Multifactor Study on Circular Business Models in the textile sector

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1 Introduction

This report is done by the Telavalue project, a Co-Innovation project funded by Business Finland (BF). The Telavalue project was a part of the larger Telaketju research continuum. The Telavalue project was carried out during February 2022–July 2024. The researchers come from Turku University of Applied Sciences, VTT and LAB Turku University of Applied Sciences.

Additionally, we have put the results of the work together in Finnish into a webinar[1] that can be found on Telaketju webpages.

In Telavalue[2], the research made in novel circular business models bases on the desire to understand the future possibilities for companies to create value and maintain profitability when the production decreases. The novel circular business models included to the research are product as a service, reuse, take-back, on demand production and sharing platforms models. Together with the companies and researchers the two business models that take a different view on ownership the material of the product were chosen to closer investigation. This meant intensive research on the business models from six different viewpoints: environmental, social, economic, consumer, design and data (Figure 1).

Figure 1 The six different viewpoints: social, environmental, economic, consumer, design and data.

The output from the research on circular business models is a multifactor study on the business models from the social, environmental, economical, consumer, design and data viewpoints and a summary of the researchers' findings.

The research on novel circular business models started in 2022 summer with desk research. The literature found on different types of novel circular business models and the different impact of them where listed. Based on the desk research and discussions with researchers, as well as research done in past projects, 25 hypothetical cases were conducted. These included product as a service (10 cases), reuse (10 cases) and take-back (5 cases) business models. A workshop was held in Autum 2022 with researchers to discuss the different aspects of how the business models should be studied going further. After the workshop with researchers, the models were presented to and reflected with the companies. In Spring 2023, a workshop was held with companies and researchers, based on which two hypothetical cases were selected for further studying from the perspective of design, economics (economic, social and environmental costs), and data. These two cases were: 1) business-to-business case with product as a service (workwear) - A comprehensive solution for companies, and 2) business-to-consumer case - Reuse and Take-back.

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[1] https://telaketju.turkuamk.fi/telavaluen-tuloksia/multifactor-study-on-business-models/
[2] https://telaketju.turkuamk.fi/en/telavalue-project-results/

2   Social aspects – Eerika Heinonen

The potential social pain points of the hypothetical business models are illustrated in the table below. A company or organisation could base their social responsibility evaluation on this framework. The company could focus on just one variable for implementation, but in the best-case scenario, they would take into consideration all the variables and aim to implement them all excellently.

Social responsibility stages in circular business of textiles

NAME OF THE VARIABLE	IMPLEMENTATION OF VARIABLES			
	OK	GOOD	VERY GOOD	EXCELLENT
Code of Conduct	Code of conduct in effect	CoC followed	Implementation evaluated (possibly via 3rd party)	Results reported publicly
Internal feedback	Grievance mechanism	Measuring and monitoring	Interference with problems	Changes in company policies and operation
External feedback	Grievance mechanism	Reaction to feedback	Procedure	Changes in company policies and operation
Remuneration	Employees with employment contract	Living wage	Equal pay	Employment of locals
Stakeholders	Transparent and public value chain	Established partnerships	Partners involved in development work	Economically viable business ecosystem
Product as a service	The product is sustainable, comfortable and safe	Repairable and refurbishable	Sustainable material	Closed loop system
Reusable product	The product is sustainable, comfortable and safe	Remains its value (even repaired)	Recyclable material	Closed loop system
Accessibility in reuse	Promise of product durability	Platform supporting reuse	Product used up	Valuable material returns to the company
Transparency of product data	Internal trackability of products	Link to up-to-date product data within the product	Product data includes scope 3	Product data during use-phase collected
Business model	Test	Pilot	Established part of business	Decreases the production of new products
Sustainability communications	Communication on the current situation	Communication on the development	Communication on the future	Communication on the results and reaching the targets set

Telavalue-hanke. Turku AMK/Eerika Heinonen 2023.

Figure 2 Social responsibility stages in circular business of textiles.

Social responsibility strategies in circular textile business are collected into Figure 2 Social responsibility stages in circular business of textiles. This table should be read from left to right. On the left side, the name of the variable is stated. On the top, the implementation of each variable is stated. The company or other actor can implement the variables on four separate stages (ok, good, very good, excellent). The stages are cumulative, each level must materialize for the actor to move onto the next stage. The company or other actor can at the same time be on different stages at different variables.

The outcome of this research gives viewpoints on social sustainability, not just taking one point of view of working conditions but trying to consider all different stakeholders in the service model. For the novel business to be truly a sustainable choice, all the different points of views need to be considered. The hypothetical circular business cases selected during Spring 2023, were further studied from the perspective of potential social impacts. As a basis for this study, the framework of social life cycle assessment of products and organisations by UNEP, was used. The different impacts were also cross-checked with the Global Reporting Initiative's social standards. This study did not take into account the impacts on traditional production countries, as the study limited only on the use-phase, which hypothetically took place in Europe, more accurately in Finland. As a result, a table or visualisation was made, and it included the potential social pain points of the business models, which each company could base their social sustainability evaluation on. The original tale can be foud online https://telaketju.turkuamk.fi/en/yleinen-en/how-to-evaluate-social-responsibility-of-novel-business-models/

3 Environmental Aspects – Erika Raitala and Mitja Hokkanen

The two circular business cases in this work package were hypothetical, so this time there was no data for LCA or emission calculations. Instead, the environmental analysis focused on different factors that would affect the environmental performance. These include, for example, transportation modes and distances, washing process energy consumption, storage time of the product etc. We noticed that both circular business cases consist of similar main processes: washing, repairs, storage, maintaining the sales platform, transportations, and end of life treatment for unusable items. Some of these processes can occur multiple times during the clothes' use phase.

In this study it was examined the environmental factors of two circular business models: re-use and product as a service. To study these models, detailed example cases were created of each model. They were a take-back system for consumers, and a textile service for enterprises. To form realistic life cycles, both models were tweaked together with companies and researchers. As a result of brainstorming, workshops and interviews, the following product life cycles were chosen for an environmental analysis as in Figure 3 Environmental aspects in "Product as a service" business model. and in Figure 4 Environmental aspects in "Take Back" business model. Figure 3 shows the modelled life cycle of the Product as a Service -business model and Figure 4 shows the modelled life cycle of the Take Back -business model Each process of the life cycle was examined separately, and variables related to the environmental impact of each process were listed.

The listings of factors help companies to recognize all the relevant environmental factors, if implementing these circular models and aiming for sustainability. They also serve as a basis for future life cycle inventories.
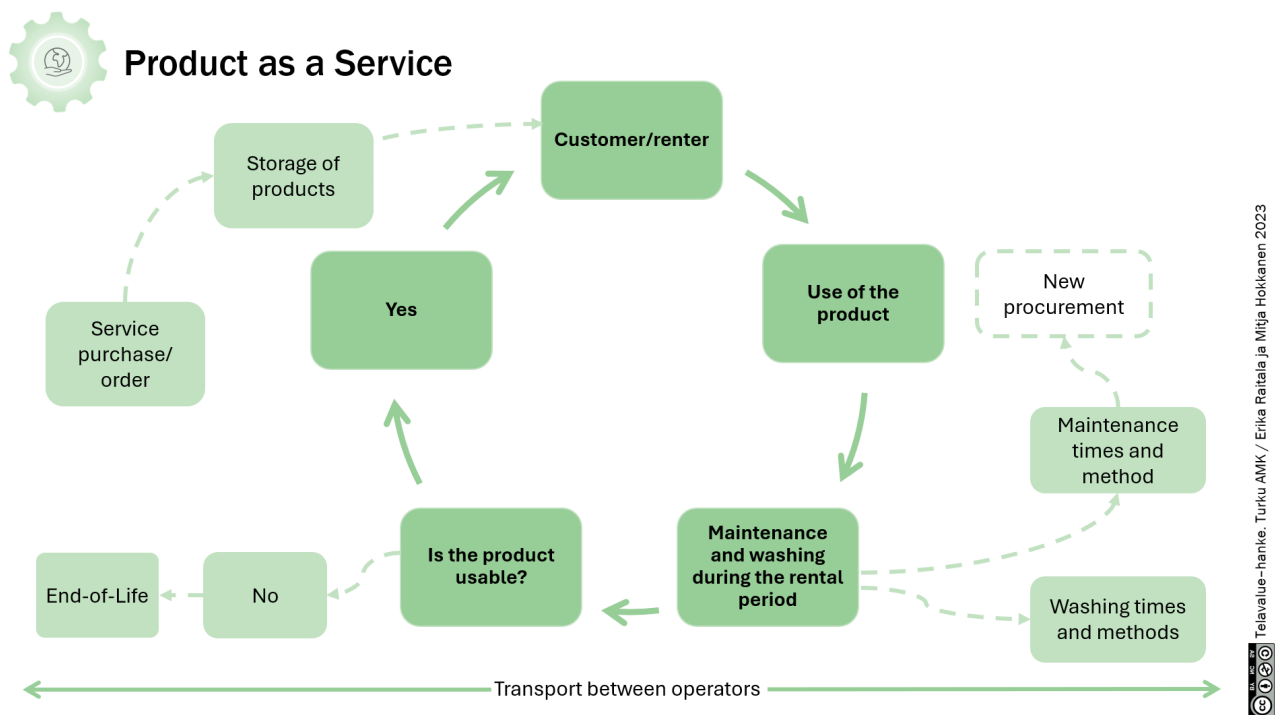
Figure 3 Environmental aspects in "Product as a service" business model.
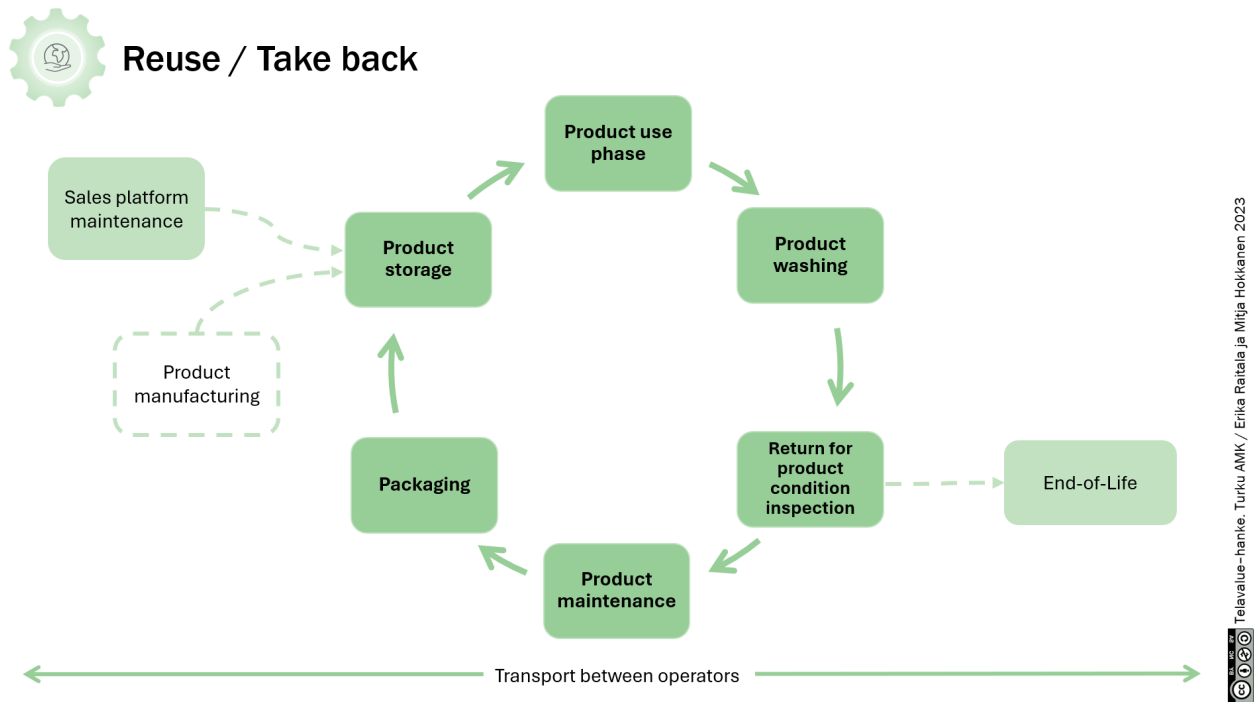
Figure 4 Environmental aspects in "Take Back" business model.

The research started by examining two different business models and the factors that cause environmental effects in them. The factors were found using literature and interviews. Based on the similarity of the variables, as a final result in the study, one list was created that include the variables for both business models. Out of the examined product life cycles, a total of 29 environmentally relevant factors were found. These are listed in the original web publication (https://telaketju.turkuamk.fi/en/telavalue-results/environmental-impacts-of-circular-textile-models/). Most of the factors (17) are quantitative, and the result tables suggest suitable measurement units for them. The rest of the factors (12) are qualitative, related to the choice of energy form, among others.

4 Economic Analysis – Marjaana Launonen

The economic analysis was made through a literature review related to considering the economic aspect of circular economy business models. The aim of the literature review was to find out how much literature is available in the databases that takes into account the economic aspects of circular economy business models. By economic aspects in the study we mean profitability, cost accounting and pricing. In order to make more use of circular economy business models, the monetary benefits of the models should be highlighted, as well as what economic factors should be taken into account when moving to a business model. In triple-bottom-line decision-making, the economy is also one of the decisive factors in the sustainable development of companies, along with the social and environmental perspective.

The result of the literature review is that there are only a few articles on economic perspectives to be found, and the need for this kind of material clearly exists.

Three business model types i.e. sharing platforms, product as a service and product life extension were looked for the literature review. The search was conducted mainly from the central databases of business administration and sales, with the keywords circular economy, business model, profitability, cost accounting and pricing. Only articles available online that are not related to previous studies or publications in the Telaketju project were taken into account in the search. A total of five articles were found in the searches, and some of these articles covered the topic more extensively than others. More information on this can be found online. https://telaketju.turkuamk.fi/en/telavalue-results/the-economic-aspects-of-new-ce-business-models/

5 Design Aspects – Helena Kalliomäki and Annariina Ruokamo

The hypothesis of the study was that product design must focus not only on structural solutions that support the circular economy, but also on the emotional and social needs of the consumer. Especially in producer ownership business models, where a product may have multiple users, it is important to design products that respond the consumer's requirements and desired usage and to consider how product design can be used to create added value in addition to sustainable solutions, e.g., in rental business models.

At the beginning of the study, the research team organized a workshop, where Telavalue researchers and companies dived into these two selected business model variables together. Three themes emerged at the workshop and based on the previous study within the subject: 1) criteria for rentability, 2) feedback collection of the user experiences and 3) emotional aspects of a rental product.

All identified themes are linked to product design by asking these research questions:

1) What are the criteria for the functionality of the rental garment in general?

2) How does the information about the user's experience of wearing the garment reach the designer?

3) What are the social conventions of the rental product according to the user's experiences?
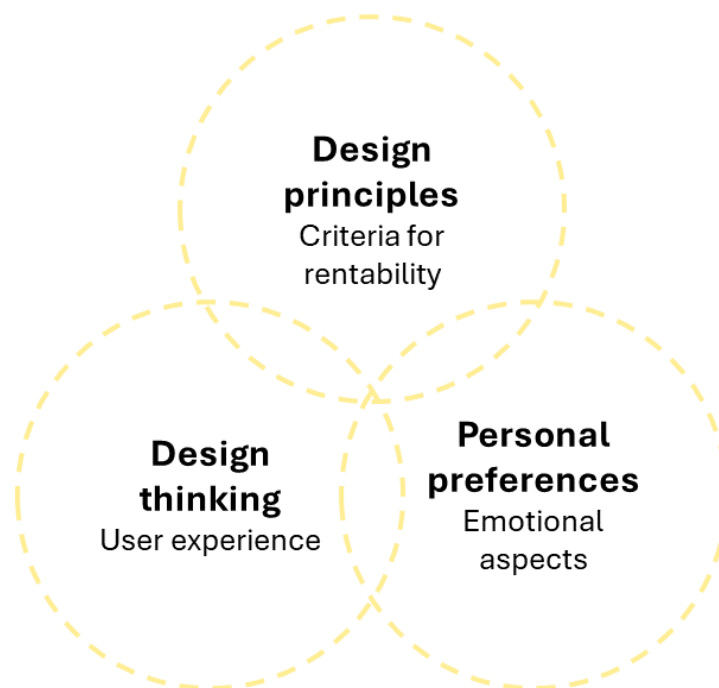
Figure 5 Three themes emerged from the study that are all linked to product design (Kalliomäki & Ruokamo.)

After the workshops, the researchers interviewed four companies from the casual wear, workwear and childrenswear sectors. As the respondents represented the clothing rental experience, the issues to be discussed, which affect product design, were shaped on this basis. However, the interviews included a discussion on the possible activities of companies in terms of product take-back and reuse and whether the requirements of this approach differed from those of the rental business from a product design point of view.

The interviews were conducted as semi-structured theme interviews that followed the three themes defined above. As sub-themes of the rentability criteria, the companies were also asked about the life and use cycles

of the products and about ways to extend the life cycle of the product, either through design or other activities. In addition, companies were asked for their perspective on what kind of product design solutions are required for rental concept garments. Some of the questions also addressed recyclability, modularity, standards required for garments and other factors affecting product design. The existence and ways of collecting user experience and feedback from companies were also asked. The user needs and experiences from the collected feedback were also explored in the interviews. In relation to social conventions, questions were asked about end-user and stakeholder attitudes to product wear and tear, among other things.

As a conclusion, the output from the interviews with companies varied widely both between companies and between product categories. On the other hand, the survey was of a small scale and thus each company represented itself and the results were not presented in a broader context. The findings according to the study themes were the following:

The criteria for product design for rental clothing highlight the importance of the product's lifespan. The principles in designing for the Product as a service model are the same as for permanent collections for retail sale, and none of the companies interviewed had a clothing collection specifically designed for rent, whether it was an existing rental business or a pilot the company had. In the companies interviewed, the general principles of sustainable product design were emphasized: the use of durable materials and accessories, the choice of material according to the intended use, and attention to sizing, for example in terms of product looseness so that seams are not overly worn. The importance of modularity came up in one interview, but this was to be expected when it had to do with children's clothing. Also, the companies implemented widely the encouragement of repair and the emphasis on care instructions, both product-specific and through other brand communication.

Findings of the second research theme **the feedback collection and user experience** varied by the companies. Still, in each company, the impact of collecting the user feedback to be taken into account in product design was limited. End-user feedback was not perceived to be relevant when the buyer was someone else than the end-user, such as in the workwear sector. There was a consensus in the companies that feedback is always given when asked, but the consideration of it is constantly being balanced when it comes to final design choices. As a matter of principle, user feedback is taken into account in design by considering its importance, but the user feedback received was perceived as conflicting, which seemed to contribute significantly to its lack of use. As the user experiences is a critical factor in sustainability oriented and user-centered design thinking, these findings towards systemizing the feedback collection in companies were surprising.

On the other hand, systematizing the collection of user feedback was also a source of excitement for some: one respondent was eager to consider how useful it would be to get user feedback, especially for the rental garments. Then the feedback could be implemented to design a garment that would be as durable as possible for the rental process. In some cases, collecting user feedback may also fall on the way. This is the case, for example, in a business model where the workwear company's customers are laundries or other entities that rent out the products. In this case, the laundry acts as a platform for the rental business and user information is easily captured by the laundry without ever being fed back to the product development team.

As mentioned earlier, the workshops held in the beginning of the study revealed that, in the case of workwear for rent, an employee may wish to have a previously worn garment after a round of maintenance and laundry. **The emotional aspects in rental business models** were considered as a strong hypothesis in this study, but the interviews did not really reveal any narratives supporting the above hypothesis. On the other hand, it was perceived among respondents that emotional aspects on the rental system and its impact on product design is challenging to comment on now, due to the lack of user data and the short time limit for testing business models in the pilot phase. The respondents had mixed experiences regarding the end-user experience of rented clothing.

Visible wear and tear are also linked to product categories and the performance required of the product. In everyday dressing, the weariness of products and the acceptance of it is strongly linked to personal preferences. For parents, visible repaired children's clothing can be a status issue, while on the other hand, wear and tear can cause shame, even though repairing products is currently trendy. For workwear, the need

for the garment to represent the employer's brand and to meet its requirements is highlighted. These requirements vary according to the sector: for example, in the rescue sector, workwear is intended to communicate absolute safety, and wear and tear, for example on reflective parts of the product, does not support this objective.

An interesting idea that emerged from an interview with a workwear company was the possibility of classifying clothing according to the degree of wear: lower-rated clothing could serve well in more invisible jobs. This would allow the clothes to be used for longer.

In general, it became clear that the Product-as-a-Service, Take-Back-Reuse business models and their impact and requirements for product design would require longer-term monitoring. Some companies had an existing and original rental business, while others had only carried out tests or pilots over a brief period. The Take-Back-Reuse model is even more uncommon and needs further implementation and piloting on the market. Short-term activities are not yet well analyzed enough to provide a complete picture of circular business models, especially where the aim is to extend the product life cycle by means of product design. If the life of a product is estimated in years, for example 3–5 years, the monitoring period should be at least the estimated life and even longer to get an overview of the entire process.

At a general level, businesses had a shared experience of organizing rental activities: the rental service was perceived as a time-consuming manual process. The functionality of the rental platform also emerged as a key element in the rental of everyday clothes, particularly in terms of a smooth customer experience. Based on the interviews, the business model where the laundry acts as a customer of a B2B company and at the same time as a rental platform proved to be the most viable model for renting clothes. The challenge in this model was to obtain the user feedback, as although the laundry was believed to be an interactive source of information, there was no process for the flow of information between the laundry and the company's product development team. To provide more relevant user information and requirements for product design in the clothing rental sector, research should be aimed at the laundry industry and study their operating models.

Further research is needed on product design and the requirements that impact it, whether it is a retail or re-use model in a circular economy. In particular, the utilization of user data collection is a clear area for development in pushing companies' product design development towards circular economy. In this respect, the understanding and knowledge of user-oriented design thinking, and the development of the design process is still limited in companies, based on the findings of this project.

The role of product design in novel business models is crucial. As there are numerous variables and operational variations in the emerging new business models, two novel business models were selected for further analysis in this study. The selected business models were 1) the Product as a Service model and 2) the Take-Back-Reuse business model. When looking at the variables of novel business models, it all comes back to the product. Business models are therefore also product-specific, and product categories differ considerably.

In addition to sustainable material choices and structural solutions, new business models require product design to consider the emotional and social needs of the user. Especially in sharing economy models, where a product has multiple users, it is important to design products that meet the needs of the user and are suitable for the intended use. It is also important to consider how design can be used to create added value for the customer in rental business models. This approach may involve not only designing the product but also developing a service concept solution. To innovate integrated solutions, feedback is needed directly from the end users of the products and service concepts.

According to the survey, design thinking is not yet widely used. The study revealed that the user feedback was collected to varying degrees, but the feedback is mostly not considered in product design or product development. The importance of Design Thinking in circular business models is still either not internalized or not seen as essential. However, integrating user insights into the development of product and service concepts can contribute to the vitality and competitiveness of new business models.

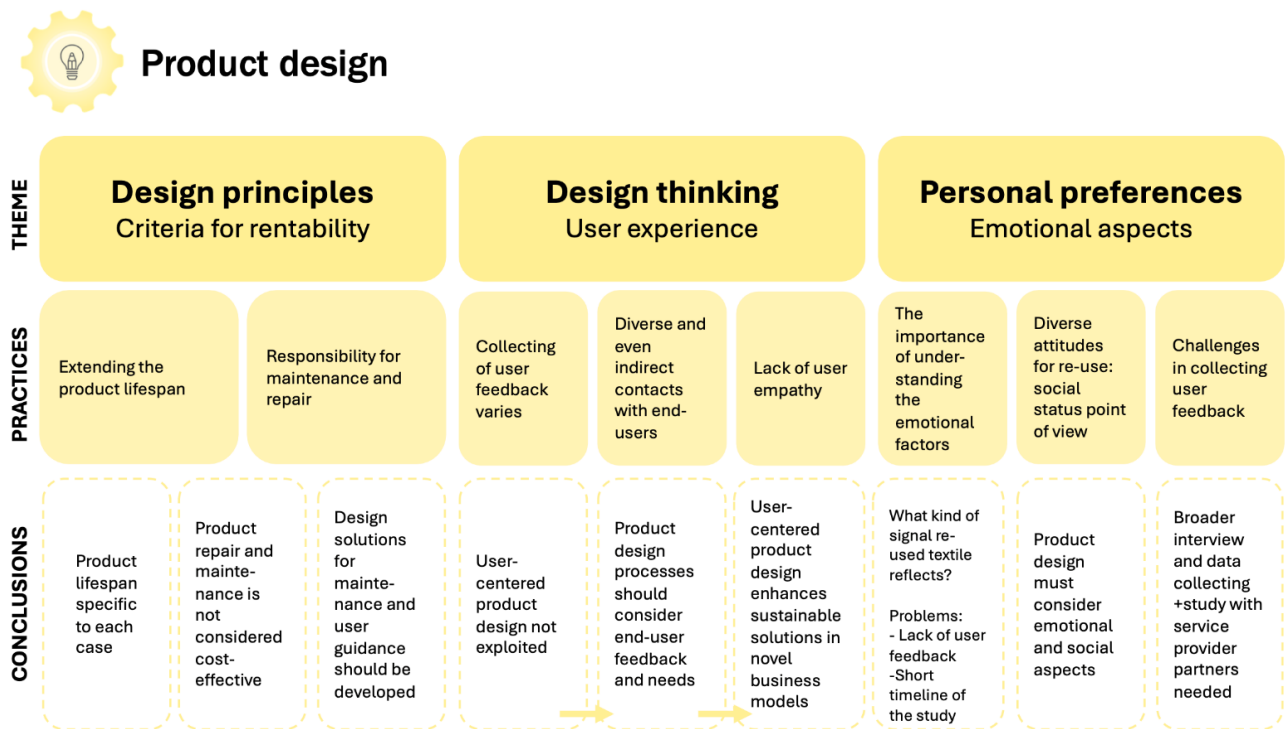The research themes, practices and conclusions of the role of product design have been visualized in Figure 6.

Product design

THEME	Design principles Criteria for rentability			Design thinking User experience			Personal preferences Emotional aspects		
PRACTICES	Extending the product lifespan	Responsibility for maintenance and repair		Collecting of user feedback varies	Diverse and even indirect contacts with end-users	Lack of user empathy	The importance of under-standing the emotional factors	Diverse attitudes for re-use: social status point of view	Challenges in collecting user feedback
CONCLUSIONS	Product lifespan specific to each case	Product repair and mainte-nance is not considered cost-effective	Design solutions for mainte-nance and user guidance should be developed	User-centered product design not exploited	Product design processes should consider end-user feedback and needs	User-centered product design enhances sustainable solutions in novel business models	What kind of signal re-used textile reflects? Problems: - Lack of user feedback -Short timeline of the study	Product design must consider emotional and social aspects	Broader interview and data collecting +study with service provider partners needed

Figure 6 Research themes, practices and conclusions of the role of product design.

The research started by organizing a workshop in the beginning of the year 2023. In the workshop Telavalue researchers and companies dived into those two selected business models mentioned above. Considering the role of product design in those novel business models, three design related themes emerged at the workshop and based on the previous study: 1) criteria for rentability 2) feedback collection of the user experiences 3) emotional aspects of a rental product. All the emerged themes are directly linked to product design. Based on those defined themes, four semi-structured theme interviews were conducted for the companies working in the casual wear, workwear and childrenswear sectors. The interviews were conducted during the period of Spring-Autumn 2023. The interviews were then analysed and as a result the visualisations were made based on the conclusions (Table 1).

6 Data Aspects – Sari Järvinen, Satu-Marja Mäkelä and Hannu Tanner

Data is expected to play a crucial role in enhancing the circular economy of textile products by providing insights and enabling informed decision-making throughout the lifecycle of textile products. Data enables better tracking, lifecycle management, recycling, consumer education, innovative design, and sustainable business practices. By leveraging data, stakeholders in the textile industry can reduce waste, improve resource efficiency, and promote a more sustainable and circular economy. In Telavalue project, the studies related to data included a review on regulation and current initiatives related to data in circular textile economy, development of a data model to support selected textile R strategies and a set of data-driven service concepts focused on Telavalue business models.

Data modeling

The study on data modeling focused on exploring the utilization of product data within product and material life cycles in the context of the circular economy. A Minimum Viable Product (MVP) approach was adopted to determine the essential data elements required. A starting point for a data model was established by examining existing models used for garments to assess their suitability for CE purposes. Additionally, two specific use cases were selected: consumer re-use perspective and sorting for automation, aiming to enhance circular economy initiatives through data insights.

The results revealed that different use cases necessitate distinct datasets with different data elements, making it challenging to minimize data requirements. It was also noted that to obtain useful data for CE, new data elements are needed to provide insights into the garment's usage phase, which are absent in current data models. The following two data categories/elements were defined:

- Maintenance Book: Contains information on how the garment is maintained, repaired, modified, and by whom.

- Circularity Information: Requires quality data elements to describe the current condition of the garment (e.g., New, Like New, Ok, Poor).

These new data elements necessitate a dynamic data model that can be updated during the usage phase. This imposes additional requirements on data management systems, necessitating capabilities for uploading and modifying data, verified access rights management, data exchange APIs, and other software infrastructure.

While the focus was on two specific use cases, supporting all use cases within circular economy could result in a large data model, posing additional challenges in data maintenance and management, leading to extra costs.

Data-driven service concepts

The study on data-driven service concepts examined the current utilization of data from the use phase, particularly the tracking of clothing, in both B2B and B2C environments. Additionally, Telavalue's business models of Product as a Service and Take Back were explored, focusing on how data can be leveraged within these models and identifying barriers and value propositions.

In current B2B environments, such as workwear and laundry services, clothing tracking is a common practice, typically using RFID technology. The limited scope of these environments facilitates the implementation of the necessary technical infrastructure for data collection. However, currently the primary focus of tracking is on optimizing workflow and services for workwear providers and users, rather than supporting garment longevity or sustainability. There is significant untapped potential to support circularity management, such as optimizing future durability (e.g., washing cycles) and garment recycling.

In B2C environments, although smart home technologies for automated tracking are available, they are rarely utilized. Manual or app-based self-tracking is more common among fashion enthusiasts. Barriers to implementing clothing tracking in consumer environments include consumer reluctance (related to privacy

concerns) and infrastructure costs. However, having such information—such as usage levels of clothing—could enable new types of services from brands to consumers.

For the Product as a Service business model, the value of data lies in assessing environmental impact and identifying process pain points. Notable technology investments would be required for data collection if it is not a core aspect of the business. Additionally, extensive data collection, management, and sharing can negatively impact sustainability, and privacy considerations for clothing users must be carefully addressed.

In the Take Back model, brands can engage customers responsibly, gather feedback on product designs, and redirect less-used products with remaining predicted lifecycle to new users. Consumers could identify and resell unused garments, facilitating the secondhand market. Similar to B2C environments, barriers include data collection challenges and sustainability concerns associated with extensive data management and sharing.

The report on regulation and current initiatives related to traceability and transparency was created by combining literature study, web searches, and knowledge acquired by networking with stakeholders. Telavalue partners were interviewed to collect information on current practices for textile product tracking. The data modeling activity was done in collaboration with Traci Kinden from TEXRoad. The main activity was a two-day expert workshop in Espoo, Finland, in April 2023 between Traci Kinden and VTT researchers. The data-driven service concepts have been iteratively developed using the results from the business modeling tasks in Telavalue, studying state-of-the-art and workshopping among the task participants. "The results can be found from a blog post that was published during spring 2024 https://telaketju.turkuamk.fi/telavaluen-tuloksia/kestavampia-tekstiilipalveluja-datan-avulla/

7   Consumer Aspects – Hannamaija Tuovila and Päivi Petänen

Novel circular business models need to be appealing to the end-users of garments, the consumers. The consumer acceptance of business models is a complex process, which needs to be understood and taken into account in developing new ways of consuming fashion. Three novel business models were chosen to be evaluated with consumers in the Telavalue project: 1) Linear model with a circularity guarantee; 2) Peer-to-peer rental; and 3) Clothing libraries.

1)   Linear model with a circularity guarantee

In this model, a fashion brand offers additional repair and take-back services to extend the lifetime of the garment, as visualised in Figure 7 below.
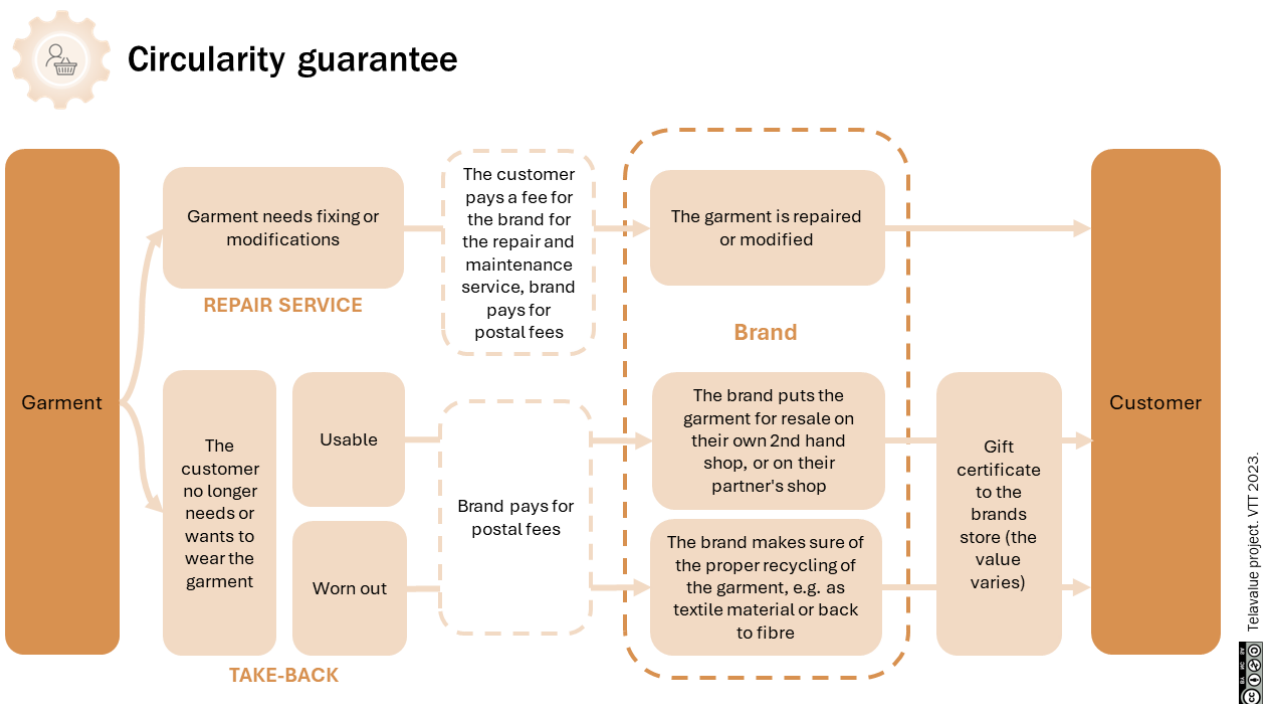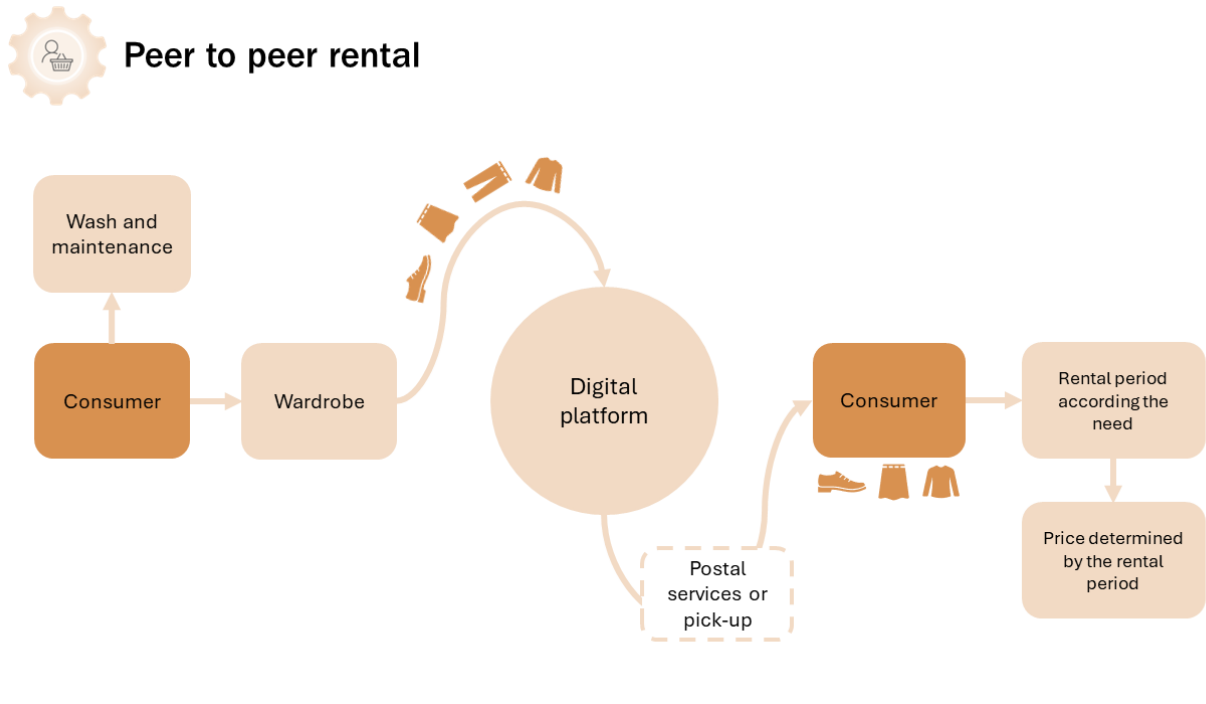

Figure 7 Visualisation of the linear business model with a circularity guarantee.

In general, consumers regarded the model very positively and it was seen as an interesting way for brands to stand out. The model was found to increase trust in the brand's products, as the model suggests that the products are originally designed to be high-quality and long-lasting. The take-back services were considered to bring various benefits to the consumer, for example, in the form of saving time and money related to the second-hand selling process. The consumers saw the complexity of the model as a challenge, as delivering clothes for repair, reuse or recycling was perceived to be burdensome and time-consuming. The reward system (gift certificate) was also seen as problematic because it would increase total consumption and would not help improve the sustainability of the fashion industry. Still, the consumers felt that some kind of reward system would be required to help the acceptance of the model. By clear and transparent communicating, the consumers' trust in the brand could be increased.

2)   Peer-to-peer rental model

In the peer-to-peer rental model, consumers rent their own wardrobe to other consumers via a digital platform (smartphone application), as visualised in Figure 8 below.

Peer to peer rental

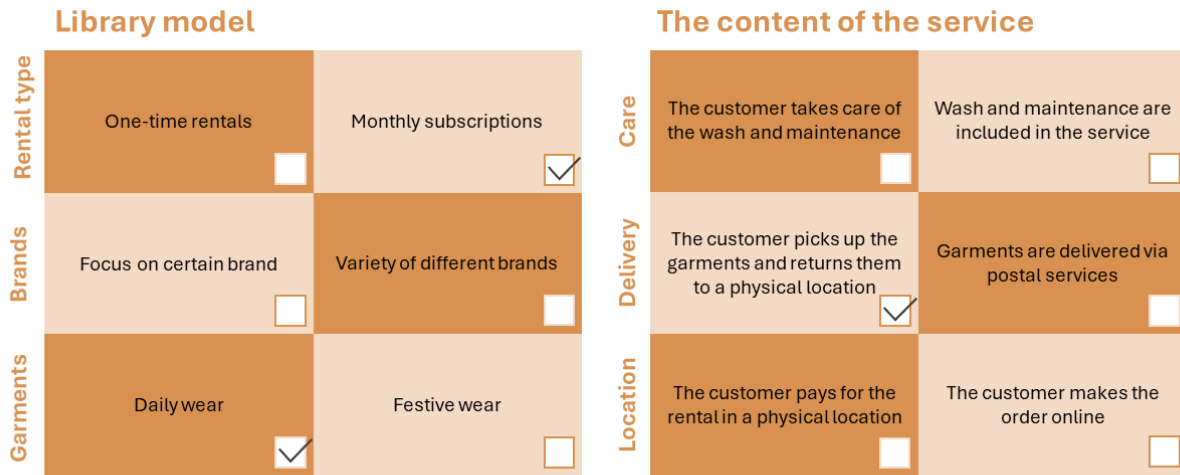*Figure 8 Visualisation of the peer-to-peer rental business model.*

As a benefit for the owner of garments, the consumers saw that the model offers a new earning opportunity, particularly for garments that are worn irregularly. This earning opportunity, however, presents risks of potential damage to the rented clothes, and in addition, organizing the renting of your own clothes may take a lot of time and energy. For the renter of the garment, the model offers an opportunity to wear expensive luxury clothes, try out different styles or to use the service for a short-term need, for example for a party. However, the liability issue was seen to be unclear in rental activities between consumers. The need to build trust between the owner and renter of garments, as well as with the provider of the digital service platform were highlighted.

3) Clothing libraries

Business models offering clothing rental in the form of a curated "library" can already be found both in Finland and on international markets. Usually, they focus either on the clothing selection of one specific brand or offer a wider selection of garments from various selected brands, as visualised in Figure 9 below.

Clothing libraries

Library model

Rental type		
	One-time rentals ☐	Monthly subscriptions ☑
Brands	Focus on certain brand ☐	Variety of different brands ☐
Garments	Daily wear ☑	Festive wear ☐

The content of the service

Care		
	The customer takes care of the wash and maintenance ☐	Wash and maintenance are included in the service ☐
Delivery	The customer picks up the garments and returns them to a physical location ☑	Garments are delivered via postal services ☐
Location	The customer pays for the rental in a physical location ☐	The customer makes the order online ☐

Telavalue project. VTT 2023.

Figure 9 Visualisation of the business model of clothing libraries.

From the consumer point of view, the benefits of clothing libraries are very similar to those of the peer-to-peer rental model, but the difference is in this type of model, the rental activity takes place between a company and the consumer. Being involved with a company was seen to bring more trust and clearer rules and conditions to the rental process, compared to the peer-to-peer rental model. In clothing libraries, the rental process includes several different service elements, such as style guidance and repair services. These were seen to increase the overall attractiveness of the model. One of the biggest challenges for model was seen to be the required change in beliefs and attitudes of consumers related to ownership of garments. Fashion was generally perceived as a factor that builds identity, and many consumers are emotionally attached to the garments they own. The consumers described that it can be difficult to build your own, personal style and stand out from others in a model where the garments are shared with other consumers.

The novel circular business models chosen for the consumer research part were selected based on discussions with the Telavalue consortium partners. The methodology used to study the consumer perspective was focus group discussions. Altogether four focus groups were organized during Fall 2023, and 14 consumers participated the study. The focus group discussions targeted consumers that have a special interest in sustainability of the textile industry and circular economy. The discussions lasted approximately 1-1,5 hours and were conducted via Microsoft Teams platform. The discussions were moderated by Telavalue researchers, and the business models were introduced to the consumers as a narrative description. A summary report on the results can be found here: https://cris.vtt.fi/en/publications/consumer-perceptions-on-novel-circular-business-models, published also as part of the Telaketju blog series: https://telaketju.turkuamk.fi/telavaluen-tuloksia/kiinnostavatko-muodin-kiertotalouden-uudet-liiketoimintamallit-kuluttajia/.

Multifactor study findings

The research team come from Turku University of Applied Sciences, VTT and LAB Turku University of Applied Sciences. They started the work together in 2022 and concluded in spring 2024. During that time they had multiple interactions with each other, the companies, other stakeholders discussing and sharing the results.

So, during spring 2024 the research team was able to summarize their understanding of the phenomena into five important messages to the research community and the society as a whole.

Five messages:

1. **The phenomena is wide and important**

The phenomenon is very interesting and vast there are "more than 12 cases in a dozen" of different variations of the circular business models on business level. We do not know enough about the phenomenon yet.

2. **The need to do the change together**

If consumtoers don't change, then the society and the companies won't change. On the other hand, how could consumers make the changes if it is not available. Society has an important role as enabler and regulator. We need to make the systemic change together.

3. **We need to decrease consumption to be sustainable**

Many contradictions must be resolved at the same time. Consumption and production must be reduced. However, the society do not aim for this yet. The new business model must reduce the production volume of the new products, otherwise the novel business models are not a better option at all. The delimitation of the research cases should be narrowed, and on the other hand, the effects on different themes should be deepened. The question is also about this for example: is a fast fashion model ever possible to be sustainable business?

4. **Consumers have a leading role**

In many ways, the companies do offer if consumers want. A dialogue with consumers is needed. What are their concrete needs and hesitations?

5. **All aspects need to be taken seriously and developed together and separately**

All perspectives must be taken into account when looking at a new business model. Everyone is part of the change. The new business model is not in itself the answer to a more sustainable business, but the actions there are within the business model are the answer.