mysharebox

A sharing home-goods service

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mysharebox
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Life is not a mechanical system, but rather a complex web of interconnected processes.

In the same way, service design is not about creating isolated products or services, but about creating an interconnected network of activities that create value for customers and society.

Capra, F. (2002). The hidden connections: A science for sustainable living.

TABLE OF CONTENT

TABLE OF CONTENT

03.

4.

5.

01.

01.

INTRODUCTION

Abstract [EN]

In recent times, continuous progress in the service industry has led technological innovation to pay more and more attention in regards to product and object sharing.
The adoption of Product Sharing Systems "PSS" is an interesting solution for educational institutions and university communities, which can improve the distribution of available resources and encourage a reduction in the ecological footprint through the sharing and reuse of consumer goods.

This thesis aims to undertake an investigation of the installation of a user-oriented service specialized in object leasing and designed specifically for the academic community of the University of Aveiro (UA).

To this end, the current state of the art will be initially exposed, after which a methodical approach involving a comprehensive holistic analysis of the contextual landscape will be used.

This study also focuses on the user experience component UX and UI during the development and service creation phases.

Sections of this paper will undertake an analysis of the key elements of the system aiming to explore the complex dynamics between users and the extensive interconnections present between the university and the student community.

In addition, the environmental benefits inherent in the successful implementation of such a system within the university landscape will be assessed.

The inherent scalability of the project provides an opportunity for this study to be able to pioneer and offer significant insights for the implementation of similar services in different educational institutions and communities in the future.

This transferability of knowledge and best practices has the potential to promote widespread adoption of sustainable and resource-efficient practices in academic and community settings. In the long term, the purpose of this study is to SERVE AS A CATALYST FOR GOOD CHANGE BY PROMOTING USER-CENTERED CONCEPTS AND SYSTEMS THINKING IN THE CONTEXT OF PRODUCT SHARING within educational institutions.

Keywords

Abstract [PT]

Nos últimos tempos, o progresso contínuo na indústria dos serviços levou a inovação tecnológica a prestar cada vez mais atenção à partilha de produtos e objectos.
A adoção de sistemas de Partilha de Produtos (PSS) é uma solução interessante para instituições de ensino e comunidades universitárias, que pode melhorar a distribuição dos recursos disponíveis e reduzir a pegada ecológica através da partilha e reutilização de bens de consumo.

Esta tese tem como objetivo levar a cabo uma investigação sobre a instalação de um serviço orientado para o utilizador, especializado no aluguer de objectos e concebido especificamente para a comunidade académica da Universidade de Aveiro (UA).

Para tal, será inicialmente exposto o estado atual da arte, seguindo-se uma abordagem metodológica que envolve uma análise holística abrangente da paisagem contextual.

Este estudo foca-se também nacomponente da experiência do utilizador UX e UI durante as fases de desenvolvimento e criação do serviço.

Nas secções deste documento, será efectuada uma análise dos elementos-chave do sistema, com o objetivo de explorar a dinâmica complexa entre os utilizadores e as extensas interligações existentes entre a universidade e a comunidade estudantil. Para além disso, serão avaliados os benefícios ambientais inerentes à implementação bem sucedida de um sistema deste tipo no panorama universitário.

A escalabilidade inerente ao projeto proporciona a oportunidade de este estudo ser pioneiro e oferecer perspectivas significativas para a implementação de serviços semelhantes em diferentes instituições e comunidades educativas no futuro.

Esta capaciadde de transferir conhecimentos e melhores práticas tem o potencial de promover a adoção generalizada de práticas sustentáveis e eficientes em termos de recursos em ambientes académicos e comunitários.

A longo prazo, o objetivo deste estudo é atuar como **CATALISADOR DE UMA BOA MUDANÇA, PROMOVENDO CONCEITOS CENTRADOS NO UTILIZADOR E O PENSAMENTO SISTÉMICO NO CONTEXTO DA PARTILHA DE PRODUTOS** nas instituições de ensino.

Keywords

Abstract [IT]

Negli ultimi tempi il continuo progresso nell'industria
dei servizi ha portato l'innovazione tecnologica a prestare sempre
più attenzione nei riguardi della condivisione di prodotti e oggetti.
L'adozione di sistemi di prodotti condivisi "PSS" rappresenta un'
interessante soluzione per le istituzioni educative e le comunità universitarie, che possono migliorare la distribuzione delle risorse disponibili e favorire una riduzione dell'impronta ecologica attraverso la condivisione e il riutilizzo dei beni di consumo.

Questa tesi vuole intraprende un'indagine sull'installazione di un servizio user oriented specializzato nel leasing di oggetti e progettato specificamente per la comunità accademica dell'Università di Aveiro (UA).
A tal fine, verrà inizialmente esposto lo stato dell'arte attuale, in seguito sarà utilizzato un approccio metodico che prevede un'analisi olistica completa del panorama contestuale. Questo studio si concentra inoltre sulla componente dell'esperienza utente UX e UI durante le fasi di sviluppo e di creazione del servizio.

Le sezioni di questo lavoro intraprenderanno un'analisi degli elementi chiave del sistema mirando a esplorare le complesse dinamiche tra gli utenti e le ampie interconnessioni presenti tra l'università e la comunità studentesca. Inoltre, verranno valutati i benefici ambientali inerenti al successo dell'implementazione di tale sistema all'interno del panorama universitario.

La scalabilità intrinseca del progetto offre l'opportunità a questa studio di poter essere pioniera e offrire spunti significativi per l'implementazione di servizi analoghi in diverse istituzioni e comunità educative in futuro.

Questa trasferibilità delle conoscenze e delle migliori pratiche ha il potenziale per promuovere l'adozione diffusa di pratiche sostenibili ed efficienti dal punto di vista delle risorse in contesti accademici e comunitari.

A lungo termine, lo scopo di questo studio è quello di fungere da **CATALIZZATORE PER UN BUON CAMBIAMENTO, PROMUOVENDO CONCETTI INCENTRATI SULL'UTENTE E IL PENSIERO SISTEMICO NEL CONTESTO DELLA CONDIVISIONE DEI PRODOTTI** all'interno delle istituzioni educative.

Keywords

Design del servizio
Sistema prodotto-servizio
Approccio sistemico
Esperienza utente
Usabilità
Progettare per la sostenibilità
Progettare per la comunità

List of abbreations

CBD - Community Based Design
DfS - Design for Sustainability
CE - Circular Economy
C2C - Cradle to Cradle
PSS - Product-Service System

References:
[1] www.ua.pt
[2] www.pordata.pt
[3] www.topuniversities.com

Student driven PSS

This thesis examines the potential implementation of a product sharing system (PSS) service at the University of Aveiro.

The fundamental motivations behind this research can be broken down into two categories.
First, the student population at the University of Aveiro has been steadily increasing, with an estimated annual growth rate of +2%, reaching approximately 16,000 students in 2022 [1]. Several factors contribute to this expansion:

1. The percentage of students enrolled in universities across the country is climbing, and Aveiro is recognized as one of the most dynamic districts in Portugal [2].

2. According to the QS World University Rankings, each year, Aveiro University improves its international standing. In 2023, UA jumped 166 spots, reaching rank 344. This was a huge improvement from the previous year [3].

It is essential to provide adequate infrastructure and services in order to meet the challenges posed by the rising student population. Because a PSS would permit student resource and service pooling, which would save costs and improve the quality of student life, it might be a workable alternative.
PSS is an emerging business model that is garnering global popularity. The University of Aveiro may be one of the first institutions in Portugal to implement a PSS. Since participation and sustainability are factors in determining how universities are ranked, this could improve those results.

This initiative could provide a variety of benefits to the student community, including:

01. INCREASING SUSTAINABILITY
Sharing products would reduce the demand for new production, thereby enhancing environmental sustainability. Less production results in fewer resources being squandered and less environmental damage.

02. BUILDING A NETWORK
The foundation of the entire initiative is the development of networks among the student community, which promotes a sense of responsibility and belonging. Students would have the chance to develop their leadership and organizational abilities as well as receive hands-on service management experience.

03. ENHANCING COLLABORATIVE LEARNING
Students' group work and collaborative learning can be enhanced by sharing resources, which is particularly advantageous in academic settings where collaboration is essential.

04. LIVING COST REDUCTION
Budgets for students can be considerably impacted by educational resources like tools and textbooks. By sharing these resources, it would be less expensive for students to have access to necessary commodities without having to pay full price for them.

05. EQUITABLE ACCESS TO RESOURCES
The leasing system can help close the wealth gap between students and foster a more welcoming learning environment. It can help alleviate the financial burden on students and make education more affordable and accessible.

06. STUDENT EMPOWERMENT
Having access to pooled resources could improve the overall university experience for students. Students would have access to tools and materials that could improve their schoolwork and assist with projects.

07. FOSTERING INVENTION
Sharing services can encourage student invention and teamwork.
Because the adoption and success of a product sharing service are heavily reliant on user perceptions and pleasure, user experience will be a key component of this analysis. As a result, a focus will be placed on the user interface assessment, the dedicated application's usability, and the capability to successfully meet user needs.
Last but not least, it gives us a chance to try a new way to lever university resources while encouraging new and environmentally friendly methods.

A PSS run by students can be especially helpful because it can help students feel like they are part of a community and encourage them to work together. It can also give them the tools they need to get goods and services in a fair, quick, and long-lasting way.

METHODOLOGY

This work started after my year studying at UA, during this time, I had the opportunity to notice students behaviors and needs, as well as the impact of their actions on the environment.

THE METHODOLOGICAL APPROACH INVOLVES A HOLISTIC ANALYSIS OF THE UNIVERSITY CONTEXT, WITH A FOCUS ON THE CIRCULAR ECONOMY, COMMUNITY DESIGN, USER EXPERIENCE (UX) AND THE ANALYSIS OF KEY ELEMENTS OF THE PRODUCT-SERVICE SYSTEM.

It will involve conducting user research to understand the needs and behaviors of the target audience, mapping out the service processes and developing solutions that align with sustainability principles. (Wolfson et al., 2015).

The expected results are the prototyping of a useful and innovative service for the student community, with the potential to promote the widespread adoption of sustainable and resource-efficient practices in academic and community settings.

For this project the **DOUBLE DIAMOND APPROACH** has been used to guide the service design process, which involves four key stages: discover, define, develop, and deliver.

During the **DISCOVER** stage, research will be conducted to gain a deep understanding of the W This will involve conducting interviews, surveys, and observations to gather insights and identify opportunities for sustainable practices (Wolfson et al., 2015).

During the **DEFINE** stage, the research findings will be

analyzed to identify key challenges and opportunities for sustainability. Based on the identified challenges and opportunities, design criteria and goals will be established (Rosen & Kishawy, 2012).

During the **DEVELOP** stage, the concept will be generated and evaluated to create solutions that address the identified challenges and align the user experience with sustainable principles. This solution will be prototyped and tested to ensure his effectiveness. Finally, during the **DELIVER** stage, the refined solution will be implemented and launched in the community (Ceschin & Gaziulusoy, 2019).
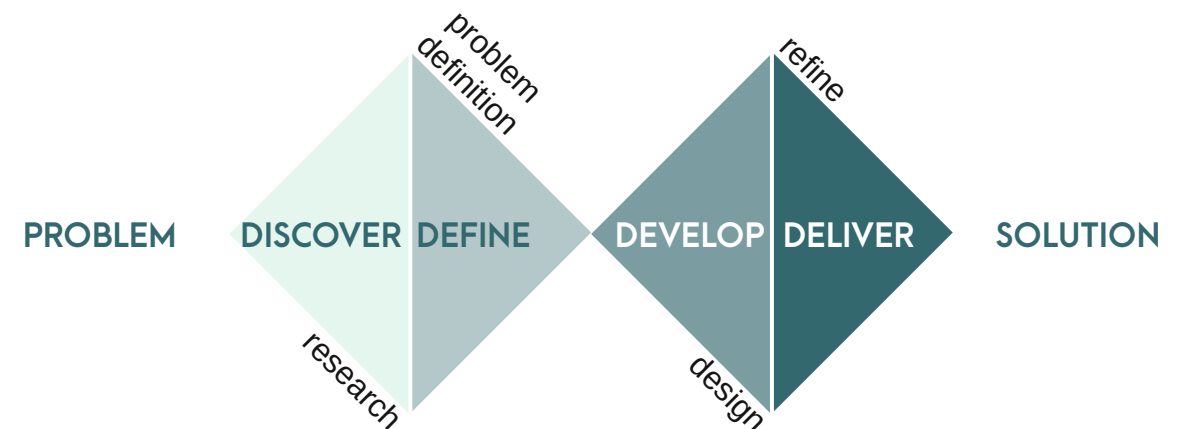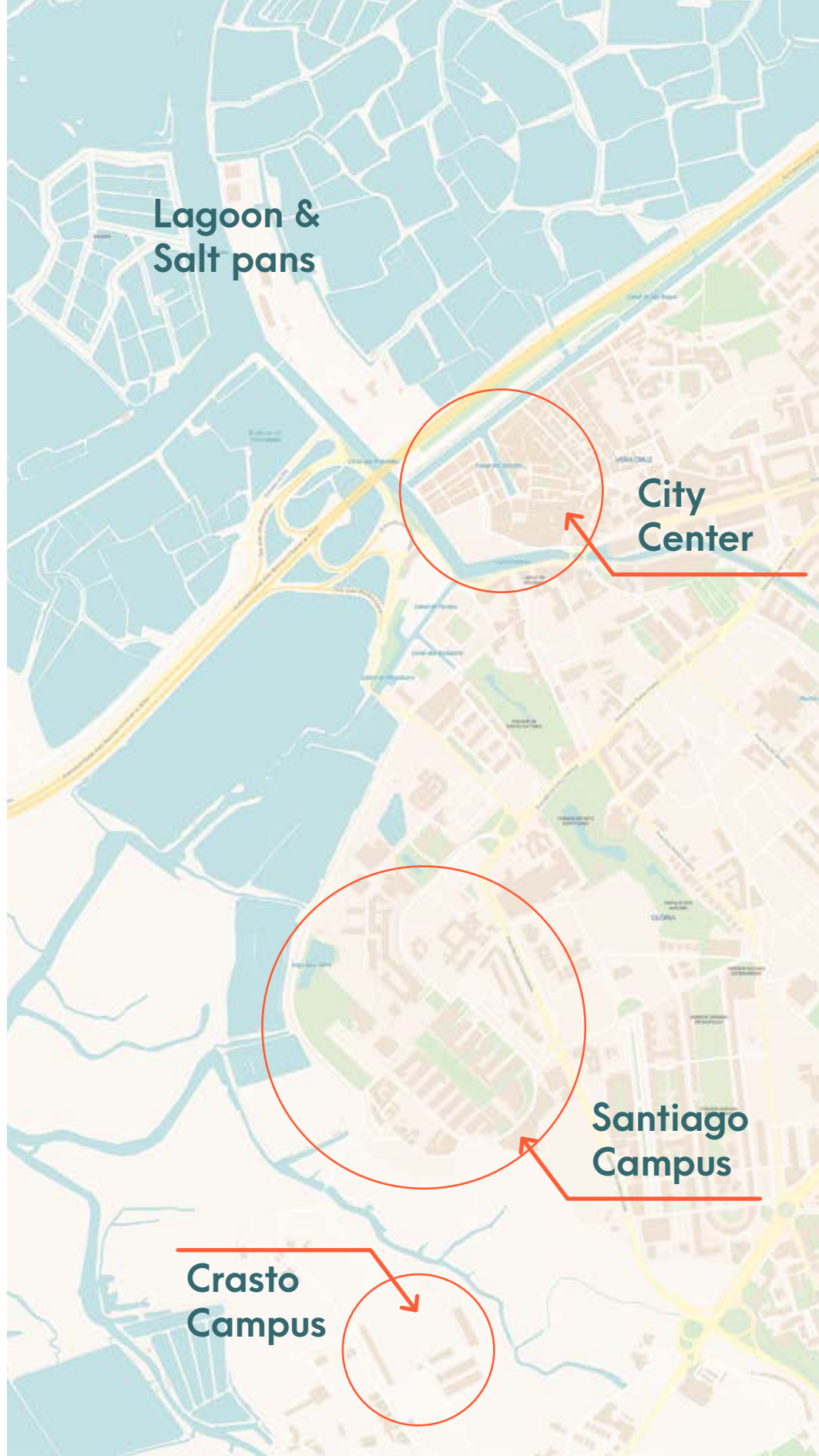

Figure: Double Diamond map

Figure:
City map
of Aveiro

Lagoon &
Salt pans

City
Center

Santiago
Campus

Crasto
Campus

Background – UA Aveiro

The University of Aveiro (UA) is a public university
in Aveiro, Portugal. It was founded on December
15, 1973 . It began with one electronics and
telecommunications course and 46 students [1].
Now, it's a leading university in Portugal[2].

The student body is over 15K, with 12% international
students from 90+ countries [1]. The university offers over
180 study tracks. These include 45 bachelor's degrees,
88 master's degrees, and 11 doctoral degrees [1].

The Santiago campus, the largest of the three university
hubs, is 150 hectares in size, hugging the Aveirense
Lagoon to the southwest of the city center. It offers
a wide range of academic programs as well as
numerous services, such as 20 school departments,
five libraries, one of which is open twenty-four hours
a day, seven school cafeterias and restaurants, sixteen
university residences housing more than a thousand
students and faculty members, one gymnasium,
and nine medical health centers [1].

With several student organizations, sports teams,
and a variety of cultural events including concerts,
festivals, and theatrical productions, the student
population on campus is quite active.

References:
[1] www.ua.pt
[2] www.pordata.pt

Project Goals

A product sharing system in universities can be an important asset for students, the university, and the environment.

By designing and implementing the system efficiently and sustainably, important goals can be achieved.

The main objectives are to:

+ CREATING A NEW SERVICE
Offer to the students of aveiro university a new service, the product sharing will use an online platform and a mobile application to make it more effective for students to use. The goal is to develop a good service and a good UX design to support the service.

+ AVOID PURCHASING ITEMS
Instead of each student or faculty member having their own collection of objects and equipment, a shared system where these items are made accessible for temporary usage can be built. This minimizes the need for them to be purchased, resulting in less resource extraction and manufacturing effects.
It also reduces the costs faced by students when buying materials, equipment, or other goods, thus helping to make college education more affordable.

+ CREATE A SENSE OF COMMUNITY
By promoting collaboration among the academic community, actively involving students in sharing products, and encouraging them to actively participate in the service.

+ CONTRIBUTE TO ENVIRONMENTAL SUSTAINABILITY
Through the integration of products and services, universities can optimize the use of resources and minimize the production of unnecessary materials. This can contribute to the reduction of environmental impact and promote a more sustainable approach to resource management. It can also facilitate circular planning, eenablingbetter management of resources.
This promotes a more circular economy approach, where resources are kept in use for as long as possible. The university can improve the efficiency of resource allocation, reduce energy consumption, and enhance the overall sustainability of their operations.

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02 STATE OF ART

The evolution of
Design for Sustainability (DfS)

In order to solve sustainability's issues, DfS has developed, drawing on a variety of design methodologies and ideas.
It began with an emphasis on the environment, driven by knowledge of the connections between ecological and social systems. After concentrating first on the environmental aspects of sustainability, the designers realized they also needed to decrease waste, cut down on resource usage, and lessen the harm that they were causing to ecosystems (Gaziulusoy & Ceschin, 2019).

The challenge of sustainability requires a shift from a product-centric to a system-level approach to design." F. Ceschin (2016)

But as time went on, the idea of sustainability grew beyond the confines of a simple environment, and DfS progressively broadened to incorporate a wider socio-technical viewpoint that acknowledged the links between social, economic, and technological variables (Bunker & Hawken, 1995)

The history shift The evolution of design approaches has been examined in a recent article by Ceschin and Gaziulusoy. The authors suggest an EVOLUTIONARY FRAMEWORK that classifies the different design approaches created in the last few decades in several levels of innovation, including ecodesign, product-service systems, systemic design, spatio-social systems, and socio-technical systems (Ceschin & Gaziulusoy, 2019).

They demonstrate how design has evolved over time from being primarily technical and product-focused to having a wider perspective.
The evolution of DfS reflects a shift towards understanding sustainability as a socio-technical challenge, where design plays a crucial role. The report also demonstrates how the scope of DfS has grown to include social system and structure design in addition to product design (Ceschin & Gaziulusoy, 2019).

Figure: Timeline of DfS methodologies approches by Ceschin & Gaziulusoy, 2019
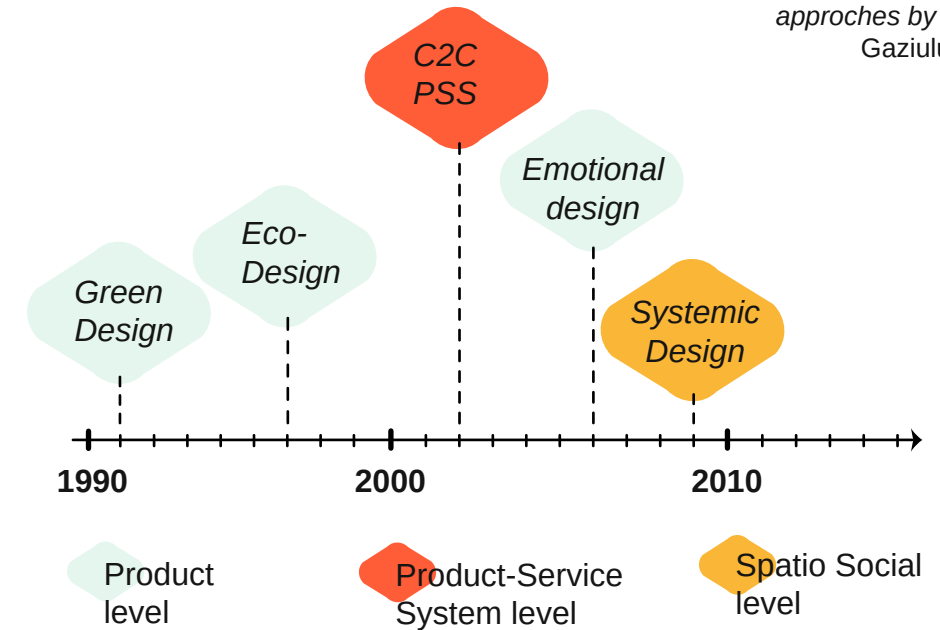
The emergence of DfS:
Green design and Eco-design

One of the earliest studies to highlight the responsibilities of industrial design in addressing environmental and social issues was PAPANEK'S book "DESIGN FOR THE REAL WORLD." This book laid the foundation for what would become the field of sustainable design.
This book laid the foundation for what would become the field of sustainable design. Papanek's work, along with other influential thinkers, such as Buckminster Fuller and Walter Stahel, paved the way for the emergence of DfS. DfS is an approach that aims to integrate ecological, social, and economic considerations into the design process. (Ceschin & Gaziulusoy, 2019).

To fully understand the key concepts of sustainable design, it is important to explore the different approaches that have emerged in the field.

Ceschin and Gaziulusoy identify and describe ten key approaches that reflect **THE SHIFT IN FOCUS FROM PRODUCT TO SYSTEMIC DESIGN BETWEEN 1990 AND 2015** (Ceschin & Gaziulusoy, 2019).

Green design In the early stages, sustainable design was often referred to as "green design," with a focus on minimizing the environmental impact of products. The 1970s and 1980s saw the development of the green design approach.

GREEN DESIGN focuses on minimizing the environmental impact of products by considering factors such as material selection, energy efficiency, and waste reduction. It also involves integrating life cycle assessment (LCA) and other sustainability metrics to evaluate the environmental impacts of a design throughout its lifecycle. This approach emphasizes the use of renewable materials and the implementation of environmentally friendly manufacturing processes (Ceschin & Gaziulusoy, 2019).

Fields of practice The practice of green design extends to various fields, including architecture, product design, industrial design, and urban planning. In architecture, green design principles are applied to create energy-efficient buildings, utilize sustainable materials, and incorporate passive design strategies. In product design, green design focuses on reducing material waste, improving product durability, and promoting recyclability (Grover et al., 2018).

Another approach is **ECO–DESIGN**, which builds upon Green Design but takes a more holistic approach by considering the entire life cycle of a product. (Ceschin & Gaziulusoy, 2019).

It takes into account the environmental impacts of the product from raw material extraction to disposal, and seeks to optimize resource efficiency and minimize waste throughout the lifecycle.

Figure: The Grow It Yourself Helmet designed by Diego Mata

Another approach is **DESIGN FOR EMOTIONAL DURABILITY AND BEHAVIOR CHANGE**, which recognizes the role of emotional attachment in promoting sustainable behaviors.
Design for Emotional Durability and Behavior Change seeks to create products that foster emotional attachment and encourage sustainable behaviors, such as reducing energy consumption or recycling (Ceschin & Gaziulusoy, 2019).
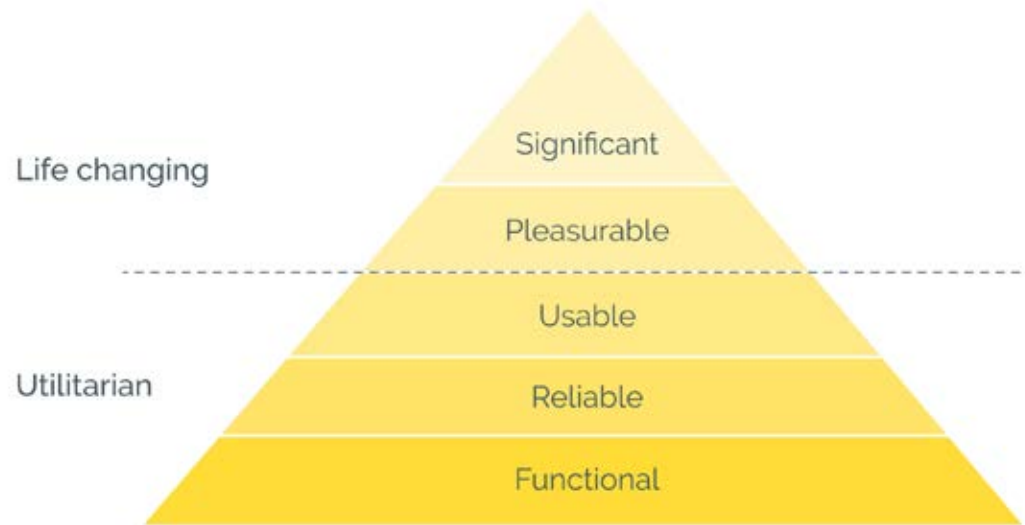

Figure: Emotional design The Hierarchy of Users Needs

Figure: Juicy Salif by Philippe Starck, 1988
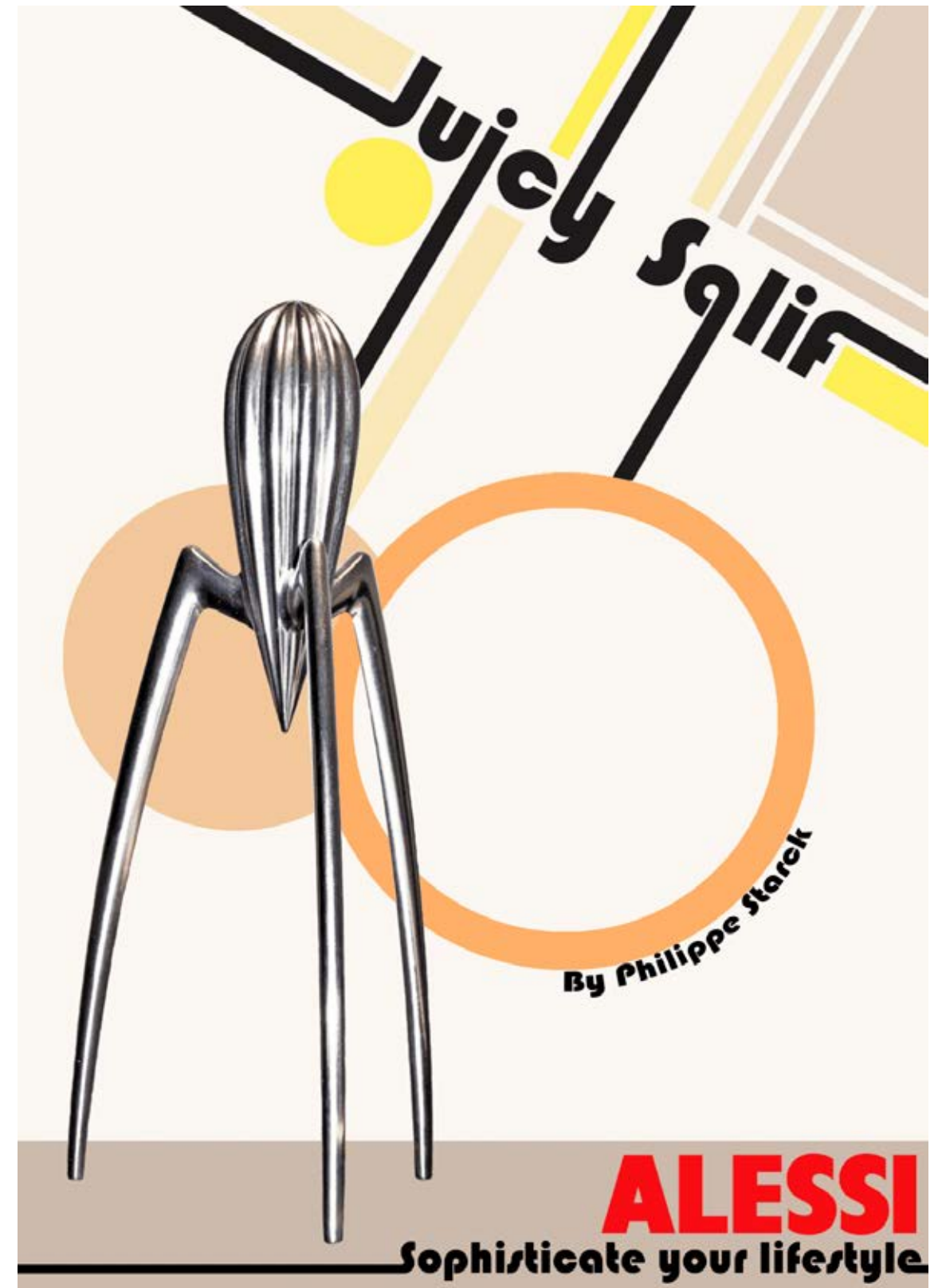
In the 1990s, the concept of "**SUSTAINABLE DESIGN**"
emerged, which encompassed a broader understanding
of sustainability and sought to **CREATE PRODUCTS
AND SERVICES THAT "MET THE NEEDS OF THE
PRESENT WITHOUT COMPROMISING THE ABILITY
OF FUTURE GENERATIONS TO MEET THEIR OWN
NEEDS"** (Brundtland, 1987).

Innovation
Capital Efficiency
Risk Management
Margin Improvement
Growth Enhancement
Total Shareholder Return

Economic
Growth

Resource Efficiency
Product Stewardshop
Life-cycle Management
Products to Services

Job Creation
Skills Enhancement
Local Economic Impacts
Social Investments
Business Ethics
Security

Socio-
Economic

Eco-
Efficiency

Sustainability

Clean Air, Water & Land
Emissions Reductions
Zero Waste, Releases & Spills
Biodiversity

Social
Progress

Socio-
Environ-
mental

Environmental
Stewardship

Diversity
Human Rights
Community Outreach
Indigenous Communities
Labour Relations

Safety & Health
Environmental Regulations
Global Climate Change
Access to Potable Water
Crisis Management
Environmental Justice

HUMAN
CAPITAL

*Figure: Four pillars
of sustainability by
Alberto Corbino e
Cornelia Hulla*

A brief introduction
to Circular Economy

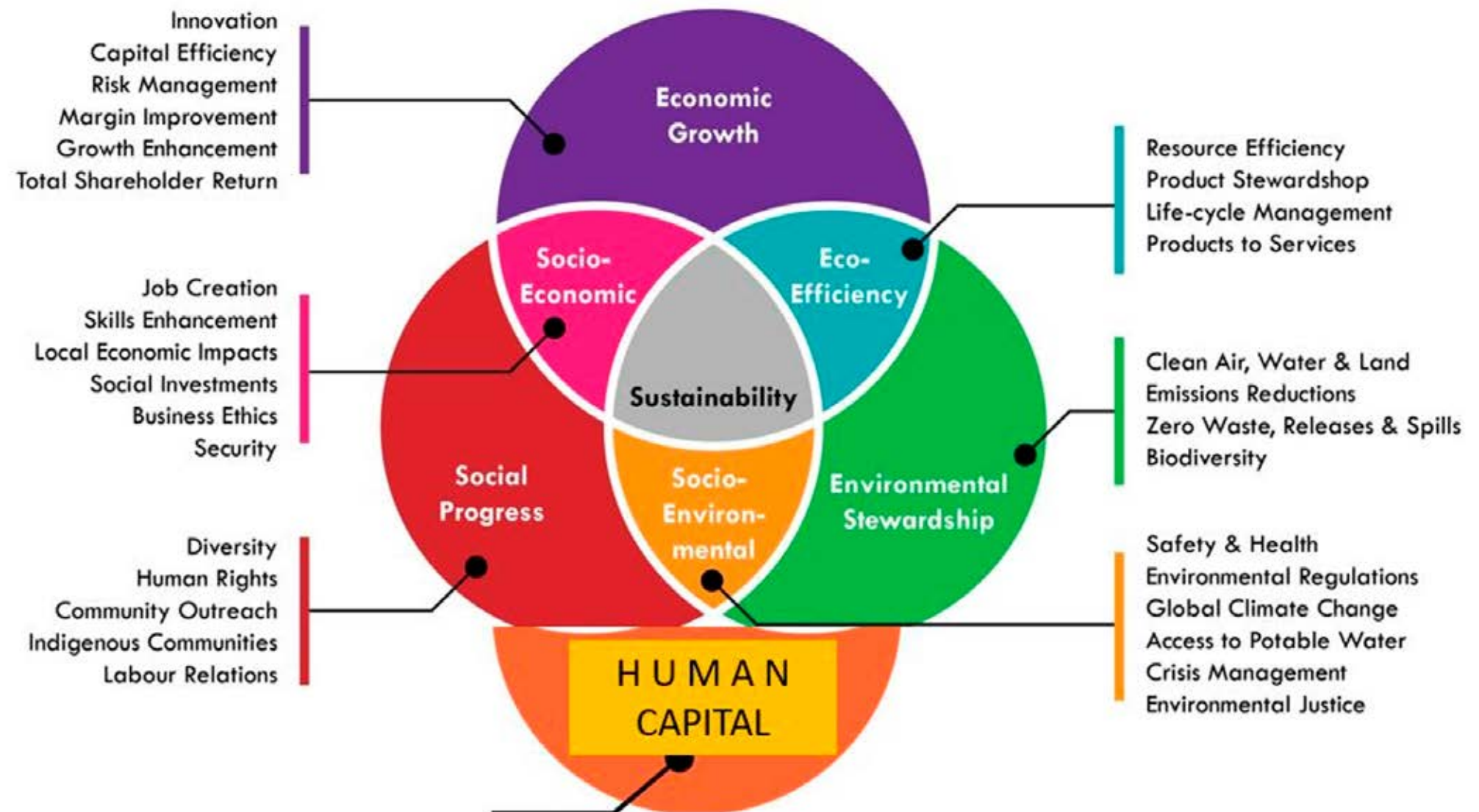**The idea** In sustainable design, the idea of the circular economy is one that is promoted. Reducing waste, optimizing resource efficiency, and establishing a closed-loop system where materials are continuously recycled and reused are the goals of the circular economy.

Recognizing the limits of resources and aiming to decouple economic growth from resource consumption, the circular economy promotes a regenerative approach instead of the traditional linear model of "take-make-dispose" (Ceschin & Gaziulusoy, 2019, Sumter et al., 2020).

The atualization It is necessary to incorporate sustainability ideas into the design process as we move toward a circular economy. In order to create systems, goods, and services that are not only socially and economically responsible but also ecologically friendly, designers have a critical role to play (Ceschin & Gaziulusoy, 2019, Sumter et al., 2020).

The implementation Compared to the linear economy, design is predicted to play a more significant role in the circular economy. Due of conceptual misunderstanding surrounding the lexicon of the circular economy, design researchers need to communicate and be clear with one another.

Thinking about systems, normative skills, predictive abilities, strategic planning capabilities, and interpersonal skills for cooperative problem-solving should all be part of a circular competency. According to a recent study, business models, impact assessments, recovery procedures, user involvement, teamwork, and communication within the circular economy should all be prioritized in more circular design practices.

By encouraging collaborative workspaces throughout value chains and reducing new production from scratch, the circular economy seeks to maximize resources already in place.
Designers have a vital role to play in the transition towards a circular economy (Sumter et al., 2020).

Sustainability can be achieved through responsible sourcing and end-of-life management while increasing efforts towards designing circular products and implementing circular business models.

Business models play an important role in reducing human impact on earth as they influence both product/service circularity as well internal organization strategies of firms/companies (Romani et al., 2021).

Figure: Levi's Jeans made from Circulose® fiber

CRADLE-TO-CRADLE (C2C) FRAMEWORK

The idea The concept of "cradle to cradle" is primarily associated with the work of William McDonough and Michael Braungart. They introduced the cradle to cradle design framework, which emphasizes the creation of products and systems that are not only environmentally sustainable but also regenerative and beneficial to society. The cradle to cradle approach aims to eliminate the concept of waste by designing products that can be continuously recycled or biodegraded, and by ensuring that the materials used are safe for human health and the environment (Ceschin & Gaziulusoy, 2019,Bunker & Hawken, 1995).

The Ecology of Commerce: A Declaration of Sustainability McDonough and Braungart's book, "*The Ecology of Commerce: A Declaration of Sustainability* " discusses the cradle to cradle concept and its application in the business world. They argue that businesses should shift from a linear "take-make-waste" model to a circular model that mimics natural systems and promotes sustainability.
The book explores the potential for businesses to become agents of positive change by adopting sustainable practices and redesigning products and processes (Bunker & Hawken, 1995).

The cradle to cradle concept has also been discussed in the field of architecture and design.
Papanek advocates for a shift towards a more holistic and sustainable approach to design, which aligns with the principles of cradle to cradle (Jackson, 1993).

For example, in the book "*Design for the Real World: Human Ecology and Social Change*" by Victor Papanek, the importance of designing products and systems that are environmentally sustainable and socially responsible is emphasized (Jackson, 1993).
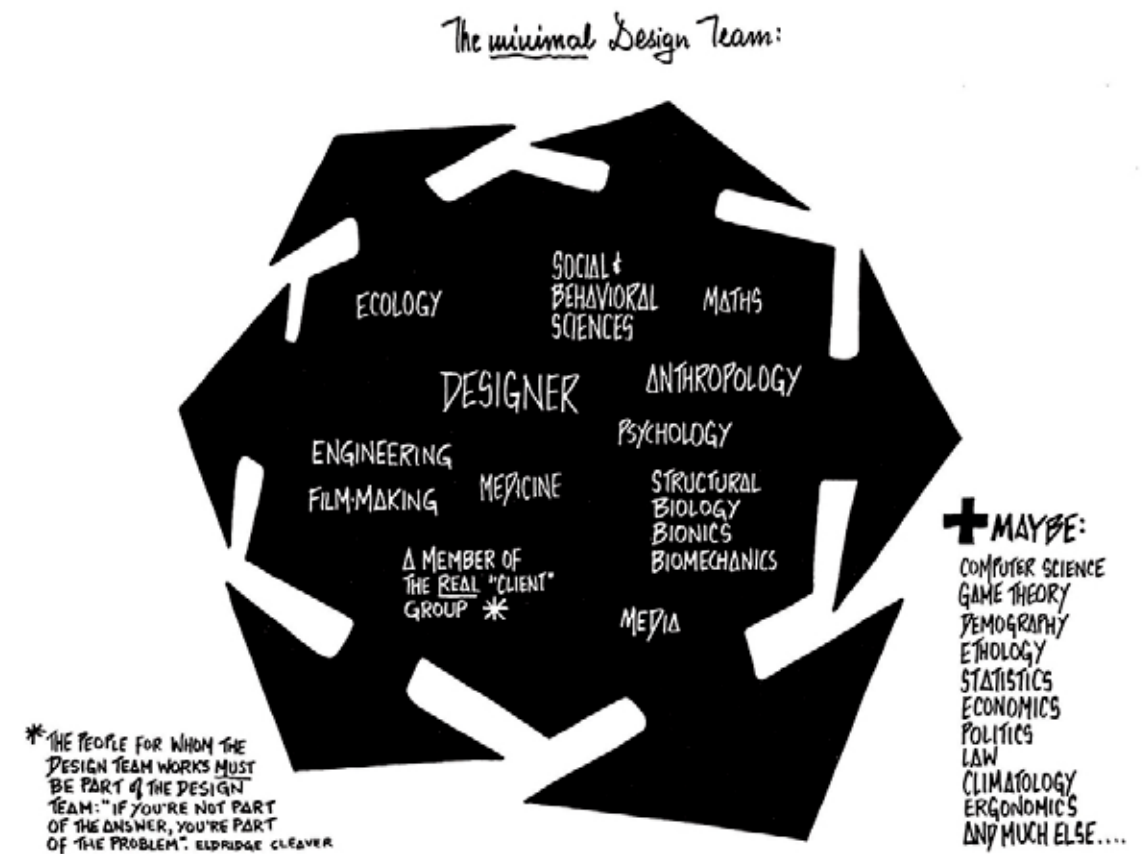

Figure: Sketch from the book "Design for the Real World: Human Ecology and Social Change" - Victor Papanek.

CIRCULAR ECONOMY PILLARS

Cradle-to-cradle principles, are a set of design principles that aim to create products and systems that are restorative and regenerative, rather than contributing to waste and environmental harm.

The circular economy is a concept that aims to create a regenerative and sustainable economic system by minimizing waste, maximizing resource efficiency, and promoting the reuse and recycling of materials.
It is built on three key pillars:

– DESIGN FOR CIRCULARITY
– RESOURCE EFFICIENCY
– CLOSING THE LOOP

The pillars The first pillar, DESIGN FOR CIRCULARITY, focuses on designing products and systems with the intention of enabling their reuse, repair, and recycling. This involves considering the entire lifecycle of a product, from its design and production to its end-of-life treatment. By incorporating circular design principles, such as modular design and the use of recyclable materials, products can be more easily disassembled and their components can be reused or recycled (Ghisellini et al., 2016).

The second pillar, RESOURCE EFFICIENCY, emphasizes the importance of using resources in a sustainable and efficient manner. This involves reducing resource consumption, optimizing production processes, and minimizing waste generation. Resource efficiency can be achieved through measures such as energy-efficient manufacturing, waste reduction strategies, and the adoption of cleaner production technologies (Ghisellini et al., 2016).

The third pillar, CLOSING THE LOOP, focuses on creating a closed-loop system where materials are continuously circulated and reused, rather than being discarded as waste. This involves implementing strategies such as recycling, remanufacturing, and the development of circular supply chains. By closing the loop, the circular economy aims to minimize the extraction of virgin resources and reduce the environmental impacts associated with resource extraction and waste disposal (Ghisellini et al., 2016).

These three pillars of the circular economy work together to create a more sustainable and regenerative economic system. By designing products for circularity, optimizing resource use, and closing the loop through recycling and reuse, the circular economy aims to reduce waste, conserve resources, and promote long-term environmental and economic sustainability.

Through circular design principles, products can be designed to enable their reuse, repair, and recycling. This can lead to a reduction in waste generation and the extraction of virgin resources. Resource efficiency measures, such as energy-efficient manufacturing and waste reduction strategies, can further enhance the sustainability of the circular economy.

THE FUTURE OF CIRCULAR ECONOMY IN DESIGN FIELD

Circular economy vision

One key aspect of the circular economy is the concept of circular product design which focuses on creating products that are designed for longevity, recyclability, and ease of disassembly. Circular product design ensures that products are built to last, with durable materials and components that can be easily repaired or replaced.

This shift away from the traditional linear model of production, where products are made, used, and then disposed of, opens up new opportunities for sustainable design practices. (Hawken, 2013)

Circular economy approaches

Designing for regeneration is a competency that is important in the circular economy. This approach goes beyond just designing for multiple use cycles and recovery, but also considers the potential for products to actively contribute to the regeneration and restoration of natural systems. By incorporating regenerative principles into the design process, designers can create products that not only minimize their negative impact on the environment but also actively contribute to its restoration (Sumter et al., 2020, Sumter et al., 2021).

By designing for regeneration, designers can contribute to the creation of a closed-loop system where materials are continually reused and natural systems are restored, mimicking nature's principles and processes to create products and systems that support ecological health (Sumter et al., 2020, Sumter et al., 2021).

" The circular economy is about creating value from waste."

William McDonough

Understanding the
Product–Service System Concept

The idea The concept of product service systems (PSS) came of age in the late 1990s, when PSS were proposed by the United Nations Environment Programme (UNEP). It is not credited to a single person or group of people. Instead, it has developed over time in response to society's, the environment's, and enterprises' evolving requirements and expectations.

Developments Product service systems originally began to be talked about when companies began to implement maintenance services for their products as a result of an increasing focus on environmental sustainability in order to extend the life of products.
The development of PSS has been supported by research projects and initiatives, which have spread to different sectors. For example, the EU's Fifth Framework Program has supported projects such as MEPSS (Methodology Product Service Systems), gaining attention in several research fields, including sustainability, economics, and new product development (Moro et al., 2020; Tukker & Tischner, 2006; Aurich et al., 2006; Isaksson et al., 2009).
This is a business model integrated with a combination of products and services, which are no longer viewed as stand-alone entities but rather as parts of a larger system. (Baines et al., 2007).

This approach to product and service design and management focuses on creating a new type of customer value because, with integrated management, networks of participants and supporting infrastructure are created to more effectively meet customer needs (Zhou et al., 2021).
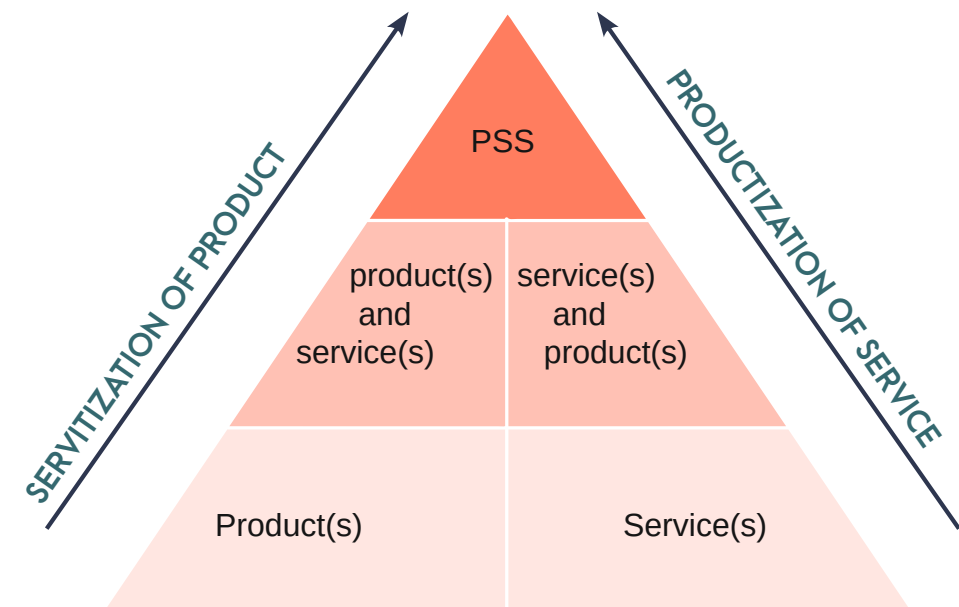

Figure: Evolution of the PSS concept by Jeffrey Robert Alcock

PSS CONSISTS OF TANGIBLE PRODUCTS AND INTANGIBLE SERVICES designed and combined to meet specific customer needs, **OFFERING A HOLISTIC SOLUTION THAT MEETS CUSTOMER NEEDS** by combining value-added products and services (Cook et al., 2012; Baines et al., 2007).

PSS focuses on three main dimensions:

THE PRODUCT is the tangible, physical element, viewed as a dynamic entity that evolves over time. PSS focuses on continuous product improvement to meet the changing needs of customers.

THE SERVICE is the intangible element; although a service can be considered a product, the difference in PSS focuses on providing the service, thus going on to increase the value of the product.

THE SYSTEM: together, these two entities are part of a larger system, the PSS, which creates the infrastructure needed to provide this integrated management between product and service and also creates a relationship between the PSS provider and the customer.

TYPES OF PSS

It is a new production paradigm that offers customers an integrated product-service solution (Sheng et al., 2016).
In accordance with the literature a PSS can be classified into three types based on the predominant orientation of its use, that is, the share between product and service most offered it may be: product-oriented, use-oriented, and outcome-oriented.
In addition to these categories we then expand the subcategories for each type. (Zhou et al., 2021).

In a **PRODUCT–ORIENTED PSS**, product has within service the largest share, while service is more resolved to support and advice. Thus, the focus is mainly on the design, production, and sale of the physical product, with some additional services added, including, for example, maintenance, repair, or technical support (Zhou et al., 2021).

In contrast, a **USE–ORIENTED PSS** presents a balanced balance between product and service, emphasizes product-related services or service-oriented products. The customer is granted the right to use the product rather than own it. This balance reconciles the conflict between the two parties and realizes the synergy of interests through integration and complementarity of resources, ultimately leading to increased value and win-win outcomes (Zhou et al., 2021).
Examples of use-oriented PSS are product leasing, renting, sharing or pooling, in which the customer pays for the use of the product without the burden of ownership (Liu et al., 2019).

Otherwise still a **SERVICE–ORIENTED PSS** it is the service that has the largest share, it goes beyond the product itself and focuses on service delivery. The product is considered a part of the overall service, the emphasis is on meeting the customer's needs and achieving the desired results. This type of PSS aims to provide a complete solution that meets specific customer needs and delivers tangible results while not possessing the tangibility of the object in question (Zhou et al., 2021).

Evolutions The shift from a product-oriented to a service-oriented approach is called " **SERVITIZATION** " and it has become a trend in many industries (Mustonen et al., 2019). When companies shift to servitization, they gradually add use- and outcome-oriented services to their offerings. This shift enables companies to provide a more holistic solution to customers, focusing on delivering value and meeting their specific needs. (Marjanovic et al., 2020).

There is no single methodology for designing a PSS; moreover, it is a matter of approaching the design according to the factors that are deemed most akin and useful, including focus on environmental sustainability, system modularity, value creation, and customer needs. the customer is the primary creator of value.

THE FOCUS IS ON REALIZING THE USE VALUE OF PRODUCTS, RATHER THAN JUST THE EXCHANGE VALUE.
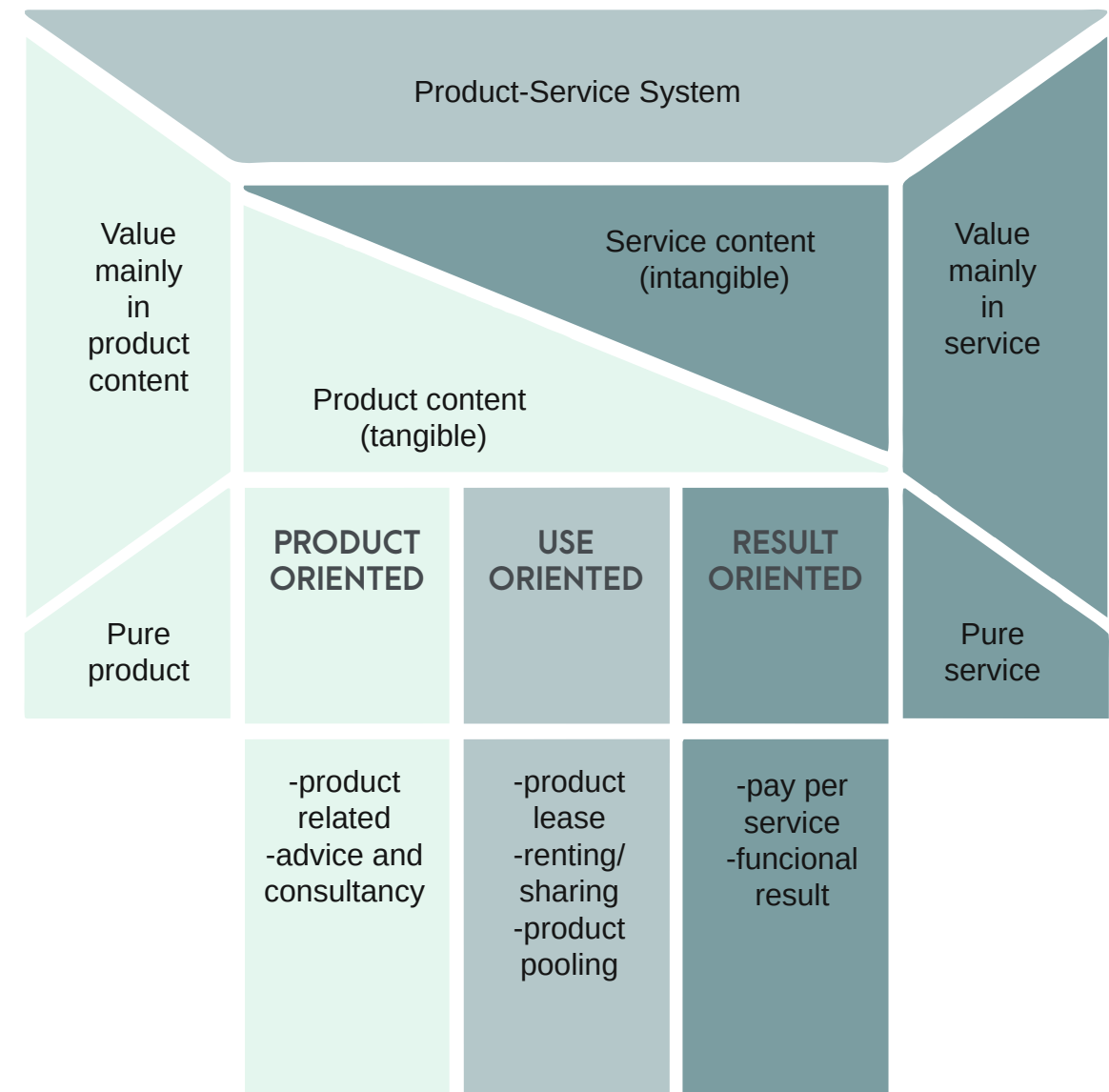

Figure:
PSS map

PSS scalability PSS are developed to be competitive, satisfy customers, and be more environmentally friendly than traditional business models because instead of purchasing a product as a physical asset separate from any support services, customers with a PSS receive a complete solution that can include product use, maintenance, upgrades, and even take-back or recycling at the end of the product's life cycle. This approach shifts the focus from purchasing items to a broader perspective by maximizing utility for the customer and minimizing waste. They can also contribute to the circular economy by promoting the reuse, remanufacturing, and recycling of products (Aurich et al., 2006)

The implementation of a PSS requires a shift in mindset from traditional product-centered approaches to a more service-oriented perspective. The design, implementation, and development of PSSs differ from those of traditional products (Tubis et al., 2021).

Challenges and possibiliteis Although, in fact, they have several **ADVANTAGES** including: increased resource efficiency, reduced environmental impact, improved customer satisfaction, and increased business competitiveness. However, there are also **BARRIERS** to implementing PSS, including organizational challenges, lack of awareness and understanding, and resistance to change (Moro et al., 2020).

Value creation in a PSS occurs through the integration and application of resources between service providers and customers (Zhou et al., 2021).

Certainly among the most recurring approaches is design thinking, which focuses design on humans and their needs. Creating innovative and empathetic solutions by encouraging a collaborative and iterative process involving multidisciplinary teams and stakeholders during the ideation, prototyping, and testing phases. (Jantakun et al., 2023)

Systems engineering also has a relevant position in the context of PSS, particularly for the design and development of complex systems. Systems engineering is a systems approach that focuses on the design, analysis and management of complex systems throughout their life cycle. It involves consideration of the interactions and interdependencies between different components and subsystems to ensure the functionality and performance of the overall system. (Baines et al., 2007).

PRINCIPLES OF PSS

Product-Service Systems (PSS) usable principles encompass a variety of concepts and tactics for developing more sustainable, user-centric solutions. Three elements are given special consideration in the context of this thesis.

ECONOMIC, ENVIRONMENTAL, AND SOCIAL SUSTAINABILITY: A basic element of the PSS is sustainability. It entails creating products and services in such a manner that their environmental effect is minimized throughout their life cycle. This might involve cutting back on resources, eliminating waste, and improving energy efficiency. PSS is committed to developing solutions that are not only commercially viable, but also ecologically and socially ethical. By encouraging long-term sustainability. Climate change, resource depletion, and pollution are among the challenges addressed by PSS. (Baines et al., 2007).

USER–CENTRICITY: In PSS, user centrality refers to the notion that goods and services should be built with a significant emphasis on addressing end users' wants and preferences. This idea promotes product and service modification to guarantee that they deliver the most value and utility to particular consumers. User-centered PSS may boost user pleasure, engagement, and sense of belonging, resulting in more sustainable consumption patterns and product lifecycles (Baines et al., 2007; Cook, 2018).

COLLABORATIVE CONSUMPTION: A concept strongly related with PSS is collaborative consumption, often known as the sharing economy or access economy. These are people who share goods and services rather than owning them individually. This might take the shape of car-sharing, home-sharing, or other forms of collaborative consumption. PSS hopes to lower overall demand for new goods by fostering shared access to resources. (Baines et al., 2007).

DIFFICULTIES

The implementation of a PSS process certainly presents difficulties as PSS are systemic designs at different levels of complexity. Each project is unique and has its own difficulties and limitations.
More generally, it is possible to say that there are barriers at the level of business model change, with the implementation of new investments and consequently new risks to be taken into account. The design will therefore have to be done with a high level of coordination among all the actors involved (Baines et al., 2007; Meier et al., 2010).

BENEFIT

On the other hand, however, it is possible to see the enormous benefits that a PSS can offer, including:

COST SAVINGS: this is a benefit offered to both customers and suppliers, as customers can benefit from reduced upfront costs by paying for the functionality or use of a product rather than buying it outright, while suppliers can achieve cost savings through better resource allocation and efficiency (Baines et al., 2007;Mert & Aurich, 2017)

IMPROVED CUSTOMER EXPERIENCE: The customer's needs are put at the forefront, which allows them to create a more personalized and tailored experience. By integrating products and services, PSS can meet specific customer needs and provide a complete solution, while also benefiting the supplier with increased customer satisfaction and retention (Cook et al., 2012;Mert & Aurich, 2017).

SUSTAINABILITY: PSS promotes sustainability by reducing resource consumption and waste. Sharing and pooling resources through PSS can lead to more efficient use of products, resulting in reduced environmental impact (Baines et al., 2007). PSS can contribute to circular economy principles by extending the life span of products and reducing the need for new production (Mert & Aurich, 2017).

IMPROVING ACCESS AND AFFORDABILITY: PSSs can provide equitable access to resources and services. By sharing products and services, PSS can help close the wealth gap and make goods and services more affordable and accessible to more users (Cook et al., 2012). This can contribute to social inclusion and equality.

INNOVATION AND FLEXIBILITY: PSS encourages fluidity in business models by enabling the development of new offerings and the ability to adapt to changing customer needs and market demands. (Tukker & Tischner, 2006)

OPPORTUNITIES FOR COLLABORATION: PSS encourages collaboration and networking among stakeholders. It creates networks and partnerships. It promotes knowledge sharing, cooperation and collective problem solving. This can lead to the development of new ideas, improved decision making and shared learning experiences (Baines et al., 2007).

CIRCULAR ECONOMY IN PSS

The Product-Service System (PSS) concept takes root in several areas, including sustainability, the circular economy and changes in business models.
The methodology to be applied in these projects depends on the context and specific project objectives, but is therefore multidisciplinary, often involving professionals from different areas including engineering, design, environment and business. (Stahel, 2016; Baines et al., 2007).

Generally, however, it can be said that PSS is guided by principles that promote resource efficiency, reduction of environmental impacts and customer satisfaction.
(Baines et al., 2007).

Supported by a growing interest in environmental sustainability and the need to reduce waste has inspired the development of PSS. The transition from a linear consumption model (take, produce, discard) to a circular one (reuse, recycle, repair) has pushed the search for new business models.
For these factors, the circular economy is closely linked to the PSS, encouraging the reuse, rental, sharing and repair of products rather than their simple sale.(Stahel, 2016).

Furthermore, the configuration of circular economy business models often involves servitization, where the focus is on service-led growth. Han et al. (2020) explore circular economy business models with a specific focus on servitization, highlighting the "product as service model" as an innovative approach.

Circularity-centered design: In PSD, the product design is geared towards maximizing circularity, ensuring that materials are easy to recover and recycle and that products can be repaired or upgraded rather than replaced.

Among the leading exponents, Walter Stahel, a Swiss engineer and author born in 1943 known for having coined the term "Cradle to Cradle" (From cradle to cradle), where he stresses the importance of correctly designing products so as to be easily reusable or recyclable, reducing waste and resource degradation (Stahel, 2016).

Stahel promotes the concept of offering "products as services", approaching the pillars of the PSS. This approach involves renting, sharing or supplying products so that they are used more efficiently and last longer. His vision of designing for product circularity fits perfectly with the principles of Product-Service Design. The joint implementation of these ideas offers significant potential to create more sustainable consumption and production systems (Stahel, 2016; Baines et al., 2007).

Walter's work on the circular economy has influenced the understanding and promotion of sustainable economic systems. The circular economy and the PSS are interconnected concepts that contribute to the transition to a more sustainable and resource-efficient economy. A holistic approach that considers the entire life cycle of products and services can lead to sustainable results (Stahel, 2016; Baines et al., 2007).

FUTURE OF PSS IN THE DESIGN FIELD

Evolutions The future of Product-Service Systems (PSS) in the design field is a topic of interest and ongoing research. PSS design is still in the initial stages of development, and substantial research is required to develop a practical PSS design methodology (Vasantha et al., 2012). However, there have been significant advancements in the field over the past two decades, with a significant amount of scientific literature produced on the topic (Barravecchia et al., 2021).

One of the key trends for future PSS research is the integration of sustainability principles. Sustainable PSS, which aim to reduce resource consumption and environmental impact, are considered a promising approach for sustainability transitions. (Ceschin, 2014)

Use the holistic approach The development of PSS for sustainability requires a holistic approach. It involves integrating ecological, economic, and social factors and considering the benefits that nature provides to humans. The assessment of ecosystem services provides a framework suited to tackling complex problems related to sustainability (Durán et al., 2022)

To ensure the success of PSS in the design for sustainability field, there are challenges that need to be addressed. These include barriers to adoption, such as potential benefits and barriers to adoption (Baines et al., 2007). There is a need to not only ideate and propose sustainable PSS concepts but also to favor and support their introduction and scaling up (Ceschin, 2014).

Sustainable financing is also a challenge for large-scale implementation of PSS (Moro et al., 2020, Ceschin & Gaziulusoy, 2019).

To guide the development and implementation of PSS, strategic planning methods are essential. This method can help designers and organizations navigate the complexities of PSS design and ensure successful outcomes (Moro et al., 2020)

In conclusion, product-service systems present significant opportunities for sustainability in design. PSS supports the circular economy, fosters innovative solutions for sustainability, and contributes to sustainable development. However, challenges must be overcome to effectively implement PSS for sustainable outcomes (Ceschin & Gaziulusoy, 2019, Ceschin, 2014, Baines et al., 2007)

Systemic Design : A Paradigm Shift for Sustainable Solutions

The idea The field of design has seen a transformation in recent years, moving towards a systemic and sustainability-oriented approach. This evolution is the result of a growing awareness of the interconnectedness of complex problems and the need for holistic solutions that can address not only the individual components but the system as a whole.

The approach The core of systemic design is a deep understanding of the complex relationships between elements within a system. It departs from traditional design approaches that focus on isolated components, recognizing that problems and their solutions are not independent entities but interconnected parts of a larger context.

This holistic perspective allows designers to identify the root causes of challenges and develop comprehensive and sustainable solutions, overcoming the limits of fragmentary interventions (Jones, 2014).

The focus of systemic design is on understanding the system as a whole, which goes beyond just knowing its constituent parts and includes the largest social, economic, and environmental factors that shape and influence the behavior of the system.
The adoption of a global perspective allows designers to address problems with greater depth and completeness, taking into account the possible results and compromises of design choices in different areas of influence (Battistoni et al., 2019).

Influential figures The adoption of systemic design principles has been supported by influential figures such as Buckminster Fuller, Victor Papanek and Walter Stahel. More in detail:

BUCKMINSTER FULLER (1895–1983), a renowned architect, systems theorist, author, designer, and inventor, is widely recognized for his innovative approach to sustainable design. He popularized the concept of "Spaceship Earth," emphasizing the finite resources of our planet and the need for sustainable design and living practices.
Fuller's geodesic dome structures are emblematic of his commitment to efficient, sustainable design solutions that minimize material usage while maximizing structural integrity. His use of laminated corrugated cardboard panels for geodesic domes exemplifies his commitment to exploring sustainable and unconventional materials in architecture (Diarte & Shaffer, 2021).

VICTOR PAPANEK (1923–1998), an influential designer and educator, advocated for a design approach that prioritizes the needs of the community and the environment, challenging prevailing consumerist and wasteful design practices. His advocacy for sustainable, human-centered design has had a lasting impact on the field, inspiring designers to consider the broader social and environmental implications of their work (Melles et al., 2011; Battistoni et al., 2019).

WALTER STAHEL (1946, –), a Swiss architect and industrial analyst, is renowned for his pioneering work on the concept of the "circular economy" (Stahel, 2016). his research and advocacy have been instrumental in promoting the idea of a regenerative economic system that minimizes waste and maximizes resource efficiency. His work has significantly influenced the design and manufacturing industries, encouraging the adoption of sustainable, cradle-to-cradle production processes that prioritize resource conservation and reuse (Stahel, W. R. 2016).

These designers recognized and highlighted the inadequacy of traditional design approaches in addressing sustainability challenges and pushed for a more holistic, systems-based approach that considers the impacts of the product lifecycle and systems.

Ceschin and Gaziulusoy (2019) provide compelling evidence of the effectiveness of systemic design in addressing sustainability challenges. Their study highlights the potential of systemic design to foster collaboration between diverse stakeholders, promote innovation, and ultimately lead to more sustainable solutions.

The transition towards systemic design represents a significant step forward in the field of design, offering a powerful framework for addressing the complex and interconnected challenges of our time. By embracing a holistic perspective and considering the broader system, designers can create transformative solutions that promote sustainability and foster a more harmonious future (Battistoni et al.,2019; Ceschin & Gaziulusoy, 2019).

PRINCIPLES AND OBJECTIVES

As the field of design evolves, there is a growing recognition of the need for a systemic approach to address the challenges of sustainability. Designers are increasingly acknowledging the interconnectedness of various components within a system and the need to consider the broader social, economic, and environmental aspects.
These concepts are crucial in shaping the approach to design and innovation, particularly in addressing complex societal and environmental challenges.
Some of the key principles and objectives of systemic design include:

• Understanding the interdependencies and feedback loops within a system.
Identifying and addressing root causes of problems rather than focusing on symptoms (Harris et al., 2016).
• Developing solutions that are sustainable and have long-term positive impacts (Ceschin & Gaziulusoy, 2019).
• Promoting social justice and equity within the design process (Harris et al., 2016).
• Considering the needs and perspectives of diverse stakeholders, and encouraging a long-term perspective, taking into account the impacts of decisions and designs over time (Jones, 2014).

The integration of systemic design with design thinking offers promising potential for addressing complex societal and environmental challenges.
By combining the principles and objectives of systemic design with practical methods of design practice, it can lead to innovative and sustainable solutions.

different perspectives It's essential to note that systemic design places an emphasis on locally-based locally based productive systems that prioritize the use of a range of local resources, including natural resources, material and energy flows, and social and cultural resources. This focus on localized systems can potentially yield environmental, social, and economic benefits. From an environmental standpoint, the use of local resources reduces the impact related to transporting these resources. From a socioeconomic perspective, it also entails the involvement of more local socio-economic actors, potentially increasing local employment and the local dissemination of skills and competencies. Additionally, it may lead to the preservation of local cultural heritage, fostering local economic and social development.

However, challenges exist in implementing systemic design. One challenge is the complexity and interconnectedness of systems, which can make it difficult to fully understand and predict the potential outcomes and unintended consequences of design interventions (Harris et al., 2016).

The weaknesses highlighted for systemic design include its limited focus on consumption patterns and behavior change, as well as the need for further exploration of how systemic design can be combined with other design approaches to address these limitations. For example, combining systemic design with approaches such as product-service System design for sustainability or design for social innovation can help address consumption patterns and behavior change (Ceschin & Gaziulusoy, 2019).

HOLISTIC APPROACH AND HOLISTIC DIAGNOSIS

The holistic approach to systemic design is a fundamental aspect that underpins the integration of sustainability principles into the design process. It is important to emphasize that this approach transcends conventional linear thinking and embraces non-linear, multidimensional, and experimental modes of thinking and problem-solving. By considering the interconnectedness and interdependencies within a system, systemic design aims to address complex challenges and create sustainable solutions that go beyond just individual components (Battistoni et al., 2019).

Deepening the understanding of the holistic approach in systemic design requires a closer examination of the interconnectedness and interdependencies within a given system. This holistic perspective goes beyond traditional linear thinking, embracing non-linear, multi-dimensional, and experimental modes of thinking and knowing.

This holistic approach to systemic design is influenced by the work of **VICTOR PAPANEK** and **FRITJOF CAPRA** (Öztekin & Gaziulusoy, 2019).

Papanek emphasized the need for design to address social and environmental issues, advocating for a shift from designing products for profit to designing products for people's well-being and the well-being of the planet. Capra, on the other hand, emphasized the interconnectedness and interdependence of all living systems and advocated for a shift towards a more holistic and ecological perspective in design. The relationship between systemic design and sustainability is crucial (Ceschin & Gaziulusoy, 2019).

systemic design tools Incorporating the holistic perspective into systemic design can lead to innovative and sustainable solutions that address complex societal and environmental challenges. Systemic design methods and tools are instrumental in implementing the holistic approach. Visualization tools, tailored to support designers in systemic design projects, enable the portrayal of actors, resources, material, energy, and information flows within a given system.

These tools facilitate the visualization of complex data, support participatory design processes, and aid in the identification of critical areas within the system. They have been effectively utilized to visualize both current production systems and new systemic production models.

FRITJOF CAPRA (1939, –), a physicist and systems thinker, has also contributed to the development of systemic design principles. Fritjof Capra's emphasis on systemic thinking aligns well with the principles of sustainable design, as it requires designers to consider the ecological impact of their actions and design solutions in the broader context of interconnected systems. His book "The Web of Life" explores the interconnectedness of all living systems and emphasizes the importance of understanding and designing for the whole system rather than just the individual components. (Capra & Luisi, 2014)

Holistic diagnosis,
a new approach

It is critical to consider the work of Bistagnino, Battistoni, Barbero, and Toso, as well as the contributions of Peruccio, as they provide valuable insights into the principles and methods of systemic design.
USING A SYSTEMIC DESIGN APPROACH NOT ONLY ENABLES DESIGNERS TO UNDERSTAND THE COMPLEXITY OF A SYSTEM BUT ALSO ALLOWS THEM TO IDENTIFY LEVERAGE POINTS FOR TRANSFORMATIVE CHANGE
(Barbero, 2017, Battistoni et al., 2019; Ceschin & Gaziulusoy, 2019).

These professors proposed a structured process called HOLISTIC DIAGNOSIS, which is a context framework that allows designers to assess, research, collect, visualize, and interpret data in order to gain a deep understanding of complex environments.
The holistic diagnosis process helps designers identify interconnected factors that influence the system, allowing for a more comprehensive understanding of the problem at hand.

Toso, on the other hand, highlights the limitations of systemic design in addressing consumer demand and individual consumption. In order to address this limitation, Toso suggests combining systemic design with other design approaches, such as PSS design for sustainability or design for social innovation, to bring about a change in consumption patterns (Ceschin & Gaziulusoy, 2019).

Peruccio's point of view is that the systemic design approach can help designers go beyond the traditional focus on product innovation and instead focus on the broader system in which a product operates. By considering the entire system, including its interconnected components, designers can identify opportunities for sustainable interventions that go beyond individual products. (Ceschin & Gaziulusoy, 2019)

These contributions underscore the importance of addressing the needs of specific target groups at a local level, enabling tailored solutions that cater to local socio-economic stakeholders. The emphasis on the use of locally based productive systems, natural resources, material and energy flows, and social and cultural resources specific to the geographical area aligns with the holistic approach to systemic design.

We can conclude by saying that the holistic approach in systemic design recognizes a comprehensive approach to design that takes into consideration the whole system, including individuals, resources, material flows, and energy flows.
(Barbero, 2017, Battistoni et al., 2019, Ceschin & Gaziulusoy, 2019).

CHALLENGES AND OPPORTUNITIES

While systemic design offers a holistic and integrated approach to addressing complex environmental and social challenges, it also presents several challenges and opportunities for further exploration and development.
Some of the challenges include:

ADDRESSING CONSUMER BEHAVIOR: One of the
main limitations of systemic design, as highlighted by Toso, is its focus on production processes and systems without directly addressing individual consumption. This poses a challenge to achieving holistic sustainability as it does not influence people's consumption behavior and habits. To overcome this, systemic design can be combined with other design approaches, such as PSS design for sustainability or design for social innovation, to effectively bring about a change in consumption patterns. (Battistoni et al., 2019)

BALANCING LOCAL AND NON-LOCAL ACTIVITIES:
SD focuses on local productive processes and emphasizes the use of local resources. However, the balance between local and non-local activities needs to be carefully considered. While local resources have benefits such as reduced environmental impact, there are potential efficiency gains from large non-local productive processes.
Designers need to navigate and make informed decisions about the appropriate balance, considering both eco-efficacy and economy-of-scale factors. (Ceschin & Gaziulusoy, 2019).

EXPANDING APPLICATION SECTORS: Most of the current applications of systemic design are related to the agro-food sector, with a few projects focusing on exhibitions, fairs, and behavior change.
Expanding the sectors of application and understanding the implications of adopting systemic design in addressing diverse challenges is essential. This broader understanding will help comprehend the strengths and limitations of the approach in various sectors.
Despite these challenges, systemic design presents opportunities for further exploration and development.
It offers a means to transcend "systemic complexities" and provides a substantial framework for sustainability leaders to work through difficult and messy issues.
By integrating complexity and inviting innovation, systemic design enables the creation of resilient systems that move towards sustainability on environmental, social, and economic levels. Additionally, the future of systemic design holds potential for advancements in tools and methods (Lees & Uri, 2018).

In summary, systemic design is a promising approach to addressing complex sustainability challenges.
It considers the whole system and aims to create sustainable solutions by designing out waste, working on input and output relationships, and creating local systems.

THE ROLE OF SYSTEMIC DESIGN
IN SUSTAINABILITY TRANSITIONS

During the integration of the 1990s, the focus on sustainable need fulfillment and the transformation of socio-technical systems for sustainability emerged in the fields of science and technology studies. This shift in perspective recognized the limitations of traditional design approaches and emphasized the need for a systemic shift in outlook and approaches.

Take a whole view In the context of sustainability, systemic design emphasizes the importance of addressing the complexity and interconnectedness of social, economic, and environmental factors. By taking a systemic approach, designers can identify and address the root causes of problems rather than merely addressing the symptoms. This approach leads to the development of sustainable solutions with long-term positive impacts. Moreover, the integration of systemic design with design thinking offers promising potential for addressing complex societal and environmental challenges by understanding and visualizing the actors, resources, material, energy, and information flows of a given system. (Battistoni et al., 2019; Ceschin & Gaziulusoy, 2019)

In essence, systemic design, with its holistic approach and focus on interconnected systems, plays a crucial role in driving sustainability transitions by identifying opportunities for sustainable interventions and understanding the complexities of our interconnected world.

An integrated approach in which the development of products and services happens concurrently is, therefore, important in systemic design (Ceschin & Gaziulusoy, 2019)
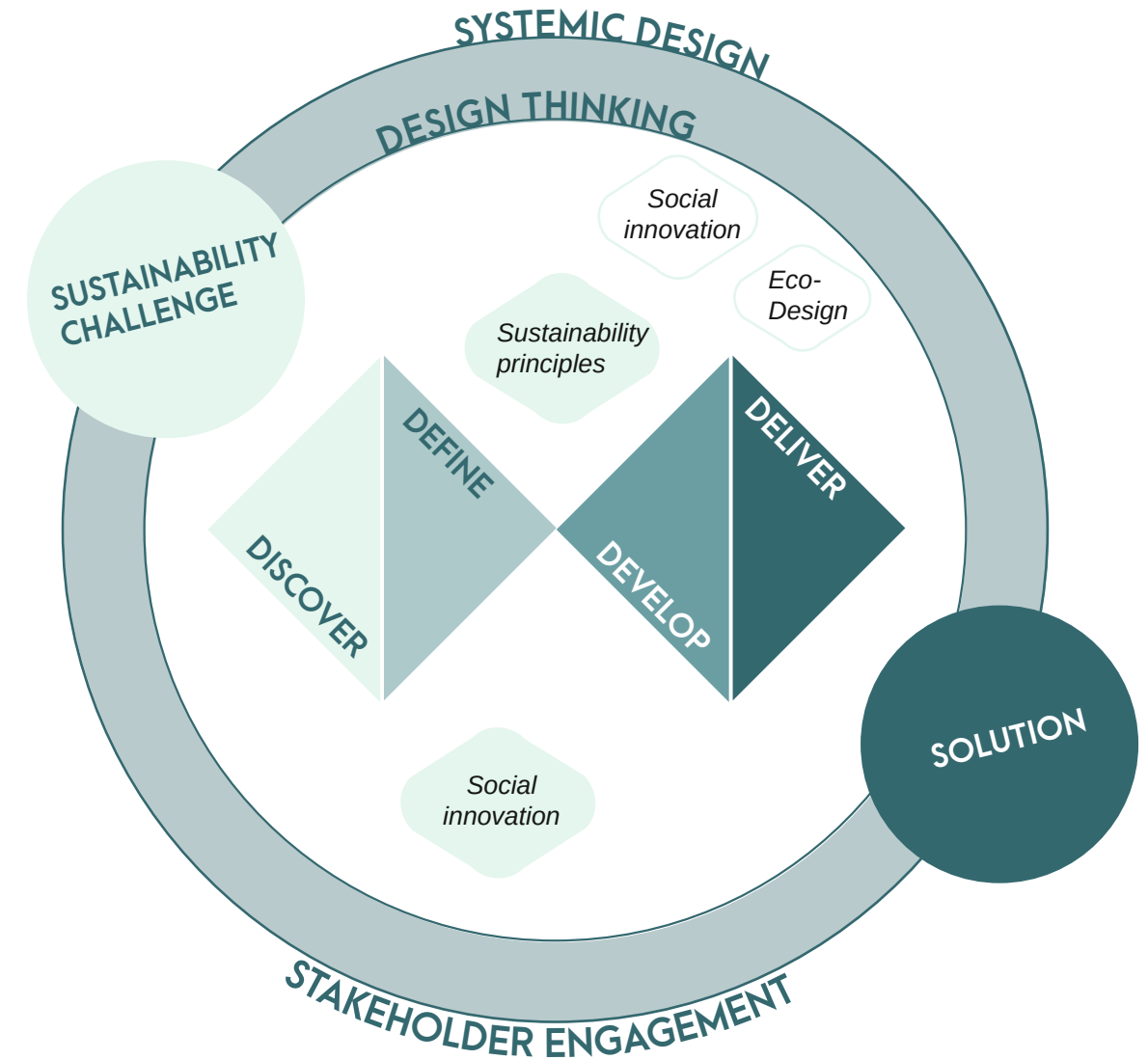

Figure: Systemic design implementation in design for sustainability

THE FUTURE OF SYSTEMIC DESIGN

The future of systemic design holds promise for driving transformative change across various sectors and societal contexts. As the interconnectedness of social, economic, and environmental factors continues to shape global challenges, systemic design will play a pivotal role in fostering sustainability transitions and addressing complex systemic issues.

INTEGRATION WITH EMERGING TECHNOLOGIES:

The advancement of technologies such as artificial intelligence, internet of things, and data analytics presents opportunities to enhance the systemic design approach. By leveraging these technologies, designers can gain deeper insights into complex systems, optimize resource flows, and develop innovative, sustainable solutions that are adaptive to dynamic socio-technical contexts (Aurich et al., 2006).

COLLABORATION AND INTERDISCIPLINARY PARTNERSHIPS:

Systemic issues require multifaceted solutions, making collaboration among designers, engineers, policymakers, social scientists, and other stakeholders imperative. Interdisciplinary partnerships will enable a more comprehensive understanding of systemic challenges and facilitate the development of integrated, contextually relevant interventions (Angheloiu et al., 2017).

EDUCATING THE NEXT GENERATION OF DESIGNERS:

Education and training will be essential in shaping the future of systemic design. Integrating systemic design principles into design curricula and professional development programs will empower the next generation of designers to tackle complex challenges with a systemic mindset. By instilling the values of sustainability, resilience, and social responsibility, future designers will be equipped to drive meaningful systemic change (Angheloiu et al., 2017).

Overall, the future of systemic design holds immense potential in driving sustainability transitions and addressing complex systemic issues through the integration of emerging technologies, interdisciplinary collaborations, and a focus on education. This trajectory underscores the role of systemic design in shaping a more sustainable and resilient future. A systemic design perspective provides a way of thinking and a format of practice that integrates complexity and invites innovation through an literative designed evolution.

The Intersection of Sustainability and Service Design

The intersection between sustainability and service design offers the opportunity to address the environmental, social, and economic aspects of complex systems. Service design, with its transdisciplinary nature, includes various elements, including product experience, business models, human behavior, emerging technologies, and economic impact.
Therefore, the integration of sustainability into service design frameworks and methodologies is crucial to enabling designers and researchers to prepare for future systemic challenges and transformations.

This integration allows the creation of services that not only meet the needs of users but are also in line with environmental and social responsibility. Designing services that are not only functional and user-friendly, but also environmental and social managers, fundamental for sustainable development (Lee et al., 2023)

Design for sustainability also requires a shift in consumption patterns and behaviors (Lee et al., 2023). This shift involves promoting circular economy principles, reducing waste, embracing renewable energy sources, and encouraging responsible and ethical consumption (Battistoni et al., 2019). Design for sustainability aims to address the systemic challenges associated with unsustainable consumption patterns and behaviors (Ceschin & Gaziulusoy, 2019).

Design for sustainability requires a holistic approach that considers the interconnectedness of social, environmental, and economic factors. This intersection also involves considering the life cycle of products and services, from sourcing materials to end-of-life disposal. Design can play a powerful role in promoting sustainability and social innovation by approaching complex challenges with a systemic mindset.

HUMAN CENTERED DESIGN
TO SUSTAINABLE SERVICE DESIGN

The intersection of sustainability and service design presents not only an opportunity to address the environmental, social, and economic aspects of complex systems but also to create services that align with environmental and social responsibility. This integration not only meets the needs of users but also embraces sustainable development principles, promoting the shift towards more sustainable and inclusive systems.

In this context, the holistic approach of systemic design not only recognizes the interconnectedness of social, environmental, and economic systems but also establishes conditions for the transition towards more sustainable and inclusive systems.

This shift has been further exemplified by the transition from product innovation to product-service system innovation and, ultimately, to socio-technical system innovation.
Essentially, service and service design are a transdisciplinary domain of knowledge that covers aspects from product experience, business models, human behavior, emerging technology, and economic impact (Lee et al., 2023).

COMMUNITY BASED SERVICE DESIGN
AS A TOOL FOR SUSTAINABILITY

Community-Based Service Design is an innovative approach that combines the principles of service design and sustainability to address community needs as a way to address complex social and environmental challenges (Chou et al., 2012)

By integrating these two concepts, **IT AIMS TO CREATE SUSTAINABLE SOLUTIONS THAT ARE TAILORED TO THE SPECIFIC REQUIREMENTS AND CHALLENGES OF LOCAL COMMUNITIES**. This approach emphasizes active participation and engagement from community members, ensuring their ownership over the services provided. This approach recognizes that sustainable development cannot be achieved without the active involvement and empowerment of local communities (Chou et al., 2012, Ceschin & Gaziulusoy, 2019)

Community-based Service Design includes three key elements:

CO-DESIGN is the process of involving community members in the design of services, to identify their needs and co-create solutions. This can be done through a variety of methods, such as workshops, interviews, and surveys. It helps to ensure that services are designed to meet the needs of the community and that they are feasible to implement.

CO-PRODUCTION is the process of involving community members in the delivery of services. This can be done in a variety of ways, such as through volunteering, peer support, and community-managed services. Co-production helps to build capacity within the community and to make services more sustainable.

CO–MANAGEMENT is the process of involving community members in the governance of services. This can be done through a variety of mechanisms, such as community boards, advisory councils, and user-led organizations. Co-management helps to ensure that services are accountable to the community and that they reflect the community's values and priorities. (Trischler et al., 2016)

The ultimate goal is to foster long-term community support and empowerment through a collaborative design process. This requires multiple disciplines and an expanded focus on the importance of human-related aspects.

It is increasingly acknowledged that we need to move towards socio-technical systems that can operate within the planet's limits while ensuring ethical and just pathways (Ceschin & Gaziulusoy, 2019).

Community-Based Service Design plays a crucial role in achieving sustainability. **DESIGNING FOR SUSTAINABILITY INVOLVES CREATING SOLUTIONS THAT MINIMIZE NEGATIVE ENVIRONMENTAL AND SOCIAL IMPACTS WHILE PROMOTING LONG– TERM VIABILITY.** It is crucial to consider the integration of products, services, and communication within a company's system to effectively address sustainability challenges. Designers should also strive to develop clear visions, facilitate strategic dialogue between stakeholders, and foster co-design processes.

This approach extends beyond individual products or technical aspects and focuses on large-scale systemic changes necessary for achieving sustainable outcomes. (Wolfson et al., 2015)

To achieve this, community-based service design takes a holistic approach, considering the social, economic, and environmental dimensions of sustainability. This approach recognizes that sustainability is not just about environmental conservation, but also about social equity and economic viability. (Wolfson et al., 2015)

By understanding the various approaches in design for sustainability, designers can contribute to specific aspects of sustainability while recognizing their interconnections and complementarities. (Wolfson et al., 2015)

DEFINING
COMMUNITY–BASED SERVICE DESIGN

Community-based service design is an approach that places the needs and aspirations of the local community at the center of the design process. By engaging directly with the community and involving them in the design and implementation of services, this approach ensures that solutions are relevant, accessible, and inclusive
(Manzini & Vezzoli,)

To ensure the long-term sustainability of services, a life-cycle perspective is crucial in community-based service design. This perspective examines not only the initial design and implementation of services but also their operation, maintenance, and eventual discontinuation or replacement
(Ceschin & Gaziulusoy, 2016, Tukker & Tischner, 2006)

This holistic approach allows for a comprehensive assessment of the environmental, social, and economic impacts of services at every stage of their life cycle. This approach allows for the recognition of areas that can be enhanced and the formulation of plans to reduce negative consequences while maximizing positive results. Now more than ever, the role of products and services is central to the sustainability debate.
(Manzini & Vezzoli, 2003, Ceschin & Gaziulusoy, 2016)

SIGNIFICANCE OF
SERVICE DESIGN IN SUSTAINABILITY

Service design is a multidisciplinary approach that focuses on creating and improving service experiences for users. It involves understanding user needs, mapping out service processes, and designing solutions that meet those needs while also considering the social, economic, and environmental impacts.
In the context of sustainability, service design plays a crucial role in addressing complex challenges and finding innovative solutions. By taking a community-based approach, service design allows for the active involvement and collaboration of various stakeholders, including users, businesses, and local communities
(Wolfson et al., 2015).

Service design is important for sustainability because it helps identify opportunities for more sustainable practices and behaviors. **BY UNDERSTANDING THE NEEDS AND BEHAVIORS OF USERS, SERVICE DESIGNERS CAN IDENTIFY AREAS WHERE RESOURCES ARE BEING WASTED OR INEFFICIENTLY USED.** Through iterative design processes, service designers can develop solutions that promote resource conservation, waste reduction, and overall environmental stewardship. Furthermore, service design can contribute to the social and economic dimensions of sustainability
(Wolfson et al., 2015).

Collaborative consumption

Collaborative consumption platforms have emerged as a transformative force, reshaping traditional consumption patterns and fostering new forms of sharing and collaboration within communities. These platforms facilitate the sharing of goods, services, and resources among individuals, creating a more efficient and sustainable way of meeting consumer needs (Lamberton, 2015). By harnessing the power of technology and connectivity, collaborative consumption platforms have revolutionized the way we access and utilize resources. The increasing popularity of these platforms can be attributed to several factors (Garrett et al., 2017).

One factor is the ECONOMIC BENEFIT, as sharing resources allows individuals to save money by accessing what they need without the cost of ownership (Alzamora-Ruiz et al., 2020). Another factor is the ENVIRONMENTAL IMPACT, as collaborative consumption reduces waste and promotes sustainable resource use (Wei et al., 2021). Furthermore, these platforms also FOSTER A SENSE OF COMMUNITY and social connection by enabling individuals to interact and engage with others in their local area (Alzamora-Ruiz et al., 2020).

CASE STUDIES

In the student community, shared objects can play a crucial role in promoting collaboration, resourcefulness, and affordability. By sharing objects such as study materials as textbooks, but also equipment, students can reduce the financial burden of purchasing these items individually.

Is important to take in consideration also that the majority of the students are not from the city, but they rent room or apartments during their time at university. Therefore, having access to shared objects eliminates the need for students to transport or store large and bulky items that they may only need for a short period of time. Additionally, sharing objects fosters a sense of community among students, as they come together to support each other in their academic pursuits. This practice also promotes sustainability by reducing the demand for new materials and minimizing waste.

2.6

References:
https://www.freecycle.org/

2.6

References:
https://aroundagain.com.au/

NON-PROFIT ORGANIZATIONS

FREECYCLE ITALIA (IT)

A non-profit organization that connects people who want to give away items they no longer need with others who can use them, promoting resource sharing and reducing waste.

AROUNDAGAIN (AUS)

The Christie Centre is addressing this gap by using our Social Enterprises to create accessible work opportunities for people of all abilities. Their aim to resell, reuse or repurpose the donations, and if the items are to damaged the dismantle them and recycle the components

POSITIVE

- Get for free second hand items
-Donate unused items

POSITIVE

- Social impact
- Local second hand shop where to buy or donate unused items

REUSE CITY SERVICES

MUNICIPALITY OF BOLZEN (IT)

In Bolzen, a city in italy, there is a place to donate or go looking for second-hand furniture for free. the service is offered by the municipality of bolzano. annually is then organized the "Feast of the bulky" one free exchange of furniture and appliances.

POSITIVE
- Local impact
- Free exchange of furniture and appliances

PRISCA PILOT PROJECT (IT):

Two reuse centers have been established as a result of the bulky waste stream pilot project where possibly reusable items are diverted from disposal through the municipal collection centers in Vicenza and San Benedetto del Tronto. These goods can be resold at retail or wholesale after being examined, cleaned, and repaired in order to make them fit for reuse.

POSITIVE
- Local impact
- New income from recycled items

2.6

References:
https://www.neptl.org/

2.6

References:
https://www.libraryofthings.
co.uk/

LIBRARIES

NORTHEAST PORTLAND TOOL LIBRARY (USA):
They lend households and community groups in the Northeast an ever-expanding collection of gardening and home repair equipment at no cost.

LIBRARY OF THINGS (UK):
Their goal since 2014 has been to make borrowing more advantageous than purchasing for both individuals and the environment by making it more easy, economical, rewarding for society, and environmentally friendly.
Is a low price pay for day/week of borrowing.
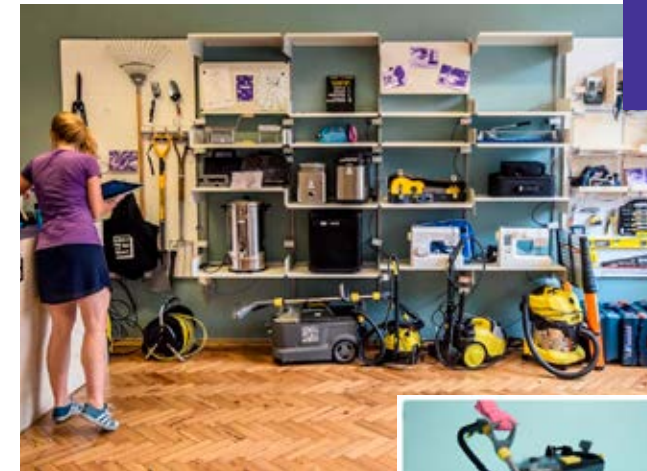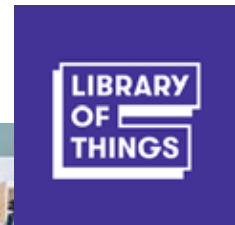
Carpet Cleaner
£25 per day

Heavy Duty Pressure Washer
£17.50 per day

POSITIVE
- Local impact
- Free borrowing

POSITIVE
- Local impact
- Locker-style rental system

References:
https://padova.esn.it/en/
events/esn-second-hand-
market
https://www.esnleuven.be/
events/second-hand-fair-
esn-leuven
https://www.esn-usti.cz/
events/second-hand-0
https://happeningnext.com/
event/thrift-store-crawl-with-
esn-agh-eid3a08odp0lj

COLLEGE SERVICES

ERASMUS STUDENT ASSOCIATION

Some ESNs are coordinating a sustainable and cooperative initiative: a second hand market for people who are leaving the city as well as those who are staying or are soon to come. They are collecting old items, decorations, furniture, appliances, clothing, and literature. These initiatives are promoted by the individual esn groups, therefore they are not present in every university city.
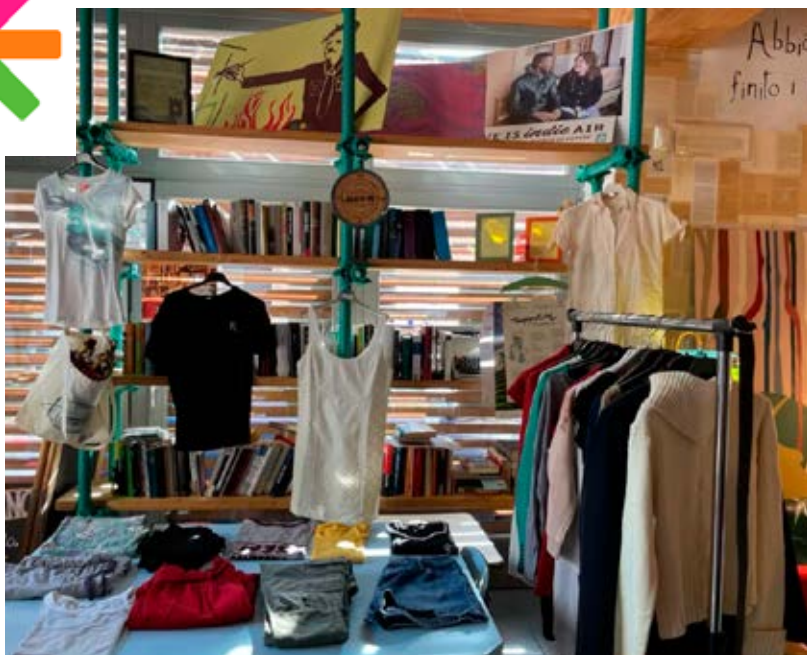
POSITIVE
- Social impact
- Young people involved

References:
https://www.esnfint.org/
services/starting-kits

ESN CAMPUS OF TAMPERE UNIVERSITY (FINT)

At the City Center Campus, ESN FINT provides all foreign students with a domestic equipment loan service. For a small fee it's possible to rent a starter kit for the kitchen or the bedroom.

Content of the Kitchen Set
- 1 pot with lid
- 1 frying pan
- 2 large plates
- 1 deep plate
- 1 small plate
- 1 bowl
- 1 cup
- 1 small mug
- 1 glass
- 8 pieces of cutlery
  (2 forks, 2 knives,
  2 spoons, 2 teaspoons)
- 2 sharp knives
- 3 cooking utensils
  (spatula, whisk, ladle or similar)
- 1 bag

Content of the Bedroom Set
- 1 pillow
- 1 duvet
  (+ 1 extra blanket for thin duvets)
- 1 pillow cover
- 1 duvet cover
- 1 bed sheet
- 1 bag

POSITIVE
- Local and social impact
- Young people involved

ASSESSMENT MATRIX

legenda: 2 · 4 · 6 · 8

	TARGET AUDIENCE	OBJECT CATEGORIES	SUSTAINABILITY	USABILITY	ACCESSIBILITY AND USER FRIENDLINESS	COMMUNITY BUILDING	EFFECTIVENESS	
NON-PROFIT ORGANIZATIONS								
FREECYCLE ITALIA								32
AROUNDAGAIN								34
REUSE CITY SERVICES								
MUNICIPALITY OF BOLZEN								48
PRISCA PILOT PROJECT								48
LIBRARIES								
NORTHEAST PORTLAND TOOL LIBRARY								38
LIBRARY OF THINGS								34
COLLEGE SERVICES								
ERASMUS STUDENT ASSOCIATION								32
ESN CAMPUS OF TAMPERE UNIVERSITY (FINT)								50

CONCLUSION

In conclusion, there are various platforms and services available for sharing objects among the student community and promoting collaborative consumption. These include centers of reuse, libraries of things, college services such as the Erasmus Student Association, and second-hand shops.

These initiatives promote sustainability, reduce over-consumption, and provide affordable options for students to access and utilize objects they need without the need for individual ownership in a shared economy model.

These projects, however, do not fully respond to the needs of the students, of course, they can be a valuable help.

Surely the service that comes closest to the needs of the student is offered by ESN FINT, which offers the opportunity to rent kits for the kitchen or the bedroom, however these are new items purchased ad hoc by the organization, therefore the recycling of objects from donations is not taken into account.

There is a need for a tailored project that specifically caters to the needs and abilities of offsite students in terms of sharing objects among the student community, such as offering a platform where students can easily borrow or lend items they need within their local community.

This platform would enable students to connect with each other and share resources, whether it be books, furniture, electronics, or any other items that they may require during their time abroad.

By facilitating these exchanges, students can save money, reduce waste, and foster a sense of community among themselves. This platform would also need to address practical considerations such as logistics, safety, and accountability.

03.

DISCOVER & DEFINE

03

The systemic approach

The systemic approach is a methodology that is used to study and create complex systems. In order to do this, one must comprehend how different parts of a system are interrelated and take into account their interactions, dependencies, and linkages (Battistoni et al., 2019).

Service designers may create more effective solutions and solve problems more effectively by using a systemic approach, which gives them a thorough grasp of the system and its dynamics.

It was crucial for me as a systemic designer student to use a holistic approach at beginning of my investigation in order to fully understand the complexity of the situation with which I was dealing and to pinpoint possible areas for innovation.

METHODOLOGY

The systemic approach methodology takes a comprehensive perspective on problem-solving, considering complex systems as interconnected and interdependent.
It highlights the significance of comprehending the connections between various elements of a system to effectively recognize and tackle issues.

This methodology utilizes systems thinking principles that focus on understanding the system as a whole rather than focusing solely on individual components.

These principles include:

HOLISTIC APPROACH: taking into consideration the entire system and its interconnectedness rather than focusing on isolated elements.

INTERCONNECTEDNESS: recognizing the relationships and dependencies between different components within the system.

INTERDEPENDENCE: understanding how changes in one component can impact the entire system.

FEEDBACK LOOPS: recognizing how information and actions circulate within the system, creating feedback loops that can amplify or dampen certain behaviors (Mele et al., 2010).

The systemic approach emphasizes iterative and holistic problem-solving, involving multiple stages such as data collection, user research, and analysis. Overall, the methodology seeks to develop a deep understanding of the system and its dynamics in order to generate effective and sustainable solutions. (Battistoni et al., 2019).

In conclusion, the systemic approach methodology provides a powerful framework for service designers to effectively analyze and design complex systems.

By understanding the interconnectedness of system components, considering their relationships and dependencies, and maintaining a holistic perspective throughout the process, systemic designers can develop innovative and impactful solutions that lead to improved outcomes for all stakeholders.
With the implementation of a systemic design approach, there are several positive outcomes that can be achieved. These outcomes include:

ENVIRONMENTAL BENEFITS: By optimizing energy and material flows, reducing resource consumption, and promoting sustainable production processes, systemic design can contribute to lower environmental impact and reduce carbon emissions.

SOCIAL BENEFITS: Systemic design takes into account the needs and perspectives of different stakeholders, including local communities, cultural factors, and social dynamics.

ECONOMIC BENEFITS: By optimizing system efficiency, reducing waste, and identifying new opportunities for value creation, systemic design can lead to increased economic productivity and competitiveness

One potential challenge in implementing systemic design projects is the need to balance the focus on local resources with the potential benefits of economies of scale (Ceschin & Gaziulusoy, 2019).

Data Collection and User Research

The systemic approach is a methodology that is used to study and create complex systems. In order to do this, one must comprehend how different parts of a system are interrelated and take into account their interactions, dependencies, and linkages (Battistoni et al., 2019).

Service designers may create more effective solutions and solve problems more effectively by using a systemic approach, which gives them a thorough grasp of the system and its dynamics.

It was crucial for me as a systemic designer student to use a holistic approach at beginning of my investigation in order to fully understand the complexity of the situation with which I was dealing and to pinpoint possible areas for innovation.

USER RESEARCH

The project's user research methods included an online questionnaire and structured interviews.
Both were designed for students at the University of Aveiro: Erasmus, Internationals and Portuguese students.

The purpose was to **COLLECT QUANTITATIVE AND QUALITATIVE INFORMATION ON THEIR PRESENT HOUSING ARRANGEMENT IN SHARED RENTAL HOUSES, PRIVATE CAMPUSES, AND UNIVERSITY DORMS**.

QUESTIONNAIRE

The survey consists of 40 questions of different types.

The questionnaire is divided into two macro-areas: the first part is aimed at collecting the socio-personal data of the respondents, while the second part deepens the needs and needs of students during their period of study outside the home.
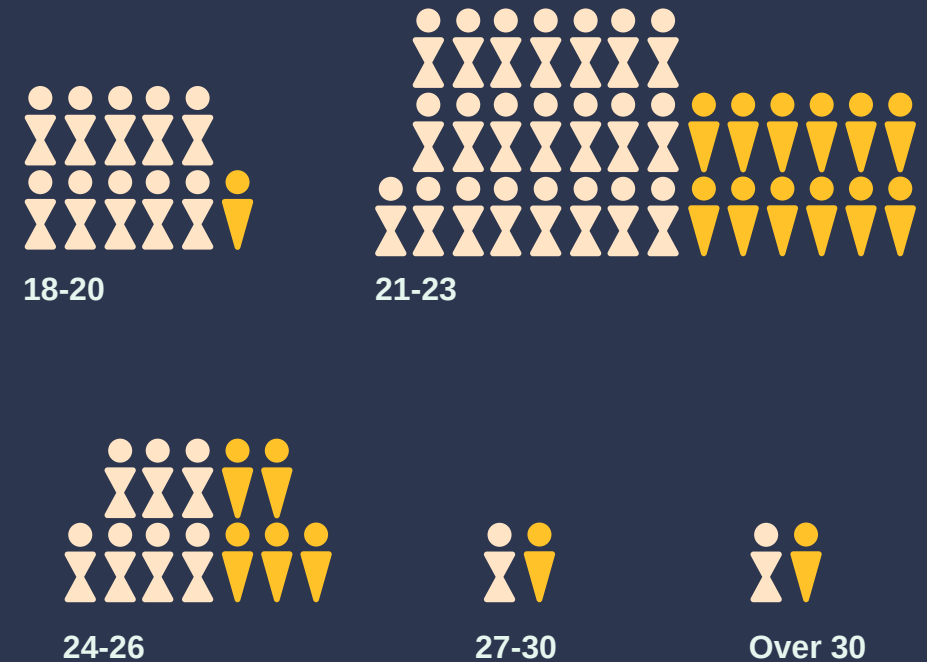
The poll was shared by word of mouth and social networks, had an average duration of 10-15 minutes, and was conducted in March 2023, getting 91 anonymous responses. After cleaning the results, I have got 61 valid questionnaires.

The data were then examined to identify similarities and differences among the various demands that emerged.

40 QUESTIONS 15 MINUTES

61 VALID QUESTIONNAIRES

RESULTS DEMOGRAPHY

18-20

21-23

24-26

27-30

Over 30

NATIONALITY

Polish (12)

Other Countries (13)

Spanish (4)

Brazilians (3)

Portuguese (12)

Italians (17)

MONTHS AWAY

15%

36%

49%

1   3   6   10+   months living
                     outside home

HOW FAR IS YOUR HOMETOWN?

**UA students
(28)**

100-200km (8)

200-500km (10)

500-800km (5)

1000-1500km (3)

800-1000km (4)

50-100km (5)

0-50km (3)

**Erasmus
students
(33)**

>1500km (23)
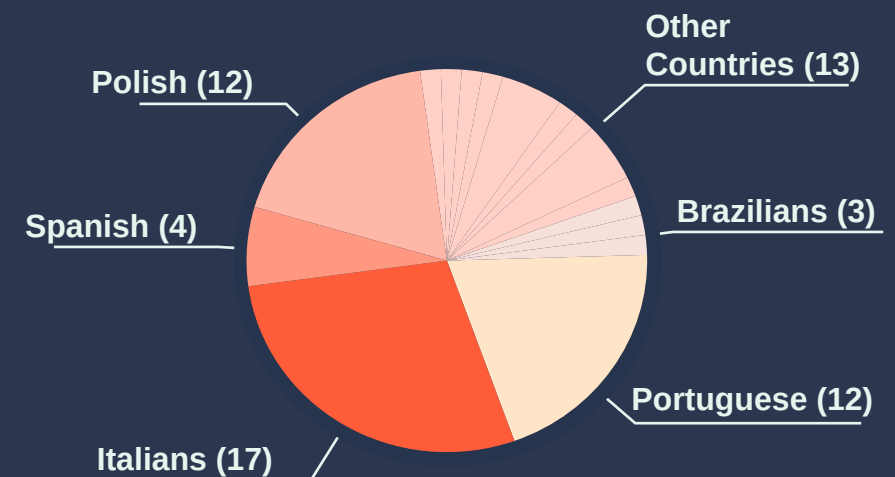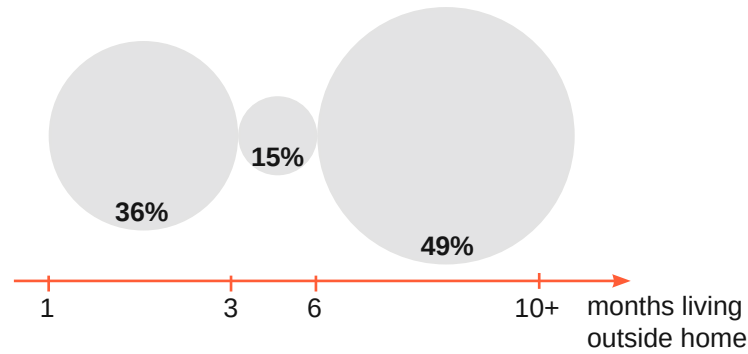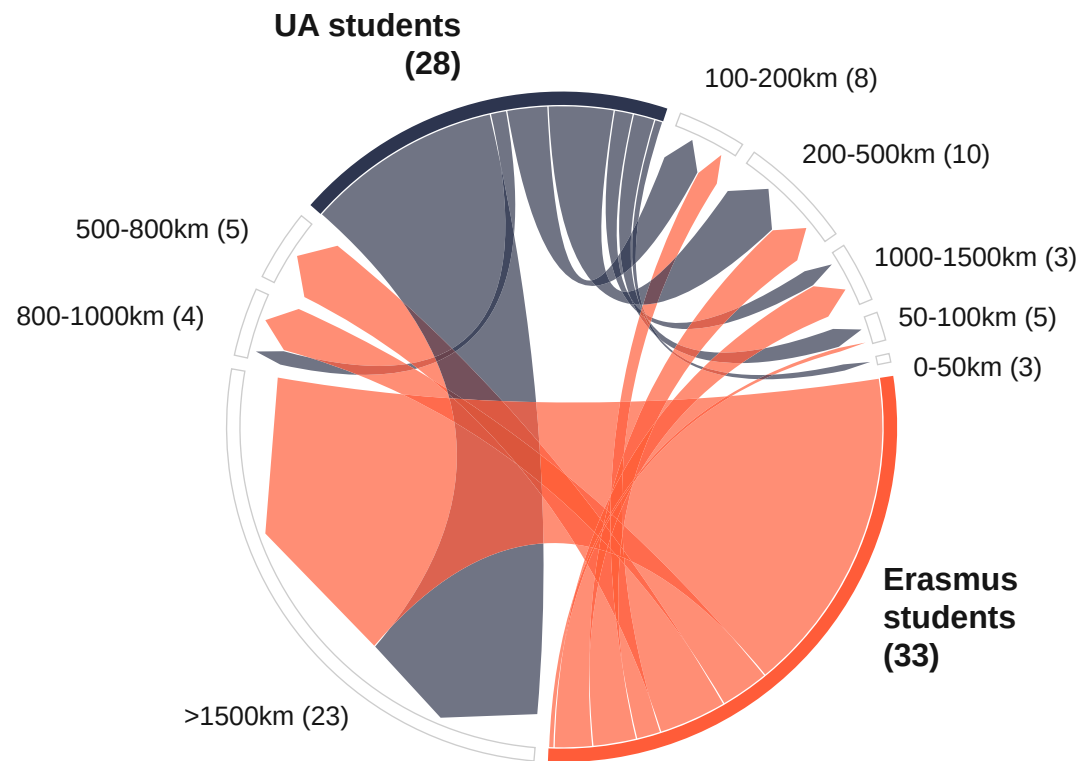
DID YOU HAVE TO BUY SOMETHING ON YOUR ARRIVAL?

Sports

Bedroom
items

Kitchen
items

No (2)   Yes (60)

Household
appliances

General
house items

THE FUTURE OF THE ITEMS

Try to sell it (12)
Donate (2)

Leave them (20)

No idea (9)

Take them back home (21)
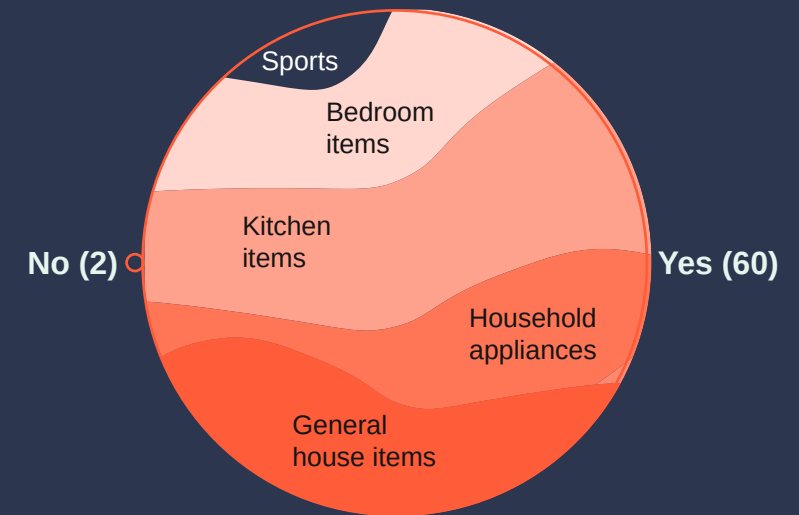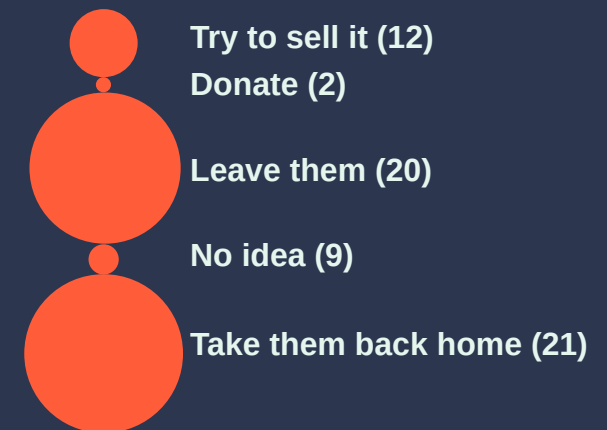
INTERVIEWS

The survey consists of 20 questions of different types.

Is divided into two macro-areas as the questionnares: the first part is for collecting the socio-personal data of the respondents, meanwhile the second part deals more specifically with purchased items, the average of how much money they spent and the willingness of users to pay a service to borrow the items they needed rather than buy them.

This had an average duration of 10-15 minutes, and was conducted in December 2023, getting 23 anonymous responses.

Each participant agreed by signing the informed consent form to share their data.

20 QUESTIONS
15 MINUTES

23 INTERVIEWS

RESULTS DEMOGRAPHY

18-20   21-23   24-26   27-30   over 30

THE AVERAGE MONEY SPENT

800 €

90 €

50 € - Moda

60 €

0 €

THE FUTURE OF THE ITEMS

Donate

Leave

Take home
Try to sell
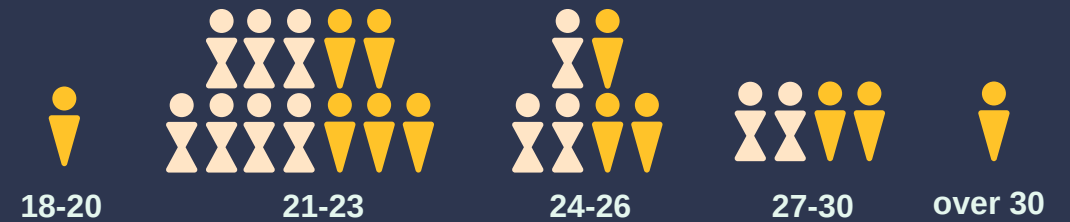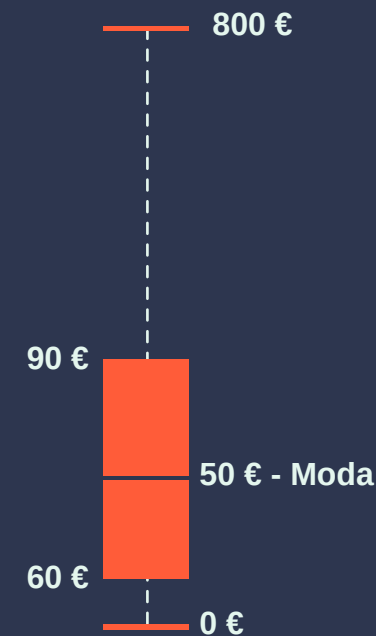
BORROWING SERVICE PRICE

on average
5 € / Month

QUOTES

"I ONLY HAD THE MATTRESS IN MY HOME WHEN I ARRIVED"

"I BOUGHT ONLY FROM THE CHINESE STORE BECAUSE I KNOW THAT I CAN'T TAKE THIS BACK HOME WITH ME"

"I AM STRUGGLING WITH BUYING WHAT IS NECESSARY FOR EVERYDAY LIFE IN A NEW PLACE AND WHAT I WANT TO HAVE AROUND ME.
I LOVE COOKING, BUT A MIXER IS SUCH A BIG EXPENSE FOR ME"

"IN THE DORMITORY WE USE THE STUFF THAT SOMEONE LEFT THERE, WHEN THEY ARE ON THE SHELF"

"I GATHERED A LOT OF USEFUL TOOLS THAT I WILL NOT BE NEEDED ANYMORE IN THE PLACE I WILL LIVE NEXT."

I'm leaving some things here so if you or someone you know are interested, DM me 😊👍

Also giving away these balls. If by any chance someone needs, pm me

I sell this shelf for €4

PERSONAS

EMMA ROSSI

ROMA (IT) 22.Y.O.

ERASMUS STUDENT AT UA

6 MONTHS

THE STUDENT

TIME ● ● ● ● ● ○ ○ ○
MONEY ● ● ● ○ ○ ○ ○ ○
SPACE ● ● ● ● ○ ○ ○ ○

BACKGROUND

Emma is an language student from Rome who is pursuing her studies at the University of Aveiro (UA) in Portugal as an erasmus student. She recently moved out of her parents' home to live 6 months in a shared student apartment in Aveiro. As student she has a limited budget, because her scholarship cover only the monthy rent, so she has to use her pocket money.

STORY

Emma's journey to Aveiro began with excitement and anticipation. She was eager to start her new life as a university student and immerse herself in the Portuguese culture.

However, as she settled into her new apartment, she quickly realized that her tight budget would make it difficult to furnish and equip her home. She didn't have the money to buy all the essential items she needed, and she didn't want to accumulate unnecessary clutter.

" I'VE ONLY HAD A COUPLE OF BURNING PANS AND KNIVES THAT DON'T CUT... I NEED A USABLE KITCHEN"

PERSONAS

DIMITRI STAMATAKOS

PARGA (GR) 27.Y.O.

DIGITAL NOMAD

10+ MONTHS

DIGITAL NOMAD

TIME	● ● ● ○ ○ ○ ○ ○
MONEY	● ● ● ● ○ ○ ○ ○
SPACE	● ● ● ● ● ○ ○ ○

BACKGROUND

Dimitri is a digital nomad who likes to travel frequently and is currently based in Portugal. He decided to rent an house for a couple of months, but now he decided to stay more, trying to learn how to surf. He ended up discovering that he has nothing to clear the floor with, such as a broom or a vacuum cleaner, he also noticed that the house has not the AC unit and summer season is under the corner.

STORY

He is used to moving apartment, he knew that this would mean making some sacrifices and compromises, but he really need a vacuum to take out all the sand.
He can affort to buy one, but he doesn't want to, it will be another big item to deal with after, and he already has stuff that he doesn't know what to do with them later.

" I JUST BOUGHT A SURFBOARD FOR THE SEASON "

Project Implementation at UA

The implementation of the house-goods sharing service in the UA Contest would involve several key steps:

1. Conduct a **FEASIBILITY STUDY** to assess the market demand and potential profitability of the service in the UA Contest area. Like the number of students living in off-campus housing, the number of the international one and the Erasmus students. Also the cost of living, and the availability of rental options.

2. Identify potential partners and **STAKEHOLDERS** who can support the implementation of the service, such as the university and the university's associations but also the local companies and community organizations for the scalability and the overall efficiency of the project.

3. Develop a comprehensive **BUSINESS PLAN** that outlines the service model, target audience, pricing strategy, marketing and promotion strategies, operational procedures, and financial projections.

4. Secure the necessary **FUNDING** or investment to support the implementation and initial operations of the service.

5. Set up the necessary **INFRASTRUCTURE** and systems for the house-goods sharing service, including a website or mobile app for users to browse and borrow items, an inventory management system to keep track of available items, and a customer support system for inquiries and issue resolution.

6. Market the service to the **TARGET AUDIENCE** through various channels such as social media, university events, and partnerships with local organizations and businesses.
(Apte & Davis, 2019)

1- FEASIBILITY STUDY

This study involve collecting data from the university such as the number of students living in off-campus housing and the number of internationals and erasmus students living in Aveiro.

There are **16,705 STUDENTS ENROLLED** at the University of Aveiro as of 2023–2024, of whom 14,673 are of Portuguese origin, according to data shared by the university. However, just 2,682 students, around 16% of all students, reside in Aveiro.
This shows how **MOST STUDENTS MOVE TO THE CITY FOR STUDY PURPOSES**.

Based on the available information, there is a **POTENTIAL MARKET** for a house-goods sharing service in the UA contest area, Therefore, there is a potential market for a house-goods sharing service among these students who may need temporary furniture and appliances during their stay in Aveiro. there is a high potential in this kind of service, and the implementation of a house-goods sharing service would have a **POSITIVE IMPACT** on the students community.
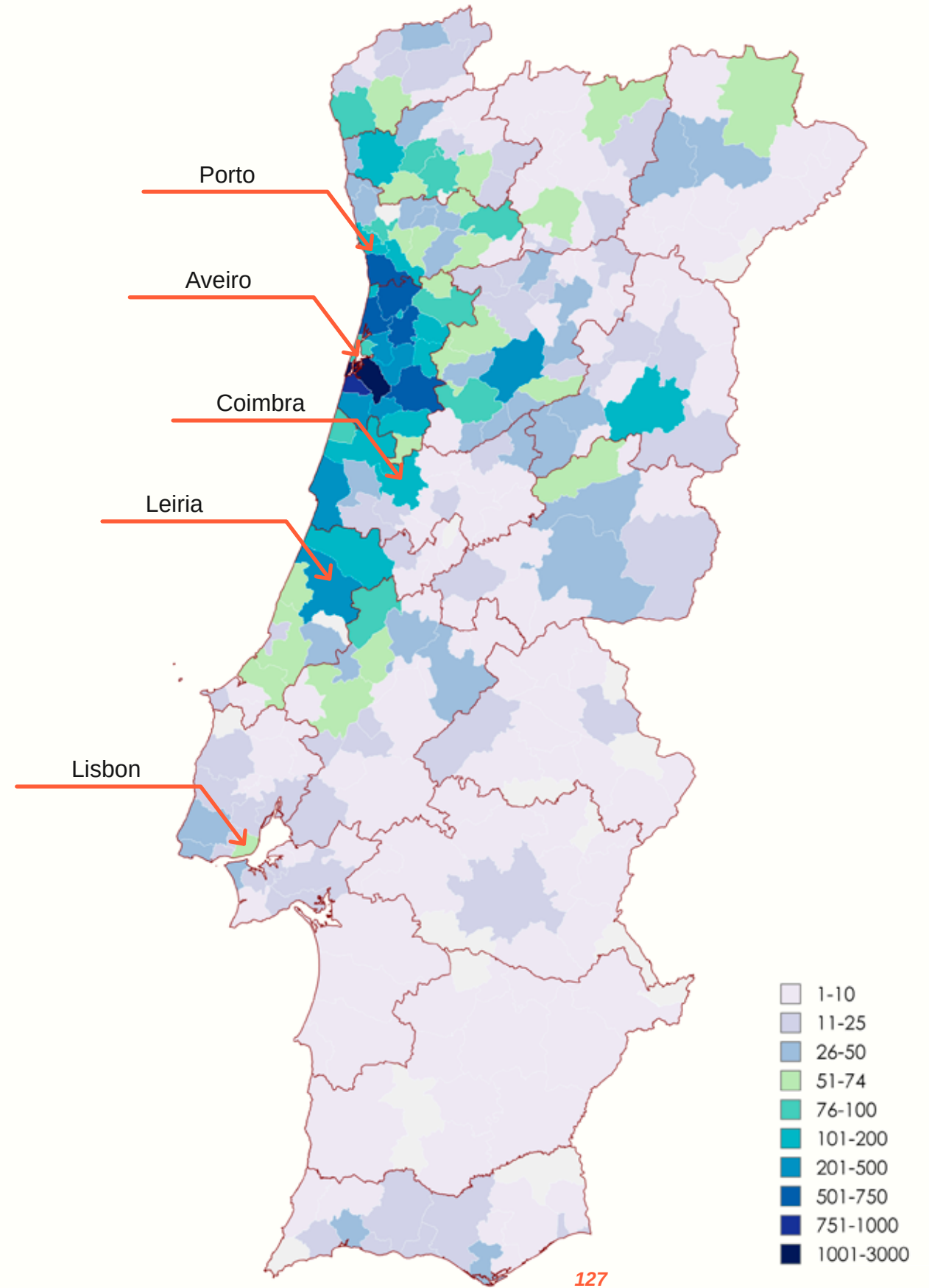
PORTUGAL COUNTRY

More detailed, the map indicates that the University of Aveiro is a popular university that attracts students from all over the country.

Additionally, a significant number of students choose Aveiro over nearby, renowned colleges like Lisbon, Porto, and Coimbra. Also, there are a lot of students from overseas, like the Azores and Madeira islands.

14,673 PORTUGUESE STUDENTS

Porto

Aveiro

Coimbra

Leiria

Lisbon

Azores islands

Madeira islands

	1-10
	11-25
	26-50
	51-74
	76-100
	101-200
	201-500
	501-750
	751-1000
	1001-3000

WORLDWIDE

Also, worldwide, the university gathers students from all over the globe. The majority comes from the former colonies, like 703 Brazilians.
Below the list in detail:

2,032 INTERNATIONAL STUDENTS

N. OF STUDENTS PER NATION

1	Afghanistan	3	Chile	3	Ghana
1	Albania	95	China	5	Greece
16	Algeria	26	Colombia	130	Guinea
283	Angola	1	Costa Rica	1	Haiti
4	Argentina	3	Cuba	1	Hungary
1	Australia	1	Cyprus	14	India
2	Belarus	1	R.D of Congo	85	Iran
1	Belgium	50	Ecuador	1	Israel
1	Benin	1	Egypt	38	Italy
1	Bolivia	1	El Salvador	2	Japan
703	Brazil	1	Ethiopia	2	Jordan
1	Bulgaria	8	France	1	Kazakhstan
1	Canada	2	Gabon	2	Lebanon
103	Cape Verde	26	Germany	1	Lithuania
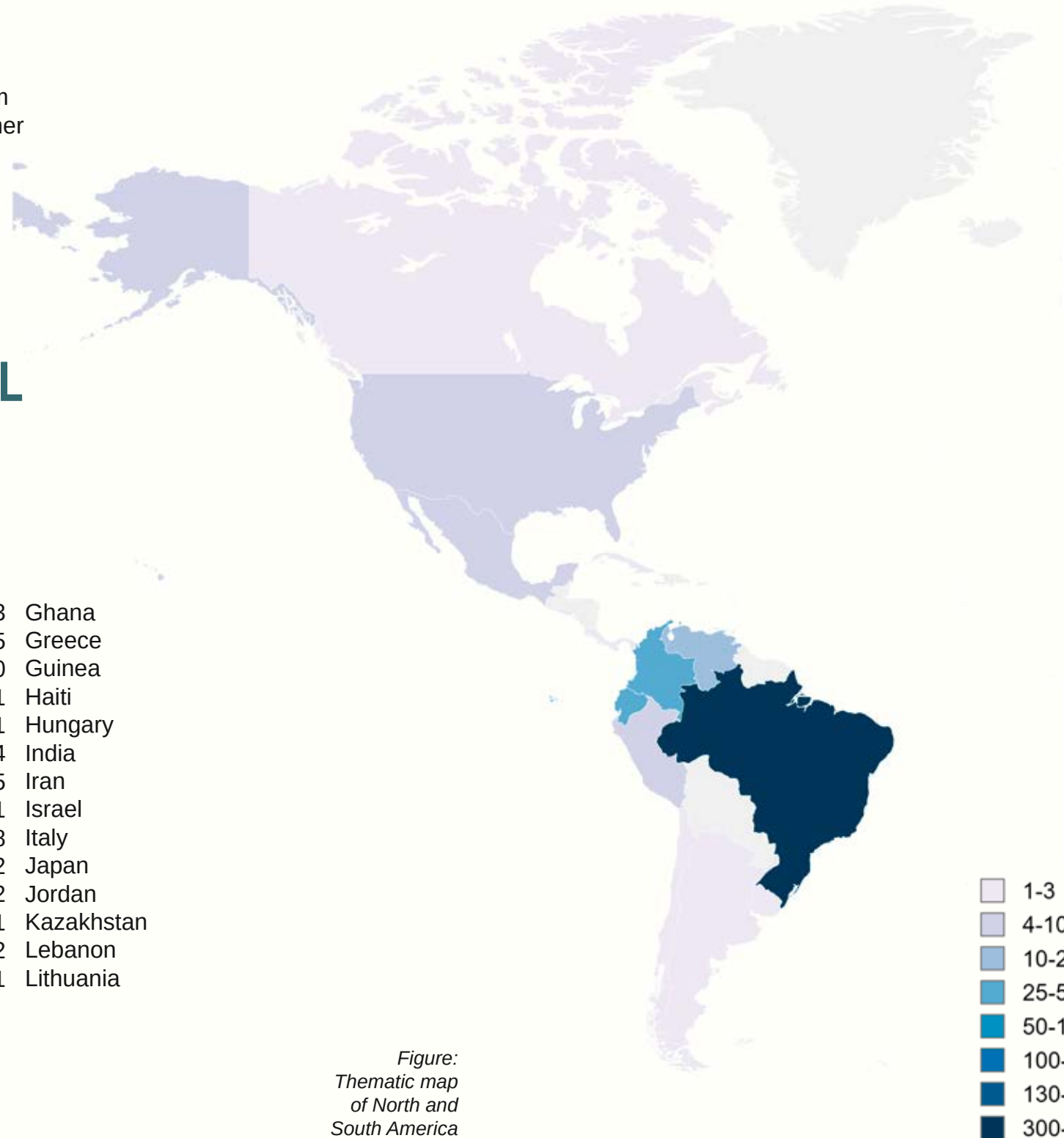
Figure:
Thematic map
of North and
South America

1-3
4-10
10-25
25-50
50-100
100-130
130-300
300-700
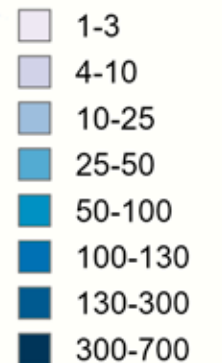
Figure:
Thematic map
of Europe,
Africa, Asia and
Oceania

	1-3
	4-10
	10-25
	25-50
	50-100
	100-130
	130-300
	300-700
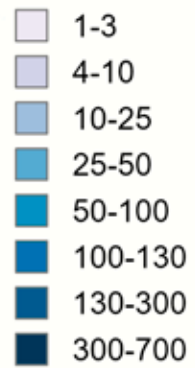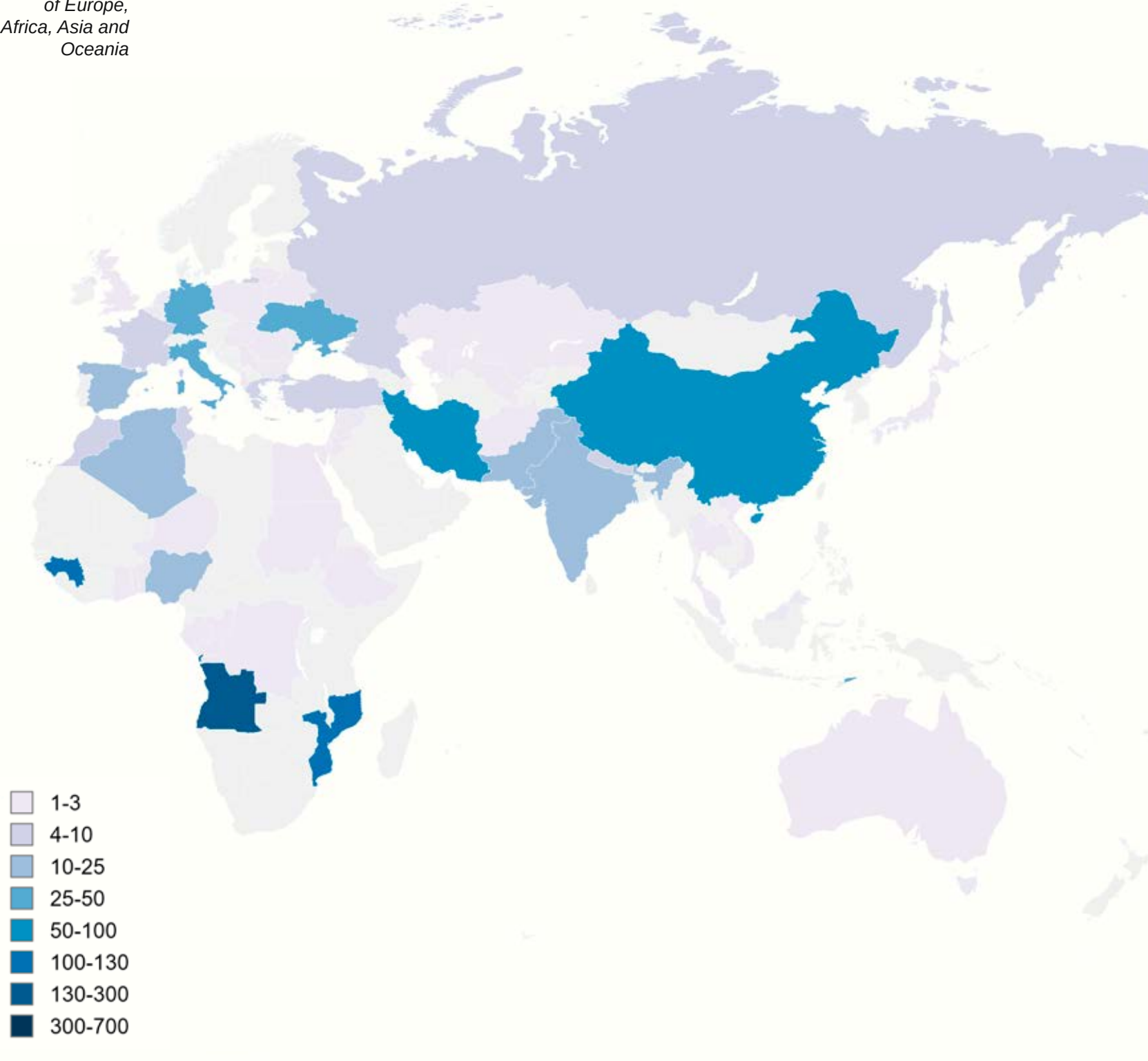
N. OF STUDENTS PER NATION

1	Luxembourg	3	Serbia
2	Malaysia	2	Singapore
1	Mauritius	1	Slovakia
10	Mexico	19	Spain
1	Moldova	1	Sudan
10	Morocco	3	Syria
116	Mozambique	3	Thailand
5	Nepal	34	Timor
3	Netherlands	1	Togo
3	Niger	8	Tunisia
24	Nigeria	6	Turkey
22	Pakistan	46	Ukraine
1	Panama	1	United Kingdom
5	Peru	6	United States
3	Poland	1	Uruguay
4	Romania	1	Uzbekistan
6	Russia	17	Venezuela
36	São Tomé	1	Vietnam

2– STAKEHOLDER'S DESCRIPTION

KEY PLAYERS:
The rectory is the university's highest governing body, with ultimate power over its services. Since they must approve the project scope, budget, and timeframe, their authority makes them an essential stakeholder in any univerity related design project.

NEUTRAL PARTIES:
UAcoopera is an important stakeholder because they can provide valuable guidance and support during the development of the service project. They may organize events, match universities with potential partners, and provide support for negotiating licensing agreements

SUPPORTERS:
Student associations act as a point of contact between students and university management, encouraging communication and collaboration. They bring student voices to the decision-making table and collaborate with university administrators to successfully address student problems.

MARGINAL STAKEHOLDERS:
ESN facilitates students' study abroad experiences by providing them with information, assistance, and resources. They are the direct contacts with the international students.

STAKEHOLDER'S MAP DESCRIPTION

A stakeholders map is a visual representation of the different individuals, groups, or organizations that have an interest or are affected by a particular project, decision, or organization. It helps to identify and categorize stakeholders based on their level of influence, interest, and importance.

So when it comes to understanding and managing stakeholders, it is crucial to have a clear and comprehensive stakeholders map.

The stakeholders map typically consists of a grid or matrix with two axes: influence and interest.

Figure: Stakeholders example map
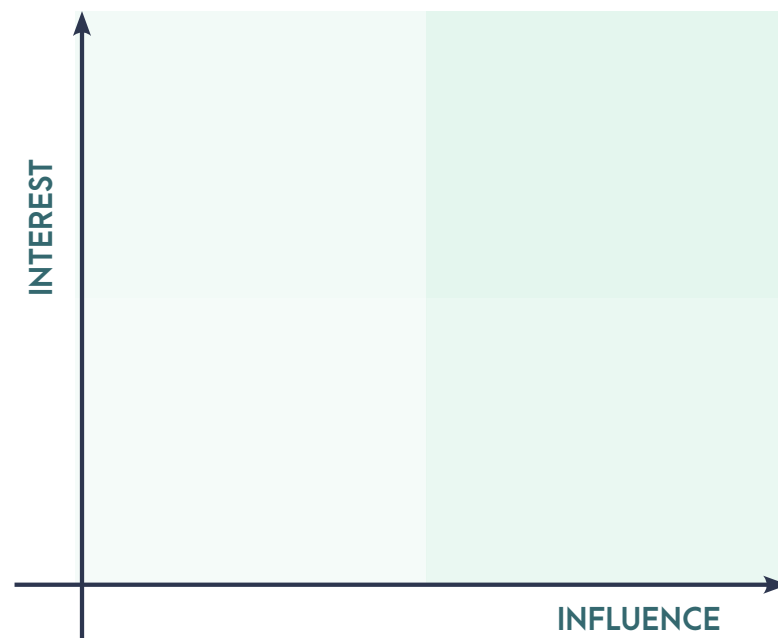
The **INFLUENCE** axis represents the level of power or control that stakeholders have over the project or decision.
This can range from high influence, where stakeholders have the ability to make or break the project, to low influence, where stakeholders have minimal impact.

The **INTEREST** axis represents the level of concern or involvement that stakeholders have in the project. This can range from high interest, where stakeholders are directly affected by the project and have a vested interest in its success, to low interest, where stakeholders have little or no direct impact.

Based on these two axes, stakeholders can be categorized into four main groups:

KEY PLAYERS: These are stakeholders who have both high influence and high interest in the project. They are typically the decision-makers or those who have the power to significantly impact the project's outcome. It is crucial to engage and involve key players in the decision-making process and keep them informed throughout the project.

SUPPORTERS: These stakeholders have high interest but low influence. They may not have the power to make decisions, but they are still important as they can provide support, resources, or expertise. Engaging supporters can help gain buy-in and build alliances for the project.

NEUTRAL PARTIES: These stakeholders have low interest but high influence. They may not be directly affected by the project, but they have the power to influence its outcome. It is important to monitor and manage their concerns or potential opposition to ensure the smooth progress of the project.

MARGINAL STAKEHOLDERS: These stakeholders have both low influence and low interest. They may have minimal impact on the project and may not be directly affected by it. While it is not necessary to actively engage with marginal stakeholders, it is still important to keep them informed to maintain transparency and avoid any potential conflicts.

This map allows for effective stakeholder management and communication strategies to be developed, ensuring that all relevant parties are engaged and their interests are taken into account.

STAKEHOLDER'S MAP

Figure:
Stakeholder's map

STAKEHOLDER'S INTERVIEWS

UACOOPERA is the branch that interfaces the University of Aveiro with the rest of the world, promoting culture and innovation. It deals with creating a bridge between the university and the business world, as well as creating links with other institutions of the Region.

Cooperation is concerned with linking university projects with business organisations and providing services and advice by transferring knowledge and technologies. It also promotes actions to support start-ups and intermediation of parternship through the university incubator. Plus the protection of intellectual property by patenting the work done.

ESN Aveiro is a section of the Erasmus Student Network, a non-profit organization created in 1987, that assists students from all around the world in participating in Erasmus+ mobility programmes.
The organization has a good reputation for embracing international students and helping them during their stay in Aveiro.

OVERALL

The project was presented on 15 November 2023 to two representatives of the cooperation Sofia Nunes and Joana Coimbra.

The meeting was very informative and the project proposal was well received by the society, with subsequent meetings and proposals for the development of a pilot project idea and future expansion to potential partners.

OVERALL

The project was presented on 2 February 2024 to the president of the assocaition Carolina Reis Rodrigues.

The meeting was very positive and Carolina was very supportive of the project. Environmental sustainability is a very strong point on the part of the association; therefore, she has been favorable to support the initiative, so much so that made available to grant the space of the office, ESN Aveiro, for the deposit of the first future donations and the future creation of the first kits for those who need them.

3– BUSINESS PLAN

The business plan for the house-goods sharing service will involve several key components based on the stage of implementation:

1. FIRST LEVEL – PILOT PROJECT:

The beginning stage of the business plan will focus on conducting a pilot project in a specific area or target market to test the viability and potential success of the service. In this phase, the focus will be on acquiring a small inventory of house goods and establishing partnerships with local businesses or individuals who are willing to donate theiritems for the service.

The service it should be free of charge as a way to attract users and generate initial feedback and data, also because all the items will be donated and second-hand and only a deposit will be required as a security measure.

2. SECOND LEVEL – EXPANSION AND GROWTH:

After the success of the pilot project, the next phase of the business plan will involve expanding the service to a larger target, includind workers and other individuals in need of short-term furniture and appliances. During this stage, the focus will be on scaling up the inventory of house goods and establishing partnerships with furniture rental companies or manufacturers to ensure a steady supplyof high-quality items.

In this scenario , the service can introduce a rental fee structure to generate revenue and cover operational costs, and it will be also possible that some items will be lended brand new from manufacturers or retailers that have unused warehouse inventory.

At the end the focus of the service is to provide convenient and affordable solutions for individuals who need temporary furniture and appliances, whether they are students or workers, without forgetting the importance of sustainability and reducing waste in the process.

4– INFRASTRUCTURE

The infrastructure is a critical component of the house-goods sharing service as it involves the physical resources and systems needed to support the operation. This includes storage facilities for the house goods, transportation for delivering and retrieving items, and an online platform or app for users to browse and reserve items.

At the moment the University of Aveiro has limited storage options facilities, but is currently expanding its space creating new buildings and storage around the campus area. Maybe in the future the university could allocate some of these spaces for storage purposes, or alternatively, partnerships could be formed with local storage facilities to fulfill this need.

Meanwhile, ESN Aveiro is already open and offers its space for short-term item storage. Therefore, using the available space temporarily, as long as the quantity is limited, while looking for a permanent location for when the service expands, would be the viable alternative.

TARGET AUDIENCE

The main reference market for this service is university students living in dormitories or rental apartments. This group is defined by scarce financial resources, strong demand for household products and growing awareness of environmental problems. In addition to these, students often buy several items just for a momentary use because of necessity.

In the future, the service could be extended to anyone who needs it, be it a young worker who has just moved, a digital nomad or a family on holiday who forgets something. The high scalability of the service opens the door to potential growth both in terms of resources and territorially.
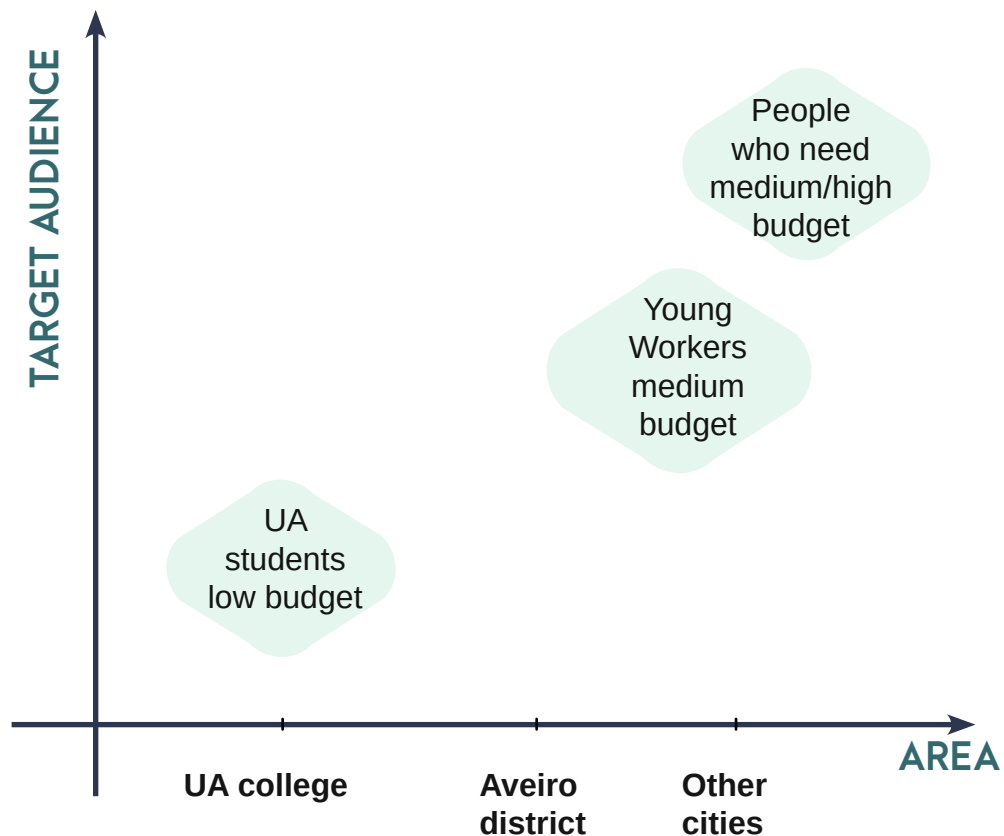
Conclusion

Based on the research, market analysis, and understanding of the infrastructure requirements, it is clear that there is a demand for a house-goods sharing service in the UA Contest area. By providing convenient and affordable solutions for individuals in need of temporary furniture and appliances, the service can cater to a wide range of users, including students andworkers.

Additionally, the focus on sustainability and reducing waste aligns with the growing environmental consciousness of consumers.

The data showed that many students face challenges with affordability, convenience, and sustainability when it comes to furnishing their living spaces. Additionally, the user interviews revealed that many students are open to the idea of borrowing items from others and see value in a sharing economy model.

The stakeholders interwiewed were also positive about the idea and expressed interest in potentially partnering or supporting the service.

The next steps would involve further refinement of the service concept, including developing the implementation of the service.

Figure: Target audience evolution map

04.

DEVELOPT
& DELIVER

04

04

Research question

A research question is a specific and clear inquiry that guides the research process and defines what the researcher wants to investigate or discover. With this question the researcher aims to answer through their study.

The research question "How can I help the students living in off-campus housing in the UA Contest area to access essential household items and promote sustainable consumption habits?"

The data analysis from the previous chapter suggests that implementing a house-goods **SHARING SERVICE** in the UA Contest area would be an effective solution to address these needs, because the question is relevant and aligns with the goals of promoting sustainable living and reducing waste in the community.

There is a potential for the development of this service in the UA Contest: first of all, the market research highlights that nowadays there isn't a valid alternative and from the data research, the data shows that there is a demand for such a service, as students living in off-campus housing often struggle to access essential household items and resort to buying new items, plus Erasmus students are forced to buy items that often can not take back with them, ended up with trash them, which contributes to waste and unsustainable consumption.

Therefore, implementing a house-goods-sharing service in the UA Contest area can provide a sustainable solution to these challenges and meet the needs of the target audience

The research question

"HOW CAN I HELP THE UA STUDENTS LIVING IN OFF-CAMPUS HOUSING TO ACCESS ESSENTIAL HOUSEHOLD ITEMS AND PROMOTE SUSTAINABLE CONSUMPTION HABITS?"

AFFINITY DIAGRAM

ITEM HOUSE SHARING
- Wide range of shareable items to meet diverse needs
- Flexible rental options (short or long term)
- Easy search and filtering (by category, availability, etc.)

COMMUNITY ENGAGEMENT
- Share the service among the student community and associations
- Listing review system to promote quality and trust
-Utilize social media integration to connect users

USER EXPERIENCE
- Intuitive and user-friendly interface
-Seamless communication tools for inquiries and bookings
- Gamification elements to encourage participation

COST SAVINGS
- Reduce the need to buy new items
- Save money
- Promote a more sustainable lifestyle

LOCATION-BASED SERVICES
-Access a wider variety near the university campus
- Map only available items
- Real-time notifications for new listings

MOODBOARD

SCENARIO BEFORE THE SERVICE
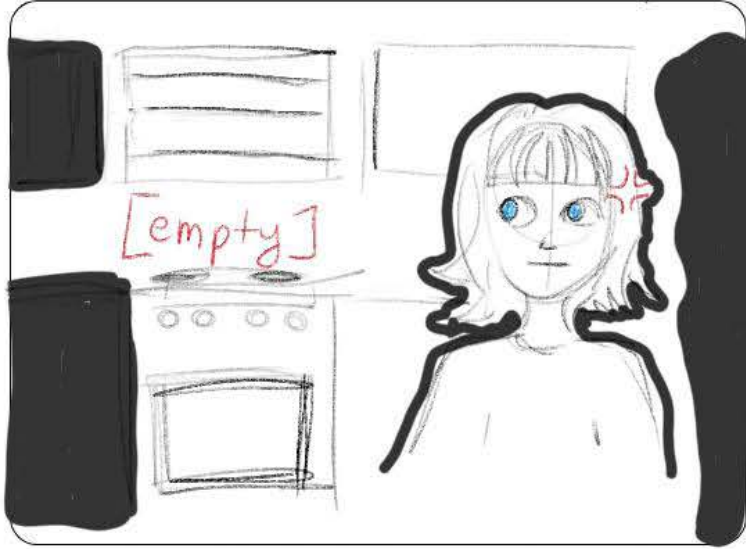
Service concept

Create a service for the UA students to circulate necessary home-items during their stay in Aveiro.

The service will enable to borrow objects and support their return for future use.

THE SERVICE

The service will function as a peer-to-peer platform where UA Contest area residents can borrow and donate household goods.

This service aims to fill the gap in access to essential household items for students living in off-campus housing and promote sustainable consumption habits.

The service will operate through a user-friendly online platform, where residents can create an account and browse through AVAILABLE ITEMS FOR BORROWING. Users will be able to search for specific items or browse categories such as kitchen appliances or bedding items. They can then request to borrow an item for a specific period of time.

Additionally, a section of the service will be open to free DONATIONS, which allows users to put into circulation items that are still in a good state but are no longer in use to their owners. It ought to be utilized only as a last option to prevent throwing away unused items.

The service will be developed around the development of a mobile application, to better meet the needs of the target, ovverro young students from 18 to 30 years.

MYSHAREBOX

The service name will be MyshareBox, combining the possessive pronoun "my" with the word "sharing". Because it aims to refer to a once personal item sharing.

The "box" instead refers to the common place of the shipping package box that can be used to exchange the borrowed or donated items

NEW SCENARIO
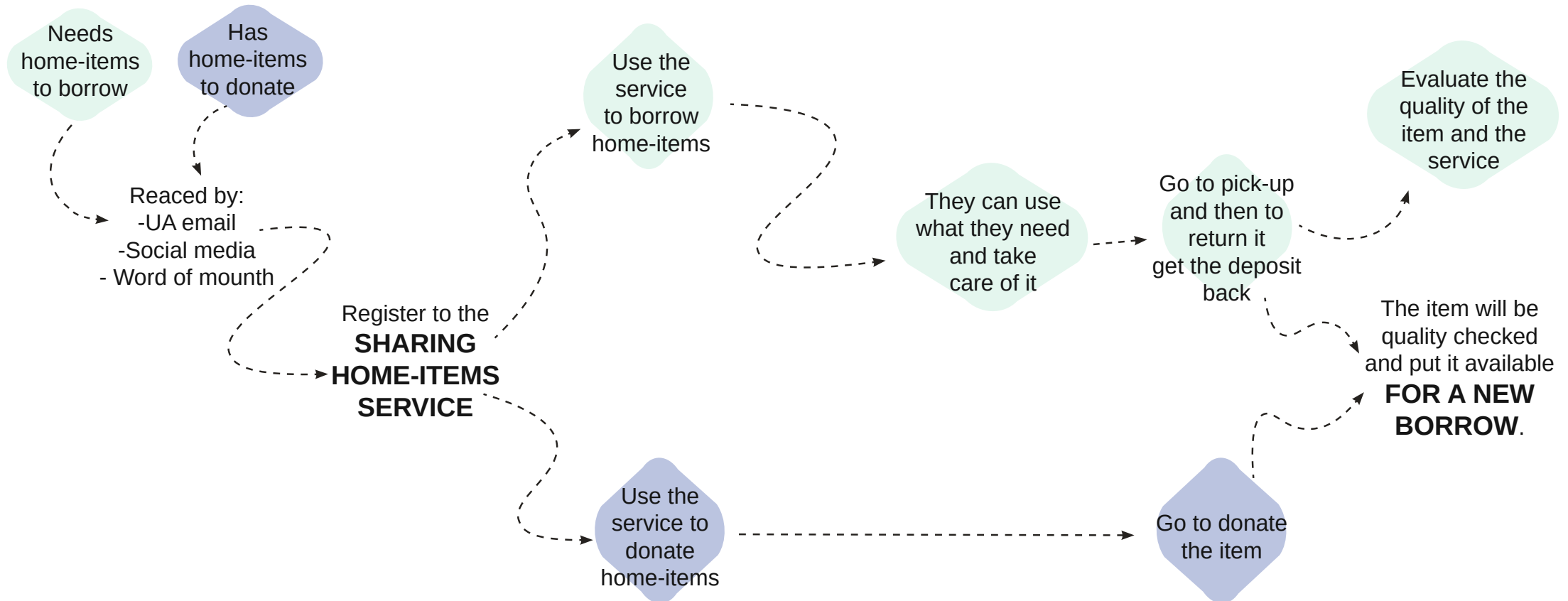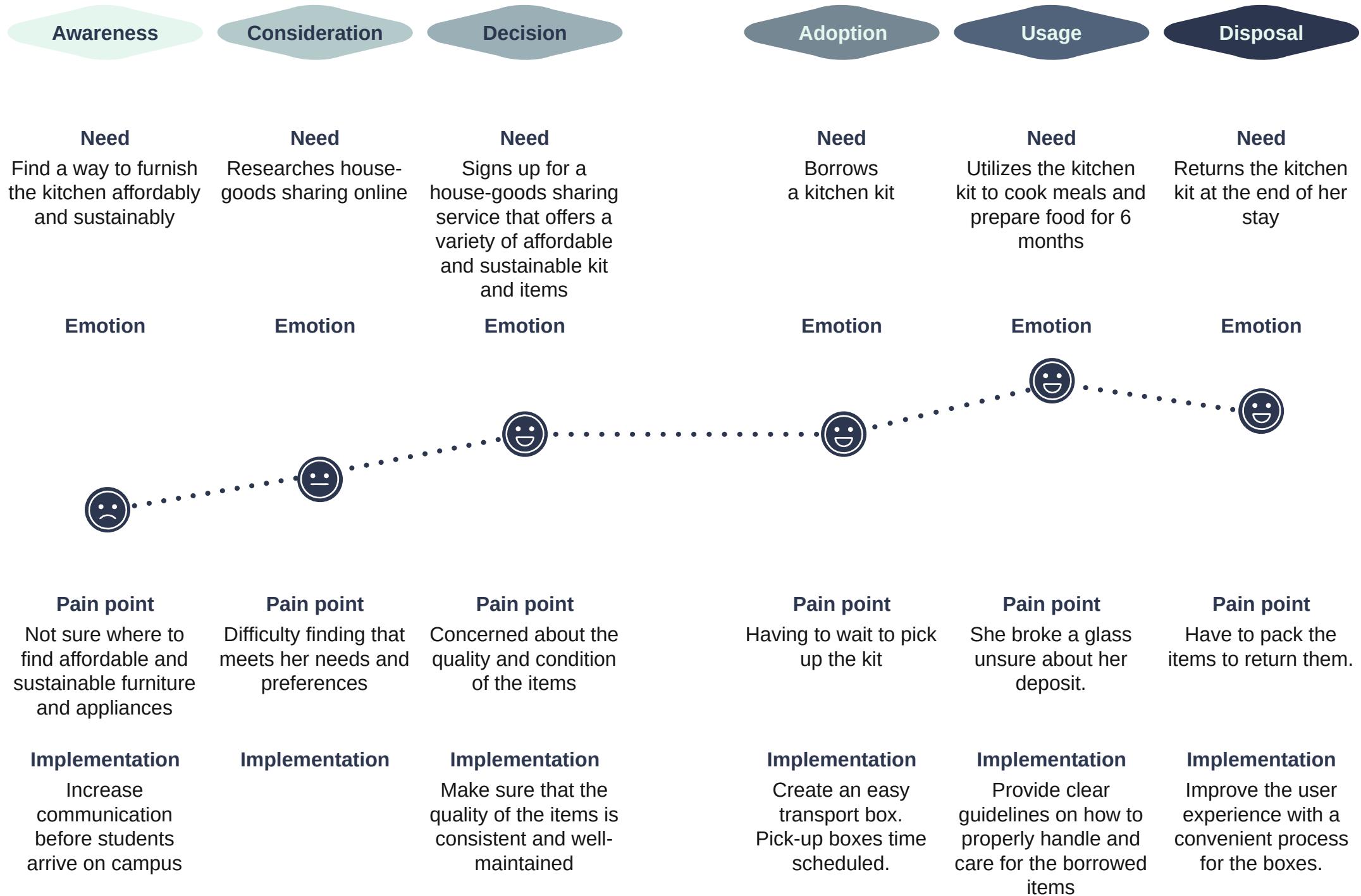
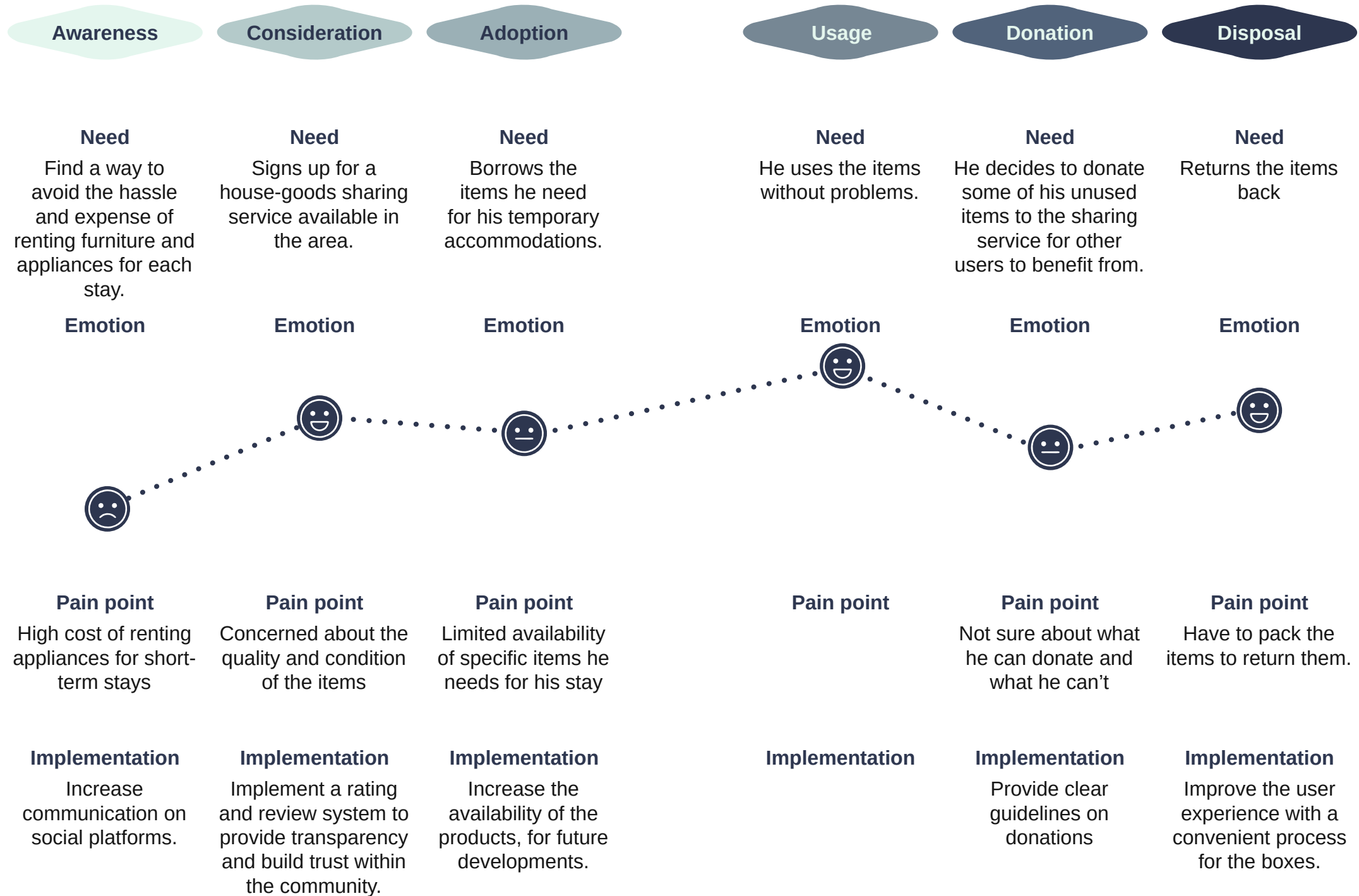arriving to a new place...

a few months later...

SYSTEM SCENARIO

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Awareness	**Registration and onboarding**	**Usage**	**Once home**	**Picking up and Drop-off items**	**Feedbacks**
Discovering the house-goods sharing service	Joining up the service and create a new user profile.	Browse the available items on the platform, select it and submit a borrowing request Or Update the item to donate and set a drop-off appointment	Provide detailed rules on how to properly handle and care for loaned things.	Create a simple and easy way process. Provide clear guidelines about quality, deposit payment and donation conditions	Implementing a rating and review system to provide customer feedback of their experience. building trust within the community.

UA STUDENTS

Needs home-items to borrow

Has home-items to donate

Reaced by:
-UA email
-Social media
- Word of mounth

Register to the **SHARING HOME-ITEMS SERVICE**

Use the service to borrow home-items

Use the service to donate home-items

They can use what they need and take care of it

Go to pick-up and then to return it get the deposit back

Go to donate the item

Evaluate the quality of the item and the service

The item will be quality checked and put it available **FOR A NEW BORROW**.

EMMA'S USER JOURNEY

Awareness	Consideration	Decision	Adoption	Usage	Disposal

Need

Find a way to furnish the kitchen affordably and sustainably

Need

Researches house-goods sharing online

Need

Signs up for a house-goods sharing service that offers a variety of affordable and sustainable kit and items

Need

Borrows a kitchen kit

Need

Utilizes the kitchen kit to cook meals and prepare food for 6 months

Need

Returns the kitchen kit at the end of her stay

Emotion   **Emotion**   **Emotion**   **Emotion**   **Emotion**   **Emotion**

Pain point

Not sure where to find affordable and sustainable furniture and appliances

Pain point

Difficulty finding that meets her needs and preferences

Pain point

Concerned about the quality and condition of the items

Pain point

Having to wait to pick up the kit

Pain point

She broke a glass unsure about her deposit.

Pain point

Have to pack the items to return them.

Implementation

Increase communication before students arrive on campus

Implementation

Implementation

Make sure that the quality of the items is consistent and well-maintained

Implementation

Create an easy transport box. Pick-up boxes time scheduled.

Implementation

Provide clear guidelines on how to properly handle and care for the borrowed items

Implementation

Improve the user experience with a convenient process for the boxes.

DIMITRI'S USER JOURNEY

| Awareness | Consideration | Adoption | Usage | Donation | Disposal |

Need

Find a way to avoid the hassle and expense of renting furniture and appliances for each stay.

Need

Signs up for a house-goods sharing service available in the area.

Need

Borrows the items he need for his temporary accommodations.

Need

He uses the items without problems.

Need

He decides to donate some of his unused items to the sharing service for other users to benefit from.

Need

Returns the items back

Emotion   **Emotion**   **Emotion**   **Emotion**   **Emotion**   **Emotion**

Pain point

High cost of renting appliances for short-term stays

Pain point

Concerned about the quality and condition of the items

Pain point

Limited availability of specific items he needs for his stay

Pain point

Pain point

Not sure about what he can donate and what he can't

Pain point

Have to pack the items to return them.

Implementation

Increase communication on social platforms.

Implementation

Implement a rating and review system to provide transparency and build trust within the community.

Implementation

Increase the availability of the products, for future developments.

Implementation

Implementation

Provide clear guidelines on donations

Implementation

Improve the user experience with a convenient process for the boxes.

EMPATHY MAP

The Empathy Map will enable me to put myself in the shoes of the users and visualize their needs, desires, fears, and motivations.

An empathy map is a tool that allows you to capture the thoughts, feelings, actions, and words of users in a specific situation (Popescu, 2019).

EMMA – 23 Y.O. ROME (IT) – STUDENT AT UA

GOAL

- Don't need to worry about furnitures in her new house

- Have a convenient way to access and return items

- Have affordably items

SAY

"I'M GRATEFUL FOR THE OPPORTUNITY TO SAVE MONEY BY BORROWING INSTEAD OF BUYING."

THINK

"I'M GLAD THAT THERE'S A SERVICE AVAILABLE THAT MAKES IT EASY TO FURNISH MY ROOM."

FEEL

RELIEVED TO HAVE A SOLUTION TO THE PROBLEM.

DOES

REQUESTS THE ITEMS SHE NEEDS FOR HIS ROOM.

SITE MAP
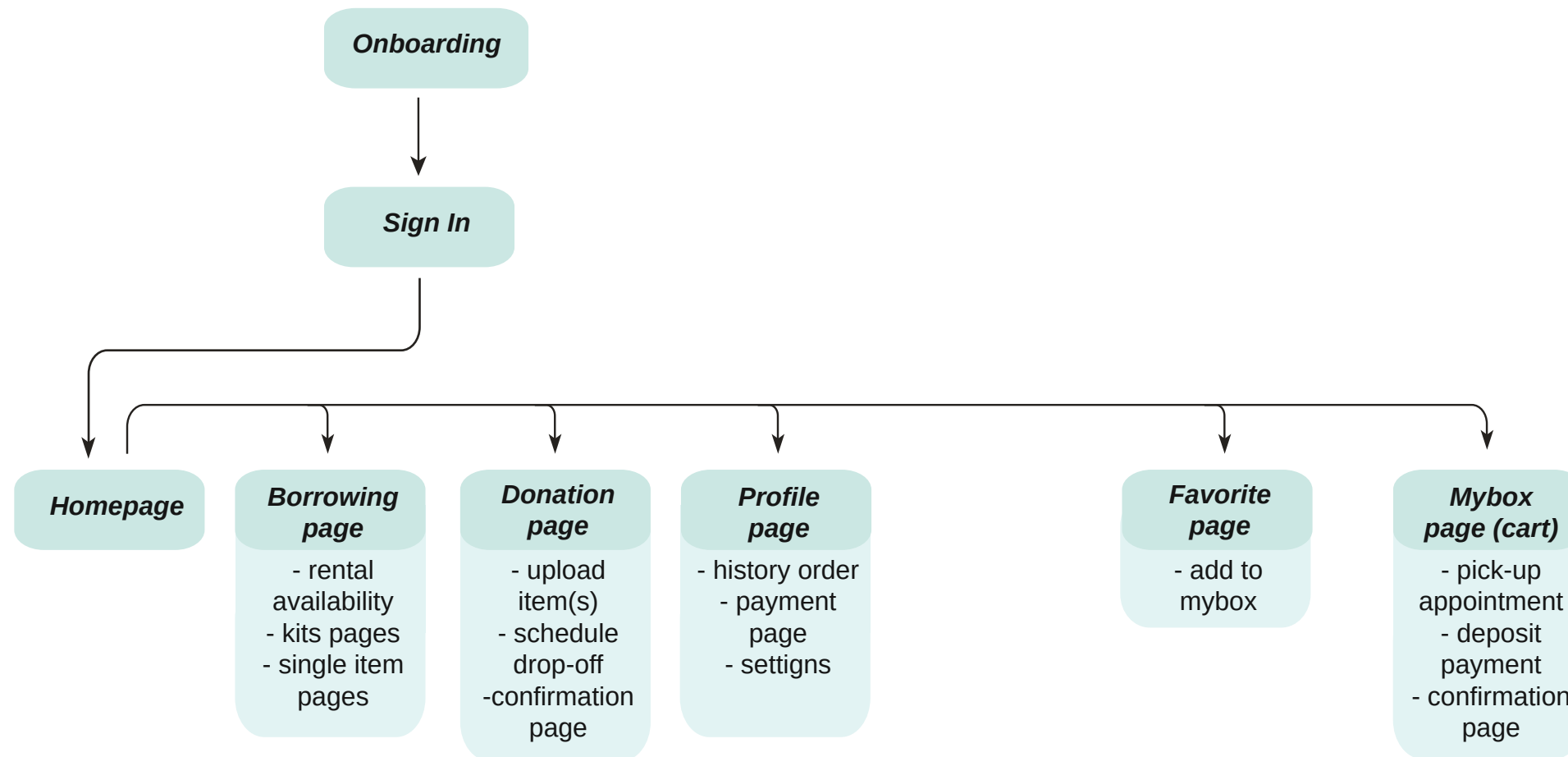
Figure: Sitemap workflow map

WIREFRAMES
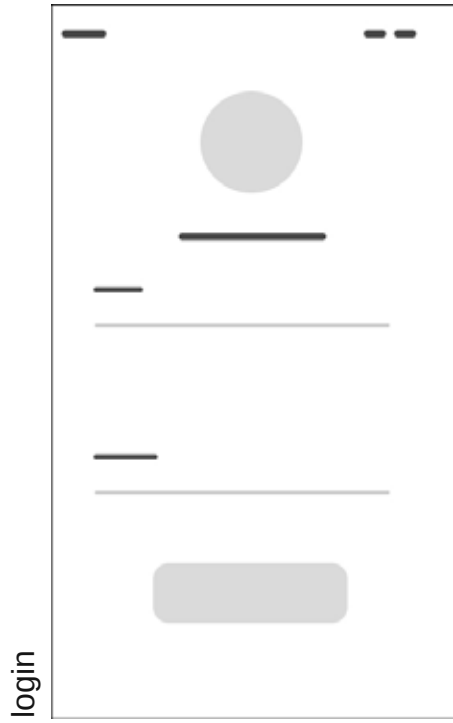
onboarding

borrowing section

mybox section

login
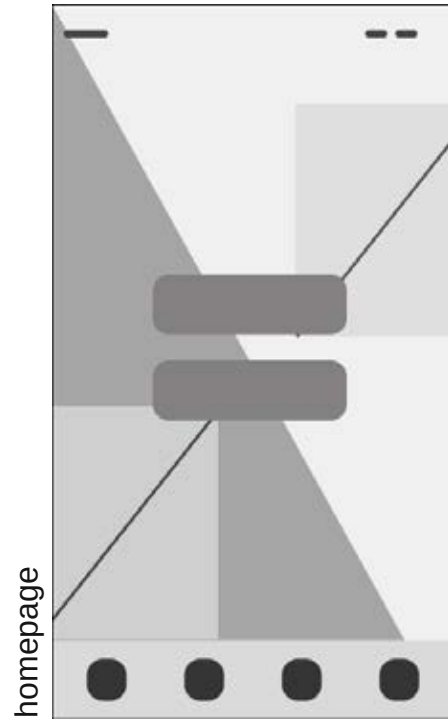
homepage
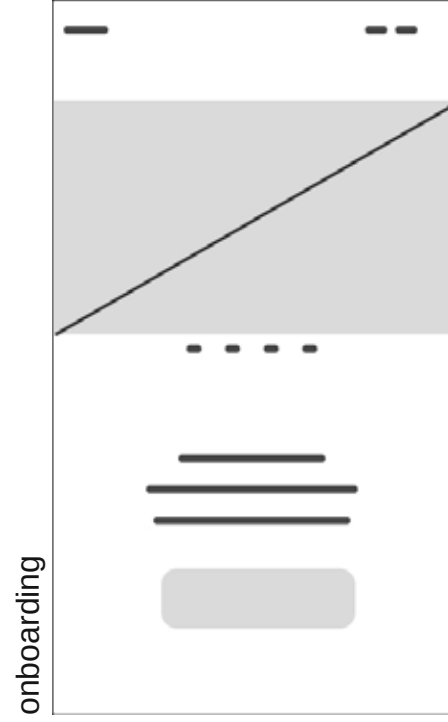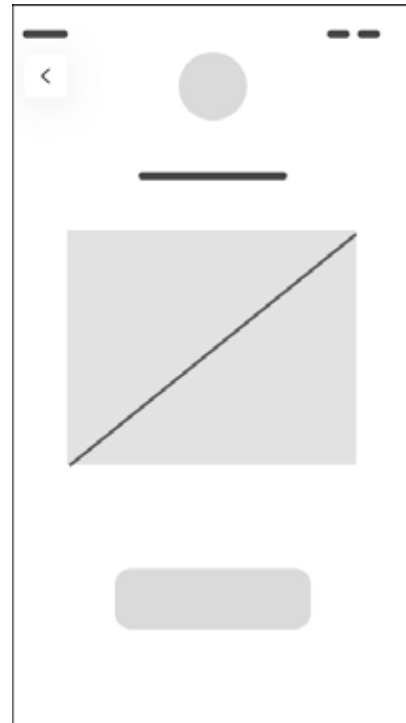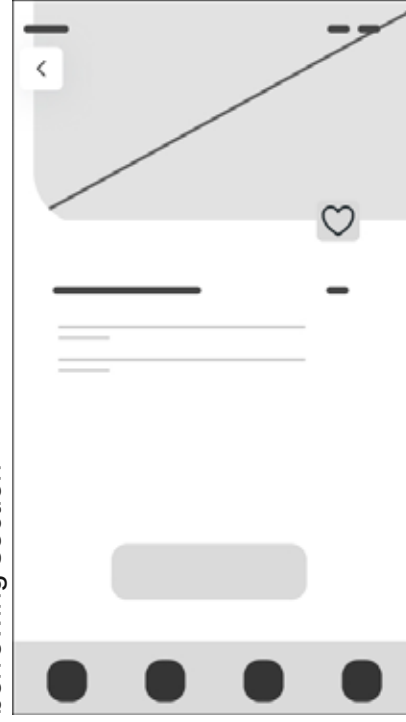
donation section
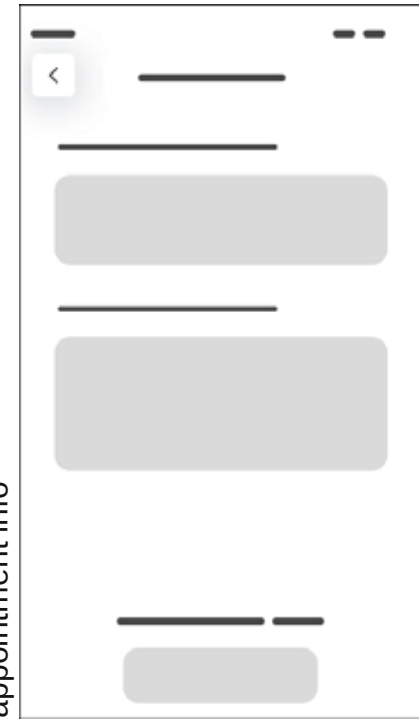
appointment info
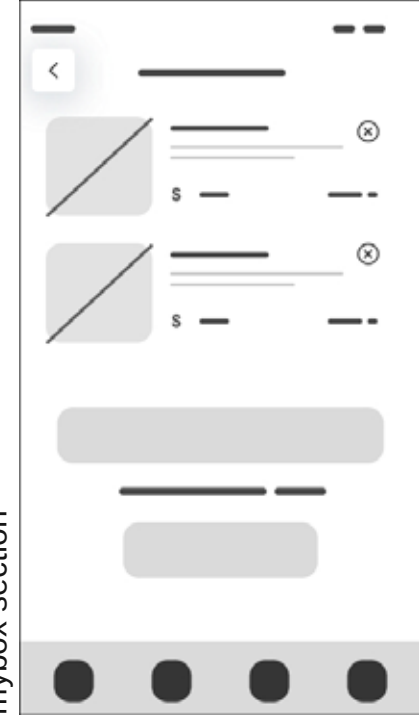
LOGO

shipping
box
+
house
+
sharing
items

- - - - - - - ->

mysharebox

COLOUR PALETTE

Charcoal blue
R48 G51 B66

Dusty blue
R101 G114 B179
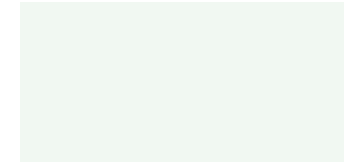
Mint Cream
R243 G248 B242
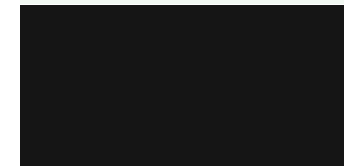
Eerie blue
R27 G28 B28
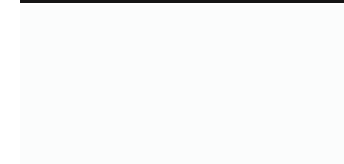
Ghost white
R251 G252 B252

Cutty Sark
R73 G104 B110
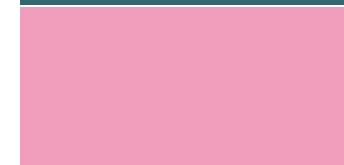
Pink Begonia
R219 G154 B186

Medium Vermilion
R229 G93 B60

TYPOGRAPHY

Abel

Aa Bb Cc Dd ee Ff Gg
Hh Ii Jj Kk Ll Mm Nn
Oo Pp Qq Rr Ss Tt Uu
Vv Xx Yy Ww Zz

logo

Arca majora

**Aa Bb Cc Dd ee
Ff Gg Hh Ii Jj Kk
Ll Mm Nn Oo Pp
Qq Rr Ss Tt Uu Vv
Xx Yy Ww Zz**

headings

Montserrat

Aa Bb Cc Dd ee
Ff Gg Hh Ii Jj Kk
Ll Mm Nn Oo Pp
Qq Rr Ss Tt Uu
Vv Xx Yy Ww Zz

text

PROTOTYPES

The service app will open with the **LOGO PAGE** folllowed by four **ONBOARDING** pages. These pages provide an overview of the general functionality of the service
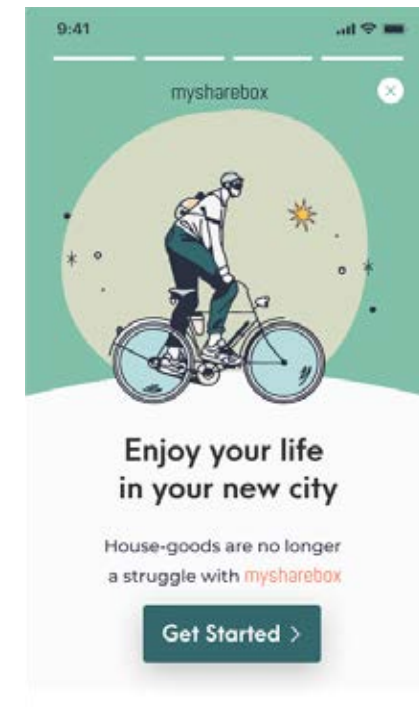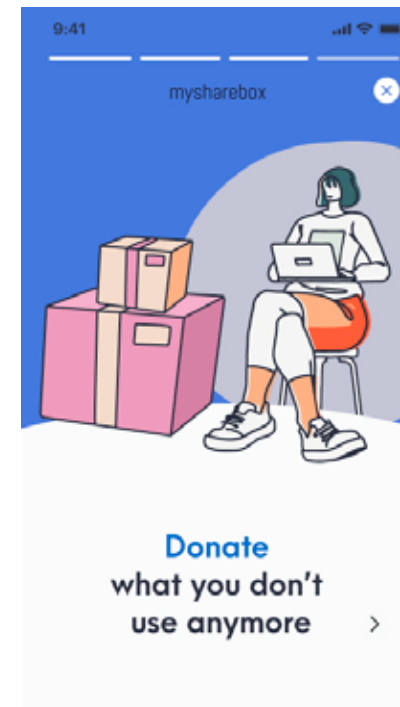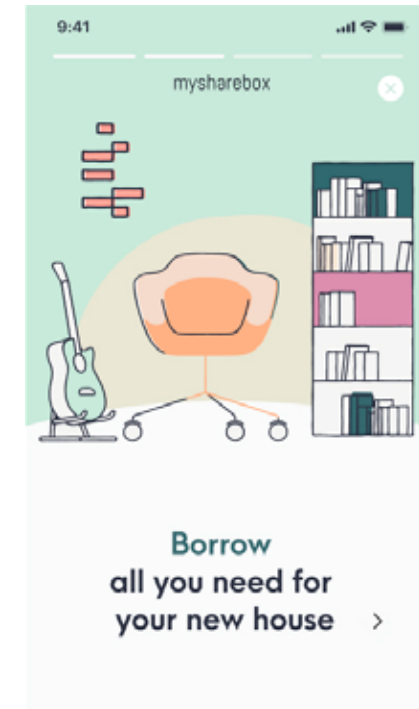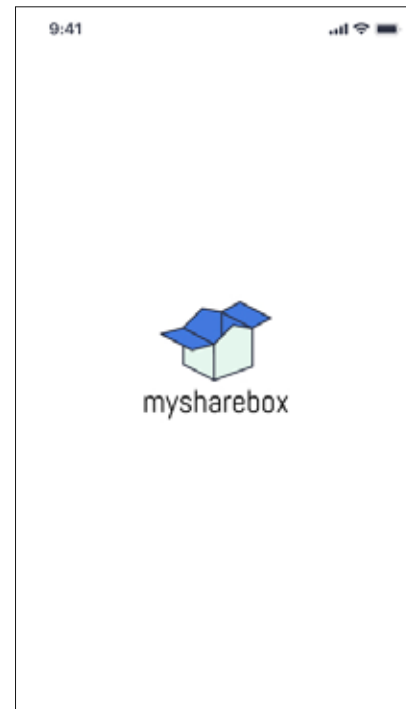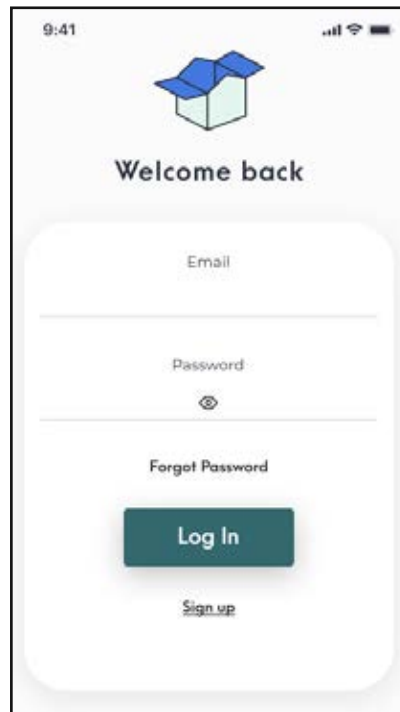
Then it will be possible to **LOG** into the app or Create a New account
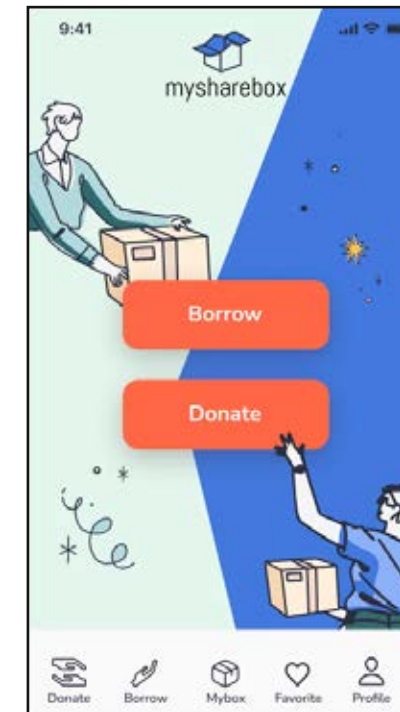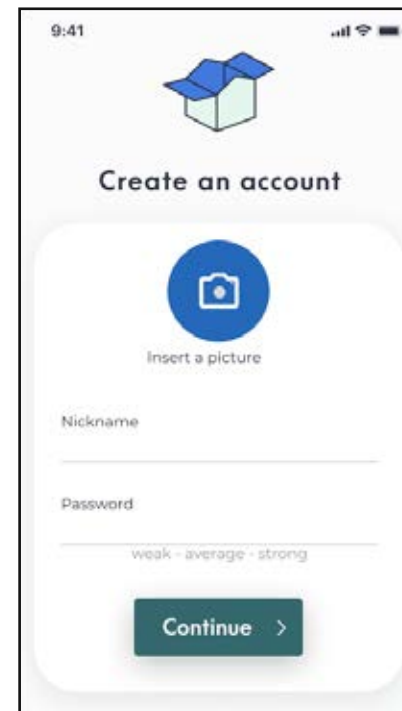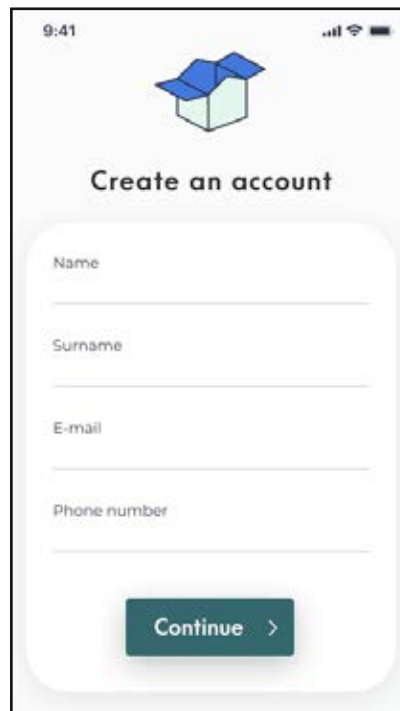
The **HOMEPAGE** page gave to the users the possibility of decide the main action: Borrow or Donate.

This page will be displayed after the first opening ot the app, later it will be always possible to navigate through the sections using the navigation bar at the bottom.

NAVIGATION BAR

The **BORROWING SECTION** of the application allows the users to:

- Search directly an item with the searching bar

- Filter the items with the categories

- Borrow a already made kit or create a custom kit of items

- See the lastest items donated by other users.
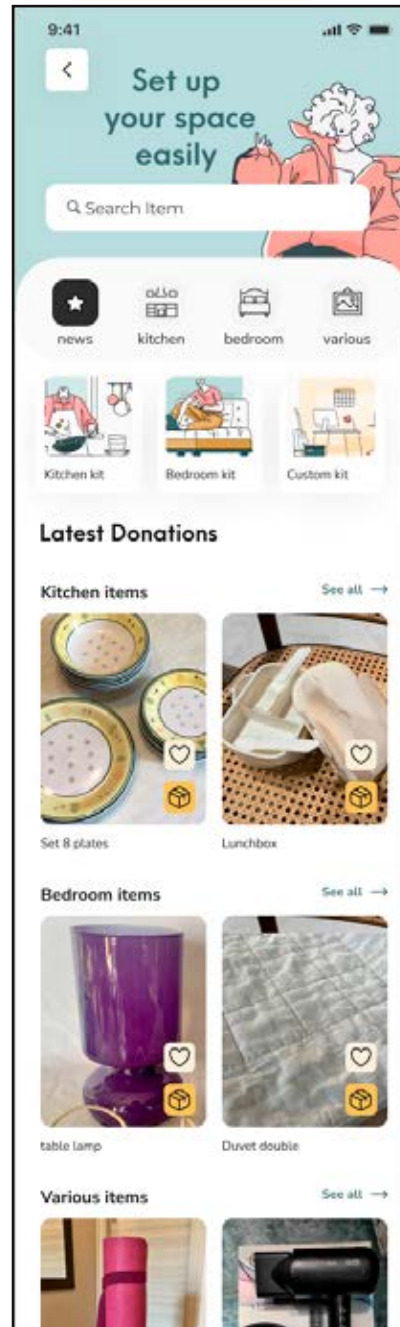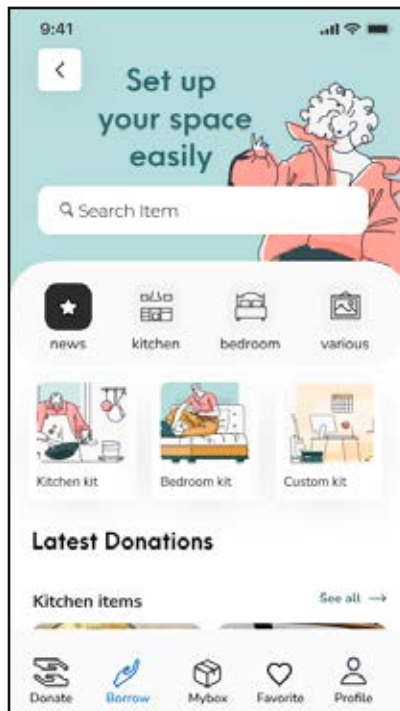
The **KITS** are divided into two main sections, the kitchen stuff and the bedroom stuff.
Is also possible to create a custom kit mixing items from different section.

Every kit is made from 1 up to 4 person and can be borrowed from 1 to 12 months. Is also possible to return before the items or or extend the rental period in the profile section.
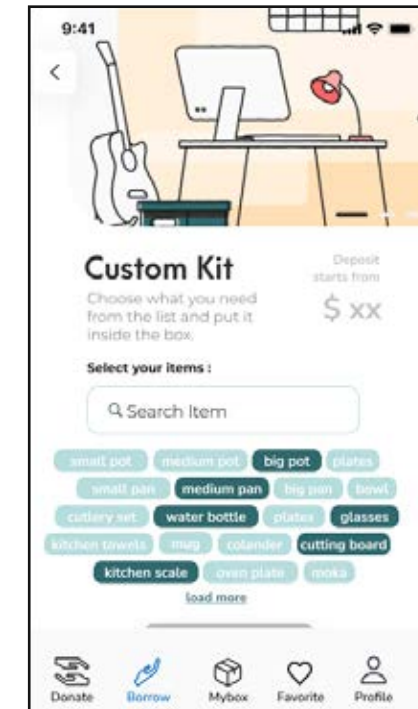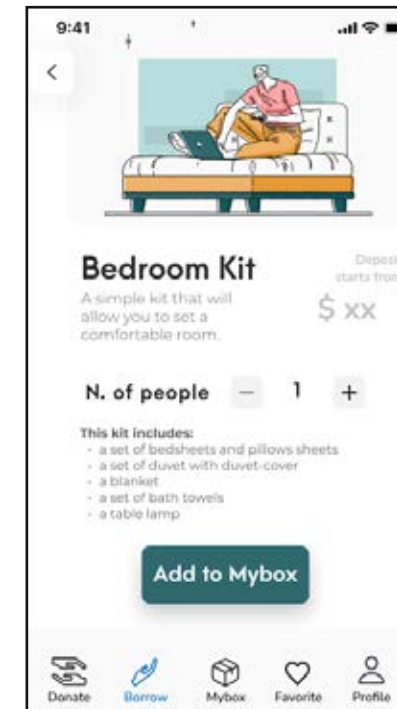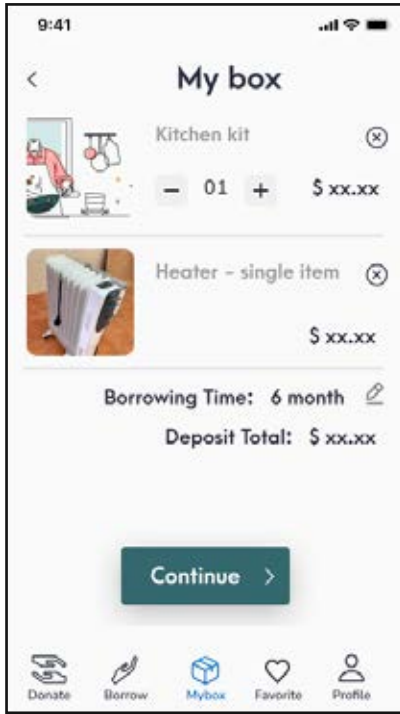
The **CART SECTION** is called "Mybox" in order to mantain the coherence with the concept.

On this section is possible to proced with the borrowing request.
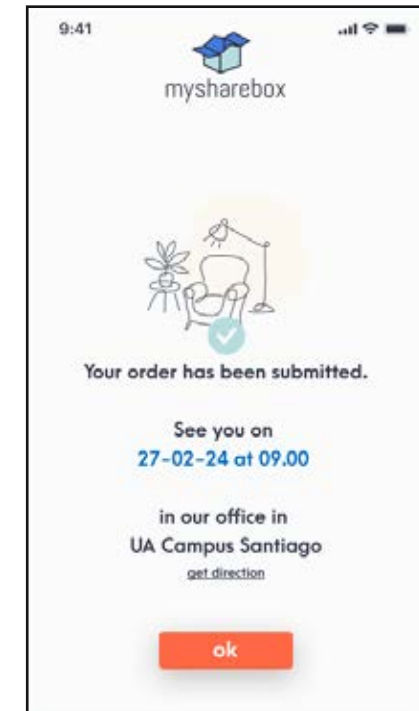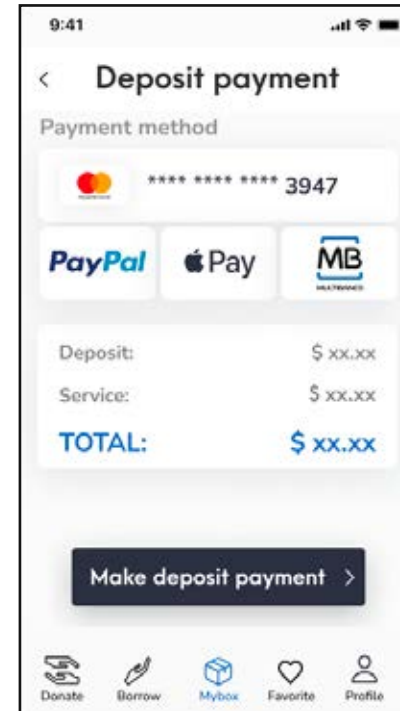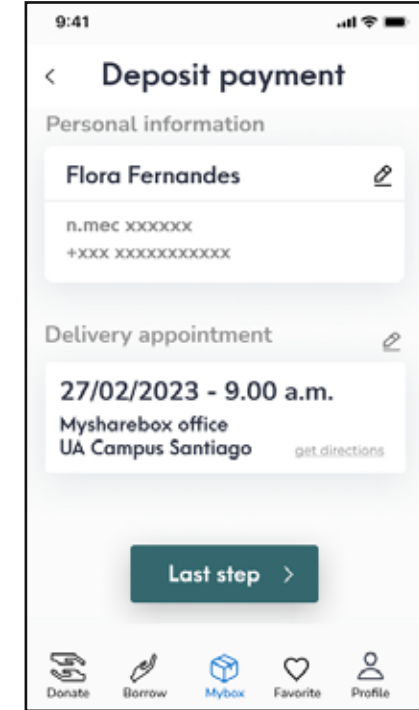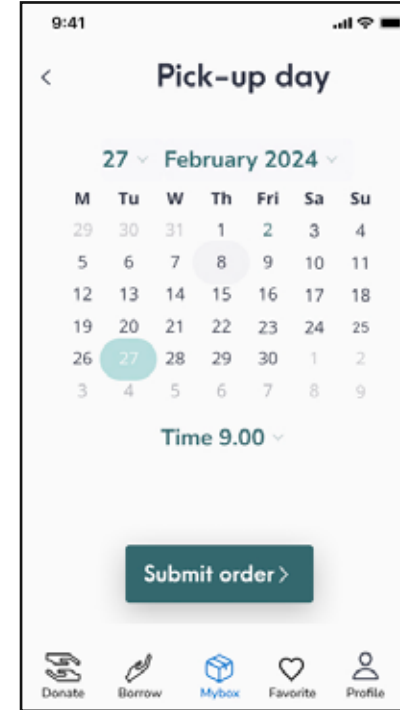
On the **DONATION SECTION** users can
upload their items.

This procedure is fast and easy going, it will
be asked to the users to upload a photo and
then to set a drop-off appointment.

With the photo will be possible understand
the quantity and the quality of the items.
And with the appointment is will be possible
to manage a fast and organized schedule,
so the users will not wait unnecessarily in the
office.
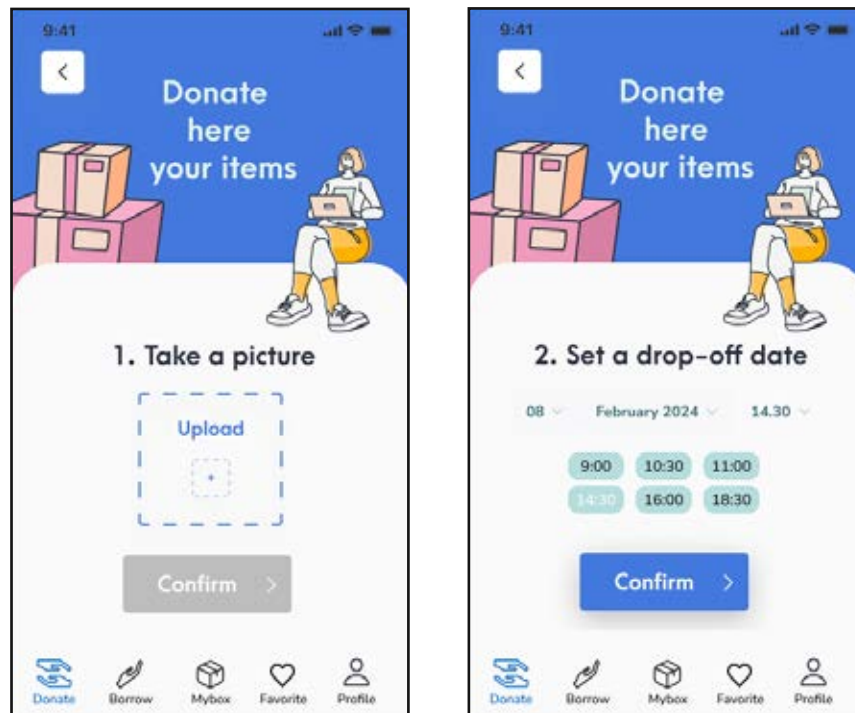
On the **PROFILE SECTION** will be displayed
all the personal information of the user.
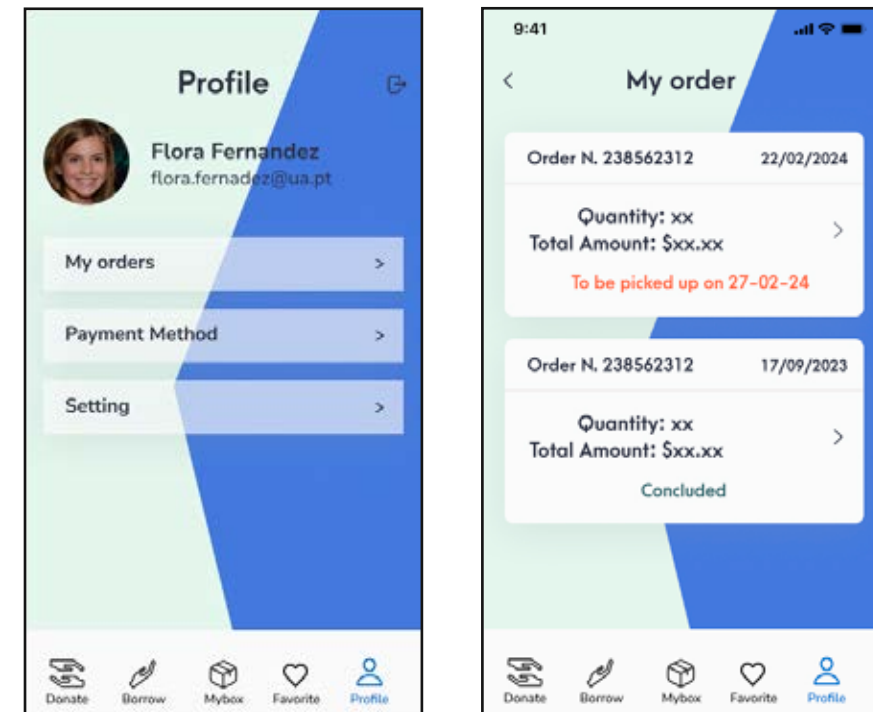
Usability test

In order to evaluate the usability of our project service application, we conducted a usability test with target users, UA students, to assess the efficiency, effectiveness, and user satisfaction of the application. The test consisted of a series of tasks that participants had to complete using the application:
the tasks reflects real-life scenarios and challenges that users might encounter while using the application.

During the usability test, participants were encouraged to think aloud and provide feedback on their experience with the application, including any difficulties they encountered, areas of confusion, and suggestions for improvement.
At the end some questions were asked to gather additional insights on their overall satisfaction with the application and any additional features they would like to see.

2 SCENARIOS

13 TESTS

SCENARIO 1
Imagine you and a friend have entered a master course in Aveiro University - you are both very excited. You have arrived at the house you've both rented in Aveiro. The landlord showed you the house, it has the major furniture (e.g. bed, desk, the hoven, sink) but there is only a very used pot to cook; and no cutlery nor plates.
So you're looking for kitchen tools to be able to cook in your new house. To help you set up, you've heard about borrowing service good-items used among university students.
Moreover, it is December, and it's quite cold. A heater would be most welcome as well.
You search the app Mysharebox and you open it to get the items.

SCENARIO 2
Your period abroad is going to end and you find out that you bought a lot of items and now you don't have space in your luggage to bring them back with you. You have a lunchbox set that you would like to donate, and you know about a donation service good-items used among university students. so, you search the app Mysharebox and you use it to donate there your item.

USABILITY TEST RESULTS & REDESIGN

The overall results of the usability test indicate that the users are interested into the project service and the application performed well in terms of efficiency and general user satisfaction.

Participants were able to successfully complete the tasks and achieve their scenario's goals within a reasonable amount of time.

The feedback received from participants was largely positive, with users finding the application easy to navigate and understand.
Participants also appreciated the clear and intuitive user interface, which allowed them to quickly find the information they needed.
However, there were a few areas where users encountered difficulties or suggested improvements, most of them in the borrowing section of the application.
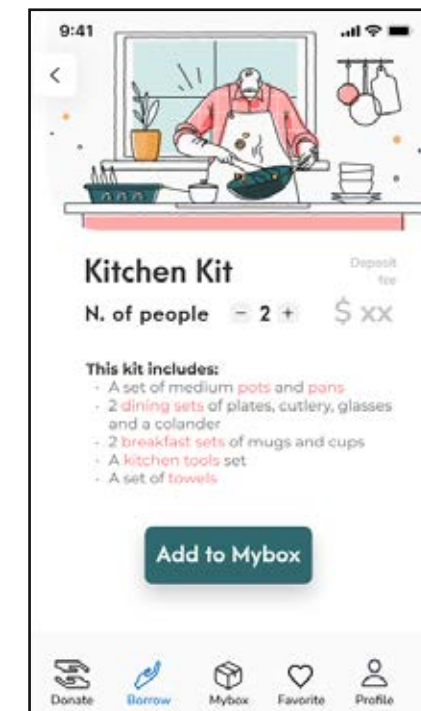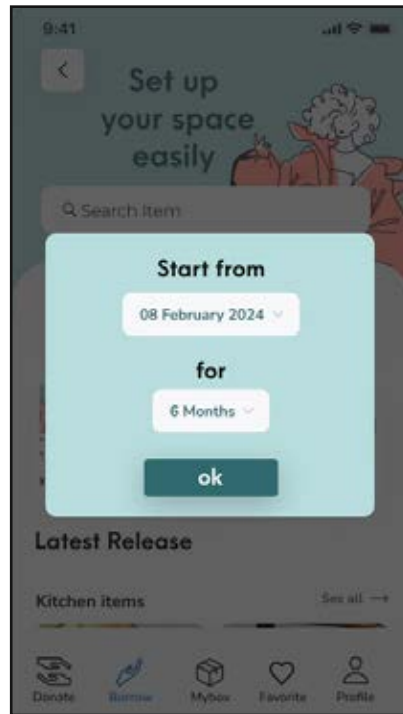
Main changes applied:

BORROWING SECTION:

- pop-up availability diplayed at the beginning of the section
- kit pages changed the layout of the information. Now it will be displayed only the necessary ones.
- thank you page has changed into a more coherent one, diplayed only the important information that the users need.

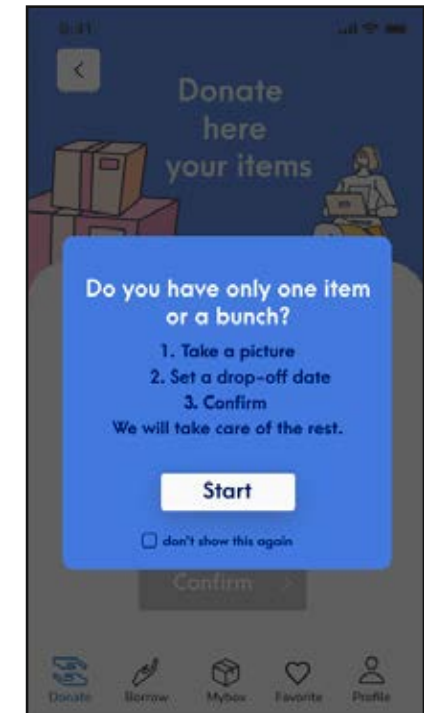Before   After
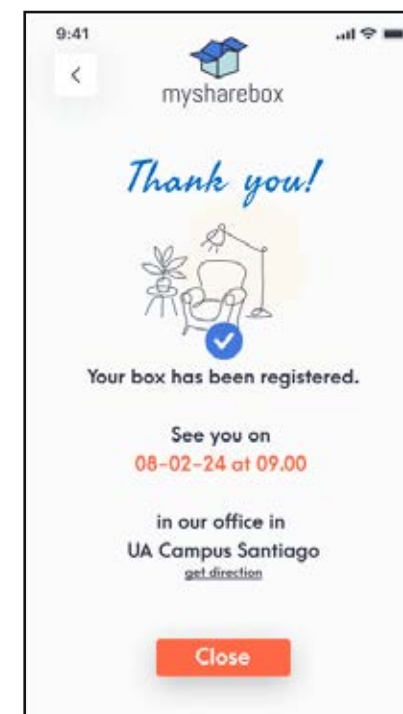
pop-up for availability
at the beginning
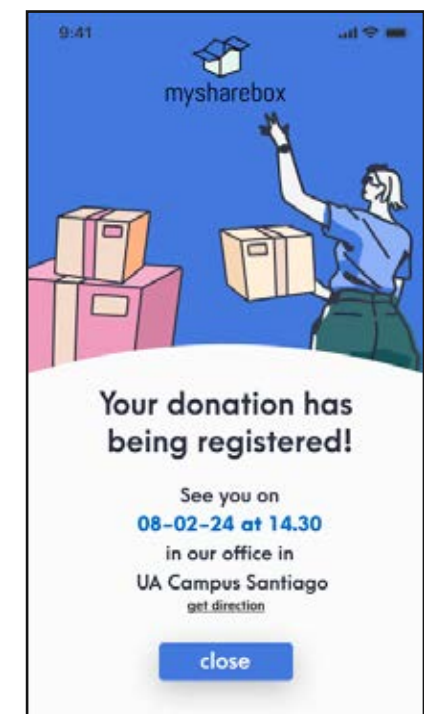

pop-up for adding
item to mybox

DONATION SECTION:

- pop-up with instruction
diplayed at the beginning of
the section
- thank you page has
changed into a more
coherent one, diplayed only
the important information
that the users need.

pop-up instruction

Before

After

CONCLUSION

Conclusion

FUTURE PROSPECTIVES

This thesis aim was to explore the possibility of using a service design approach to develop a new usefull service in the UA Contest area.
To archive this goal, the starting point was an historical overview of the evolution of design for sustainability and the shift towards a more human-centered approach.

The research involved a systemic approach, data collection through user research methods such as surveys and interviews, and analysis of the collected data.

Based on this data it was found that there is a demand for a house-goods sharing service among the students body. With this service, students and other individuals can have access to affordable and convenient furniture and appliances without the need for purchasing and storing their own. Additionally, the service promotes sustainability by reducing waste and encouraging a sharing economy model.

The proposed service has been developed into a prototype application that has undergone usability testing and received positive feedback from users and support from the stakeholders.

The conclusions suggest that there is potential for the implementation of such as service because it would address the needs and challenges faced by students in terms of affordability, convenience, and sustainability when it comes to furnishing their living spaces.

The implementation of the service design project would require further development that was not possible to conduct in this research project, but can be carried out in the future, starting from the pilot project and scaling up based on its success.

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2.0 STATE OF ART

HISTORICAL OVERVIEW OF DFS
2.3 INTRODUCTION TO CIRCULAR ECONOMY

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