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Worthy or not worthy? Repair motivations and barriers from consumers across fashion, furniture, and consumer electronics in Denmark

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Abstract:
Never has human consumption and demand for products been this high, and the growing demand for products puts a strain on the finite resources available. Therefore, the need for prolonging the lifetime of existing consumer products has received increasing attention from governing bodies such as the European Commission e.g. shown in the 'right-to-repair' directive. While 77% percent of European citizens state they want to repair products before buying new, only 64% state that they have done it – and ~90% have never purchased clothing, smartphones, or televisions secondhand. Prolonging the lifetime of consumer products through repair is therefore an important point towards more sustainable consumption. Yet, a lot of broken products never enter a repair process. This paper aims to shed light on the barriers and motivations for repair to help increase the understanding of how more repairable products can get repaired. Through a Danish national survey (N=1068) and 11 semi-structured interviews, we identify main barriers and motivations for entering a repair process within three main product classifications: *Consumer electronics*, *Fashion*, and *Furniture*. We confirm existing findings that price of repair/replacement is a main motivator/barrier. We also identify *perceived repairability* and *ease of cassation or replacement* as barriers not previously described.

Introduction

'Sustainability' is increasingly a guiding star for governments and companies alike. A Baker McKenzie survey revealed that 73% of companies surveyed expressed willingness to collaborate with competitors to reach 'net-zero', taking away as much greenhouse gas as they emit (Auberger, n.d.). A definition of sustainable development was eloquently worded in the 'Brundtland Report' as development that *"meets the needs of the present without compromising the ability of future generations to meet their own needs"* (United Nations, 1987, p. 15).

However, the 'take-make-waste' approach to products on a large, global scale is positioning many companies far from sustainable development and contributes to large waste of resources. Take textiles as an example; a recent report outlined the volume of returned or unsold textile products that ended up getting destroyed. 20% of textiles sold online are estimated to be returned, where one third of that ends up getting destroyed. Moreover, 4-9% of textiles put on the European market are estimated to be destroyed before ever being used (Duhoux et al., 2024).

Extending the lifespan of products is therefore an important aspect of sustainability, alongside other resource efficiency, waste reduction, and low-carbon strategies (Cooper, 2010). One way to extend product lifespan is through repair. The 'right to repair' movement advocates for empowering individuals by providing them with more opportunities to repair their objects instead of disposing them (European Commission, 2023). However, many repairable consumer products never enter a repair process and instead are discarded and/or replaced by new products (Magnier & Mugge, 2022). Studies conducted on citizens from the EU-28 countries revealed that 77% of consumers are willing to attempt product repair before buying new (European Commission, 2014), yet, only 64% actually engage in repair activities (European Commission, 2018; Laitala et al., 2021). With products like vacuum cleaners, dishwashers, televisions, smartphones and clothing, studies reveal that

~90% have never bought them second-hand (European Commission, 2018). This indicates that if broken products are not repaired, consumers purchase new.

Repairable IT products stay at home

A Danish national survey from 2024 revealed how a large portion of Danish citizens store old IT products (e.g., smartphones, PCs, tablets etc.), which are no longer used, instead of repairing them or making sure they arrive at a recycling station. In the age group between 16-74, 52% stated that their old smartphone is stored at home, while 44% stated that their old laptop or tablet was stored at home (Statistics Denmark, 2024). This is an issue from a resource standpoint as valuable materials then lie dormant in people's drawers rather than re-entering value streams to be used to produce new and relevant products that are needed today. This may also indicate that people tend to store other product categories at home without having them repaired or responsibly discarded of e.g., for recycling or reuse.

In this paper we aim to study the pre-steps before the actual repair process begins to identify determinants and barriers for repair. We investigate this through a Danish national survey and semi-structured interviews of consumers' experiences and attitudes towards repair.

The repair process

According to Bracquene et al., (2019) repairing a product can be portrayed as a 5-step process:

1) Product identification
2) Failure Diagnostic
3) Disassembly & Reassembly
4) Spare Part Replacement
5) Restoring to Working Condition

However, before the repair process can begin, some barriers need to be overcome. This can be interpreted as a decision-making process to decide whether a product is even 'fit' for repair. Among these barriers, a valuation process often occurs to determine whether it is worth spending time or money on a repair rather than a replacement, as perceived product value depreciates over time (van den Berge et al., 2023).

Once this choice has been made, there is a need to determine whether access to the right tools is present or not – this also includes (knowledge of) available offers for repair like local repair cafes. A person's willingness to repair a product rather than dispose of it therefore have multiple thought processes and possibly actors that influence the repair outcome – before a conventional repair process commences. See Figure 1 for a visualization of how the decision-making processes combined with the repair process may result in failure to repair in nearly every step.

Hindrances prior to repair

Despite the value of repair, the repairability of products has decreased considerably in recent years (Fachbach et al., 2022). Additionally, as the number of businesses offering repair has decreased, consumer spending on new products has gone up (Korsunova et al., 2023). There is a need for skills and resources to combat the decline in consumer interest and involvement in the repair process (Hernandez et al., 2020). Some of the common barriers faced by consumers when it comes to product repair are financial constraints, lack of time, knowledge, and skills (E. Dewberry et al., 2016; van den Berge et al., 2023), see also Table 1 for an overview of motivations and barriers that people experience with product repair. The hindrances are many, therefore, it is very beneficial to have repair opportunities that

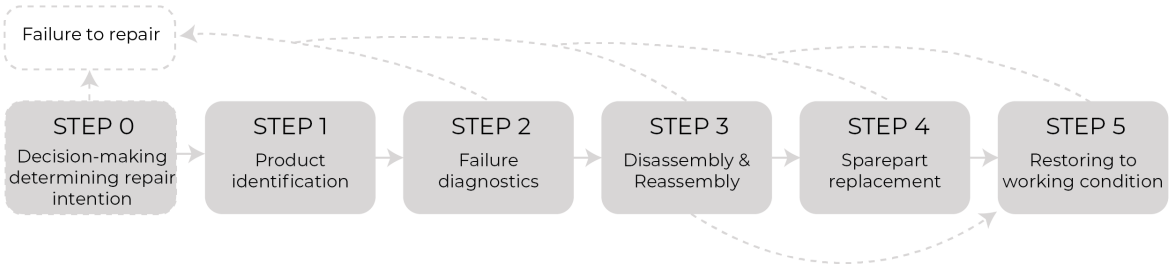

Figure 1. Depiction of the repair process in six steps. Adapted from Bracquene et al. 2019

Table 1 Barriers and motivations for repair

Barrier/ motivation for repair	Description	Reference
Barrier	Lack of time	(E. L. Dewberry et al., 2017; Diddi & Yan, 2019; McCollough, 2020; Mclaren & McLauchlan, 2015)
Barrier / motivation	Financial cost	(Diddi & Yan, 2019; Hernandez et al., 2020; McCollough, 2020; Mclaren & McLauchlan, 2015; Terzioğlu, 2021)
Barrier	Lack of skills	(Cooper & Salvia, 2018; E. L. Dewberry et al., 2017; Diddi & Yan, 2019; Mclaren & McLauchlan, 2015)
Barrier	Lack of product knowledge or available technical specifications	(Hernandez et al., 2020)
Barrier	Negative stigma	(Cooper & Salvia, 2018; Diddi & Yan, 2019; Terzioğlu, 2021)
Barrier	Ease of access to new products and desire for new functionality	(Diddi & Yan, 2019; McCollough, 2020)
Barrier	Low quality materials or condition of the product	(Cooper & Salvia, 2018; Terzioğlu et al., 2015)
Barrier	Spare part availability	(Hernandez et al., 2020; Terzioğlu et al., 2015; Van Der Velden, 2021)
Barrier / motivation	Design for disassembly	(Cooper & Salvia, 2018; E. L. Dewberry et al., 2017; Hernandez et al., 2020; Park, 2021)
Motivation	Environmental footprint	(Diddi & Yan, 2019)
Motivation	Emotional attachment	(Diddi & Yan, 2019; Hernandez et al., 2020; Terzioğlu et al., 2015)
Motivation	Longer lasting product	(Diddi & Yan, 2019)
Motivation	Interest, hobby or perceived satisfaction	(Nielsen & Laursen, 2023; Terzioğlu, 2021; Terzioğlu et al., 2015)
Motivation	Utilitarian need	(Terzioğlu et al., 2015)

may lower the identified repair barriers or increase repair motivation. Community repair initiatives, especially Repair cafés, have emerged to address the repair barriers and the throwaway culture by enabling repair and reducing the number of discarded products (Charter & Keiller, 2016; Pit, 2020; Rosner & Ames, 2014). In repair cafés, people volunteer to repair products free of charge to extend product lifespan. These volunteers provide the necessary skills, knowledge, tools, and experience to overcome some barriers faced by consumers (Madon, 2022). However, multiple factors are influencing whether a product needing repair is repaired. The choice to repair initially lies with the consumer (Terzioğlu, 2021). Thus, if the barriers experienced are too great, the products will not be repaired and likely be discarded and/or replaced. The findings by Terzioglu et al., (2015) also suggest that repair motivations and barriers differ between product categories. Though, such product differentiation is not always included in literature on barriers to product repair.

We argue that it is important to better understand what happens *before* the hands-on repair process begins. The repair decision making, to gain insights into the reasoning behind repairing or replacing a product. To the best of the authors knowledge, a study investigating barriers and motivations for repair within different product categories have not

been conducted before. In this paper, we look towards consumer product classifications that currently generates most of the consumer product waste: 1. Consumer electronics, 2. Furniture, and 3. Fashion (e.g., clothing and footwear) (Ministerie van Algemene Zaken, 2023).

To investigate this, we conducted a Danish national survey within these three classifications of consumer products. The dataset was used to better understand why people replace products in different product categories instead of repairing or recycling. Additionally, semi-structured interviews were done to get richer data on the reasoning behind consumers' decision to repair or not repair a product.

Methodology

The survey was designed around 21 different product classifications within the overarching product classifications (Consumer Electronics, Furniture, and Fashion).

The survey was distributed to a representative Danish population of 1068 people (age distribution: 19% under 30 yrs, 16% between 30-39 yrs, 15% between 40-49 yrs, and 50% between 50-99 yrs). Respondents were asked questions related to the product categories within the three classifications. The following are a select set of questions from the survey that are relevant for this study:

- *Has your household had any of the following products break in 2023-2024?* [Product categories], See Figure 2.
- *Was the product repaired?*
- *Why did you or your household repair or intend to repair the product?*
- *Where was the product repaired?*
- *Why was the product not repaired?*

To supplement the findings from the survey, a semi-structured interview guide was developed and 11 people who have engaged in repair activities (ages between: 24-65) were interviewed about which products they repair, how, and why they repair them. The interview data was initially transcribed were then inductively coded following a thematic analysis protocol inspired by Braun & Clarke's reflexive thematic analysis (Braun & Clarke, 2019).

Findings

Most survey respondents experienced defect products in the *fashion* product classification (Mean 25%, SD 0,12), while the experienced defects within *consumer electronics* were roughly half (Mean 13%, SD 0,06). The *furniture* classification had by far the lowest number of reported defects (mean 5%, SD 0,015). See Figure 2. A fraction of survey respondents noted how they stored products that they intend to repair in all product categories except *power tools* and *household appliances (blender, vacuum cleaner etc.)*. The

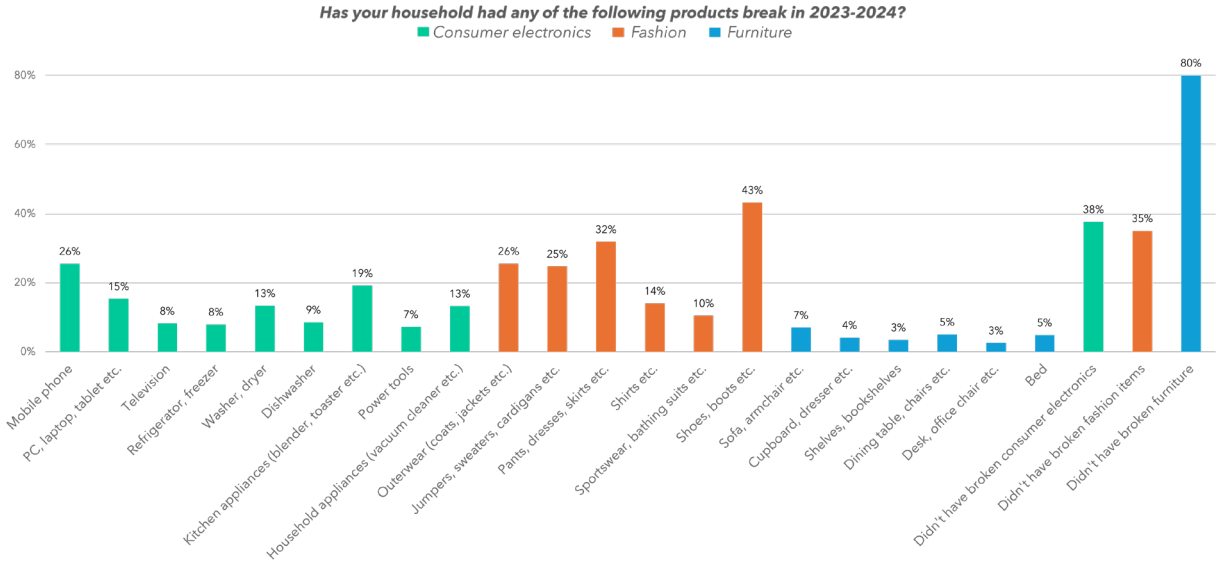

Figure 2. Overview of product categories with reported percentages on broken products (N=1068)

only product categories where the *repair* fraction was larger than the *not repaired* were within furniture *(dining table, chairs etc.; cupboard, dresser)* and consumer electronics *(washer/dryer; Computer, PC laptop etc.)*. See Figure 3. The fashion category had the highest number of reported defects with the overall lowest reported fraction of repairs. This underlines a large potential for prolonging the lifetimes of fashion items through repair activities.

Why was the product repaired (or intension to repair)?

When looking across the product classifications, the reasoning behind repair were apparent in three main categories:

i) *price-related:* a newer product would be more expensive
ii) *Emotional reasons for repair*: expression of deep care for the product
iii) *Inability to replace:* Deemed impossible to find a similar replacement in a new product.

Price-related reasons for repair were dominated by the consumer electronics category, whereas emotional reasons were strictly related to the fashion classification. For furniture, it stood out how people repaired the products because they were not able to find a similar product to replace the furniture. A person commented on the general reasoning behind repair: *"[repair] is really exciting to experiment with. There is something satisfying about saying 'I did that'. It's gold [valuable]"*. Likewise, for repair tasks like sewing, a person's interest (or lack thereof) was noted as both a barrier and a motivation: *"I love to sew and I do it a lot […]. It is a hobby of mine"*, tapping into the pleasure dimension of repair.

Where was the product repaired?

Repair Cafés are now showing up as an option that some respondents used in order to repair their broken products, albeit an underrepresented one. This could indicate that awareness of these repair cafés is slowly increasing, compared with an earlier survey conducted in 2020 (Jørgensen, 2021). Most

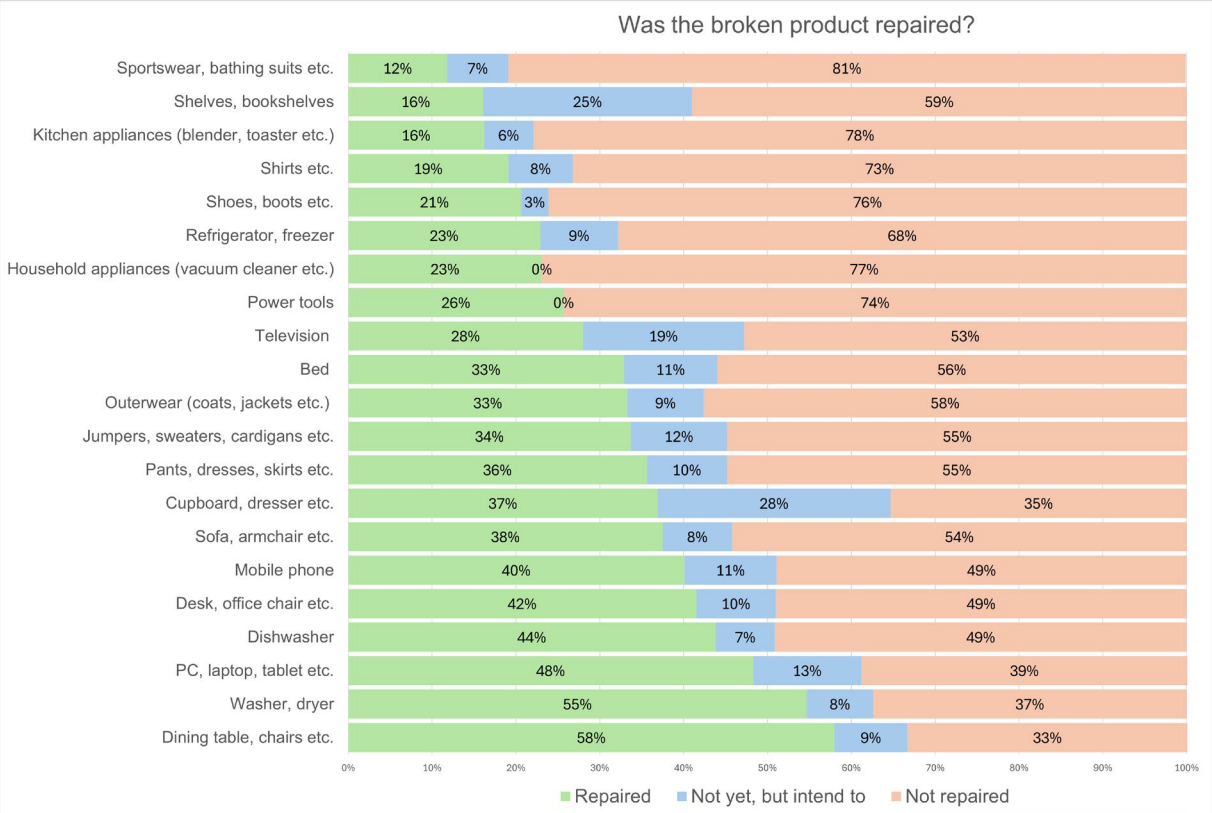

Figure 3 Overview of which of the broken products people repaired, intended to repair or did not repair

consumer electronics were repaired externally by professionals.
The results further complement previous studies indicating that consumers are more likely to attempt self-repair of clothing and furniture (Laitala et al., 2021). These products are previously categorised as static products with lower complexity over mechanical, electromechanical and electrical products (Nielsen et al., 2023)

Why was the product not repaired?

In the consumer electronics classification, the respondents mainly deemed that the product would be too expensive to repair or perceived it as unrepairable. The interviewees confirmed this: "*if it costs too much to repair my old phone, I'd rather pay for a new one. But if it is significantly cheaper to repair, I will always do that".* Consumer electronics was the only classification where a notable group of people marked that they still store the product at home, but do not use it anymore except for large household items such as fridges, dishwashers and vacuum cleaners, which compliments the findings from (Statistics Denmark, 2024). Consumers seem more inclined to get rid of fashion items and furniture items compared to consumer electronics. In the fashion classification, most deemed the product unrepairable, too expensive to repair, or listed the primary reason for not repairing the product to be because they had already gotten rid of the product.
The main reason for not repairing furniture was shared between the respondents who deemed their product unrepairable or too expensive to repair. For dining tables and chairs the main hindrance was noted as being too time-consuming to repair. Notably, most respondents in the desks/office chairs category reported how it was not possible to find a place to have them repaired.

In addition to economic considerations, all 11 interviewees mentioned that time is a big factor in determining if a repair is worthy or not: *"it is often not the repair itself that takes time. It is the research on how to do the repair that takes time"*. Time was also mentioned in relation to browsing for spare parts and waiting for them to arrive when no physical stores nearby offered the right parts. Interviewees also mentioned a specific lack of tools and facilities to properly repair their products: *"There is a loose screw in my speakers, but I don't have the specific tool to fix it, and I don't want to use the time and money on buying the right tool"*. Especially for the respondents living in apartments, the lack of facilities showed: *"right now I don't have a workshop to complete the repair".* These barriers were not picked up in the survey.

A sense of material respect was expressed by the interviewees and a feeling of gratification achieved from repairing their products. This was mainly from people with an interest in the type of repair or related hobby, which in turn acts as a barrier when missing. Upbringing and social environment appear to affect their motivation for repair: *"My interest probably stems from my upbringing. I am affected by what I was given to play with. I had a toolbox when I was a kid"*.

Discussion and Conclusions

Based on the survey results and the interview data, the top barriers and motivations that affect the decision-making process prior to a repair process were summarised in Table 2.

What motivates or hinders repair differs depending on the product classification. For consumer electronics, the main reason for having the product repaired is related to the *price of repair* compared to buying a new product. For fashion people are more *emotionally attached* to the products and thus more motivated to repair the items, though cost is also a big factor. For furniture, the *inability to replace the product* with a similar one was prevalent.

Interviewees expressed the lack of access to tools and facilities to be a barrier. If repair cafes were more accessible it could result in increased product repair. For example, hiring a mobile repairman through an app like it has become normalised for food bringers. In recent years, such a service-based business model for repair has gained traction for electronic devices like smartphones (e.g. https://samsungrepair.com/).

Table 2 Main barriers (B) and motivations (M) identified from the survey and interviews. *Derived from the interview data. **Not described in literature from Table 1

	Consumer electronics	Fashion	Furniture
B	1. Financial cost (Repair too expensive) 2. Perceived repairability** 3. Did not consider repair 4. Ease of cassation or replacement** 5. Financial cost	1. Perceived repairability** 2. Financial cost (Repair too expensive) 3. Ease of cassation or replacement** 4. Did not consider repair	1. Perceived repairability 2. Ease of cassation 3. Financial cost (Repair too expensive) 4. Did not consider repair
M	1. Financial cost (Repair cheaper than new) 2. Emotional attachment 3. Environmental concerns 4. Perceived interest* 5. Perceived pleasure*	1. Emotional attachment 2. Financial cost (Repair cheaper than new) 3. Inability to replace *AND* Environmental concerns 4. Perceived interest* 5. Perceived pleasure*	1. Financial cost (Repair cheaper than new) 2. Inability to replace 3. Emotional attachment *AND* Environmental concerns

We have yet to see the trend spread to other common everyday products that people own in their home, which may come down to the price for repairs if performed by a professional. Retailers typically do not repair when the cost of repair surpasses 50% of the price to replace with new (Scott & Weaver, 2014). Some replace rather than repair if the rice for repair is higher than just 20% percent of a new product (McCollough, 2007). This underlines the importance of access to affordable repairs. Here it is worth noting that Repair Cafes in Denmark are free, however, not easily accessible with opening hours only once or twice per month. Next after repair price, *perceived repairability* of a product is the biggest barrier, which was not found described in previous literature. This refers to how easy or difficult a user believes a repair will be – this means that easily repairable products may never be repaired due to a low perceived repairability from the user. Likewise, the ease of cassation or replacement barrier was also not documented as a barrier previously. This barrier indicates a tendency to replace before repair. The survey revealed how a large fraction of broken products was never even considered for repair, already replaced with new or not deemed repairable. This underlines a large repair potential in everyday products. Further studies are needed to determine ways to positively affect the perceived repairability of different product categories to increase the fraction of broken products considered for repair. The recent Ecodesign for Sustainable Products Regulation from the European Commission (European Commission, 2024) may help affect the perceived repairability of everyday products by increasing awareness of repair and availability of affordable spare parts.

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