

# ReCiPSS

## D6.1-Report on non-technical barriers and legal issues

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## List of abbreviations

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<i>Abbreviation</i>	<i>Explanation</i>
<b>B2B</b>	Business-to-Business
<b>B2C</b>	Business-to-Consumer
<b>C2C</b>	Consumer-to-Consumer
<b>CC</b>	Collaborative Consumption
<b>CE</b>	Circular Economy
<b>CEO</b>	Chief Executive Officer
<b>EC</b>	European Commission
<b>ELV</b>	End of Life Vehicles
<b>EPR</b>	Extended Producer Responsibility
<b>EU</b>	European Union
<b>GDP</b>	Gross Domestic Product
<b>GDPR</b>	General Data Protection Regulation
<b>OEM</b>	Original Equipment Manufacturer
<b>PSC</b>	Point of Single Contact
<b>PSS</b>	Product-Service-Systems
<b>RoHS</b>	Restriction on Hazardous Substances
<b>SBU</b>	Strategic Business Unit
<b>SE</b>	Sharing Economy
<b>WEEE</b>	Waste Electrical and Electronic Equipment
<b>WFD</b>	Waste Framework Directive

# 1. Executive Summary

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This report presents an overview of relevant non-technical and legal challenges for consideration during the deployment of a pay-per-wash business model in four European countries (Netherlands, Slovenia, Denmark and Austria). Three categories of barriers are derived from a literature study: Policy, Economic and Market. Furthermore, legislative background to the project is discussed based on academic papers and European legislation. Finally, a snapshot of operational challenges in relation to the deployment of the pay-per-wash business models are presented based on primary data. Key questions for the white goods demonstrator Gorenje are juxtaposed with the experience of the supporting startup HOMIE. While several challenges are discovered, no major obstacles to project success are identified.

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## 2. Introduction

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This document is a result of Task 6.1, work package 6: Evaluating all non-technical barriers and legal issues for service-based business models in target EU countries, which focused on the deployment of a pilot business model from the white goods demonstrator Gorenje in four countries. This task uses as input the results of deliverable D3.1: Baseline Report and D2.1: Demonstrator Baseline and Market Characteristics Report.

With the growing concerns for global sustainability, new ways of tackling environmental challenges are required. Traditional take-make-dispose production and consumption threatens to deplete Earth's limited resources. The concept of a Circular Economy (CE) has been praised as a promising idea, not only for keeping valuable resources in the loop, but also to boost global competitiveness, generating new jobs and foster a sustainable economic growth in society. According to European Commission estimates, the resource productivity target (i.e. a 30% increase in resource productivity by 2030) would induce an increase in EU GDP of 0.8% by 2030 and the creation of 2 million new jobs (European Parliamentary Research Service, 2014). An estimation by the Netherlands Organisation for Applied Scientific Research (TNO) expects a potential reduction in CO<sub>2</sub>-emissions of 17,150 kt, only in the Netherlands (Bastein et al., 2013). As such, the European Commission has done a lot to promote the development of CE in Europe, but the transition requires radical changes across the board, including new product design, revised supply chains, consumption patterns and business models (Ellen MacArthur Foundation, 2013). As a consequence of the complexity in the sustainable development vision, it is especially the implementation-phase that needs to be supported by intermediaries, who provide services and designs towards radical changes in practices, policies and decision-making tools (Ghisellini et al., 2016).

In order to operationalize the ideals that the CE concept proposes, the 'sale of functionality' is one promising idea that is being proposed (Tukker, 2015; Lieder and Rashid, 2016). Within this, pay-per-use and operational lease are the most used examples of service providing and 'selling products as a service' (Ploeger et al., 2019). As a part of project ReCiPSS, the white goods producer Gorenje will deploy a pay-per-use business model in four European countries. A number of technical challenges are known with the development of the new pay-per-wash solution (such as connectivity with the washing machine for example). However, it is also to be expected that the deployment of a new business model sets a number of challenges for any OEM, where business-as-usual is built around the traditional linear business model. Such non-technical challenges can be diverse and ambiguous, but need to be tackled during the development. Furthermore, as the novel business model requires a different relationship with the customer, new questions arise in terms of legal concerns. This is especially important considering that the pilot will be in four different European countries, where local legislation can have different requirements and guidelines.

The objective of this task is therefore to examine what type of non-technical barriers and legal issues that may arise with the development of a service-based business model in the targeted EU countries exists. For this purpose, scientific research publications will be scrutinized as well as European legislation. Furthermore, interview data will be gathered from both the white goods demonstrator Gorenje and the pay-per-wash start-up HOMIE.



## 2.1. Research on Barriers to Circular Economy

Despite CE being an increasingly promoted concept by policy makers and practitioners, the development of CE is still long away from the envisioned future. Furthermore, business practitioners have played a large role in leading the development of the CE concept, with academia lagging slightly behind (Korhonen et al., 2018). Considering the gap between the early stage of development (Ghisellini et al., 2016; Smart et al., 2017) and the vast amount of interest circular economy has attracted both from practitioners and increasingly from academia (Lieder and Rashid, 2016), barriers for circular economy implementation has now become a notable topic of research in itself (Kirchherr et al., 2018). This entails both empirical research following industrial cases, conceptual papers debating specific issues, or systematic literature reviews that summarize, cluster and analyze the barriers with the aim to create a greater understanding. Many studies focus on the diffusion of CE practices in a macro context (e.g. region or nation) while somewhat less attention is brought to the perspective of a single company (Ghisellini et al., 2016).

## 2.2. Gorenje – The White Goods Demonstrator

The OEM that is implementing a novel business model is Gorenje, one of the leading European manufacturers of household appliances with a history reaching back almost 70 decades to date and has been manufacturing washing machines since 1964. The main factory is located in Velenje, Slovenia, where the larger appliances, like washing machines, are produced. Typically, suppliers are based in Slovenia or other parts of Europe. Finished products are distributed through regional distribution centers to Gorenje's own selling points in Eastern Europe, as well as retailers throughout the rest of the world. Gorenje Group is present in the market with a portfolio of eight brands, including strategic business units (SBUs) such as ATAG, ASKO and Gorenje for example (Gorenje Group, 2019; Klopalová et al., 2019).

## 2.3. HOMIE

Also involved in the project is the company HOMIE. Located in Delft, the Netherlands, HOMIE is a relatively small spin-off company from TU Delft and delivers a pay-per-use service for household appliances. Currently, they offer pay-per-use washing machines for households throughout two western provinces of the Netherlands, specifically Zuid-Holland and Noord-Holland. Their vision is to reduce the environmental impact of domestic appliances, by moving from ownership to pay-per-use (HOMIE B.V., 2019). The company does not manufacture its own washing machines, but instead use existing washing machines with some modification (Bocken et al., 2018). For this project, they bring in their knowledge and expertise regarding pay-per-wash services, offering washing machines in per-pay-use systems to households. Besides having an active customer base and the experience that comes with it, HOMIE is accustomed to experimenting with their offer and optimizing it by means of customer feedback (Klopalová et al., 2019).

## 2.4. Document Scope

First, social and cultural aspects such as consumer acceptance or consumer trust are not part of the literature review, considering the extensive analysis done in Deliverable 2.1 of the ReCiPSS project, the Demonstrator baseline and market characteristics report (Klapalová et al., 2019). The information in this report complements the previous report by discussing barriers with a different perspective, in particular focusing on legal issues and non-technical barriers other than social. Furthermore, customer behavior and acceptance of HOMIE's pay-per-wash service has been analyzed by Cherry and Pidgeon (2018) and by the HOMIE co-founder and researcher Nancy Bocken (2018) and her colleagues. However, some social aspects will be discussed in section 4 – “Operational Challenges Identified”, as they arose during the discussion with the companies.

Secondly, this report is intended to support an organization that has already taken the decision to pilot a circular business model. As such, barriers relating to the making of such decision are not covered, such as lack of awareness or lack of incentives.

Thirdly, this report focuses on the challenges that lie outside of the organizational boundaries of the white goods demonstrator. In other words, barriers categorized as organizational (e.g. managerial fear of risks, business culture etc.) are not within the scope of this report.

## 2.5. Methodology

This report was developed through two simultaneous processes. Firstly, a literature study on CE barriers as well as European legislation, and secondly, interviews and group discussions with the white goods demonstrator Gorenje as well as the supporting startup HOMIE.

### 2.5.1. Literature mapping and review

The starting point of the literature review was based on the results of a systematic literature mapping undertaken during the spring of 2019. The aim of which was to first, systematically map the literature on barriers to circular/sharing economy and second, to classify barriers and understand interactions between them as well as in what way they are specific for e.g. an industry or an organization. The result of the mapping procedure was a database of literature coded based on content of the abstracts. Thus, selection of papers to study further can be done by any combination of codes (e.g. CE literature with empirical interview data conducted in the Netherlands). The methodology of the literature mapping will be summarized in this section.

Search strings were tested with synonymous keywords (e.g. barriers, challenges, hurdles) and four researchers jointly discussed the domain fields: circular economy, sharing economy, product-service system, collaborative consumption. The final search string resulted in:

( TITLE-ABS-KEY ( "circular economy" OR ( "product service-system" ) OR "sharing economy" OR "collaborative consumption" ) AND TITLE-ABS-KEY ( barrier OR hinder OR obstacle OR inhibitor OR limitation OR hurdle ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )

The search was conducted in the data source Scopus, which indexes 70% more sources compared to Web of Science (Brzezinski, 2015) and provides a substantial coverage of the latest publications (Harzing and Alakangas, 2016). The search was limited to abstract, title and keywords. Bibliographic information, including abstracts, of the resulting 527 papers was downloaded and inserted to a joint-access online spreadsheet and shared database. Each abstract was assigned an identification number, and every member of the review team could access the same sheet simultaneously to work in parallel.

Based on the developed guidelines in a mapping protocol (Okoli and Schabram, 2011; James et al., 2016; Xiao and Watson, 2017), each abstract and title was read, data was extracted and mapped in the spreadsheet. A summary of the extraction fields can be found in Table 1 below.

*Table 1: Extraction fields for the systematic literature mapping.*

Code	Guiding question	Example codes
Framed as	How is the paper framed? Which research paradigm does it belong to?	CE, CC, SE, PSS, ...
Core strategy	What loop 'strategy' is the core focus?	Reuse, Recycle, Remanufacture, ...
Position in supply chain	Which actor in the supply chain is studied?	C2C, C2B, B2C, B2B, EoL
Geographical context	Does the study relate to a certain region?	Europe, North America, Africa, ...
Country	Is a certain country specified?	Germany, Sweden, Slovenia, ...
Human development context	Does the study relate to a specified human development index?	Developing country, Developed country
Barrier focus	Does the paper primarily study barriers?	Barriers are the focus, Barriers are not the focus, No barrier is mentioned
Solution/Mechanism	Does the paper study a solution or mechanism to overcome barriers?	Empirically tested, Discussed conceptually, Not discussed/tested
Level of analysis	Which level of analysis does the study primarily relate to?	Business model, User/Individual, Governance/policy, ...
Sector/Industry/Product	Is a specified sector, industry or product the main focus of the paper?	Packaging, Electronic products, Clothes/textiles, ...
Type of study	What type of scientific paper is it?	Conceptual, Empirical, Literature Review

Research approach	How was the research conducted?	Qualitative, Quantitative, Mix methods, ...
Research method	How was data gathered?	Interviews, Action research, Simulation, ...
Data source	What type of data are the results based on?	Primary, Secondary, Primary and secondary

The finalized mapping resulted in a database, where a subset selection of papers can be done based on a combination of criteria of the users own choosing. For this report, three different combinations of criteria were made. Firstly, one selection of 9 papers coded as empirical research on barriers with the level of analysis of an OEM (such as Gorenje). Secondly, 7 papers coded as research on barriers with the level of analysis of governance and policy in the EU. Lastly, 9 systematic literature reviews with the focus on barriers were also included. The total 25 papers were further screened for their method, results, discussion and conclusion, in relation to the aim of this report. False positives were removed based on certain exclusion criteria, for example, papers limited to only one technology not related to the white goods demonstrator was discarded (e.g. the recycling of PV-panels or a specific material).

As several papers contained secondary data regarded as relevant considering the project specifics, a snowballing technique (Jalali and Wohlin, 2012) was used to track relevant papers. Special attention was payed to legal concerns and business models similar to pay-per-use as in this project; furthermore, references to EU law was noted.

EU documentation was also scrutinized, which is available for public use in 24 different languages through the Official Journal of the EU (European Union, 2019). The material was retrieved both through backwards-searching relevant legislation mentioned in academic papers, as well as forward searching relevant terms (e.g. circular economy, remanufacturing, reuse, electronics, services, waste, etc.).

Systematic literature reviews were included in the making of this report, with the intention of getting a broad overview over the body of literature. As also noted by Pieroni et al. (2019), a significant portion of the material produced by practitioners is available in grey literature rather than scientific articles. In snowballing, these were also scrutinized, considering that much of CE development is led by the business community (Korhonen et al., 2018).

### 2.5.2. Primary Data

In parallel with the literature review, qualitative primary data was collected through semi-structured interviews, following an interview guideline (Creswell, 2014) based on the project specifics in the baseline and market characteristics report (Klapalová et al., 2019) as well as the conducted literature review. Semi-structured interviews are suggested by Adams (2015) when there is a need to:

- ask probing, open-ended questions in order to know the independent thoughts of each individual in a larger group
- ask probing, open-ended questions on sensitive topics that your respondents might not want to be open about if sitting with peers in a focus group

- conduct a formative program evaluation and want one-on-one interviews with key program managers, staff, and front-line service providers
- examine uncharted territory, with unknown but potentially momentous issues, where the interviewers need maximum room to identify useful leads and pursue them during the interview process

The topic was not considered as sensitive, and as such, group discussions were also conducted in order to maximize the input from different perspectives, and to utilize the resources offered by Gorenje to their full potential. The group discussions were held with key personnel in Gorenje, as identified by the ReCiPSS manager of Gorenje as well as the primary representative from Gorenje legal department in Slovenia. In total, ten representatives from Gorenje were involved in the data gathering. The intention with this was to get snapshot insights into the non-technical challenges that Gorenje currently experience in relation to the development of the experimental business model. More specifically, at the time of the study, Gorenje were in the process of formulating the consumer agreement, where several critical questions arose. Iteratively, these questions were also discussed through semi-structured interviews with the CEO of HOMIE to build upon previous experience of establishing and operating a similar business model in the Netherlands. A continuous email correspondence was also sustained during the data gathering, in order to share documents and follow-up questions that arose from the discussions, as suggested by Creswell (2014).

## 2.6. Document Structure

The remainder of the document will present the results from the literature review on barriers in a larger context, then, describe the issues identified in the current development of Gorenje and HOMIE, to be followed by a discussion and conclusion.

## 3. Barriers and Legislative Background

This section is divided into two parts, firstly, the focus is on the literature stream of CE barriers, and secondly, a section departing in EU documentation.

### 3.1. Circular Economy Literature on Barriers

Barriers to the development of circular economy has become a stream of literature in of itself. The barriers are often identified, discussed and categorized in several different ways by academics. Given that the concept is holistic and spans many stakeholders, the barriers found in research can also be scrutinized on different levels and from several perspectives. The implications can therefore be challenging to relate to, if the given perspective and level of analysis is not clear (Tura et al., 2019). To tackle this, the systematic literature review on CE barriers by Govindan and Hasanagic (Govindan and Hasanagic, 2018) differentiate between which stakeholder is affected by a certain barrier identified by the literature. Furthermore, the authors separate between barriers in the ‘external’ and ‘internal’ environment of the aforementioned stakeholder. In other words, for a producer, is this a challenge within the organization or outside the boundaries. Following this rationale, this report focuses predominantly on those barriers that are external for the OEM (Gorenje), meaning that the OEM may be affected by these barriers, and yet, have no direct control over them.

Several systematic reviews have been undertaken regarding the barriers to CE. A study by de Jesus and Mendonça (2018) found that 23% of the barriers discussed in 141 academic papers can be categorized as ‘Institutional and Regulatory’ barriers, compared to the ‘Technical’ barriers being the most dominant with 35%. The remaining were categorized as ‘Economic/Financial/Market’ (22%) and ‘Social/Cultural’ (20%). The types of barriers discussed within institutional and regulatory barriers were further exemplified by misaligned incentives, lacking of a conducive legal system, deficient institutional framework.

A relatively common theme in literature relating to policy and CE demonstrates that different geographical regions support different types of business models, pointing towards the problematic differences in policy of nations (Wasserbaur and Sakao, 2018). The support may also vary between different strategies towards achieving circularity. A recent comparative study between China, US and Europe by Ranta et al. (2018) concluded that the high-level EU directives on CE (e.g. Closing the Loop - European Commission, 2019a) have a clear support of recycling as a CE strategy, other strategies that reduces total demand (e.g. reuse) have been acknowledged to a lesser extent.

As the CE initiative is holistic, so is the implications on policy and legislation. On this topic, Technopolis Group published a report on behalf of the European Commission, regarding regulatory barriers towards CE by studying 10 cases (Technopolis Group; et al., 2016). This report analyses the development of CE on the level of EU, and therefore the implications are on a policy level rather than for the standalone firm. However, as 10 cases are studied, some relevant insights can be found. For example, a firm developing business in several EU countries will likely be affected by:



1. Lagging or incomplete implementation or enforcement of legislation, notably of the Waste Framework Directive (2008/98/EC), and the Exports and Shipment regulation;
2. Different and conflicting national implementations of a legislation (most notably directives or national action plans), observed in the context of the Waste Framework Directive, Basel Convention and WEEE Directive (Waste Electrical and Electronical Equipment).
3. Legislations that conflict each other because they represent conflicting values, for example with hygiene rules versus food waste.

In Table 2 following below, a concise summary of common barriers encountered in literature for this report is presented with short descriptions and references to the relevant literature. The barriers were categorized as Policy, Market and Economic, based on inspiration from systematic literature reviews in the field (Tukker, 2015; de Jesus and Mendonça, 2018; Govindan and Hasanagic, 2018).

*Table 2: Summary of identified barriers in literature.*

Category	Barrier	Description	Reference(s)
Policy	Ineffective implementation of CE laws	Despite good intention of high-level circular economy directives, regional legislation in Europe is lagging behind and the implementations are to a large extent ineffective as drivers. Commonly, policy directives are a ‘one size fits all’ but need more detail when it comes to what type of eco-innovation they are targeting to support.	(Shahbazi et al., 2016; Technopolis Group; et al., 2016; Govindan and Hasanagic, 2018; Kiefer et al., 2018)
Policy	Legal ambiguity	<p>Differentiating between goods that are intended for reuse and waste can be problematic, since legislation targets illegal trade in electronic waste. There is a lack of clarity over what processes such as remanufacturing, repair or reuse entails. For example, there is no clear guidance on the use of remanufactured components in new products or whether remanufactured products need to be declared as ‘second-hand’. Furthermore, there are concerns over the effect on remanufactured products of legislation such as:</p> <ul style="list-style-type: none"> <li>• WEEE Directive,</li> <li>• Waste Framework Directive,</li> <li>• ELV Directive,</li> <li>• Sales of Goods Act,</li> <li>• REACH Regulation,</li> <li>• RoHS Directive,</li> <li>• Energy Using Products Directive</li> </ul> <p>There are also problems arising with the transportation and import of used products, as they may be stopped after their first lifecycle due to uncertainty about processing rules.</p>	(Bastein et al., 2013; ERN, 2015; Dominish et al., 2018; Govindan and Hasanagic, 2018; Tura et al., 2019)



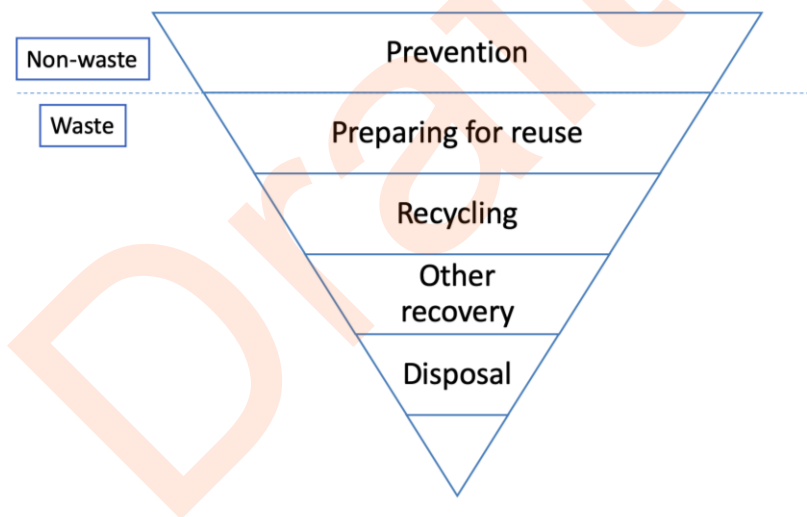
Category	Barrier	Description	Reference(s)
Policy	Overlapping regulations and local differences	When deploying a business across nations, different and conflicting national implementations of European directives are problematic. This has been observed with regards to the Waste Framework Directive, Basel Convention and WEEE Directive.	(Bastein et al., 2013; ERN, 2015; Technopolis Group; et al., 2016; Ranta et al., 2018; Tura et al., 2019)
Policy	Definition of waste	There is ambiguity over what is defined as waste and what is not. Consequently, handling and processing such goods may be labeled as waste processing. This is especially relevant in the case of remanufacturing. Furthermore, the requirement to control and process products that are legally considered waste adds additional administrative and compliance costs to a business. Where there is no clear regulatory guidance, there is a business risk.	(Bastein et al., 2013; ERN, 2015; Technopolis Group; et al., 2016; European Union, 2017; Pheifer, 2017)
Economic	Major upfront investment costs in supply- and value chain by implementing CE	For some firms, especially when moving from product sales to delivering services focusing on results, the transition cost becomes a problem. Implementing and scaling up circular economy initiatives in already existing supply chains is demanding. For example, remanufacturing results in redesigning the shop floor and production unit, including trained staff, construction technology and more. Such challenges are especially prevalent in SMEs and micro-industries. Alternative financing structures may be required from externalities unfamiliar with CE.	(Pan et al., 2014; Tukker, 2015; European Union, 2017; Gebauer et al., 2017; Ritzén and Ölundh Sandström, 2017; de Jesus and Mendonça, 2018; Govindan and Hasanagic, 2018)
Economic	Reverse logistic costs and complexity	The transport of large or bulky items can be a significant cost, which may prevent remanufacture or reuse of certain goods. This is especially crucial when it comes to sparsely populated areas and without economies of scale, as the transportation cost becomes noteworthy.	(ERN, 2015; European Union, 2017; Pheifer, 2017)

Category	Barrier	Description	Reference(s)
Economic	Novel pricing strategies	The correct cost of resources in CE projects can be challenging to estimate due to novelty and complexity. This challenge is reflected in the pricing as well. This is also an institutional challenge since financial measurements and assessments rely on traditional linear business models.	(Lieder and Rashid, 2016; Gebauer et al., 2017; Govindan and Hasanagic, 2018)
Market	Technological obsolescence in consumer electronics	With high market demand and speedy technological innovation, today's consumer electronics can consist of components which are developing rapidly. Consequently, a two-year old product may be considered 'old' or out of fashion by the market.	(Bastein et al., 2013; ERN, 2015; Laurenti et al., 2015; Technopolis Group; et al., 2016; Diener et al., 2019)
Market	Market saturation and low prices driving down potential for repair and remanufacturing	White goods are being imported at a relatively low price, saturating the market and lowering the prices of new appliances which compete with alternative offerings such as remanufactured appliances or pay-per-use. Furthermore, the imported appliances are lessening the supply of quality cores for remanufacturing.	(ERN, 2015; Laurenti et al., 2015)

## 3.2. EU Documentation

This section presents relevant EU Policy and praxis as well as commentary from academic papers on the aforementioned documentation, with the aim to give a background to the legislative questions that are in play in relation to the specifics of this project.

On a national level, under the EU Directive 2018/851 (2018) which amends the Waste Framework Directive (WFD) 2008/98/EC (2008), waste prevention is the most efficient way to improve resource efficiency and to reduce the environmental impact of waste, illustrated in the waste hierarchy in Figure 1. Member states are therefore obligated to facilitate innovative production, business and consumption models which support waste prevention. Potential solutions encourage the increase of the lifespan of products, promote re-use through the establishment and support of re-use and repair networks, deposit-refund and return-refill schemes, and utilizes remanufacturing, refurbishment or, where appropriate, repurposing of products as well as sharing platforms.



*Figure 1: Waste hierarchy first introduced in 2008/98/EC, after (Gharfalkar et al., 2015).*

### 3.2.1. Waste and Related Operations

As far back as 1997, the European Council concluded that waste prevention should be the first priority of waste management, meaning that re-use and recycling of material is preferable over recovery of energy from waste. This effectively questions the meaning of waste, which is a long-debated topic in of itself. In response, Directive 2008/98/EC (2008) repealed the former Directive 2006/12/EC (2006a) regarding the definition of key concepts such as waste, recovery and disposal. According to 2008/98/EC:

- ‘waste’ means any substance or object which the holder discards or intends or is required to discard.

- ‘re-use’ means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived;
- ‘recovery’ means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Directive sets out a non-exhaustive list of recovery operations;
- ‘preparing for re-use’ means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing;
- ‘recycling’ means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;

The definitions have been criticized for being ambiguous and inconsistent. For example, Gharfalkar et al. (2015) calls for a debate on how waste should not be defined by the intention to discard, as a perfectly good product could easily be rendered waste based on the intention of the owner.

With innovation cycles shortening and markets growing, consumers replacing electronic equipment and discarding their old one has led to an increase of electronic waste, now estimated to be one of the fastest growing fractions of municipal solid waste (Technopolis Group; et al., 2016). The Directive on Waste Electrical and Electronic Equipment (WEEE) 2012/19/EU (2012), establishes targets for waste recycling, recovery, and reuse for electrical and electronic devices. Furthermore, it states that producers are responsible for financing the management of consequential waste from their products. The implications for OEMs interested in reuse may vary, since the Directive may encourage reuse, but OEMs must also bear the costs of compliance as original producers of equipment covered by the Directive (ERN, 2015).

To some extent, the WEEE has been increasingly operationalized by member states with the aid from circular economy as a growing phenomenon of interest. Kama (2015) describes a dichotomy of waste following the ‘logic of hazard’ and the ‘logic of resource’ in EU policy documentation. The logic of hazard describes waste as dominantly harmful to human health and the environment, which effectively means that it must be rigorously regulated, monitored and reported accordingly by the member states. This type of restrictive policy is perhaps most notable in EU’s Restriction of the Use of Certain Hazardous Substances (RoHS) Directive and Waste Shipment Regulation (ERN, 2015; Kama, 2015). Contrastingly, the logic of resource opens up the idea that waste can be potential source of secondary raw materials. Thus, shifting the policy focus towards collection rates and the banning of exports for example, ensuring that the value from waste does not leave the EU (Kama, 2015).

This tension between different logics can be problematic for proponents of circular economy. For example, the changing guidelines of waste shipment policy may pose a risk to remanufacture, refurbishment, recycling and repair of electronics. Achieving critical mass in such operations could rely heavily on the international transport of waste materials. As illegal trade of hazardous electronic waste needs to be tackled, the regulation could potentially classify used electrical and electronic equipment as e-waste as an unintended side-effect. Specifically, guidelines intended to tighten regulations and prevent developed countries from transporting hazardous e-waste to less developed countries, where informal recovery industries operate (Bastein et al., 2013; ERN, 2015).

If the washing machine would be shipped outside of EU for preparation for re-use or recycling, special consideration must be taken during export, in case the washing machine would be regarded as waste by any government authority. Article 50 of Directive 2018/851 (2018) states that:

In the case of exports of waste from the Union for preparing for re-use or recycling, Member States should make effective use of the inspection powers provided for in **Article 50 (4c) of Regulation (EC) No 1013/2006** to require documentary evidence to ascertain whether a shipment is destined for recovery operations which are in compliance with Article 49 of that Regulation and therefore managed in an environmentally sound manner at a facility operating in accordance with human health and environmental protection standards that are broadly equivalent to standards established in Union legislation. [...]

The aforementioned Regulation No. 1013/2006/EC (2006) regards shipments of waste. In which, line B1110 of Annex IX lists electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct re-use and not for recycling or final disposal, as not covered by the export prohibition. The Directive notes that re-use can include repair, refurbishment or upgrading, but not major reassembly. Furthermore, it also notes that in some countries, these materials destined for direct re-use are not considered as waste.

### ***3.2.2. Services within the European Union***

Two thirds of the EU economy consist of services, and a total of 90% of the job creation is related to services. Furthermore, the manufacturing industry is tightly intertwined and dependent on services. However, the productivity growth of the service sector is relatively low, and facing a number of challenges (European Commission, 2017). As discussed previously, policy instruments and measures vary across government levels and across nations. On the European Union level, Honorato Clemento et al. (2018) highlight a lack of specific policies focusing on supporting servitization solutions in the context of PSS.

In 2002, the European Commission presented a comprehensive report on the state of internal market for services, highlighting a number of barriers for establishing, running and expanding services in the European Union. The report differentiates between legal and non-legal barriers identified by interested parties and member states as well as complaints made to the Commission, from European Parliament petitions and written question, and including cases filed with the European Court of Justice or from studies and surveys which have come to the notice of the Commission (European Commission,

2002). With globalization and servitization evolving in parallel, the issue has been increasingly relevant. In response to the identified challenges, the European Commission presented the ‘services Directive’ in 2006, intended to break the barriers for cross-border service providers within Europe (ECC Slovenia, 2019). Besides requiring member states to take legislative actions to make cross-border services feasible, the Directive asks them to put in place a variety of practical measures such as points of single contact (PSCs) for service providers, electronic procedures and administrative cooperation. These are intended to be a single point of contact about specific country information such as laws, requirements and permits for example (2006/123/EC on Services in the Internal Market, 2006b). The contact portals for the targeted countries are listed in Table 3.

*Table 3: Contact portals for deploying services in the target countries (European Commission, 2019b).*

Country	URL
Austria	<a href="https://www.eap.gv.at/index_en.html">https://www.eap.gv.at/index_en.html</a>
Slovenia	<a href="http://eugo.gov.si/en/running/">http://eugo.gov.si/en/running/</a>
Denmark	<a href="https://danishbusinessauthority.dk/legislation">https://danishbusinessauthority.dk/legislation</a>
Netherlands	<a href="https://business.gov.nl/running-your-business/business-management/legal-matters/">https://business.gov.nl/running-your-business/business-management/legal-matters/</a>

For example, the site representing the Netherlands (Business.gov.nl, 2019) contains information about payment terms, collections charges and statutory interest<sup>1</sup>, cancellation period in case of a sale<sup>2</sup>, what happens if a customer does not pay<sup>3</sup> and how debt collection agencies and bailiffs work<sup>4</sup>. Similarly, there are also contact points in the respective countries from a consumer standpoint, see Table 4.

*Table 4: Contacts for consumer law in target countries.*

Country	URL
Austria	<a href="https://europakonsument.at/en">https://europakonsument.at/en</a>
Slovenia	<a href="https://www.epc.si/pages/en/home.php">https://www.epc.si/pages/en/home.php</a>
Denmark	<a href="https://www.consumereurope.dk/purchase-and-rights/rights/cancellation-right/">https://www.consumereurope.dk/purchase-and-rights/rights/cancellation-right/</a>
Netherlands	<a href="https://www.eccnederland.nl/en">https://www.eccnederland.nl/en</a>

<sup>1</sup> <https://business.gov.nl/regulation/payment-term-collection-charges-statutory-interest/>

<sup>2</sup> <https://business.gov.nl/regulation/cancellation-period-sale/>

<sup>3</sup> <https://business.gov.nl/regulation/payment-term-collection-charges-statutory-interest/>

<sup>4</sup> <https://business.gov.nl/regulation/debt-collection-agencies-bailiffs/>



## 4. Operational Challenges Identified

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The majority of the content in this section is based on the primary data collected from the two companies Gorenje and HOMIE. It is titled operational challenges, due to the fact that the issues that arose during the discussions do not necessarily relate to those of the development of CE in a larger context. Instead, the issues or challenges that are brought up can be true for any similar endeavor that is not undertaken in the pursuit of sustainability. However, this represents a snapshot of the non-technical and legal concerns in the project at the time of writing. They are operational in the sense that they relate to the establishment and running of the business model, and regarded as challenges since they are concerns which need to be tackled but do not necessarily block the success of the project.

### 4.1. Service or operational lease

As mentioned in a previous section, at the time of preparing this report, the white goods demonstrator is in the process of making the consumer agreement. There is a choice to be made which impacts how this agreement takes shape, that is, the choice between either a leasing agreement or a service agreement. The major difference between the two is the transfer of ownership and responsibilities that is traditional in a leasing agreement, compared with offering the service of washing in machines owned by Gorenje. The choice has impact on several parts of the operation and both options will have to be investigated thoroughly.

The leasing agreement being prepared is of the type ‘operational’, meaning that the lessor (Gorenje and their local SBUs) retains ownership of the washing machine, and the lessee (private consumer) is allowed to use the machine. In contrast, after a finance lease term, the ownership of the leased goods is usually transferred to the lessee and may also have a buy-out option below market price during the leasing period. The lessor assumes more risk and responsibilities in an operational lease in comparison with the finance lease (Deloitte, 2019). Normally, for stipulating high-value financial leasing contract, a credit check of the lessee is performed. For operational leasing, this will not be necessary for individual consumers, but may be relevant for business with legal entities. By Slovenian accounting standards, renting must be registered as a debt. In Gorenje a credit check of individuals is not required, a credit check of legal entity is recommended, according to publicly available data. The case for a service contract can be motivated by the customer benefit that they do not have to financially commit themselves to subscription fees over a longer period of time. In the Netherlands, as exemplified by HOMIE, any form of subscription or rental agreement must be registered as a debt, affecting the overview of the personal economy of consumers, and the possibility for mortgage and loans.

In the case of HOMIE, the ownership of the appliances is kept by HOMIE and not the consumer. This is not the case for all similar businesses, and even actively avoided by some, since the ownership affects the balance sheet of the company negatively. Specifically, the debt-to-equity ratio is heavily impacted. For a small company such as HOMIE, the effect of this is that they need to explain their business to financial sponsors and banks in order to be provided with a loan. Alternatives for financing structures of

pay-per-use services has been discussed by Gebauer et al. (2017) as well, noting a similar issue when communicating with external financing. As explained by the CEO of HOMIE, a balance sheet should not be compared across industries, and not between different business models. The balance sheet of a traditional car rental company would likely not look positive out of context, but taking the business model into account, it may not be a problem to get a loan. So, for HOMIE, one challenge has therefore been to communicate their business model in a landscape still dominated by measures and reasonings not well adopted to their setup. This is also relevant for large OEMs such as Gorenje, since as the local SBU (lessor) would have to extend their balance sheet with appliances at other locations (the lessees), which may need approval and support throughout the organization.

Where a leasing contract may have to be constructed to follow local law requirements and guidelines, a service contract is less likely to have special rules other than those that govern contracts in general. For example, HOMIE has been advised that there is no service contract defined by Dutch law.

During the preparation of this report, Gorenje have turned their attention towards a service contract rather than operational lease, which is reflected in section **Error! Reference source not found.** below.

## 4.2. User agreement and local law

The contract will be prepared in accordance with Slovenian law in English, distributed to the SBUs, revised, adapted to local law and finally translated to each local language. Gorenje has aftersales service in all target markets, so that operations such as repairs can be handled with the existing partners. With regards to legal representatives, all countries have key personnel with the exception of Austria, where an external lawyer firm may be contacted for consultancy if necessary.

Currently, the agreement may be cancelled by Gorenje in three cases:

- 1) In case of non-payment according to the contractual provisions. By Slovenian legislation, the service provider has to send a reminder to the user in case of non-payment. And if the user still does not pay, Gorenje may shut down the machine and pick up the machine according to the contract.
- 2) The service provider also has the right to terminate the agreement without considering the notice period if the appliance has not been connected to the internet via WiFi for two consecutive months.
- 3) If the contract is stipulated with individual consumers, they are not allowed to use the machine for professional use. The contract may be cancelled without any notice if this is not upheld by the user.

In contrast, the user can cancel the contract if repairs are lengthy, or if there are any faults on the machine which cannot be repaired. It is currently being discussed if the local service provider will provide a new machine in case of faults. In each case where the user reports a fault, Gorenje will be obliged to investigate at the place of installment, a task



that is planned for the service manager. The user agrees to provide the service personnel with access. If it is decided after investigation that the machine cannot be repaired, the local service manager will replace the machine so that the user will have a machine available for use at all time. A service level agreement may be introduced, so that priority repairs and holiday repairs may cost an additional fee in comparison to repairs after a week or similar.

The warranty period in the designated countries is not uniform. Under the Slovenian Consumer Protection Act, consumers who have purchased certain technical products are covered by an obligatory 1-year guarantee from the producer (the voluntary warranty may be longer), during which, the consumer is entitled to have any defects corrected within 45 days. Failure to comply would mean that the producer is required to replace the machine with a new one (alternatively, a full or partial refund) or to return the purchase price to the user and the user is consequently required to return the machine. However, if the ownership is retained by Gorenje and the washes are offered as services, this law does not apply, giving more control to the service provider.

Time periods will have to be examined, for example, the Netherlands has different notice periods than in Slovenia in case the customer decides to cancel the contract. By Dutch legislation, the notice period depends on how long the contract is valid, whereas by Slovenian law, the notice period is fixed.

### 4.3. Flexible pricing

Compared with the traditional sales, Gorenje would like to offer flexible pricing tailored to the customer. The pricing will vary on a number of different variables, for example the type of machine, contract duration, number of possible washing programs, service level agreement and the user behavior (i.e. benefits if the user washes environmentally friendly by using lower temperatures). Since this flexibility is built upon a number of different factors, it becomes challenging to inform the customer what the final price will be, which is mandatory in stipulating the contract. Furthermore, fine-tunings of the price become inconvenient if there is a need to inform the customer each time a variable of the price changes. Lastly, marketing may become difficult to attract new customers if the pricing is not easily comprehensible.

The current draft lists the pricing in appendices to the contract, so that the contract provisions may be reused for a long time, and potential updates to the pricing will be easier to manage as a separate document. Furthermore, since informing the customer of each and every variability of the pricing is impractical and may not be comprehensible for the average consumer, one potential solution could be to state a maximum price. The customer will then be informed of a maximum fee, and then incentivized to make it lower depending on user behavior, but never higher.

In HOMIE user agreements, it is stated that the pricing will not change for the minimum contract period of six months. After the initial period, pricing may change, but HOMIE will inform of this change one month in advance, which is a legal requirement in the Netherlands. The customer then has the option to cancel the contract if they do not agree with the pricing change. HOMIE is very hesitant to change the pricing, and have only

done so once to date. The CEO notes that the phrasing and marketing of the pricing is important. Communicating the pricing was a challenge in the beginning, but now there are fewer questions from potential customers after some rephrasing has been done. However, HOMIE have experienced that some customers (both existing and potential) perceive that they are paying more than they actually are. Consequently, they perceive that alternatives (e.g. purchasing) may be cheaper for them when they, in fact, would not be upon closer examination. To counter this, HOMIE is working on implementing a ‘slider’ on the website, demonstrating the cost for a potential customer given a certain washing pattern.

In relation to revenue, HOMIE has had some corner cases such as users that utilize the washing machine very irregularly. The reason behind this user behavior is most likely that the customer has another washing machine at home already (e.g. received as a gift or purchased after the contract with HOMIE was signed). The user agreement states that the customer should use the washing machine as their primary washing machine, and if this is not upheld, they may be charged for previous usage behavior based on historical data. Similarly, the user promises to keep the machine connected to the internet, and if the machine is offline for more than one month, a penalty fee may be added. The payment system needs to be able to handle such scenarios and more common issues such as backlog payments.

#### **4.4. Establishing a good customer relationship and trust**

Establishing a good customer relationship and gaining trust is commonly referred to in CE literature, including the baseline and market characteristics report of this project (Klapalová et al., 2019). This challenge was discussed with HOMIE during the making of this report.

HOMIE is using the services of a Dutch accreditation firm for online businesses. This firm verifies that the business is conducted in accordance with national law, and beyond that, they ensure that the customer is protected in every step of the business. They have also offered HOMIE legal counsel when it comes to the agreement towards the customer. The governing idea is that the customer should never be the losing party in an agreement in a B2C relationship. The firm is paid an annual fee, and helps HOMIE with gaining the trust of customers as well as counsel when needed in a dispute with a customer. However, the CEO notes that most customers read the contract and are aware of how they are expected to behave properly. Some customers even notify HOMIE that they are leaving for vacation and that the machine will be unused for some time.

The most common concern of HOMIEs customers, according to the CEO, is the fear of being held accountable for damage made to the washing machine. The contract states that the user promises to take good care of the washing machine, and to not make any adjustments or reparations. With normal use, wear and tear is expected by HOMIE, and it must be communicated that regular usage will not be a problem.

As a new company, it can be challenging to gain the trust of potential customers without any brand recognition. HOMIE has been supported by TU Delft from the start, whose brand is well renowned and provides authenticity. This is further strengthened today with

the support of an external bank. HOMIE have also been working actively with an online review collection company that collects and publicly displays consumer reviews on their own website, search engines and HOMIEs website. The CEO of HOMIE notes that this really helps with getting in new customers, since they at the time of writing have a rating of 9,5 out of 10 (Trustpilot, 2019a). The feedback is being actively monitored by a responsible person at HOMIE, and responses to the reviews are being sent to the consumer who wrote the review. In comparison, a similar company based in Denmark who are not working actively with their online reviews, the ratings are currently consistently negative and left unanswered to date. The complaints include poor and time-consuming help from the support team, costly operation of dryers, error messages and dryers locked without the possibility to open them (Trustpilot, 2019b).

## 4.5. Data Protection

The EU General Data Protection Regulation (GDPR) constituted a major change in data privacy regulation, a challenging change for many organizations. However, the interviewees at Gorenje currently see no major challenges when comparing Gorenjes standard procedure for data protection with the requirements of this project. It is a process which will require some consideration, time and resources, but no obstacle is foreseen.

In the current draft, the lessee must give Gorenje a prior agreement or consent to terms and privacy policy of the lease contract. These documents will be a binding part of the contract since Gorenje is required under GDPR to provide evidence that the lessee gave consent that Gorenje can process their personal data. Relevant personal data such as name, surname, address, and possibly, special data regarding health will be required. The latter can be explained by the high likelihood that Gorenje will be able to see if the lessee has used washing programs designated for allergies, data which is considered sensitive health information.

All activities related to GDPR will be performed according to a personal data catalogue. This is a catalogue which will contain all information about who is processing the data, purpose behind the processing, what types of automatic decisions are made based on the data, the responsible contact person, as well as which organizational and technical measures are in place for using and providing safe storage of personal data. The lessee will be able to take part of this catalogue on the webpage of the lessor (local SBU). Furthermore, the lessee will be able to act on their rights which they are entitled to according to GDPR, such as the right to be forgotten and the right to be informed about which data has been collected etc.

Considering that this is a joint project with multiple parties involved, a more in-depth data privacy impact assessment will have to be made. However, since there already are organizational and technical measures in place at Gorenje, this is a standardized process and should not uphold the project.

In the case of HOMIE, GDPR has not turned out to be a major issue, according to the CEO. HOMIE only collects the data that is required for the service, and because of the business model being pay-per-use, there is arguably a clear reason to collect more data in comparison with a traditionally sold washing machine. HOMIE is transparent with the

customer over which information they collect and share with other parties (such as customer name and address with logistics companies) and have a data processing agreement in place with these third parties. The data from the washing machine tracker is transferred over the customers personal WiFi connection, but information such as WiFi password is stored locally on the tracker in the machine and never on any of HOMIEs remote servers. This setup is preferable to ensure customer privacy and data protection.

Measures have also been taken so that data from individuals who are no longer customers will be deleted after a specified amount of time, and not stored longer than required. The rationale for storing the data for some time is mostly tied to accounting and invoicing. It is also possible to anonymize the data, in order keep statistics which may be interesting for research purposes, for example knowing that ‘this washing machine ran at this time’, but no information linking to which customer or user who ran the wash.

## 4.6. Non-payment and ensuring product return

Two corner-cases of concern were identified in the onset of this project, the issue of non-payment and ensuring the return of the washing machine. These have been scrutinized in the making of this report.

### 4.6.1. Non-payment

The lessee is obliged to pay the rent within the time limits specified in the contract. In the case of a lessee not willing or able to pay, the lessor can cancel the contract after first informing the lessee prior to the cancellation of the contract. For HOMIE, outstanding payments is a problem with approximately 1-2% of their customers, according to the CEO. Furthermore, the average debt of these customers is estimated to be around 100€.

Some measures are in place to prevent non-payment at HOMIE:

- 1) Penalty fees specified in the contract and reminders in case of outstanding payments.
- 2) A variety of payment options, such as pay after the end of the month or the additional 14 days payment terms. After those 14 days, an extra charge will be added to a new notification.
- 3) Easier payments. For example, HOMIE has introduced automatic top-ups, meaning that if a customer forgets that they are out of funds, then more money can be taken from their account and added as credit to HOMIEs so that do not run behind on payments. Furthermore, simple automated email notifications with one-click link to payment site have helped.
- 4) HOMIE do have technical preparations in place that makes it possible for them to remotely disable the machine.

If the reminders of outstanding payments have no effect, the customer is contacted and informed that if they do not pay within the next 14 days that an administrative fee will be added and the case will be forwarded to an external debt collection agency. This has proven to be effective for HOMIE, as the debt is usually paid then without having to involve the debt collection firm. The debt collection agency can also offer the customer other payment terms, such as splitting the debt into several smaller payments over time instead of a single payment. However, HOMIEs backend systems needed to account for these types of agreements, since the customer should then be able to use the machine as a regular customer, and not have to be reminded of unpaid washes. This way, HOMIE do not need to lose the customer. In the worst-case scenario, the customer would have to be taken to court by the debt collection agency. So far, this has not happened with HOMIEs customers when it comes to non-payment.

#### ***4.6.2. Ensuring the return of the washing machine***

Gorenje must be able to retrieve the washing machine from the place of installment. Such a situation needs to be predetermined in the contract, in other words, the lessee needs to be informed of what happens if one does not pay. As a part of the technical specifications, the washing machine can be remotely disabled by Gorenje. If disconnected from WiFi, the machine will allow a few washes until reconnected if it is an individual user, whereas a for example a shared machine in a student dorm will be immediately disabled until reconnected.

The issue of ensuring the return of the washing machines is also relevant for the bank who provides HOMIE with a loan, considering that a large part of the investment is tied to the physical machines. The agreement with the current bank is that if HOMIE were to default on their loan, the bank can step in and take over the business, focusing on revenue rather than taking back the machines.

In the current contract draft by Gorenje, the lessee will consent to the lessor being granted to enter the household in order to repair, replace or retake the appliance after a few specified days of notice. If the lessee does not hold up this term of the agreement, Gorenje will have to take legal action and sue the lessee in order to authorize repossession or debt collection from after a court order. In case that the customer agrees to schedule a pick up, it is preferable if Gorenje service managers are responsible for the transport rather than external debt collectors, in order to minimize the risk for transport damage etc.

In HOMIEs case, customers need to return the appliance within 14 days of cancellation of the contract. This means that both parties need to agree on a date and time when the machine can be picked up by HOMIE. If they have not set such a date after 14 days, an end-of-contract cancellation fee can be added. The CEO notes that while several customers appreciate the free takeback of the machine as a bonus, HOMIE is in fact obligated to take back the machines under Dutch law, despite having a leasing construction not actually selling the machines. The logistics of the takeback can be challenging however, since even though a time and date has been agreed upon, it is no guarantee that the customer will be home at the agreed upon time. HOMIE is considering adding a ‘not-at-home’ fee to be used in such scenarios to cover the additional costs and add incentives to not miss the agreed timeslot. Machines that are broken down and cannot

be repaired are put in the correct recycling stream. Customers have shown interest in what happens with used machines, and so, HOMIE would like to do more than they are today (e.g. reuse or remanufacture components to a greater extent than what is currently possible with the existing machines and resources) and communicate this to the customers.

To date, two customers have ignored the messages from HOMIE requesting to book a time for pickup. In the first case, the machine had already been confiscated by a debt collection firm in order to pay a different debt, under the assumption that the washing machine was the property of the customer. To ensure no such event happens again, all washing machines are now marked with a sticker informing that the machine is the property of HOMIE. In the second case, the machine had broken down, and the customer had decided to throw the machine out themselves, even though HOMIE clearly states that they will repair the machine if this happens. This second case has been taken to court in order to come to an agreement with the customer. While the practicality of these scenarios may sound daunting, the CEO acknowledges that events like these are unavoidable, and have therefore adjusted their pricing to account for them rather than preparing for each imaginable scenario in the agreement.

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## 5. Discussion and Conclusion

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The aim of this report was to give insights on non-technical barriers and legal concerns which may arise with Gorenjes deployment of a pay-per-use business model for washing machines. The initial idea when presented with the task was to create a framework of barriers based on scientific publications and, together with Gorenje, evaluate which issues were the most pressing in relation to their situation. However, as the project evolved and discussions were in progress, it was clear that the literature on barriers seldomly reaches the level of detail compared to the operational issues that were being discussed at the time. Instead, a snapshot of the current non-technical barriers and legal concerns has been given, with evaluation and discussion based on primary data with key personnel at Gorenje and with the CEO of HOMIE.

Interesting challenges have been encountered, such as the legal and operational implications of the choice between an operational lease and a service agreement. Specifically, the question of ownership has a large effect on both legal and financial questions.

Given the current state of development of CE, the legislative context in which the project operates is regarded ambiguous and messy, as noted by the literature review. This is especially challenging considering that the business model will be demonstrated in four different nations. Some local differences are to be expected, however, no major obstacle has been identified in this regard in the process of this report. As the user agreement draft is currently being distributed to the local SBUs, further evaluation will be taken with regards to local law and questions may arise then. However, the existing resources at Gorenjes disposal are considered adequate and no major issues are expected in this regard.

Moving away from the traditional sales model opens up the opportunity to introduce a flexible pricing scheme to the customer. However, this has proven to be a challenge not only by the literature review but also in Gorenje's case, since this is problematic when it comes to the user agreement and marketing strategies. Some solutions are being explored.

Issues of data-protection (GDPR) were not regarded as problematic, neither by Gorenje nor HOMIE. Considerations and preparations must be done, but no new major issues arise with the deployment of the pay-per-use business model.

The experience of HOMIE shed some light on challenges identified in the previous market characteristics report (Klapalová et al., 2019). Specifically, some suggestions on the establishment of a good customer relationship and ensuring trust were brought up for consideration. This may be crucial as a pay-per-use business model arguably requires more attention to customer services compared to traditional sales through retailers.

Corner cases have been explored with legal representatives from Gorenje as well as with the experience of HOMIEs CEO. Specifically, non-payment and failure to retrieve the washing machine has been discussed. Some considerations to ease the payment process have been suggested, and a review of disputes with customers have been illustrated by HOMIE. Preparations in terms of the user agreement have been discussed.

This report is suggested to be a point of discussion for the white goods demonstrator, in particular with the local SBUs, to identify and coordinate issues which may need extra consideration prior to deployment. At the time of writing, none of the identified challenges are considered to be blocking the success of the project.

In closing, this report focused predominantly on the external challenges which the demonstrator will have to relate to, but have no control over. There may also organizational challenges within the boundaries of the firm which could be interesting to explore and evaluate, in particular with regards to how this radical project is received and treated within the rest of the organization. Managing new roles, networks of actors, co-creating with customers and putting sustainability on the strategic agenda of the organization could be topics to explore further.

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