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Circular Economy and Consumer's Engagement: An Exploratory Study on Higher Education

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Abstract

Background: Circular Economy has been considered one of the most powerful principles of modern society. The concerns about increasing resource consumption have forced governments and companies to look at the circular models as a hedge against resource scarcity and an engine for innovation and growth. **Objectives:** This research aims to bring together the Circular Economy and the consumer's perspective to perceive the impact of its choices on CE initiatives. **Methods/Approach:** A survey was conducted considering the consumer's engagement with the circular economy concepts. **Results:** The results pointed out the awareness and willingness of consumers for the transition from the linear to the circular production model, providing an added value to consumers for reducing environmental impacts. **Conclusions:** Consumers' behaviour can have a forefront role in building a guide with best practices to be considered by companies, designers, and consumers on implementing initiatives in the field of Circular Economy.

Keywords: Logistics, Circular Economy, Sustainability, Consumers

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Introduction

Over the last decades, sustainability has been considered one of the most powerful principles of modern society. This principle has contributed to society's increased place on the value of sustainable technologies, processes, and products that either have zero impact on ecosystems or function within the limits of their carrying capacity. Also, society is increasingly sensitive to issues related to sustainable values (George et al., 2015; Kirchherr et al., 2017; Korhonen et al., 2018).

From the industrial perspective, this sector faces significant economic and environmental challenges toward a sustainable process. Challenges such as the lack of non-renewable resources have culminated in a prompting call for disseminating initiatives aiming to develop sustainable business models in the industrial sector (Minunno et al., 2020; Brydges, 2021; Tseng et al., 2020).

To achieve sustainability, Circular Economy (CE) has emerged as an alternative for both industries and governments. According to Ellen MacArthur Foundation (2013), which presents the first attempt to define CE, it can be defined as an industrial system that can be seen as a vital system if the concept of the end of life is replaced and shifted towards a business model which considers waste elimination from the design to a disposal of a product or service, in all stages of production.

Logistics activities can be seen as a decisive element for the supply chain since it is directly associated with two main aspects: the consumption of resources by customers and the possibility of serving as a bridge to manage the waste generated by customers in the product's end-of-life. In the supply chain, each stage could obtain raw materials for end-of-life; when well-managed, these products can contribute to the overall circularity of products (Jain et al., 2018; Julianelli et al., 2020).

Although CE has attracted the attention of researchers and practitioners, few studies have investigated the possibility of integrating CE with other approaches, which can also contribute to sustainability. As such, the engagement of companies, governments, and consumers in initiatives toward CE, can be considered the key element to closing the loop in the traditional linear economy model (Geiger et al., 2018; Wu et al., 2018).

When performed, it can also empower consumers to provide cost-saving and opportunities to force companies to build a sustainable product policy. It is in this direction, enhancing the participation of consumers in the CE, that the European Commission proposes a revision of EU consumer law, aiming to ensure that consumers receive trustworthy and relevant information on products at the point of sale, including on their lifespan and the availability of repair services, spare parts, and repair manuals (European Commission, 2020). The European Commission's strategy should strengthen consumer protection against greenwashing practices and premature obsolescence, setting minimum requirements for sustainability labels/logos and information tools (Chen, 2013; Zou et al., 2019).

From this perspective, this research aims to understand the impact of consumers' choices on CE initiatives focusing on the younger bits of society, identifying then CE aspects such as general behaviour, environmental attitudes, the durability and reparability of products, and also the main barriers and drivers faced by consumers from higher education.

This paper is divided as follows. Literature Review presents concepts related to CE and the importance of the consumer's behaviour related to embracing CE initiatives. Subsequently, it is described the methodological approach used in the development of this study. Afterwards, the results are presented and discussed. Finally, the last section presents the conclusions and suggestions for future works.

Literature overview

According to Ӧzkan et al. (2020), the linear economy is based on the traditional model of extraction, consumption, and disposal of resources, resulting in the disorder and destruction of the ecosystems on which we depend. To stay within our planet's boundaries, companies and all society have been called to think together about the urgency to redesign the current economic model, focusing on ecological principles. The CE is a production and consumption approach that focuses on the circularity of raw materials sustainably, closed then cycles, energized by renewable sources, regenerating ecosystems, and ensuring social progress. The fundamental principles of a CE are: 1) Eliminate waste and retain value; 2) Ecological regeneration; 3) Systemic perspective (Hanumante et al., 2019).

If considered, the transition from linear to CE can reduce pressure on natural resources and achieve sustainable growth, considering, for instance, climate neutrality targets and halting biodiversity loss. It targets how products are designed, promotes CE processes, and encourages sustainable consumption, ensuring that waste is prevented and that resources used are kept in the EU economy for as long as possible (European Commission, 2020).

Morseletto (2020) defends that as an economic model, CE can be seen as an efficient approach to use resources through waste minimization towards a closing loop of products, contributing then to environmental protection as well as delivering social benefits. In doing so, this approach aimed at reducing the negative impacts of the linear economy through building long-term resilience in business and economic opportunity, providing environmental and social benefits.

As a sustainable approach, initiatives related to CE have been increasing in developing and developed economies. It has been supporting different economic sectors, such as the industrial, touristic, and service, to emphasize the importance of waste reduction from the design to disposal in all stages of their production, contributing to both sustainability and the closure of the supply chain's loop (Hartley et al., 2020; Gazzola et al.,2020; Tobler et al., 2012).

For society, CE can contribute to providing high-quality, functional, and safe products that are efficient and affordable, last longer, and are designed for reuse, repair, and high-quality recycling. Nonetheless, to enhance the participation of consumers in the CE, the policies developed by European Commission (2020) propose a revision of EU consumer law to ensure that consumers receive trustworthy and relevant information on products at the point of sale, including on their lifespan and the availability of repair services, spare parts, and repair manuals.

In doing so, companies and consumers can work together towards analyzing (the end of life of products beyond recovery at the product level, the material and parts that can be recovered through recycling and reusing parts, according to (Islam et al. (2021), researcher which investigates the consumer behaviour can support both companies and academics to identify suitable methods to achieve CE. This strategy can also be important to understand better consumers' needs and awareness regarding aspects such as consumption, disposal, recycling, and repair. The authors also defend that there is a considerable knowledge gap in the current literature when trying to understand consumer behaviour around the link between consumer behaviours and CE.

Also, Arman & Mark-Herbert, (2021) reinforce the importance of responsible consumption by consumers. According to these authors, this practice is important for reducing waste in a different type of production process, which is also one of the Sustainable Development Goals, namely Responsible Consumption and Production (SDG 12). It can be reached when postponing product life in a cradle-to-cradle

structure as part of CE. Nonetheless, it is necessary to understand if the consumers are willing to delay the products' life by reusing them.

Yet, the research developed by Testa et al. (2022) defends that number of green consumers behaviours has been increasing over the last few years. In this context, the consumer's behaviours can be linked to green consumption. Nevertheless, the emergent environmental awareness forces companies and researchers to develop further research to investigate how consumers deal with consumption from a CE perspective.

As such, this research is oriented to consumer behaviours. This opportunity to investigate this theme from a CE perspective becomes relevant since the design of these aspects is the basis of CE concepts. Designers also can create enabling preconditions for prolonged product lifetimes. However, whether products designed for prolonged lifetimes will be used for longer and/or more frequently utilized depends on the people using them (Selvefors et al., 2019; Chi et al., 2021).

Aiming to understand the antecedents of CE engagement and green buying, Morais et al. (2021) developed a conceptual model exploring the effects that the need for social status and competitive altruism play as drivers of those. The objective was to contribute knowledge for elaborating strategies and public policies for enhancing and stimulating CE acceptance from a consumer's perspective.

Also, Islam et al. (2021) performed a global review of consumer behaviour toward e-waste and its implications for CE research. In the same direction, Kuah and Wang (2020) developed a study to examine consumers' acceptance of three CE practices in East and Southeast Asia: using shared platforms, buying recycled goods, and purchasing remanufactured products. The authors concluded that Asia generates a large amount of e-waste, but the level of awareness of CE facilities and programs is limited; although consumers are willing to try sharing platforms, they are concerned about being exploited or tricked; consumer acceptance of recycled and remanufactured products in Asia is low because of their concern of reliability and quality, and consumers are still willing to buy these products in the future because of their environmental- and cost-consciousness.

From the research conducted, Kuah and Wang (2020) recommended that policymakers and companies work on promoting CE practices, such as targeting certain demographic groups, managing consumers' trust, easing their concerns, improving offerings, and appealing to innovation-minded consumers.

For the case of end users or consumers, these concerns are not well-known; however, some examples, such as e-waste, start in a journey into several paths within the CE, such as repair, reuse, remanufacturing, and recycling, are available. E-waste often ends up in landfill due to improper disposal of e-waste with household waste by consumers. Studying consumer behaviour allows for identifying appropriate approaches to achieve CE (Islam et al., 2021).

From the consumer's perspective, CE can be considered a key element to support them when buying goods with quality and at an affordable price; it can be justified due to the linkage between optimal lifetime and durability of products and the easy repair, upgrade, disassemble and recycling of products (Nyadzayo et al., 2020). It is also possible due to the potential to give products a second life by selling them in the second-hand market.
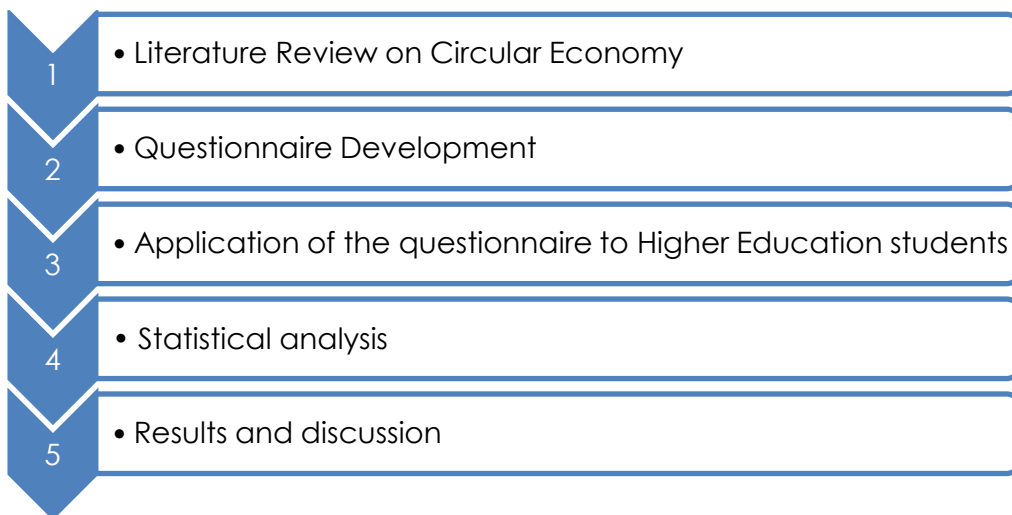
Methodology

This section presents an overview of the main steps carried out in this research to achieve the objective proposed. The work was designed to assess CE in terms of consumers' value, considering logistics activities as a strategic player to CE. Figure 1

presents the main stages developed in this work, namely: (1) The research began with an initial screening of scientific studies on the CE topic, focusing on its challenges and benefits; (2) Then, a questionnaire was developed to understand consumers' willingness to embrace CE practices; (3) The questionnaire was then applied among the selected sample, namely 123 young students from High Educations institutions in Portugal. (4) A statistical analysis was developed resorting to IBM SPSS version 27; (5) Based on the achieved results from the questionnaire, the linkage between Logistics and CE was established, focusing on aspects such as reparability, availability to spare parts, and repair.

The undertaken steps presented in this section were used as a strategy to capture consumer behaviour towards moving on to an alternative over the traditional linear economy; then to draw suggestions regarding the role of logistics activities in this shift.

Figure 1
Methodological approach

1 • Literature Review on Circular Economy

2 • Questionnaire Development

3 • Application of the questionnaire to Higher Education students

4 • Statistical analysis

5 • Results and discussion

Source: Authors' work

The questionnaire developed was inspired by the previous report published by European Commission. This report was chosen due to the importance of this research, which aimed to offer relevant insights to support implementing an Action Plan for CE in the European Union. Also, due to the application and validity of the study, which focused on a qualitative and quantitative analysis, resorting to a survey as a research strategy, linking different countries from the EU (see: Implementing Framework Contract – _CHAFEA/2015/CP/01/LE) (European Commission, 2018).

The questionnaire is composed of four parts: the first one is related to general information about the respondents; the second is associated with CE behaviour and environmental attitudes; the third is concerned with the durability and reparability of the products; finally, the last part uses some category product to observe the barriers and drivers to repair or reuse products. Table 1 describes the items analyzed on the questionnaire, namely the second and the third part.

Table 1
Items related to CE, durability, and reparability information

Item	Description
Agreement Level on Circular Economy Behavior	
CE1	I always keep things I own for a long time
CE2	I always recycle my unwanted possessions
CE3	I always repair my possessions if they break
CE4	I buy second-hand products
CE5	I always buy the latest fashion clothes
CE6	I always buy new the newest electronic goods and gadgets
Agreement Level on Environmental Attitudes	
EA1	It is important to be environmentally friendly
EA2	I want my friends to know that I care for the environment
EA3	When I buy things, I know the expected lifespan of the product
EA4	I am aware of repair services for the products I own
EA5	Second-hand products are usually good quality
EA6	I much prefer possessions that are brand new
EA7	I want my friends to know I own the latest trends or fashion
EA8	I trust claims made by companies about their products
EA9	I am usually very busy and lack free time
Agreement Level About Durability and Reparability Information	
DR1	I always search for information on how long a product will last
DR2	I always search for information on how easy it is to repair a product
DR3	I would like to receive better information on how long a product will last
DR4	I would like to receive better information on how easy it is to repair a product
DR5	It is difficult to find information on how long a product will last
DR6	It is difficult to find information on how easy it is to repair a product

Source: Authors' work

Table 2
Drivers and barriers to the reparability of products

Item	Description
Thinking about the last time these products broke down or became faulty, did you repair these products?	
R1	No. I did not repair it or have it repaired
R2	Repaired the product myself
R3	Had the product repaired for me by a friend or relative
R4	Had the product repaired for me by a professional repair service
R5	Had the product repaired for me by the manufacturer (including via a retailer)
Reasons for not repairing the product	
B1	I preferred to get a new one
B2	It would have been too expensive
B3	The product could not be repaired
B4	The product was obsolete or out of fashion
B5	I did not know how to repair it/where to get it repaired
B6	It would have been too much effort
B7	The parts/materials required weren't available
Reasons for having repair the product	
D1	It was cheaper than buying a new one
D2	I am good at repairing things myself
D3	It was easier than buying a new one
D4	It is better for the environment than buying a new one
D5	I was particularly fond of my current product
D6	My preferred product was no longer in production

Source: Authors' work

In the last part of the questionnaire, inquiries were asked to think about some products from different categories, such as technology (mobile phones and TV), other applications (vacuum cleaners and dishwashers), and clothes (jackets). The goal is to understand the consumer's behaviours when these products break down (repair or buy a new one) and the reasons for that attitude. Table 2 describes the items considered for this research.

Results and discussion

This section aims to provide an overview of the main findings of this research. The results presented here are inspired by the European Commission, which aimed to analyze the general population of some European countries bringing CE and Consumer behaviours. In the meantime, this research aimed to assess the perception of the young population with some education level and access to information about CE.

Sample characteristics

As presented in Table 3, in this research, both genders were considered; all of them are young, and some have some knowledge in the logistics field. The awareness in the logistics area was evident because some of them are enrolled in courses in this area, meaning they have some knowledge regarding concepts and tools presented in the questionnaire.

Table 3
Summary of the Sample

| Gender	%	Age	%	Student status	%	Training in logistics	%
Female	66.7	**<25**	75.6	**Student (only)**	82.1	**Yes**	44.7
Male	33.3	**[25;50]**	24.4	**Student worker**	17.9	**No**	55.3

Source: Authors' work

This characterization aims to understand if some training areas or work experience could influence the opinion about CE. As summarized in Table 3, most of them are students and have some knowledge of logistics.

This section highlights that the sample was selected randomly but focused on students from Polytechnic Schools in Portugal. This strategy was chosen due to the willingness of the students to participate in the research. Due to the sample size, this research does not intend to generalize the results but gets important insight from the achieved results.

Circular economic behaviour

Regarding a generic analysis of CE statements, a Likert scale of four points was used, where one means "Strongly disagree" to 4 has the significance of "Strongly agree". Figure 2 presents the level of agreement for each sentence. Despite the answers using all scales' amplitude, there is a strong response on the positive end of the scale. The results showed that most positive answers were given items CE1 to CE3, where the median (the black line in bold) is on level 3 of agreement.

Figure 2
Boxplots related to General Behavior about CE
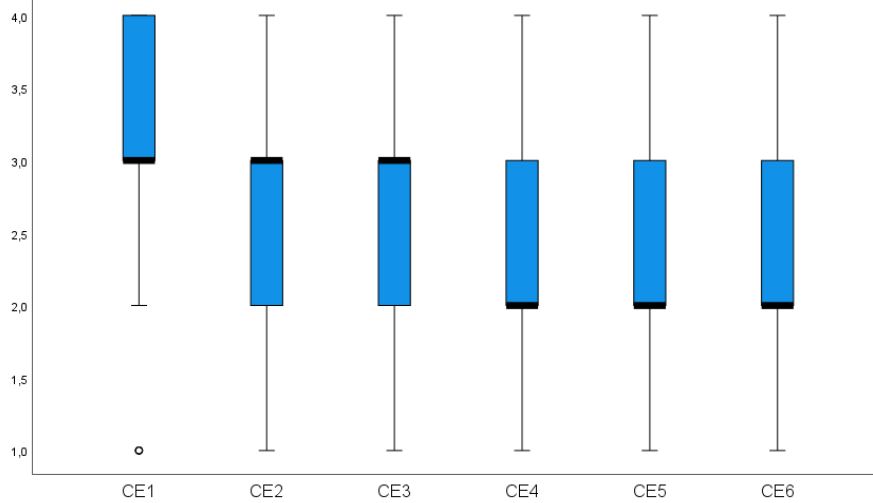
Source: Author's illustration

The results presented in Figure 2 show that the respondents considered it important to keep goods as long as possible, and they are also concerned about the possibility of repairing the products when needed. These results showed that the concerns are in line with the CE approach.

Table 4 scrutinizes the graphical analysis. Compared with the EU report, the inquiries adopt similar behaviour, increasing the purchase of second-hand items. Additionally, a non-parametric Mann-Whitney U test (Maroco, 2007) was performed to compare the differences between the two independent groups. It was used to test the null hypothesis that two non-normally distributed samples come from the same population, i.e., have the same median. The significance level used was 0.05. For this research, the answers were analyzed by gender, student status, and training in logistics.

The results evidence the opinion's difference regarding the gender factor on the items CE1 and CE2. After carefully analyzing the answers, it was possible to confirm that there is a higher dispersion of agreement level for men's answers. At the same time, the female inquiries tend to choose the positive agreement levels of the items. There is no significant difference between groups for status students; when logistic training is considered, only item CE4 stands out. In this case, students with no training in logistics tend to disagree more with the sentence.

Table 4
Descriptive Statistics and Non-parametric Man-Whitney tests regarding General Behavior of CE

| Item	Descriptive Statistics				Mann-Whitney U test		
	Min	Max	Mean	St. Dev.	By gender (sig.)	By student status (sig.)	By logistics training (sig.)
CE1	1	4	3.2	0.68	0.004***	0.947	0.847
CE2	1	4	2.8	0.76	0.019**	0.968	0.218
CE3	1	4	2.7	0.67	0.288	0.702	0.476
CE4	1	4	2.3	0.91	0.402	0.980	<.001***
CE5	1	4	2.2	0.74	0.479	0.540	0.481
CE6	1	4	2.6	0.96	0.632	0.192	0.568

*Note: *** stastically significat at 1%; ** 5%*
Source: Authors' work

Circular economy and environmental concerns

The current environmental trends emerged in a closed-loop situation, and there is a growing demand for environmentally friendly and ecological products. Following this sense, Figure 3 shows the boxplots related to the level of agreement with some environmental attitudes. The results showed that the respondents tend to agree with the environmental attitudes described, especially EA1 (be environmentally friendly), EA2 (care about the environment by themselves and friends), and EA6 (buy fashion brands).

Figure 3
Boxplots related to Environmental Attitudes
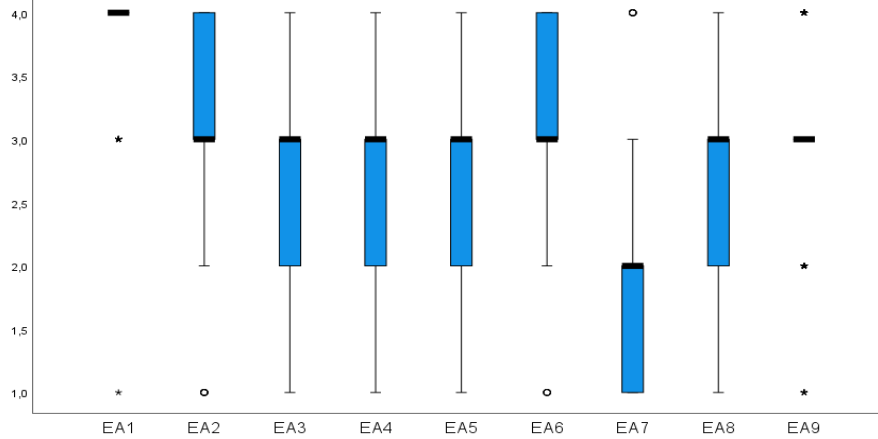
Source: Author's illustration

This behaviour is corroborated by the descriptive statistics presented in Table 5. The results showed that the standard deviation is similar for all items. However, when the mean is analyzed, it is possible to observe that item EA7 has a disagreement level average, and the highest level of agreement is item EA1 (the importance of being environmentally friendly).

Additionally, when the Mann-Whitney test was applied, the results showed no differences when the education qualifications factor was considered. Nonetheless, when gender is the factor of comparison, items EA1, EA2, and EA6 are distinct and dig into the answers. This means that women tend to agree with the importance of caring about the environment and the possibility of buying fashion brands. Students' status also revealed differences between items EA8 and EA9.

Table 5
Descriptive Statistics and Non-parametric Man-Whitney tests regarding Environmental Attitudes

| Item	Descriptive Statistics				Mann-Whitney U test		
	Min	Max	Mean	St. Dev.	By gender (sig.)	By student status (sig.)	By logistics training (sig.)
EA1	1	4	3.9	0.40	0.022**	0.857	0.616
EA2	1	4	3.2	0.76	0.006***	0.693	0.980
EA3	1	4	2.7	0.77	0.051	0.853	0.777
EA4	1	4	2.9	0.79	0.100	0.550	0.760
EA5	1	4	2.6	0.64	0.561	0.134	0.265
EA6	1	4	3.0	0.75	0.012**	0.424	0.503
EA7	1	4	1.6	0.72	0.990	0.349	0.503
EA8	1	4	2.5	0.69	0.065	0.018**	0.089
EA9	1	4	3.0	0.71	0.540	0.042**	0.900

*Note: *** stastically significat at 1%; ** 5%*
Source: Authors' work

Durability and reparability of products

Thinking in CE is changing the mindset, shifting the concept of "consumer" to "user"; thinking not only to buy but also to lease, rent, or share wherever possible can be a great opportunity to close the production cycle. Additionally, if the consumer could obtain more information regarding a product's durability and/or reparability, this correct choice can reduce consumption.

The results presented in this section are discussed in light of the durability and reparability of the products. Figure 4 shows that more than 50% of the respondents agree or strongly agree with the sentences related to the importance of considering the durability and reparability of goods. Although searching for information is real, finding it is not always easy.

Figure 4
Boxplots related to Durability and Reparability Information
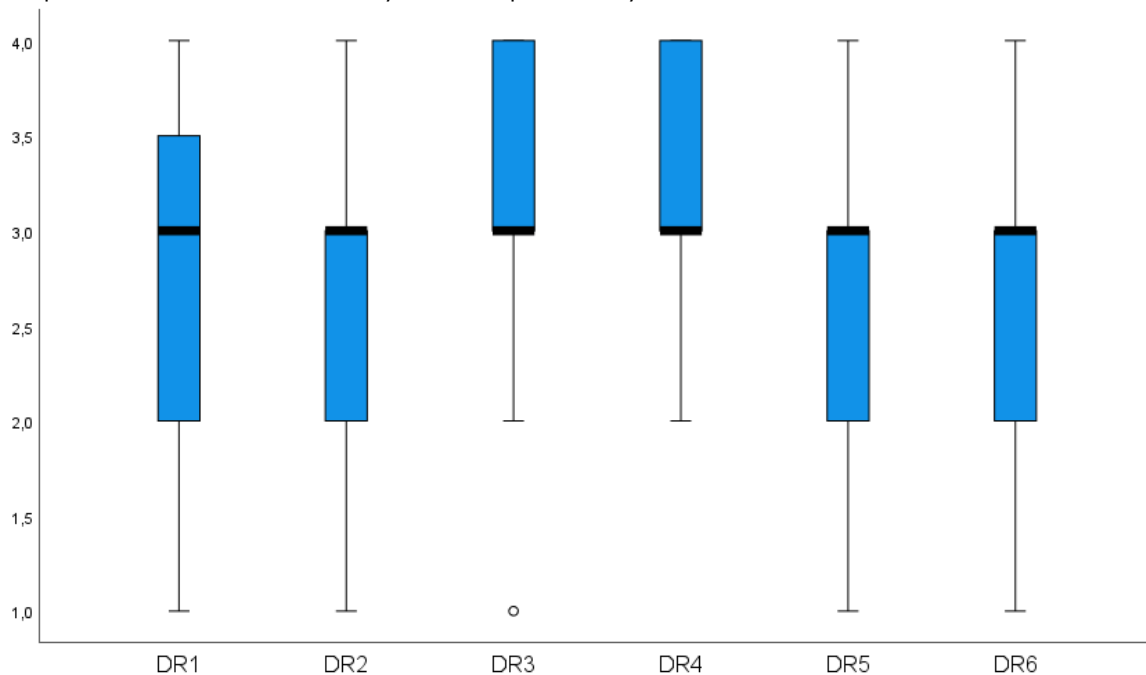
Source: Author's illustration

After analyzing the mean values presented in Table 6, it is possible to conclude that the results align with those inquiries that tend to agree with the statements of the need to get information access about the possibility of repairing goods and their durability. Concerning the Mann-Whitney tests, women strongly agreed, compared to men, with sentence DR3 (possibility to get additional information about durability and reparability of goods). Nonetheless, it is important to highlight that this result is supported not only by the non-parametric test but also by the graphics generated by factors' answers that were omitted in the paper due to the extension of this section. Regarding the students' status, meaning the students working, only DR3 and DR4 have significant differences in answers, with student workers who tend to have higher levels of agreement. The results point out the same behaviour when measuring the students who do not have training in logistics.

Table 6
Descriptive Statistics and Non-parametric Man-Whitney tests regarding Durability and Reparability Information

Item	Descriptive Statistics				Mann-Whitney U test (significance level 0.05)		
	Min	Max	Mean	St. Dev.	By gender (sig.)	By student status (sig.)	By logistics training (sig.)
DR1	1	4	2.9	0.78	0.565	0.074	0.595
DR2	1	4	2.7	0.81	0.093	0.786	0.676
DR3	1	4	3.2	0.68	0.026**	0.034**	0.059
DR4	1	4	3.3	0.61	0.130	0.032**	0.032**
DR5	1	4	2.7	0.79	0.694	0.420	0.080
DR6	1	4	2.7	0.82	0.575	0.808	0.098

*Note: ** stastically significat at 5%*
Source: Authors' work

Barriers and drivers for considering the reparability of products

Reusing and extending the product's life can be important to achieving CE. Repairability can be considered a key strategy to increase the time use of the products, increasing their lifetime. Yet, consumers face several barriers when they need to repair goods. Due to this challenging task, in this research, an analysis of the consumer's experience with repairing products was carried out, following the original EU report, and a set of product categories were considered for this analysis, namely mobile phone, TV, dishwasher, vacuum cleaner, and jacket.

Table 7 presents the results and an overview of consumers' experiences regarding reparability as an option used over the years. The results showed that not all respondents have selected any answer, probably because they do not know or do not remember the last situation when the product broke down. From the respondents that answered, it is possible to check that both applications, mobile phones, and jackets were the items with the highest values regarding R1 (Products that are not repaired). In the meantime, for those products considered by respondents to repair, mobile phones, TV, and dishwasher on repair services or manufacturers (R4 and R5), while vacuum cleaners and jackets were repaired most by themselves or a friend/relative (R2 and R3). A possible explanation for these choices could be related to the cost of the service or even the technology involved.

Table 7
Experience with Repairing Products by Category (in %)

Item	Mobile phone	TV	Dishwasher	Vacuum cleaner	Jacket
R1	36.6	30.3	19.3	32.1	41.0
R2	7.5	6.1	4.5	15.4	24.0
R3	11.9	15.2	19.3	28.2	23.0
R4	26.1	21.2	38.6	10.3	9.0
R5	17.9	27.3	18.2	14.1	3.0

Source: Authors' work

Regarding the respondents that do not repair the product, Table 8 shows a set of barriers pointed out as justification for not considering the repair as an option. In the case of mobile phones, the barriers are related reparation price of the service (B2), followed by the fact that they cannot be fixed (R3). For TV, several barriers were listed, such as difficulties in finding components to replace, the cost of its components, and the amount of time to repair were the main aspects pointed out. The dishwasher

stands out in the effort to repair, while the vacuum cleaner is pointed to the lack of knowledge (B5) and materials to replace (B7). Finally, regarding the category of clothes – jacket – the main reason indicated is the possibility of getting a new one (B1) for pleasure or because it is out of fashion (B4).

Table 8
Barriers to not repairing the product category (in %)

Item	Mobile phone	TV	Dishwasher	Vacuum cleaner	Jacket
B1	20.5	20.0	2.9	29.0	46.8
B2	37.0	30.0	37.1	22.6	2.1
B3	24.7	30.0	22.9	12.9	23.4
B4	6.8	10.0	8.6	9.7	19.1
B5	4.1	7.5	2.9	9.7	4.3
B6	4.1	0.0	20.0	6.5	2.1
B7	2.7	2.5	5.7	9.7	2.1

Source: Authors' work

To figure out what motivates self-repair, the respondents were asked to indicate the most important reason to be considered to repair a product themselves. The results presented in Table 9 showed that, for the case of a jacket, it drivers the consumer's skills needed to repair (D2) or the affective value given to that model (D5). Yet, technology items have different drivers, such as the price of the mobile phone (D1) and the attachment for the model (D6). In the case of TV, it is related to the fact that self-repair is easier to find a solution. The environmental concerns (D4) were just considered important for dishwashers; it can be justified due to the facility to find repair stores and because it is cheaper to repair than buy a new one.

Table 9
Drivers to self-repair by category of products (%)

Item	Mobile phone	TV	Dishwasher	Vacuum cleaner	Jacket
D1	37.5	16.7	50.0	22.7	14.0
D2	12.5	16.7	12.5	13.6	30.2
D3	4.2	33.3	6.3	31.8	16.3
D4	4.2	5.6	25.0	9.1	9.3
D5	29.2	16.7	0.0	13.6	25.6
D6	12.5	11.1	6.3	9.1	4.7

Source: Authors' work

Conclusion

The transition from Linear to CE is an ongoing movement changing production and consumption paradigms. This research has sought out aspects related to CE and its contribution from the consumer's side, focusing on a young audience. Due to the importance of these target audiences regarding consumer behaviour, it can be considered an important path toward the transition from the consumer perspective.

This research intended to investigate young students' understanding of the circular economy initiatives, considering aspects such as behaviour, barriers, and drivers on adopting environmental awareness when consuming goods. From the research conducted, the results presented here are aligned with the current literature, which discusses the need to disseminate the benefits of adopting circular economy initiatives among consumers, especially the young generation. It can be a powerful strategy to better understand consumers' role in the linear transition.

The results also highlight the importance of bringing together topics such as the possibility of reusing and better-designing goods; having the consumers as part of its end-use can contribute to this transition and, simultaneously, reduce the material used and take care of its disposal.

These results indicate the importance of using a young sample of students attending Higher Education as a key element to incentivize both companies and consumers to move from a linear to a circular economy. The findings also align with the work developed by the EU report (EU report, 2018), which aimed to identify barriers consumers face when purchasing goods produced through a circular approach. From this perspective, the results showed that from the consumer's outlook, to decide to buy new goods considering the concept of circularity, there is a need for further information regarding aspects related to the repair of the products and higher accessibility to pieces of the appliances.

In this research, the sample size can be considered a limitation, yet, for future work, the extension of this survey to a wider audience is considered an important task. Also, the need to better understand concerns about CE aspects from the different public to verify the European Union's understanding. It can be used as a forefront approach to building a guide with best practices to be considered by companies, designers, and consumers.

From an academic perspective, the journey of unleashing the potential CE is just at the beginning. This research calls attention to the need for future industries to provide new solutions to promote CE to consumers, especially your generation. At this moment, this research shined from the young consumers' point of view, and the results showed that there is already environmental awareness for these consumers. With a few exceptions, the answers given do not have significant differences between gender, student status, or even training qualification. The fact that only students of Higher Education have been considered in this research is a limitation of this work due to the challenge of reaching different audiences. Yet, the possibility of extending the sample will be considered for future research.

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