

Consumers' engagement in extending product life to build a circular economy

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To cite this article:

Timofei, O. (2023). Consumers' engagement in extending product life to build a circular economy. Romanian Journal of Economics, 57(2), pp. 63- 73

Abstract. *Amidst the growing significance of the circular economy and the imperative to embrace this paradigm, inquiries emerge concerning the precise manifestation of this transition. This encompasses alterations in the paradigm of value creation and the introduction of innovative business models. Furthermore, consumers' active involvement in extending products lifespans and conserving resources is crucial. Recognizing the significant environmental impacts of consumption habits, embracing circular economy behaviors becomes essential for a successful transition to this sustainable economic model. Objective to examine the behavioral dimensions of the Republic of Moldova's populace in relation to consumer products across diverse life stages. Also to pinpoint the impediments and strategic compromises encountered by consumers in deliberating their participation in the circular economy and to gauge the pivotal role played by economic, social, and psychological factors in shaping consumer behavior. Method: in order to accomplish the research goal, a survey was created to evaluate the involvement of consumers in prolonging the durability of consumer goods. The questionnaire is focused on understanding consumer behaviors and attitudes towards practices, such as leasing, second-hand purchases, and reuse, which are the essential elements of a circular economy. Results: The examination and assessment of the survey responses some interesting discoveries. Although there is an inclination within the populace to utilize products for an extended duration, consumers in the Republic of Moldova typically exhibit skepticism and hesitancy towards adopting alternative practices that foster product lifespan extension and circular economy principles. Originality: This study contributes to the existing knowledge by specifically examining the behavioral aspects of the population in relation to consumer products and their engagement in the circular economy. The study offers insights into the challenges and trade-offs encountered by consumers, illuminating the significance of economic, social, and psychological factors that impact consumer behavior in the context of transitioning to a circular economy.*

Keywords: *circular economy, consumers' behavior, increasing product usage, sustainable development, product-life extension*

JEL classification: *Q01, Q32, Q57*

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1. Introduction

According to the latest report from the United Nations, the global population is projected to exceed 9 billion individuals by the year 2050. If current production, consumption, and behavioral patterns remain unchanged, this imminent demographic growth will be accompanied by increasing pressures on the environment and available resources. Population growth and the corresponding increase in the consumer's demand for products and services risk depleting or destroying these resources. There is, therefore, an urgent need to shift towards a new, more sustainable economic model where economic growth and well-being are not based on the unsustainable use of limited natural resources.

Promoting a more sustainable development involves implementing a circular economy. This approach aims to optimize resource consumption and minimize environmental impact by reimagining the entire economic system throughout the various stages of the product life cycle, including production, consumption and recycling.

In this paper, we aim to conduct qualitative research on the lifestyles and aspirations of the population of the Republic of Moldova, providing insights into the possibilities for developing a circular economy in our country from the consumers' perspective. Additionally, the review of the literature in the field shows that there is still no consensus on the foundation of the circular economy. The concept is relatively young, and there is still extensive room for research to define the concrete practices that could be encompassed within the circular economy.

Therefore, in this paper, we mainly focus on identifying the possibilities for increasing the lifespan of products as a means to enhance the efficient use of resources. This is particularly relevant in conditions where not all participants in the economic cycle, even when practicing the principles of the circular economy, are motivated by environmental conservation. From the consumer's point of view, extending the lifespan of products can be a rational money-saving approach (buying second-hand products can be cheaper), a way to select goods and services believed to be of better quality (some may have more trust in a particular brand), etc.

Considering the aforementioned limitations, we will try to identify the potential levers of the circular economy and determine the level of population awareness regarding the necessity of extending the lifespan of products in the transition process to a circular economy.

2. Literature review

The concept of the circular economy has garnered increasing attention in recent years as a potential solution to the world's environmental challenges (Singh & Giacosa, 2018). Given the resource depletion and high waste production associated with the linear economy, the transition to a circular economy is crucial. However, Murray et al. (2016) argue that the business and sustainability literature lacks sufficient scientific studies on the circular economy that prioritize environmental, social, moral, and ethical values over the economic aspect. Several researchers concur that the circular economy is based on a cycle (Murray et al., 2016; Zhou et al., 2019), emphasizing the need for individuals to adopt various measures for its successful implementation. Consequently, the social aspect becomes paramount, and recent proposals have incorporated this aspect.

Korhonen et al. (2018) proposed the following definition (p. 547): "Circular economy is a sustainable development initiative aimed at reducing the linear flows of materials and energy in production-consumption societal systems by implementing material cycles, renewable energy, and cascade-type flows. The circular economy promotes high-value material cycles, traditional recycling, and systemic approaches that foster cooperation among producers, consumers, and other societal actors in sustainable development activities."

Camacho-Otero, Boks, and Nilstad Pettersen (2018) have shown in their research that the producer perspective is usually studied more extensively than the consumer perspective. However, the consumer's contribution is crucial for closing the loop, as confirmed by Skawińska (2019), who emphasizes that consumer behavior plays a major role in accelerating the development of the circular economy. Despite this

fact, the circular economy and the consumer perspective are not considered to be sufficiently applied in practice or theory.

Singh and Giacosa (2018) examined consumers' cognitive biases towards the transition to the circular economy and concluded that there are psychological, social, and cultural barriers to the transformation in reality. Other studies also indicate that social norms, lack of knowledge, and the belief that individuals can make a difference contribute to the limited adoption of circular economy behaviors (Lee, Prendergast, Yim & Choi, 2018; Izagirre-Olaizola, Fernández-Sainz & Vicente-Molina, 2015). These barriers may be related to consumers' personal plans, highlighting the relevance of studying the consumer perspective in circular economy investigations.

Consumers bear a particularly great responsibility when it comes to returning packaging, as the cycle is not complete without this activity. Additionally, the economy can influence consumer behavior, and the presence of financial incentives in the deposit system further emphasizes the need to understand consumer behavior and the underlying factors behind different choices during consumption (Szmigin & Piacentini, 2018).

In addition to consumer effort, Lee et al. (2018) state that external factors such as accessibility are important in promoting recycling behavior. Therefore, the availability and location of deposit machines play a crucial role in facilitating the deposit process and potentially influence the recycling rate. Additionally, the development of online sales, which have gained popularity, may also affect the recycling rate. Everyday goods e-commerce is expected to continue growing, primarily driven by young adults in metropolitan areas.

Furthermore, despite the fact that young adults consume the most beverage packaging and consider themselves environmentally conscious, they have demonstrated the lowest rate of participation in circular activities (Williams & Page, 2011). Grønhøj and Thøgersen (2009) also address young adults in their study, which indicates that while young adults have a positive attitude towards pro-environmental behaviors, they tend to prioritize personal interests more than older individuals in such activities. These trends make young adults an interesting group to study in relation to the circular economy.

Previous research also suggests that it is relevant for future studies to investigate how digitalization, such as online commerce, may affect circular solutions (Camacho-Otero et al., 2018).

Thus, consumer involvement in implementing circular economy principles can begin with extending the lifespan of products, which can be achieved through several actions:

- Adopting a more thoughtful approach to consumption aligned with genuine needs, emphasizing product preservation, and reducing vulnerability to fashion trends that encourage premature replacement.
- Maximizing utility and promoting reusability to extend the lifespan of products. Occasionally sharing equipment, like gardening tools, can boost product utilization and encourage the choice of more durable designs.

Circular behaviors involve purchasing higher quality products that are built to last longer and can be repaired in case of damage. This can be achieved through:

- ✓ Using products responsibly and with care to extend their lifespan, which may include avoiding aggressive use, regular cleaning, and proper storage.
- ✓ Improving repair skills by participating in repair courses and workshops or utilizing online resources.
- ✓ Reusing products or donating them to charities or individuals who could benefit from them.
- ✓ Recycling products or their components when they can no longer be effectively used.

These actions can be encouraged through consumer awareness campaigns, government policies, and product design innovations that facilitate efficient and simple repair or reuse.

3. Methodology and data

The research aimed to assess the level of awareness among the people of the Republic of Moldova concerning the significant role of prolonging the lifespan of products in the shift towards a circular economy.

To achieve this objective, a quantitative research study was conducted using an online questionnaire. The questionnaire was distributed through social media and emailed to a representative sample of the populace in the Republic of Moldova. It consisted of questions about respondents' knowledge and attitudes towards the concept of the circular economy, product lifespan, ways to extend product lifespan, circular behaviors, as well as aspects related to responsible consumption and its environmental impact. The questionnaire primarily focused on a group of products that, due to their consumption characteristics, would cover a wide range of similar products.

The general criteria for selecting the groups of products were as follows:

1. Reason for product replacement: Products were selected based on the reason for replacing them with a new one. For example, for phones and computers, the main reason could be technological obsolescence, while for clothing and footwear, it could be fashion-related, and for a vacuum cleaner, it could be due to damage.
2. Circular options: Products that offered various options for more circular processes such as repair, recycling, reuse, or sharing were selected.
3. Environmental impact: Products were selected based on their potential to reduce consumption and achieve positive environmental results throughout their lifecycle.

Based on the mentioned criteria, five product categories have been identified:

Smartphones and computers: Purchases are primarily driven by innovation and fashion due to fast innovation cycles, and smartphones hold significant status symbol value. These products have great potential for recycling and repair, critical raw material usage, and are subject to the Waste Law, which provides extended producer responsibility and the Waste Electrical and Electronic Equipment Regulation.

Televisions: In recent years, the replacement cycles of televisions have significantly accelerated; however, unlike mobile phones, they are not status-symbol items. Innovations play a more crucial role in their replacement than fashion trends. They possess considerable possibilities for both repair and recycling, utilizing critical materials, with various ongoing initiatives. In the Republic of Moldova, they are subject to the Waste Law, encompassing extended producer responsibility, and the Regulation on Waste Electrical and Electronic Equipment.

Vacuum cleaners: This type of product, with slower innovation cycles compared to TVs and smartphones, does not serve as an indicator of status as purchasing decisions are made primarily based on durability rather than technology or fashion. It has significant potential for recycling and repair, and is also excellent for various collaborative initiatives. Vacuum cleaners are covered at the national level in the Republic of Moldova by the Law on Waste, which provides for extended producer responsibility, and the Regulation on Waste Electrical and Electronic Equipment.

Washing machines: innovation cycles are slower than those for TVs and smartphones, and they are not considered status symbols. Therefore, purchasing decisions are likely to be more influenced by product durability. There exists the possibility of performing repairs, engaging in recycling, and promoting reuse. They fall under national regulations in the Republic of Moldova, governed by the Waste Law, which enforces extended producer responsibility and the Regulation on Waste Electrical and Electronic Equipment.

Clothing: purchase decisions are predominantly influenced by fashion trends, with the added aspect of the potential for repair and reuse. Despite the absence of energy efficiency labeling or eco-design elements, the inclusion of clothing in the study carries extra significance. This is due to the fact that technological advancements are not as crucial for clothing compared to other product categories, and it is a product category where fashion plays an essential role in replacing the product.

The survey was conducted using a mixed format, involving both online and face-to-face questioning of the participants. The sample was structured to ensure representation across various age

groups, genders, and geographical regions. Participation in the survey was voluntary, anonymous, and unpaid. The survey covered the following areas:

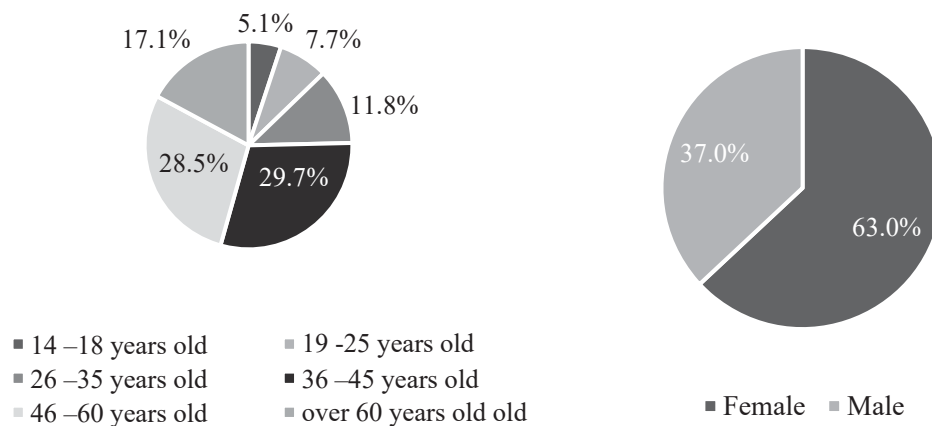
- Consumer understanding of the concepts of "sustainability" and "repairability."
- Engagement of consumers in the circular economy and the factors and obstacles influencing this involvement.
- Expectations, understanding, and awareness of sustainability and repairability.
- Consumer inclinations towards buying or leasing products.
- Post-sale expectations.
- Socio-demographic aspects and pertinent attitudes and behavioral characteristics linked to the circular economy.

The questionnaire received responses from 414 individuals. Upon analyzing the results, it was found that 63% of the participants were women, while 37% were men. The majority of respondents (58.2%) fell within the age group of 36 to 60 years. Additionally, 17.1% of the respondents were over 60 years old. The age group of 26 to 35 years represented at least 11.8% of the total, while the youth below 25 years old constituted 12.8% of the sample (Figure 1).

It is essential to highlight that this sample is particularly pertinent to the circumstances prevailing in our country. According to available statistical data, women make up over 52% of the total population, while men comprise approximately 47%. Therefore, the predominant presence of women in the survey is not inherently an issue but can be considered a reflection of the specific social and cultural realities in the Republic of Moldova. For instance, women play an important role in managing shopping and household products.

Consequently, the results of this survey provide a useful and representative perspective on the opinions and behaviors of the population in the specific circumstances of the Republic of Moldova.

Figure 1. Demographic Profile of Respondents, %



Source: Field survey, 2022

Limitations

The concept of a circular economy is relatively new and complex in the field of economics. Despite substantial interest, research in this area is still in its early stages, highlighting the urgent need for the development of robust research methods. Current methodologies fall short in adequately addressing this topic, lacking established approaches to fully understand the complexities of the phenomenon. In this context, the use of a questionnaire is one of the less efficient but financially accessible solutions for collecting data from a larger number of respondents across different geographical regions. Furthermore, the internet provides access to information and various data sources, as well as greater flexibility in administering and analyzing collected data.

Nevertheless, it is essential to recognize the constraints associated with the utilization of online questionnaires. Firstly, online surveys rely on self-selection, where respondents voluntarily choose to

participate, potentially resulting in a biased sample as those who choose to participate may be more interested or have stronger opinions on the subject compared to those who do not. Secondly, online surveys may not reach all segments of the population, as certain groups may lack internet access or feel uncomfortable using it. This can lead to underrepresentation or exclusion of specific demographic groups, affecting the generalizability of the results. Thirdly, online surveys may be susceptible to biased responses, as respondents may not answer questions honestly or may skip questions they feel uncomfortable with, resulting in inaccurate or incomplete data.

However, we contend that the outcomes of these online surveys remain potentially valuable for investigating consumer behavior. They have the potential to illuminate viewpoints and insights that might be disregarded in a broader and more representative sample. Considering the financial, time, and access limitations to the target population, online questionnaires remain the most viable option for researchers.

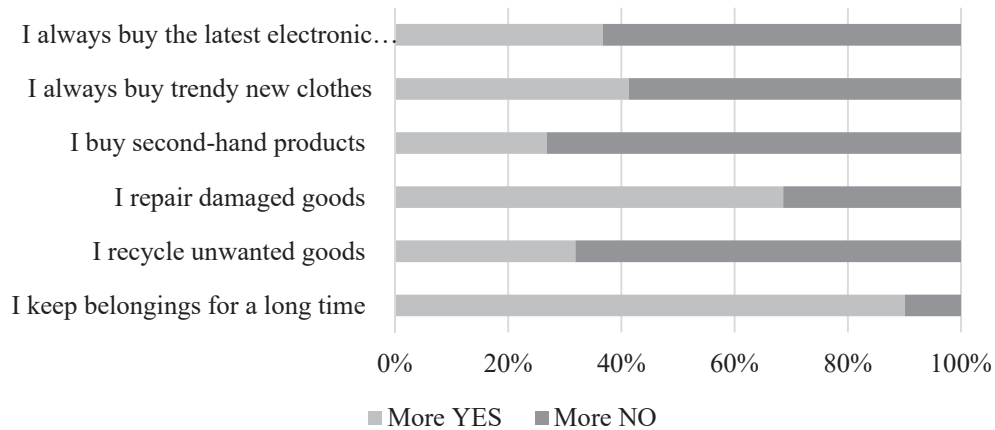
4. Research results and comments

The primary aim of the study was to obtain an overview of the population's awareness regarding the need to extend the lifespan of products during the shift toward a circular economy. The survey aimed to:

- ✓ Recognition of the behavioral aspects distinctive to the populace concerning consumer products across diverse stages of their life cycle.
- ✓ Identify challenges and concessions encountered by consumers when making decisions related to engaging in circular economy practices. This is particularly pertinent when considering the choice between purchasing a more or less durable product and deciding whether to repair an item or discard it in favor of a replacement.
- ✓ Determine the relative importance of economic, social, and psychological factors that influence consumers' engagement in circular consumption, specifically through purchasing durable products and seeking repairs rather than disposal.
- ✓ Propose policy instruments that could empower and motivate consumers to participate in circular practices associated with the longevity and repairability of products.

To identify the characteristic behavioral aspects of the population in connection with consumer goods throughout various stages of their life, respondents were asked to evaluate several statements regarding general behaviors related to the circular economy. The results are presented in Figure 2. In terms of retaining possessions for an extended period, high agreement rates were observed, with 90.1% confirming their practice of keeping goods for an extended duration. Additionally, 68.6% expressed a preference for repairing damaged items. Buying second-hand products received the lowest agreement rates regarding circular economy behaviors, at 26.8%, and only 31.9% of respondents mentioned involvement in product recycling processes. Additionally, participants were asked to analyze their preference for fashion and new gadgets. Only 41.3% mentioned that they always buy the newest and most modern clothes, while electronic gadgets seemed to be of lesser importance to respondents, with 36.7% mentioning that they always purchase new gadgets.

Figure 2. Distribution of respondents regarding general behaviors related to the circular economy, %



Source: Field survey, 2022

Considering the high rate of long-term retention of goods, participants were asked whether they seek information about the durability and reparability of goods before making a purchase. Figure 3 clearly shows that the majority of respondents exhibit responsible behavior, with 78% indicating that they seek information about the expected lifespan of a product, and a similar majority of 64% indicating that they seek information about the potential for product repair.

Figure 3. Distribution of respondents regarding their behavior before purchasing products, %

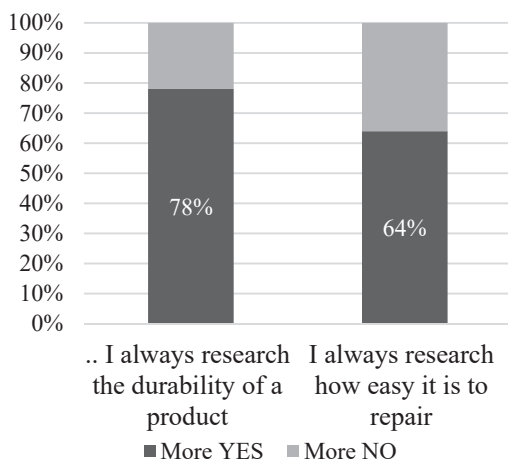
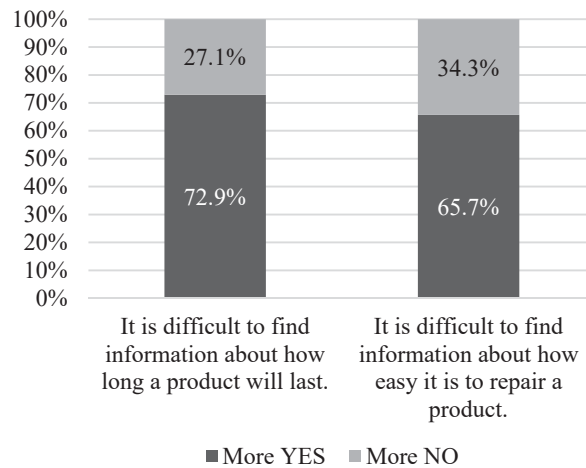


Figure 4. Distribution of respondents regarding the difficulties in finding information about durability and reparability, %



Source: Field survey, 2022

To better understand the challenges and compromises consumers face when considering participation in the circular economy, we proceeded with the study by examining their experiences during the pre-purchase and consumption phases. Our objective was to uncover the obstacles and encounters they face while embracing sustainable practices. To achieve this, participants were surveyed on the ease of accessing information regarding the durability and reparability of products (as shown in Figure 4). According to the questionnaire responses, approximately 72.9% of respondents found it difficult to access information about a product's lifespan, while 65.7% faced challenges in obtaining reparability information.

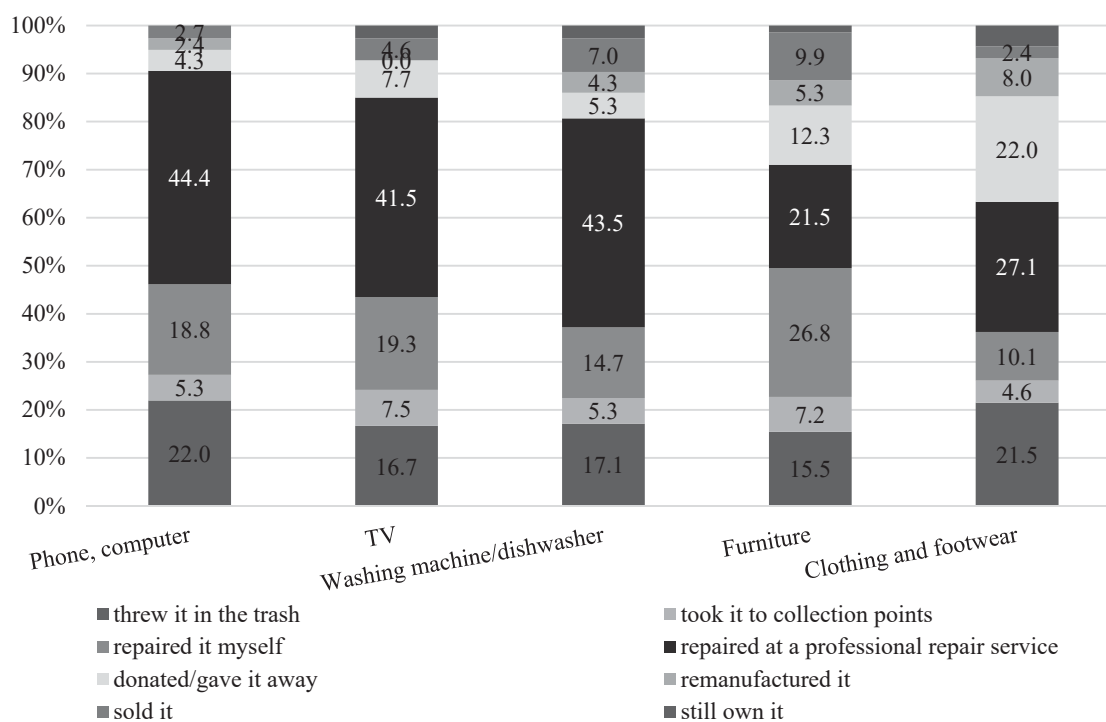
Given these circumstances, when such crucial information is not easily accessible or available, consumers might be discouraged from making well-informed and sustainable purchasing choices. This, in turn, hinders their active involvement in the circular economy, which aims to minimize waste and conserve resources through the promotion of sustainability and reparability.

It is crucial for manufacturers and governments to take responsibility and ensure that durability and reparability information becomes more accessible to consumers. This can be achieved by developing and implementing appropriate quality standards and labels. Additionally, more efforts should be made to educate and inform consumers about the significance of this information and how to effectively utilize it in making sustainable purchasing decisions.

In order to analyze consumption behaviors, we asked the respondents several questions regarding their experiences with dealing with defective goods and extending their lifespan through repair or other circular behaviors.

Figure 5 shows the behavior of the participants regarding defective products, divided by category. According to the answers to the question about how they dealt with the last failure, it was found that the majority of respondents preferred to repair the product, either at a professional repair service or by themselves. This was true for 63.2% of respondents for telephones and computers, 58.3% for washing machines, and 60.8% for televisions. In the case of furniture, clothes, and shoes, repair was preferred over other behaviors.

Figure 5. Consumer behavior with defective goods, aggregated by product categories, %



Source: Field survey, 2022

However, it should be noted that the rate of responses regarding circular behaviors such as handing over products to collection points and remanufacturing was low compared to discarding them. When asked why they chose to throw away the product (Figure 6), 23.4% of respondents mentioned that repair was expensive, while 20.3% preferred to buy a new product. Additionally, 18.8% indicated that they could not repair the product due to a lack of necessary parts, and 17.2% stated that the product could not be repaired at all. Moreover, 14.1% of respondents preferred to discard the product because it was considered morally obsolete.

Respondents who chose to repair the product instead of discarding it indicated that this decision was driven by financial reasons, with 29% believing that repair was cheaper than purchasing a new product. Additionally, 14.5% of respondents mentioned that they were skilled at repairing products themselves, and another 14.5% stated that repair was a more convenient option than buying a new product. Furthermore, 11.6% of respondents mentioned that the repaired product was their favorite, while another 11.6% were motivated by environmental concerns (Figure 6).

These results suggest that there is openness to repairing products, but there are also limits to what consumers are willing to do themselves or pay for repairs. It is important to provide options for product repair and promote the benefits of this consumption pattern, such as waste reduction and cost savings.

Figure 6. Consumer behavior with defective goods, %

Reasons for discarding defective products:	Reasons for repairing defective products:
1. Repair was expensive - 23.4%	1. It was cheaper than buying a new one - 29.0%
2. Preferred to buy a new one - 20.3%	2. I have the skills to repair things myself - 14.5%
3. Lack of necessary parts - 18.8%	3. It was easier than buying a new one - 14.5%
4. Product couldn't be repaired - 17.2%	4. It's better for the environment than buying a new one - 11.6%
5. Product was outdated / obsolete - 14.1%	5. It was my favorite product - 11.6%
6. Other - 4.7%	6. I particularly liked my current product - 8.7%
7. Didn't know how /where to repair - 1.6%	7. There are no such products available anymore - 5.8%
	8. Others - 4.3%

Source: Field survey, 2022

The questionnaire also addressed various other aspects of consumer behavior in consumption. These included inquiries about the utilization of professional repair services and the level of satisfaction derived from them, the purchase of second-hand products and the motivations behind such choices, sustainable behaviors and their association with terms like "sustainable" and "repairable," as well as the significance of product features in purchase decisions. These additional questions aimed to provide a comprehensive understanding of consumer behavior in relation to these topics.

5. Conclusions

The results presented here allow us to conclude that the consumers surveyed generally demonstrate a willingness to participate in circular economy practices. However, actual involvement is relatively low. While the majority of consumers express a willingness to keep their goods for a long time (90.1%) and claim to repair products (68.6%), a significant proportion do not engage in product repair (31.4%), have no experience in purchasing second-hand products (73.2%), and/or do not recycle unused goods (68.1%).

The limited adoption of circular practices by the population may arise from challenges such as the scarcity of information on product durability and repairability. Furthermore, the underdeveloped state of markets for second-hand items, rental services, leasing, sharing, and other related practices could contribute to this phenomenon. Throughout the study, it was noted that the majority of consumers associate durability with product quality, while repairability is primarily linked to the availability of spare parts. Repairability was considered less important to consumers compared to durability. Research methods have consistently shown that interest in product durability and repairability is generally lower than considerations of price and quality. Only in the case of furniture did a higher proportion of consumers prioritize durability and repairability characteristics in their purchasing decisions, which may be attributed to the association of durability with product quality. Environmental impact was found to be of little importance across all product groups.

The analysis and assessment of responses reveal a tendency towards prolonged product usage. However, the population maintains a skeptical and hesitant stance towards adopting other practices that

could extend product life, including leasing, second-hand purchases, reuse, and other behaviors associated with the circular economy.

To promote consumer engagement in circular practices related to durability and repairability, despite skepticism and hesitation towards other circular economy practices, the following policy tools can be implemented:

- ✓ Education and awareness campaigns
- ✓ Financial incentives
- ✓ Development of repair and reuse infrastructure
- ✓ Labeling and certification of circular products
- ✓ Public-private collaboration
- ✓ Implementation of appropriate regulations and policies

By combining these measures—education, incentives, infrastructure development, labeling, collaboration, and regulations—a comprehensive policy approach can effectively encourage consumers to embrace circular practices for durability and repairability. These initiatives can help overcome initial skepticism and facilitate a broader transition to a circular economic model. It is important to acknowledge that we are still in the early stages of this transition, and the apparent successes mentioned are largely influenced by the legacy of consumption behaviors inherited from the Soviet regime, characterized by a scarcity of consumer products.

Funding: *This paper is written within the state project 20.80009.0807.22. Developing the mechanism for the circular economy creation in the Republic of Moldova*

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