please specify)

3.5. If instead of renting, you could buy a piece of furniture and return it within 2 years for 50% of the purchase price, would you try it now? (chose one)

- Yes
- Maybe
- No

3.6. Have you rented any of these personal items for more than 1 month? (chose the options that apply)

- Never rented
- Furniture
- Car
- Tools
- Technology (appliances or electronics)
- Clothing
- Other (please specify)

4. **Block IV: Behavior towards sustainability**
   4.1. Is sustainability relevant in your purchasing decision? (chose one)

   - Never consider it
   - Not much
   - Somewhat relevant
   - Very important

If answer is "Very important" or "Somewhat relevant":

4.2. What would you do to promote sustainable options? (rank from high to low)

- Buy less
- Buy quality (even if more expensive)
- Buy products with sustainable certifications
- Rent instead of buying
- Other (please specify)

4.3. Do you believe furniture marketed as "sustainable" is more durable compared to conventional furniture? (chose one)

- Probably not
- Not sure
- Probably yes
- I wouldn't know

4.4. What aspect of sustainability do you prioritize when buying furniture? (chose one)

- Environmental impact
- Social responsibility (e.g., fair wages)
- Economic sustainability (e.g., supporting small local businesses)

Appendix 3: Interview questions

1. Business Practices

   - How is sustainability integrated into your company's purpose and strategy?
   - Can you describe specific sustainability initiatives or actions your company has undertaken?

2. Circular Economy and Design

   - How do you approach to know and measure the average lifespan of your products?
   - How does your company approach product design to enhance durability and promote circularity?
   - What type of circular economy practices have you tried to implement within your product life cycle?

3. Quality and Durability

   - How does the company ensure a production of high-quality and durable furniture?
   - How do you communicate durability and longevity of your products to consumers?
   - What is your organization's approach towards balancing quality with price competitiveness?

4. Subscription Model for Furniture

   - Has your company considered a subscription model for furniture? If so, how was it implemented, or why has it been discarded?
   - How did your organization define its pricing strategy for the subscription model?
   - What challenges or successes did you find with the subscription model?

5. Consumer Insights

   - How true is that consumers' decisions are primarily based on price? Does lifespan and sustainability affect their purchase decisions?
   - How do you see the consumer's approach to a subscription model?

6. Supply Chain Sustainability

   - How does your company ensure sustainability throughout the supply chain?
   - Do you have processes or certifications that ensure sustainable sources of supply for your most relevant products?

7. Challenges and Lessons Learned

   - What challenges have you faced in measuring sustainable-related kpi's?
   - What key lessons have you learned from your sustainability journey?

8. Future Strategies

   - What future strategies is your company considering to further advance sustainability in the furniture sector?

How do you envision the role of a sustainable and profitable subscription model evolving in?

Appendix 4: Survey results

Block I: Demographics

#	1.1 I - Country of residence	1.2 I - Age range	1.3 I - Number of people in your household
1	Uruguay	36 - 45	2 - 4
2	Uruguay	26 - 35	2 - 4
3	Uruguay	more than 46	1
4	Uruguay	26 - 35	2 - 4
5	Uruguay	36 - 45	2 - 4
6	Uruguay	26 - 35	1
7	Uruguay	more than 46	2 - 4
8	Uruguay	26 - 35	2 - 4
9	Uruguay	26 - 35	2 - 4
10	Uruguay	26 - 35	1
11	Uruguay	36 - 45	5 or more
12	Uruguay	26 - 35	5 or more
13	Uruguay	36 - 45	5 or more
14	Uruguay	26 - 35	2 - 4
15	Uruguay	more than 46	2 - 4
16	Uruguay	more than 46	2 - 4
17	Uruguay	26 - 35	2 - 4
18	Uruguay	26 - 35	2 - 4
19	Uruguay	26 - 35	2 - 4
20	Uruguay	more than 46	2 - 4
21	Uruguay	more than 46	2 - 4
22	Uruguay	more than 46	2 - 4
23	Uruguay	36 - 45	2 - 4
24	Uruguay	36 - 45	2 - 4
25	Uruguay	36 - 45	2 - 4
26	Uruguay	26 - 35	2 - 4
27	Uruguay	less than 25	2 - 4
28	Uruguay	36 - 45	2 - 4
29	Uruguay	less than 25	2 - 4
30	Uruguay	26 - 30	1
31	Uruguay	26 - 35	1
32	Uruguay	26 - 35	2 - 4
33	Uruguay	36 - 45	2 - 4
34	Uruguay	less than 25	2 - 4
35	Uruguay	36 - 45	2 - 4
36	Uruguay	36 - 45	2 - 4
37	Uruguay	26 - 35	2 - 4
38	Uruguay	26 - 35	2 - 4
39	Uruguay	more than 46	2 - 4
40	Uruguay	more than 46	2 - 4
41	Uruguay	26 - 35	2 - 4
42	Uruguay	26 - 35	2 - 4
43	Uruguay	36 - 45	2 - 4
44	Uruguay	36 - 45	2 - 4
45	Uruguay	36 - 45	2 - 4
46	Uruguay	36 - 45	2 - 4
47	Uruguay	26 - 35	2 - 4
48	Uruguay	more than 46	2 - 4
49	Uruguay	26 - 35	1
50	Uruguay	36 - 45	5 or more
51	Uruguay	36 - 45	5 or more
52	Uruguay	36 - 45	2 - 4
53	Uruguay	36 - 45	2 - 4
54	Uruguay	36 - 45	2 - 4
55	Uruguay	less than 25	2 - 4
56	Uruguay	26 - 35	1
57	Uruguay	36 - 45	2 - 4
58	Uruguay	36 - 45	2 - 4
59	Uruguay	26 - 35	2 - 4
60	Uruguay	26 - 35	2 - 4
61	Uruguay	more than 46	2 - 4
62	Uruguay	26 - 35	2 - 4
63	Uruguay	36 - 45	2 - 4
64	Uruguay	26 - 35	1
65	Uruguay	36 - 45	5 or more
66	Uruguay	26 - 35	2 - 4
67	Uruguay	36 - 45	1
68	Uruguay	36 - 45	2 - 4
69	Uruguay	26 - 35	2 - 4
70	Uruguay	36 - 45	2 - 4
71	Uruguay	36 - 45	2 - 4
72	Uruguay	26 - 35	1
73	Uruguay	36 - 45	2 - 4
74	Uruguay	36 - 45	5 or more
75	Uruguay	26 - 35	5 or more
76	Uruguay	36 - 45	2 - 4
77	Uruguay	26 - 35	1
78	Uruguay	less than 25	2 - 4
79	Uruguay	36 - 45	2 - 4
80	Uruguay	36 - 45	2 - 4
81	Uruguay	more than 46	2 - 4
82	Uruguay	36 - 45	2 - 4
83	Uruguay	less than 25	2 - 4
84	Mexico	36 - 45	2 - 4
85	Costa Rica	36 - 45	2 - 4
86	Costa Rica	more than 46	2 - 4
87	Colombia	36 - 45	2 - 4
88	Colombia	36 - 45	2 - 4
89	Colombia	36 - 45	2 - 4
90	Chile	26 - 35	2 - 4
91	Chile	36 - 45	2 - 4
92	Brasil	26 - 35	2 - 4
93	Brasil	26 - 35	2 - 4
94	Brasil	26 - 35	2 - 4

Block II: Behavior towards purchasing

#	2.1 — II - How would you describe your ability to access non-essential purchases?	2.2 — II - Are you or one of the decision-makers in your household for purchases?	2.3 — II - Which best describes your current lifestyle?	2.4 — II - What generally motivates you to acquire new furniture?	2.5 — II - What are the most relevant factors you consider when acquiring new furniture?	2.6 — II - On average, how long do you expect a piece of furniture to remain in good condition before replacing it?
1	High	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
2	High	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	2 - 5 years
3	High	Yes	Traditional (Prefer classic and timeless)	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
4	High	In some cases	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	+10 years
5	High	Yes	Fast-paced (Prioritize convenience and effi…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
6	High	Yes	Fast-paced (Prioritize convenience and effi…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	2 - 5 years
7	High	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
8	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
9	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
10	High	Yes	Fast-paced (Prioritize convenience and effi…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
11	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
12	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
13	High	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
14	High	In some cases	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
15	High	Yes	Fast-paced (Prioritize convenience and effi…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
16	High	Yes	Traditional (Prefer classic and timeless)	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
17	High	Yes	Fast-paced (Prioritize convenience and effi…	Replacement (e.g., current item broke)	Aesthetics and trendiness	2 - 5 years
18	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
19	High	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
20	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	2 - 5 years
21	High	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
22	High	Yes	Traditional (Prefer classic and timeless)	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
23	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
24	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
25	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
26	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
27	High	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
28	High	Yes	Traditional (Prefer classic and timeless)	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
29	Limited	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
30	Limited	Yes	Trendy (Prefer staying up-to-date with the l…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
31	Limited	Yes	Fast-paced (Prioritize convenience and effi…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
32	Limited	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
33	Limited	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
34	Limited	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
35	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
36	Moderate	In some cases	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
37	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
38	Moderate	Yes	Traditional (Prefer classic and timeless)	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
39	Moderate	In some cases	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
40	Moderate	In some cases	Traditional (Prefer classic and timeless)	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
41	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
42	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
43	Moderate	In some cases	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	+10 years
44	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	2 - 5 years
45	Moderate	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
46	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
47	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
48	Moderate	Yes	Traditional (Prefer classic and timeless)	Other (please specify)	Aesthetics and trendiness	+10 years
49	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
50	Moderate	Yes	Traditional (Prefer classic and timeless)	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
51	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
52	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
53	Moderate	Yes	Fast-paced (Prioritize convenience and effi…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
54	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	+10 years
55	Moderate	Yes	Traditional (Prefer classic and timeless)	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	2 - 5 years
56	Moderate	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
57	Moderate	Yes	Traditional (Prefer classic and timeless)	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
58	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
59	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
60	Moderate	Yes	Fast-paced (Prioritize convenience and effi…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
61	Moderate	In some cases	Fast-paced (Prioritize convenience and effi…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
62	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
63	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	2 - 5 years
64	Moderate	Yes	Traditional (Prefer classic and timeless)	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
65	Moderate	Yes	Fast-paced (Prioritize convenience and effi…	Replacement (e.g., current item broke)	Aesthetics and trendiness	2 - 5 years
66	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	2 - 5 years
67	Moderate	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
68	Moderate	In some cases	Traditional (Prefer classic and timeless)	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
69	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
70	Moderate	In some cases	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
71	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
72	Moderate	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
73	Moderate	Yes	Fast-paced (Prioritize convenience and effi…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	+10 years
74	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
75	Moderate	In some cases	Traditional (Prefer classic and timeless)	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
76	Very high	Yes	Trendy (Prefer staying up-to-date with the l…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	2 - 5 years
77	Very high	Yes	Fast-paced (Prioritize convenience and effi…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	2 - 5 years
78	Very high	Yes	Fast-paced (Prioritize convenience and effi…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	2 - 5 years
79	Very high	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	+10 years
80	Very high	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
81	Very high	Yes	Traditional (Prefer classic and timeless)	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
82	Very high	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
83	Very high	In some cases	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
84	High	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
85	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
86	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	2 - 5 years
87	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	5 - 10 years
88	High	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	+10 years
89	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Replacement (e.g., current item broke)	Aesthetics and trendiness	5 - 10 years
90	High	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Aesthetics and trendiness	+10 years
91	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Aesthetics and trendiness	5 - 10 years
92	High	In some cases	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Functionality and future use	2 - 5 years
93	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	Upgrade (e.g., want to replace with someth…	Quality and durability	+10 years
94	Moderate	Yes	Pragmatic (Prioritize functionality and prac…	New need (e.g., a crib for a newborn)	Functionality and future use	2 - 5 years

#	2.7.1 II - 1. Where is your preferred place to discover new furniture options? - Online	2.7.2 II - 2. Where is your preferred place to discover new furniture options? - Stores and shopping malls	2.7.3 II - 3. Where is your preferred place to discover new furniture options? - Social media (Pinterest, Hometalk, Instagram, …)	2.7.4 II - 4. Where is your preferred place to discover new furniture options? - Friends' recommendations
1	1	2	4	3
2	1	4	2	3
3	1	2	3	4
4	3	2	4	1
5	1	4	3	2
6	2	3	1	4
7	1	2	3	4
8	1	3	2	4
9	3	4	1	2
10	3	4	1	2
11	2	3	1	4
12	2	3	4	1
13	1	2	3	4
14	1	3	4	2
15	2	1	3	4
16	2	1	3	4
17	1	3	4	2
18	1	3	2	4
19	2	1	3	4
20	3	1	4	2
21	1	2	4	3
22	1	4	2	3
23	3	1	4	2
24	4	2	1	3
25	1	3	2	4
26	1	2	4	3
27	1	4	3	2
28	2	3	1	4
29	1	2	4	3
30	2	4	3	1
31	1	2	3	4
32	1	2	3	4
33	3	2	1	4
34	1	3	2	4
35	1	2	3	4
36	3	1	2	4
37	1	2	3	4
38	2	4	1	3
39	1	2	3	4
40	4	1	2	3
41	1	2	4	3
42	1	4	3	2
43	2	3	4	1
44	2	3	1	4
45	2	4	1	3
46	4	2	1	3
47	3	2	1	4
48	1	3	2	4
49	1	3	4	2
50	1	3	2	4
51	1	2	3	4
52	1	2	4	3
53	1	2	3	4
54	3	4	1	2
55	1	2	3	4
56	1	2	3	4
57	1	3	4	2
58	1	3	2	4
59	1	2	4	3
60	3	4	1	2
61	4	1	2	3
62	1	2	4	3
63	2	3	1	4
64	1	3	2	4
65	1	2	4	3
66	1	2	4	3
67	1	2	3	4
68	4	2	1	3
69	1	2	3	4
70	1	2	4	3
71	1	3	2	4
72	2	3	1	4
73	3	2	1	4
74	2	3	1	4
75	3	1	2	4
76	3	2	1	4
77	1	3	2	4
78	2	3	1	4
79	1	2	3	4
80	1	4	2	3
81	1	3	2	4
82	2	1	3	4
83	2	4	1	3
84	1	2	3	4
85	1	2	3	4
86	3	1	4	2
87	4	2	3	1
88	2	3	1	4
89	1	2	3	4
90	3	2	4	1
91	1	2	3	4
92	1	3	2	4
93	1	2	3	4
94	1	2	3	4

#	2.8.1 II - 1. Where do you prefer to purchase furniture? - Online	2.8.2 II - 2. Where do you prefer to purchase furniture? - Stores and shopping malls	2.8.3 II - 3. Where do you prefer to purchase furniture? - Carpentry (custom-made furniture)	2.8.4 II - 4. Where do you prefer to purchase furniture? - Furniture auctions	2.8.5 II - 5. Where do you prefer to purchase furniture? - Other (please specify)	2.8.6 II - 5. Where do you prefer to purchase furniture? - Other (text)
1	4	2	1	3	5	
2	1	2	4	5	3	
3	1	2	3	4	5	
4	3	2	1	4	5	
5	4	3	2	1	5	
6	2	3	1	4	5	
7	4	1	2	3	5	
8	4	3	1	2	5	
9	1	3	2	4	5	
10	1	4	3	2	5	
11	3	4	2	1	5	
12	2	3	4	1	5	
13	1	2	3	4	5	
14	2	1	3	4	5	
15	2	1	3	4	5	
16	3	2	1	4	5	
17	1	2	3	4	5	
18	1	2	3	4	5	
19	3	1	2	4	5	
20	2	1	3	4	5	
21	4	1	2	3	5	
22	3	1	2	4	5	
23	3	1	2	4	5	
24	4	1	2	3	5	
25	1	2	3	4	5	
26	3	1	2	4	5	
27	1	2	3	4	5	
28	3	1	2	4	5	
29	2	1	3	5	4	
30	2	3	1	4	5	
31	1	2	3	4	5	
32	2	3	4	1	5	
33	3	1	2	4	5	
34	2	3	1	4	5	
35	4	3	1	2	5	
36	4	1	2	3	5	
37	1	2	3	4	5	
38	2	1	3	4	5	
39	1	2	3	4	5	
40	3	1	4	2	5	
41	2	1	4	3	5	
42	1	5	2	3	4	Used from someone known
43	4	3	2	1	5	
44	1	2	3	4	5	
45	1	3	2	4	5	
46	2	1	3	4	5	
47	1	2	4	3	5	Mercadolibre
48	1	2	4	3	5	
49	1	2	3	4	5	
50	3	4	2	1	5	
51	2	1	3	4	5	
52	2	1	3	4	5	
53	1	2	3	4	5	
54	2	1	3	4	5	
55	4	1	2	3	5	
56	3	1	2	4	5	
57	2	1	3	4	5	
58	1	4	2	3	5	
59	1	2	3	4	5	
60	2	1	3	4	5	
61	3	2	1	4	5	
62	1	2	3	4	5	Sodimac
63	1	2	3	4	5	
64	1	3	2	4	5	
65	1	2	3	4	5	
66	1	2	3	4	5	
67	2	1	3	4	5	
68	4	1	3	2	5	
69	1	2	3	4	5	
70	1	2	3	5	4	
71	4	2	3	1	5	
72	2	1	3	4	5	
73	3	1	2	4	5	
74	3	2	1	4	5	
75	3	2	1	4	5	
76	2	1	3	4	5	
77	1	2	3	4	5	
78	2	1	3	4	5	
79	1	2	3	4	5	
80	3	1	2	4	5	
81	1	2	3	4	5	
82	3	1	2	4	5	
83	1	2	4	3	5	
84	1	2	3	4	5	
85	1	2	3	4	5	
86	3	1	2	4	5	
87	4	1	2	3	5	
88	3	1	2	4	5	
89	2	1	3	4	5	
90	4	1	2	3	5	
91	3	1	2	4	5	
92	1	2	4	3	5	
93	1	2	3	4	5	
94	1	2	3	4	5	

Block III: Behavior towards renting

#	3.1 III - Would you try a furniture subscription service instead of buying?	3.2.1 III - 1. What would you value most in the service? - Flexibility (changes, lifestyle, …)	3.2.2 III - 2. What would you value most in the service? - Lower cost	3.2.3 III - 3. What would you value most in the service? - Trying new products with short-term commitment	3.2.4 III - 4. What would you value most in the service? - Other	3.2.5 III - 4. What would you value most in the service? - Other (Text)
1	Yes	3	4	1	2	Sustainability
2	Maybe	2	1	3	4	
3	No					
4	Maybe	3	2	1	4	
5	Yes	1	2	3	4	
6	Yes	2	1	3	4	
7	No					
8	No					
9	Maybe	2	3	1	4	
10	Maybe	2	1	3	4	
11	Maybe	1	3	2	4	
12	Maybe	2	1	3	4	
13	Maybe	1	2	3	4	
14	Yes	1	2	3	4	
15	Maybe	2	3	1	4	
16	Yes	1	2	3	4	
17	Yes	3	2	1	4	
18	Maybe	3	2	1	4	
19	No					
20	No					
21	Maybe	2	1	3	4	
22	Yes	1	3	2	4	
23	No					
24	No					
25	No					
26	Maybe	3	1	2	4	
27	Maybe	2	1	3	4	
28	No					
29	Maybe	1	3	2	4	
30	No					
31	Maybe	1	2	3	4	
32	No					
33	No					
34	Yes	3	2	1	4	
35	No					
36	Maybe	2	1	3	4	
37	No					
38	Yes	1	2	3	4	
39	No					
40	Maybe	2	3	1	4	
41	Yes	2	1	3	4	
42	Yes	1	2	3	4	
43	No					
44	Maybe	2	1	3	4	
45	Maybe	1	3	2	4	
46	No					
47	Maybe	2	1	3	4	Reliability
48	No					
49	No					
50	Maybe	2	3	1	4	
51	No					
52	Maybe	2	1	3	4	
53	Yes	1	2	3	4	
54	Maybe	3	1	2	4	
55	Yes	1	3	2	4	
56	Yes	1	2	3	4	
57	Maybe	3	1	2	4	
58	Maybe	3	1	2	4	
59	Yes	1	3	2	4	
60	Maybe	2	1	3	4	
61	Maybe	1	3	2	4	
62	Yes	3	1	2	4	f
63	No					
64	Maybe	2	1	3	4	
65	Yes	2	1	3	4	
66	Maybe	2	1	3	4	
67	No					
68	Maybe	2	1	3	4	
69	Yes	1	2	3	4	
70	Maybe	2	1	3	4	
71	Maybe	3	2	1	4	
72	Maybe	1	3	2	4	
73	Yes	2	3	1	4	
74	Yes	1	3	2	4	
75	No					
76	Yes	3	1	2	4	
77	No					
78	No					
79	No					
80	Yes	1	2	3	4	
81	Maybe	1	3	2	4	
82	Maybe	1	2	3	4	
83	Yes	1	2	3	4	
84	Yes	1	3	2	4	
85	Maybe	1	2	3	4	
86	Yes	2	1	3	4	
87	Maybe	2	1	3	4	
88	Maybe	2	3	1	4	
89	No					
90	No					
91	Maybe	3	1	2	4	
92	Maybe	1	2	3	4	
93	Maybe	1	2	3	4	
94	Maybe	1	2	3	4	

#	3.3.1 III - If you were to subscribe, select all categories you would consider renting. - Living room furniture	3.3.2 III - If you were to subscribe, select all categories you would consider renting. - Bedroom furniture	3.3.3 III - If you were to subscribe, select all categories you would consider renting. - Dining room furniture	3.3.4 III - If you were to subscribe, select all categories you would consider renting. - Office furniture	3.3.5 III - If you were to subscribe, select all categories you would consider renting. - Outdoor furniture	3.3.6 III - If you were to subscribe, select all categories you would consider renting. - Children's and baby furniture	3.3.7 III - If you were to subscribe, select all categories you would consider renting. - Other
1	1	0	1	1	0	1	0
2	0	0	0	0	0	1	0
3	0	0	0	0	0	0	0
4	1	0	1	1	1	1	0
5	1	0	1	1	1	1	0
6	1	1	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	1	0	1	1	1	1	0
10	1	0	0	1	1	0	0
11	0	0	0	1	1	0	0
12	1	1	1	1	1	1	0
13	1	0	0	0	0	1	0
14	1	1	1	1	1	1	0
15	1	0	1	0	1	0	0
16	1	1	1	1	1	1	0
17	1	1	1	1	1	0	0
18	0	1	0	1	1	1	0
19	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
21	1	0	1	0	1	0	0
22	1	0	1	0	1	0	0
23	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0
26	1	0	0	0	1	1	0
27	1	0	0	1	1	0	0
28	0	0	0	0	0	0	0
29	0	0	1	1	1	0	0
30	0	0	0	0	0	0	0
31	1	0	0	0	1	0	0
32	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0
34	1	1	1	1	1	0	0
35	0	0	0	0	0	0	0
36	1	0	1	1	1	0	0
37	0	0	0	0	0	0	0
38	1	1	1	1	1	1	0
39	0	0	0	0	0	0	0
40	1	0	0	1	1	1	0
41	1	0	1	0	0	0	1
42	0	0	1	1	1	1	1
43	0	0	0	0	0	0	0
44	1	1	1	0	0	1	0
45	1	0	1	1	1	1	0
46	0	0	0	0	0	0	0
47	0	0	1	1	1	1	0
48	0	0	0	0	0	0	0
49	0	0	1	1	1	0	0
50	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0
52	1	1	1	0	0	1	0
53	0	1	0	0	0	1	0
54	1	0	0	0	0	0	0
55	1	0	1	0	0	0	0
56	1	1	1	1	1	0	0
57	1	0	0	1	1	0	0
58	1	0	0	0	1	1	0
59	1	0	1	1	1	0	0
60	1	1	1	1	1	0	0
61	0	0	0	0	1	1	0
62	1	0	0	0	0	0	0
63	0	0	0	0	0	0	0
64	1	0	1	0	1	1	0
65	0	1	1	0	0	0	0
66	1	0	1	1	0	1	0
67	0	0	0	0	0	0	0
68	1	0	1	1	1	1	0
69	1	0	1	1	1	0	0
70	1	1	0	1	0	1	0
71	0	0	0	1	1	1	0
72	1	1	1	1	1	0	0
73	0	1	0	1	1	0	0
74	1	0	1	1	1	1	0
75	0	0	0	0	0	0	0
76	1	1	1	1	1	1	0
77	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0
79	0	0	0	0	0	0	0
80	1	0	1	1	1	0	0
81	1	0	0	0	1	0	0
82	0	0	0	1	1	1	0
83	1	0	1	0	1	1	1
84	1	1	1	1	1	1	0
85	1	0	1	0	1	0	0
86	0	0	0	1	1	0	0
87	1	1	1	0	1	1	0
88	0	0	0	1	1	0	0
89	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0
91	1	1	0	0	0	0	0
92	1	1	1	1	1	0	0
93	1	0	0	0	0	0	0
94	1	0	0	0	0	0	0

#	3.4.1 III - What discourages you the most? - Long-term commitment	3.4.2 III - What discourages you the most? - Fear of high prices	3.4.3 III - What discourages you the most? - I want to own my things	3.4.4 III - What discourages you the most? - Buying is simpler	3.4.5 III - What discourages you the most? - Other	3.4.6 III - What discourages you the most? - Other (text)
1						
2						
3	1	2	3	4	5	
4						
5						
6						
7	1	2	3	4	5	
8	1	2	3	4	5	
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19	1	2	3	4	5	Forming a bond with a piece of furnitur
20	1	2	3	4	5	
21						
22						
23	1	2	3	4	5	
24	1	2	3	4	5	
25	1	2	3	4	5	
26						
27						
28	1	2	3	4	5	
29						
30	1	2	3	4	5	
31						
32	1	2	3	4	5	
33	1	2	3	4	5	
34						
35	1	2	3	4	5	
36						
37	1	2	3	4	5	
38						
39	1	2	3	4	5	
40						
41						
42						
43	1	2	3	4	5	Problems with return due to damages
44						
45						
46	1	2	3	4	5	
47						
48	1	2	3	4	5	
49	1	2	3	4	5	
50						
51	1	2	3	4	5	
52						
53						
54						
55						
56						
57						
58						
59						
60						
61						
62						
63	1	2	3	4	5	
64						
65						
66						
67	1	2	3	4	5	
68						
69						
70						
71						
72						
73						
74						
75	1	2	3	4	5	
76						
77	1	2	3	4	5	
78	1	2	3	4	5	
79	1	2	3	4	5	Would it be used by someone else befo
80						
81						
82						
83						
84						
85						
86						
87						
88	1	1	1	1	1	
89	1	2	3	4	5	
90	1	2	3	4	5	
91						
92						
93						
94						

#	3.5 III - If instead of renting, you could buy a piece of furniture and return it within 2 years for 50% of the purchase price, would you try it now?	3.6.1 III - Have you rented any of these personal items for more than 1 month? - Never rented	3.6.2 III - Have you rented any of these personal items for more than 1 month? - Furniture	3.6.3 III - Have you rented any of these personal items for more than 1 month? - Car	3.6.4 III - Have you rented any of these personal items for more than 1 month? - Tools	3.6.5 III - Have you rented any of these personal items for more than 1 month? - Technology (appliances or electronics)	3.6.6 III - Have you rented any of these personal items for more than 1 month? - Clothing	3.6.7 III - Have you rented any of these personal items for more than 1 month? - Other
1		1	0	0	0	0	0	0
2		1	0	0	0	0	0	0
3	Maybe	1	0	0	0	0	0	0
4		0	0	0	0	0	1	0
5		0	0	1	1	0	0	0
6		0	0	0	0	0	1	0
7	No	0	0	1	0	0	0	0
8	Maybe	1	0	0	0	0	0	0
9		1	0	0	0	0	0	0
10		1	0	0	0	0	0	0
11		1	0	0	0	0	0	0
12		1	0	0	0	0	0	0
13		0	0	1	0	0	0	0
14		1	0	0	0	0	0	0
15		0	0	1	0	1	0	0
16		0	1	0	0	0	0	0
17		1	0	0	0	0	0	0
18		1	0	0	0	0	0	0
19	Maybe	1	0	0	0	0	0	0
20	Maybe	0	0	1	0	1	0	0
21		0	0	1	0	0	0	0
22		1	0	0	0	0	0	0
23	Maybe	1	0	0	0	0	0	0
24	No	1	0	0	0	0	0	0
25	Maybe	1	0	0	0	0	0	0
26		1	0	0	0	0	0	0
27		1	0	0	0	0	0	0
28	No	1	0	0	0	0	0	0
29		1	0	0	0	0	0	0
30	Maybe	1	0	0	0	0	0	0
31		1	0	0	0	0	0	0
32	No	1	0	0	0	0	0	0
33	Yes	1	0	0	0	0	0	0
34		1	0	0	0	0	0	0
35	No	1	0	0	0	0	0	0
36		1	0	0	0	0	0	0
37	No	1	0	0	0	0	0	0
38		0	0	0	0	0	0	1
39	Maybe	1	0	0	0	0	0	0
40		1	0	0	0	0	0	0
41		1	0	0	0	0	0	0
42		0	0	1	0	0	1	0
43	No	1	0	0	0	0	0	0
44		1	0	0	0	0	0	0
45		0	0	1	0	0	0	0
46	Yes	1	0	0	0	0	0	0
47		0	0	1	0	0	0	0
48	Maybe	0	0	1	0	0	0	0
49	No	1	0	0	0	0	0	0
50		1	0	0	0	0	0	0
51	Maybe	0	0	1	0	0	1	0
52		1	0	0	0	0	0	0
53		1	0	0	0	0	0	0
54		1	0	0	0	0	0	0
55		1	0	0	0	0	0	0
56		0	0	1	0	0	0	1
57		1	0	0	0	0	0	0
58		1	0	0	0	0	0	0
59		1	0	0	0	0	0	0
60		1	0	0	0	0	0	0
61		1	0	0	0	0	0	0
62		1	0	0	0	0	0	0
63	Yes	1	0	0	0	0	0	0
64		1	0	0	0	0	0	0
65		1	0	0	0	0	0	0
66		1	0	0	0	0	0	0
67	Maybe	1	0	0	0	0	0	0
68		1	0	0	0	0	0	0
69		1	0	0	0	0	0	0
70		1	0	0	0	0	0	0
71		1	0	0	0	0	0	0
72		1	0	0	0	0	0	0
73		0	0	1	1	0	1	0
74		1	0	0	0	0	0	0
75	No	1	0	0	0	0	0	0
76		1	0	0	0	0	0	0
77	Yes	1	0	0	0	0	0	0
78	No	1	0	0	0	0	0	0
79	No	1	0	0	0	0	0	0
80		1	0	0	0	0	0	0
81		1	0	0	0	0	0	0
82		1	0	0	0	0	0	0
83		1	0	0	0	0	1	0
84		1	0	0	1	0	0	0
85		1	0	0	0	0	0	0
86		1	0	0	0	0	0	0
87		1	0	0	0	0	0	0
88		0	0	1	1	1	0	0
89	Yes	1	0	0	0	0	0	0
90	No	1	0	0	0	0	0	0
91		1	0	0	0	0	0	0
92		1	0	0	0	0	0	0
93		1	0	0	0	0	0	0
94		1	0	0	0	0	0	0

Block IV: Behavior towards sustainability

#	4.1 IV - Is sustainability relevant in your purchasing decision?	4.2.1 IV - What would you do to promote sustainable options? (rank from highest to lowest) - Buy less	4.2.2 IV - What would you do to promote sustainable options? (rank from highest to lowest) - Buy quality (even if more expensive)	4.2.3 IV - What would you do to promote sustainable options? (rank from highest to lowest) - Buy products with sustainable certifications	4.2.4 IV - What would you do to promote sustainable options? (rank from highest to lowest) - Rent instead of buying	4.2.5 IV - What would you do to promote sustainable options? (rank from highest to lowest) - Other (please specify)	4.2.6 IV - What would you do to promote sustainable options? (rank from highest to lowest) - 5. Where do you prefer to purchase furniture? - Other
1	Very important	1	2	5	3	4	
2	Not much						
3	Very important	1	2	3	4	5	
4	Somewhat relevant	3	2	1	4	5	
5	Never consider it						
6	Somewhat relevant	1	2	3	4	5	
7	Never consider it						
8	Somewhat relevant	1	2	4	3	5	
9	Somewhat relevant	3	1	2	4	5	
10	Somewhat relevant	2	1	3	4	5	
11	Somewhat relevant	4	2	1	3	5	
12	Not much						
13	Somewhat relevant	1	2	3	4	5	
14	Not much						
15	Somewhat relevant	4	3	1	2	5	
16	Somewhat relevant	4	1	2	3	5	
17	Not much						
18	Never consider it						
19	Somewhat relevant	2	1	3	4	5	
20	Somewhat relevant	3	1	2	4	5	
21	Somewhat relevant	4	2	1	3	5	
22	Somewhat relevant	3	2	1	4	5	
23	Somewhat relevant	2	1	4	3	5	
24	Not much						
25	Never consider it						
26	Somewhat relevant	2	1	3	4	5	
27	Somewhat relevant	3	2	1	4	5	
28	Somewhat relevant	1	2	3	4	5	
29	Not much						
30	Not much						
31	Not much						
32	Never consider it						
33	Somewhat relevant	3	1	2	4	5	
34	Somewhat relevant	1	3	4	2	5	
35	Somewhat relevant	3	2	1	4	5	
36	Not much						
37	Not much						
38	Somewhat relevant	4	1	2	3	5	
39	Very important	1	2	3	4	5	
40	Somewhat relevant	1	2	3	4	5	
41	Somewhat relevant	1	2	4	3	5	
42	Very important	1	3	5	2	4	
43	Very important	1	2	3	4	5	
44	Not much						
45	Somewhat relevant	4	2	1	3	5	
46	Very important	3	2	1	4	5	
47	Never consider it						
48	Somewhat relevant	2	3	1	4	5	
49	Somewhat relevant	3	1	2	4	5	
50	Very important	1	2	3	4	5	
51	Not much						
52	Somewhat relevant	3	1	2	4	5	
53	Somewhat relevant	1	2	3	4	5	
54	Not much						
55	Never consider it						
56	Never consider it						
57	Somewhat relevant	3	1	2	4	5	
58	Never consider it						
59	Never consider it						
60	Somewhat relevant	1	2	3	4	5	
61	Somewhat relevant	2	3	1	4	5	
62	Very important	3	1	2	4	5j	
63	Somewhat relevant	1	2	3	4	5	
64	Never consider it						
65	Very important	3	1	2	4	5	
66	Not much						
67	Not much						
68	Somewhat relevant	2	4	1	3	5	
69	Somewhat relevant	4	3	2	1	5	
70	Somewhat relevant	4	3	1	2	5	
71	Very important	1	4	2	3	5	
72	Somewhat relevant	2	3	1	4	5	
73	Somewhat relevant	2	3	1	4	5	
74	Not much						
75	Not much						
76	Not much						
77	Somewhat relevant	2	1	3	4	5	
78	Never consider it						
79	Somewhat relevant	3	1	2	4	5	
80	Not much						
81	Not much						
82	Not much						
83	Somewhat relevant	4	1	2	3	5	
84	Somewhat relevant	1	2	3	4	5	
85	Very important	1	2	3	4	5	
86	Very important	1	2	3	4	5	
87	Very important	2	1	3	4	5	
88	Very important	1	2	4	3	5	
89	Very important	2	3	1	4	5	
90	Not much						
91	Somewhat relevant	1	2	3	4	5	
92	Algo relevante	4	2	1	3	5	
93	Never consider it						
94							

#	4.3 IV - Do you believe furniture marketed as "sustainable" is more durable compared to conventional furniture?	4.4.1 IV - What aspect of sustainability do you prioritize most when buying furniture? - Environmental impact	4.4.2 IV - What aspect of sustainability do you prioritize most when buying furniture? - Social responsibility (e.g., fair wages)	4.4.3 IV - What aspect of sustainability do you prioritize most when buying furniture? - Economic sustainability (e.g., supporting small local businesses)
1	I wouldn't know	1	0	0
2	I wouldn't know	0	0	1
3	I wouldn't know	0	0	1
4	I wouldn't know	0	1	0
5	I wouldn't know	0	0	1
6	Probably yes	0	1	0
7	I wouldn't know	0	1	0
8	I wouldn't know	1	0	0
9	Probably not	1	0	0
10	Probably not	0	0	1
11	I wouldn't know	1	0	0
12	Probably not	0	0	1
13	Probably not	0	0	1
14	Probably yes	1	0	0
15	Probably not	0	0	0
16	I wouldn't know	1	0	0
17	I wouldn't know	0	1	1
18	I wouldn't know	0	1	0
19	I wouldn't know	1	0	1
20	Probably yes	0	0	1
21	I wouldn't know	0	0	1
22	I wouldn't know	1	0	0
23	I wouldn't know	1	0	0
24	Probably not	0	0	1
25	I wouldn't know	0	0	1
26	I wouldn't know	0	1	0
27	I wouldn't know	1	0	0
28	I wouldn't know	0	0	1
29	I wouldn't know	0	1	0
30	I wouldn't know	0	1	0
31	I wouldn't know	0	1	0
32	Probably not	1	0	0
33	I wouldn't know	1	1	1
34	I wouldn't know	1	1	1
35	I wouldn't know	0	0	1
36	I wouldn't know	1	0	0
37	Probably not	0	1	0
38	I wouldn't know	1	0	0
39	I wouldn't know	0	1	0
40	Probably not	1	0	0
41	Probably yes	1	0	1
42	I wouldn't know	1	0	0
43	Probably not	1	0	0
44	I wouldn't know	0	1	0
45	I wouldn't know	1	0	0
46	I wouldn't know	1	0	0
47	I wouldn't know	0	0	1
48	I wouldn't know	1	1	0
49	Probably not	1	0	0
50	I wouldn't know	1	1	1
51	Probably not	1	0	0
52	I wouldn't know	0	1	0
53	I wouldn't know	1	0	0
54	Probably yes	0	0	1
55	I wouldn't know	0	0	1
56	I wouldn't know	1	0	0
57	I wouldn't know	1	0	1
58	I wouldn't know	0	1	0
59	I wouldn't know	0	0	1
60	I wouldn't know	0	0	1
61	Probably yes	0	0	1
62	I wouldn't know	1	1	1
63	I wouldn't know	0	0	1
64	Probably not	0	1	0
65	I wouldn't know	0	1	1
66	I wouldn't know	1	0	0
67	Probably yes	0	1	0
68	Probably yes	1	0	0
69	Probably yes	0	0	1
70	I wouldn't know	1	0	0
71	I wouldn't know	1	0	0
72	I wouldn't know	1	0	1
73	I wouldn't know	0	1	0
74	I wouldn't know	0	0	1
75	I wouldn't know	1	0	0
76	I wouldn't know	1	0	0
77	Probably not	1	0	1
78	I wouldn't know	0	1	0
79	I wouldn't know	1	1	1
80	Probably not	0	1	0
81	I wouldn't know	0	0	1
82	Probably not	0	1	1
83	Probably yes	1	0	0
84	I wouldn't know	0	0	1
85	I wouldn't know	1	0	1
86	Probably yes	1	1	1
87	I wouldn't know	0	0	1
88	I wouldn't know	1	1	1
89	I wouldn't know	1	0	0
90	Probably not	1	0	0
91	I wouldn't know	0	1	0
92	Probably not	1	1	1
93	I wouldn't know	1	0	0
94		0	0	0

Appendix 5. Thesis data management plan

THESIS DATA MANAGEMENT PLAN

1. Management and storage of research data

There is no commissioning company involved in this thesis, as the business model was developed by the author.

The survey data was collected through Qualtrics of Microsoft. Since no personal or identifiable data was requested or gathered privacy was ensured 100%. Respondents acknowledged that their answers would be used for research purposes.

The processed data has been securely backed up in the author's Google Drive, and no one else has access to this cloud storage.

2. Processing of personal data and sensitive data

For the semi-structured interviews, all information was disclosed with the interviewees' full awareness and consent. Each interviewee explicitly authorized the inclusion of their names, positions, and companies in this thesis.

3. Ownership of thesis data

All data and results from this thesis are owned solely by the author.

4. Further use of thesis data after the work is completed

The author is open to disclose the research data for further use. An agreement will be established with the relevant parties to ensure the data can be used for future research or projects.