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CONSUMER PERCEPTION OF THE CIRCULAR ECONOMY AS THE MOST VISIBLE ENVIRONMENTAL PILLAR OF CORPORATE SOCIAL RESPONSIBILITY

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ABSTRACT

The world today is on the verge of exhausting its primary resources. In this situation the circular economy is undoubtedly a means of eliminating the shortage of raw materials faced by the Czech Republic and the whole of Europe. The development of the circular economy requires a change in how it is perceived by businesses as well as consumers. This paper is devoted to the perception and relationship between consumers and the circular economy. The potential offered by consumer behaviour as regards involvement in the circular economy lies in repairing, recycling and using products for other purposes, instead of discarding them in a landfill and then buying a new product. However, one fundamental prerequisite for this is that consumers decide to engage in the circular economy, a decision that can be motivated by economic conditions or personal incentives based on their own attitude to the environment. Two-level research was carried out in order to determine how the circular economy is perceived by consumers, where the qualitative method was first used to identify the concepts that consumers perceive as constituting the circular economy. The concepts were used to compile an original definition of the circular economy from the perspective of consumers. The concepts were subjected to quantitative data collection, identifying the importance of the concepts ascertained. The subsequent statistical evaluation served to detect differences in the perception of the importance of the identified concepts depending on consumer behaviour. The research shows that if consumers are aware of the importance of the circular economy, they themselves behave in a socially responsible manner. The assessment was intended to reveal differences in responses depending on the following demographic characteristics: age, gender, education and place of residence. It was apparent that only the respondents' education is statistically significant, with consumers with a higher education assigning greater importance to the circular economy and thus being more likely to get involved in this concept.

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INTRODUCTION

The concept of the circular economy has gained momentum both among scientists and practitioners. Over the last decade, there have been a number of papers from various fields that have influenced our current understanding and interpretation of the circular economy. Central to the circular economy is the idea that the natural ecosystem and the artificial industrial system work in a similar way, and that there are set flows of materials, energy and information (Ehrenfeld, 2007; Parida *et al*., 2019). As early as 1989, Frosch & Gallopoulos (1989) claimed that optimising the entire system requires improved production processes that minimise the generation of non-recyclable waste (including waste heat) and at the same time minimise the constant consumption of rare materials and energy resources. According to (Pizzi *et al*., 2021), innovation in the manufacturing process is needed to effectively channel materials back. The solution is industrial symbiosis, which draws on the principles of industrial ecology at the enterprise level and assumes the development of cooperative synergy between enterprises involving the exchange of resources and by-products (Chertow, 2000). This collaboration is not necessarily limited by geographic proximity and can result in the development of networks that share knowledge and support ecological innovation (Lombardi & Laybourn, 2012; Pizzi *et al*., 2021).

The dramatic evolution of the circular economy started after 2020, when the European Commission adopted a new action plan "For a Cleaner and More Competitive Europe", which is based on the results of the activities carried out since 2015. The action plan includes measures to make products placed on the market last as long as possible, to allow repairing or putting back into circulation, to avoid waste, to take action on electronics, plastics, textiles, construction and to minimise waste exports outside the EU. This strategy supports the transition from a linear to a circular economy (Kislingerová, 2021; Dobre-Baron *et al*., 2022). The European Commission has also published a framework for monitoring progress towards a circular economy which is divided into four thematic areas: production and consumption, waste management, secondary raw materials, competitiveness and innovation (Peschel & Aschemann-Witzel, 2020). In 2020, in line with the Green Deal for Europe, the European Commission has reinforced the monitoring of national plans and actions to accelerate the transition to a circular economy in order to strengthen the sustainability dimension. The new indicators, which are based on European statistics, take into account the interests of circularity, climate neutrality and a zero-pollution strategy. From 2020 onwards, resource use indicators, including consumption and material footprint, are being developed to take into account the material footprint and environmental impacts associated with production and consumption patterns (Kislingerová, 2021).

Ecosystems comprising material flows from primary raw materials to consumption, are addressed by research in which businesses are the respondents. The aim is to identify the effectiveness and benefits of ecosystems in relation to sustainable behaviour. Cities themselves are also trying to employ a whole range of circular activities.(Munzarová *et al*., 2023). On the other hand, consumer behaviour in relation to sustainable behaviour is dealt with by research into the sorting of waste. However, sorting waste is not a circular economy, as it only leads to recycling. Recycling may be described as just one part of the circular economy, as other options for consumer behaviour include the repair, renovation or reuse of discarded items for another purpose. It is therefore not exactly clear what is included in the circular economy and, above all, how the circular economy is perceived by consumers. This

situation was what motivated the goal of the research and the subsequent elaboration of the research methodology. The main aim of the paper is: *To determine how consumers currently perceive the concept of the circular economy and how important these concepts are for consumers*. This main objective was divided up into 4 research questions:

RQ 1: What concepts do consumers associate with the term circular economy and how would they define the circular economy?

RQ 2: What is the level of importance of the identified circular economy concepts for consumers?

RQ 3: How different is the evaluation of the importance of each circular economy concepts between consumers who sort their waste and those who do not?

RQ 4: What influence do consumers' socio-demographic characteristics (education, age, gender and size of their place of residence) have on the importance evaluation of the circular economy concepts for consumers?

LITERARY OVERVIEW

The circular economy (CE) is based on how items are disposed of at the end of their life cycle. However, it is important to identify the product life cycle. Management and marketing use the term Product Life Cycle (PLC), which originated in the 1960s. The term was coined by Raymond Vernon, who explained the life cycle in an international environment, divided into stages. PLC starts with the first item sold and ends when the product is sold. However, this does not refer to a specific product, but a type of product or product line (Osland, 1991; Tichy, 2011). Our article, on the other hand, uses a different concept called life cycle assessment (LCA). This type of model is designed to record the life of each product from the extraction of raw materials, through production, sale, use, to disposal at the end of the product's useful life, referred to as cradle to grave (Stevanovic-Carapina *et al*., 2011). The LCA model was published in the 1970s (Boons & Howard-Grenville, 2009).

The research also included a definition of the CE, and a part of the literature search was devoted to this. The CE has been defined by many authors; a very detailed cross-section of definitions was given by (Kirchherr *et al*., 2017; Rizos *et al*., 2017; Schut *et al*., 2016), who argue that the most prominent definition of CE is provided by the Ellen MacArthur Foundation (2012, p. 7), which reads: "*A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems.* Another important definition was supported by Lieder & Rashid, (2016), who say that: "*The CE is a closed loop material flow in the whole economic system in association with the so called 3R principles (reduction, reuse and recycling). Taking into account economic aspects CE minimizes matter without restricting economic growth*".

The European Commission included a description of the CE concept in its 2015 communication "Closing the loop – An EU action plan for the Circular Economy", which is part of the Circular Economy Package (Wuttke, 2018). Specifically, the circular economy is described as an economy "*where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised*." The transition to a circular economy has been a major contribution to the EU's efforts to develop a sustainable, low-carbon and resource-efficient competitive economy. In connection with this, the EU action plan includes a series of measures aimed at solutions in

the product cycle from production and consumption to waste management and the secondary raw materials market (Nugent & Rhinard, 2015; Camilleri, 2018) defines the circular economy as an economy "*where the value of products, materials and resources in the economy is preserved for as long as possible and the production of waste is minimized*". In general, one may summarise that the CE is a closed-loop economy that does not produce excessive amounts of waste and makes any waste a resource (Gureva & Deviatkova, 2019; Wysokińska, 2016).

As in this paper, the importance of concepts associated with CE has been discussed by Sauvé *et al*. (2016), who claim that the most important factor is a focus on closed-loop material flows. Preston (2012) says that the aspect that is most important for the CE is the approach taken by enterprises that transforms the role played by resources in the economy. Waste from factories would become a valuable input for another process, and products could be repaired, reused or upgraded rather than being thrown away. In contrast, Zhongming *et al*. (2014) argue that the most important factors for the CE are physical and material resources that are transformed through recycling and become a primary resource again. Other means of converting discarded products merely complement the CE. Some authors (Mitchell, 2015; Heck, 2006; Gureva & Deviatkova, 2019) state that the most important part of the CE is the energy resources used in the production and consumption of products. Energy should come from renewable sources. The authors agree that the use of sustainable energy is crucial in the circular economy. So, it is not products, but energy and how it is generated that are the most important component of the CE. Zhijun & Nailing (2007); Yuan *et al.* (2008) claim that what is most important for the implementation of the CE in practice is a legislative framework that induces both businesses and consumers to treat discarded items in a sustainable manner. The authors talk about the need to introduce and then comply with environmental laws. This is a directive ecological economy that would mandate a style of behaviour that reduces energy intensity and promotes recycling and other principles of sustainability. One alternative to a directive government policy enforcing mandatory participation in the CE is described by other authors (Lehmann *et al*., 2018), who state that positive voluntary motivation leading to participation in the CE is the most important factor. The authors state that positive motivation is the only way to ensure successful engagement in the CE, especially by consumers.

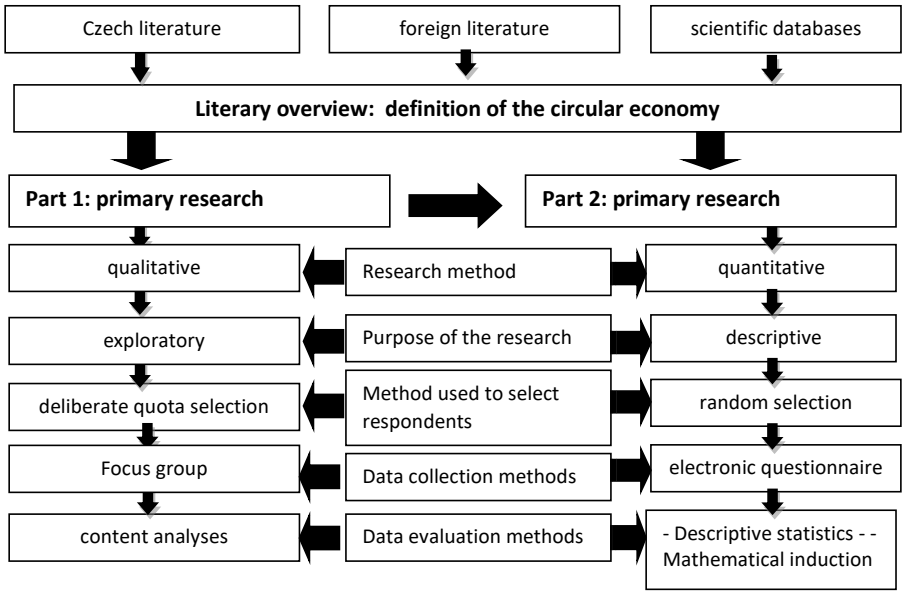
Implementation of the CE has positive benefits for society (Lacy & Rutqvist, 2015). According to Bastein *et al.* (2013), a positive environmental impact, i.e. land management, water and air protection, is essential. According to Ghisellini *et al*. (2016), the main impact of the CE is economic growth associated with job creation, complemented by increased competitiveness. A less frequently mentioned impact of the CE is the social justice that this concept entails, along with a change in the behaviour of younger generations (Lieder & Rashid, 2016). Kipping & Clark (2012) mention that the CE is the only way of facing the anticipated population boom in a sustainable manner.

METHODOLOGY

The empirical part of the paper follows on from the theoretical findings and is divided into two parts. The first part of the primary research was conducted using the qualitative focus group method. The second part was conducted using the quantitative method via an electronic questionnaire. This is a logical connection and links the in-depth exploration of the topic with the subsequent identification of frequencies in the second part. The combination of qualitative and quantitative research, as in this research, has been successfully combined by other authors (Księżak, 2016; Uhlaner Hendrickson & Tuttle, 1997). Similarly, statistical induction methods have been used by (Dishman *et al*., 2002; He *et al*., 2019) to identify

differences in respondents' answers in their researches. For the sake of clarity, the research methodology is presented in Figure 1.

Fig. 1: Consumer research methodology



Source: compiled by authors

Part 1 – the primary qualitative research was conducted using the focus group method in October 2022. The aim of the focus group was to identify concepts that consumers see as making up the circular economy. The focus group was conducted in five groups of 9 – 11 people, age being the sorting criterion. The respondents were divided up into 5 groups aged: 18 -29; 30 – 39; 40 – 49; 50 – 59; 60 and over. A total of 50 respondents took part. The evaluation was based on audio-visual recordings with group evaluation and identification using the content analysis method. At the end of the content analysis, the concepts were synthesised into a point structure.

Part 2 – the primary quantitative research was conducted using an electronic questionnaire in January 2023. A total of 1086 valid responses were obtained from the respondents who completely and correctly filled in the questionnaire. The response return rate was 36 %, as the respondents were entered in a competition to win prizes. The respondents were selected using the random selection method, where each unit of the statistical population had an equal probability of being selected. Software was used to generate email addresses from the database of respondents. For the questions, a questionnaire was compiled, which contained closed sample, enumeration and scale questions and accompanied by sorting questions intended to identify the respondent. Descriptive statistics, mode, median, mean and standard deviation were used to evaluate the quantitative research. Two mathematical induction tests were used, the Mann-Whitney test and Pearson's chi-squared test.

RESULTS

The results of the research are divided up into four parts according to the research questions. The first research question involves qualitative research; the other research questions are resolved using quantitative research.

Consumer perception of the circular economy

The first RQ was set at the beginning: What concepts do consumers associate with the term circular economy and how would they define the circular economy? Responses were first coded, then searched for meaning matches. The next step was the synthesis of the identified terms resulting in the final list. Content analysis was used to select a list of twelve concepts that the respondents identified as the CE. The group evaluation of homogeneous groups means that the list is highly valid and could serve as a basis for further research. Table 1 presents the resulting concepts.

Table 1: Concepts associated with the CE

1. Renewability of natural resources	7. Collection of discarded products in public areas
2. Environmental protection	8. Reducing the amount of waste
3. Reuse of products (for the same purpose after repair)	9. Waste management strategies
4. Reuse of products (for a different purpose)	10. Sustainable development of society
5. Repair of non-functional items	11. Closed economy
6. Recycling	12. Improved quality of life

Source: compiled by authors

The resulting list is sorted alphabetically, as the concepts have not yet been assigned importance. All the identified concepts can be characterised as how the CE is perceived by consumers. Some concepts overlap in meaning, but they always express something different. The identified concepts have been combined to form three homogeneous groups, named according to their common intersection of meaning. These three groups were internally homogeneous but heterogeneous in intergroup terms. A breakdown of the identified concepts is presented in Table 2.

Table 2: Breakdown of concepts associated with the CE

Group 1 - **social concepts**
1. Renewability of natural resources
2. Environmental protection
7. Collection of discarded products in public areas
10. Sustainable development of society
12. Improved quality of life
Group 2 - **circular concepts**
3. Reuse of products (for the same purpose after repair)
4. Reuse of products (for a different purpose)
5. Repair of non-functional items
6. Recycling
11. Closed economy
Group 3 - **reduction concepts**
8. Reducing the amount of waste
9. Waste management strategies

Source: compiled by authors

Group 1 – social concepts: there are five concepts in this group: renewability of natural resources, environmental protection, collection of discarded products in public areas, sustainable development of society, and improved quality of life. These are very general concepts, that do not specifically define how and what people should do to improve the environment. From the perspective of the circular economy, which the respondents were to address in this section, it may be said that they form part of the CE, but only at the level of socially responsible consumer behaviour. Environmental protection and the sustainable development of society, for example, are typical examples of responsible consumer behaviour relating to environmental protection. *The government, which is the executive body of the state, should be responsible for managing these areas*.

Group 2 – circular concepts: there are five concepts in this group: reuse of products (for the same purpose after repair), reuse of products (for a different purpose), repair of non-functional items, recycling, and a closed economy. Compared to the previous group, the respondents directly identified concepts associated with involvement in the circular economy. This indicates that respondents are aware of the basic principles of how the CE works. The concepts presented in this group directly portray the 3R model, which presents a possible means of involvement in the CE, namely renovation, reuse, recycle. In terms of perception of the circular economy, it is significant that the respondents did not mention recycling alone, but also stated other means of making use of end-of-life items. *The responsibility for managing these areas lies with enterprises, which can help to a great extent by designing products suitable for the CE.*

Group 3 – reduction concepts: this group comprises two concepts: reducing the amount of waste and waste management strategies. These concepts are typical for the environmental aspect of CSR, so it is not principally about involvement in the CE, but more the framework in which the CE operates. The respondents see waste reduction as reducing any waste, both that which ends up in landfills and waste that is recycled. Many respondents believe that the waste management strategy is poor where they live. They complain about overflowing recycling containers, the distance they have to drive to sorted waste containers, and the poor structure of those containers. *The responsibility for reducing unsorted waste lies with consumers, who decide what happens with a discarded product*.

Overall, it may be said that the qualitative research identified the concepts that consumers perceive as comprising the CE. A certain bias may be down to the fact that the focus group is partially familiar with the concepts that the respondents are to discuss further, or that the respondents are mutually familiar with the topic. Despite this partial bias, the research was valid and provided an independent cross-section of what consumers consider to comprise the CE. At the end of this part, the answer to RQ1 was resolved and the following definition of the CE, as seen by consumers, was drawn up: *The circular economy is the re-engagement of anything that a person uses for life in whatever state (recycling, repair, use for other purposes) for reuse in an endless loop for any purpose aimed at improving quality of life and environmental sustainability. The consequence of implementing such a system is a reduction of the amount of waste and more sparing use of mineral resources*.

Importance of CE concepts as perceived by consumers

After the identification of the concepts associated with the CE by means of the focus group, an electronic survey then followed to provide a frequency analysis. The aim of this analysis to was obtain an answer to the *second RQ*: What is the level of importance of the identified circular economy concepts for consumers? In order to ensure a representative sample set, a company providing collecting data from a database of randomly generated respondents was approached for the electronic survey. Consumers rated the importance of each circular economy concept using scaled questions. The responses were then averaged and the concepts were ranked according to their importance. The resulting table of values ranked from most to least important is presented in Table 3.

Table 3: Evaluation of the importance of CE-related concepts for consumers

CE concepts	mean	modus	median	Sd	Vc
11. Closed economy	2.95	2	3	2.19	0.74
7. Collection of discarded products in public areas	2.99	3	3	1.72	0.58
5. Repair of non-functional items	3.04	2	3	1.96	0.64
9. Waste management strategies	3.27	3	3	1.7	0.52
10. Sustainable development of society	3.33	3	3	1.84	0.55
1. Renewability of natural resources	3.37	3	3	1.48	0.44
12. Improved quality of life	3.69	3	3	1.5	0.41
3. Re-use of products	3.87	3	4	1.25	0.32
8. Reducing the amount of waste	4.01	4	4	2.66	0.66
4. Re-use of products for a different purpose	4.03	4	4	2.35	0.58
6. Recycling	4.26	4	4	2.31	0.54
2. Environmental protection	4.38	4	4	2.82	0.64

Source: compiled by authors, (1 = max. importance, 6 = min. importance)

The resulting concepts are divided into three groups according to their importance. The tests were used to determine homogeneity vs. heterogeneity within the group and homogeneity vs. heterogeneity between the group and other concepts. Student's t-test for differences in mean values was used for the tests. The following hypotheses were established:

H01: There are no statistically significant differences in the evaluation of CE concepts within the groups.

H11 non H0

H02: There are no statistically significant differences between the groups.

H12 non H02

The first group of the most important CE concepts consists of two that belonged to the interval <1;3); this is a closed economy and the collection of discarded products in public areas. According to the previous division in qualitative research, these two concepts are unrelated; one is a social concept and the other is a circular concept. If the difference is evaluated use the t-test, the difference in the mean evaluation values in the group is statistically insignificant (p value ≤0.192), while at the same time there is a statistically significant difference in the mean evaluation values of these concepts with the other groups (p valuemax <0.00001). This means that both concepts are homogeneous and significantly different from the other groups of concepts in statistical terms.

The second group consists of moderately important activities in the interval <3;4>, of which there are six. These are repair of non-functional items, waste management strategies, sustainable development of society, renewability of natural resources, improved quality of life, and re-use of products. These answers are somewhat diverse and fall into all three categories of concepts in the previous evaluation, social, circular and reduction. If the concepts from this group are evaluated using the t-test, no statistically significant difference in mean values was identified for them (p-valuemin≤0.056142). On the other hand, there are statistically significant differences if the mean values are compared with the other groups (p valuemax <0.009877). This means that the concepts within the group are homogeneous and show a statistically significant difference from the other concepts.

The third group consists of the least important concepts of the CE (4;6>, of which there were four. These are re-use of products, reducing the amount of waste, re-use of products for a different purpose, recycling, and environmental protection. Evaluation of the mean values of the group by the test identified statistically significant differences (p-valuemax≤0.044548), which means that even within the group of concepts, the evaluation is different. The evaluation with other the concepts was also statistically significant (p valuemax <0.001915). This means that the concepts within the group are heterogeneous and significantly different from other groups in statistical terms.

The tests confirmed the internal homogeneity of the first and second groups of concepts. The differences in the third group were statistically significant, but only slightly; if the 3 % confidence level had shifted, the group would also have been evaluated as homogeneous. The heterogeneity between the groups confirms the fact that the division is correct. In conclusion, it may be said that the explicit division into three groups according to average importance (Table 3) is more appropriate than the division according to the meaning of the concepts (Table 2) in the previous division.

Impact of consumer behaviour on the perception of CE concepts

A third RQ was defined for the further direction of the research: How different is the evaluation of the importance of each circular economy concepts between consumers who sort their waste and those who do not? The aim was to determine whether consumer behaviour in the sorting of waste has an impact on how the importance of CE concepts is perceived and, if necessary, to find a pattern of consumer behaviour. The Mann-Whitney test was used to determine differences in the evaluation of the individual concepts, for each activity separately. At the same time, the difference in the averages of respondents who sort and do not sort waste was added. The evaluation is presented in Table 4.

H03. There are no statistically significant differences in the evaluation of CE-related behaviour between consumers who sort and do not sort their waste.

H13 non H03.

The forms of consumer behaviour associated with the CE are ordered by p-value in the table. The test showed statistically significant differences in the four concepts associated with the CE, where the p-value did not exceed the threshold of 0.05. In the case of these concepts, consumers who sort their waste have higher importance preferences than consumers who do not sort their waste. In the remaining eight concepts, there is no statistically significant difference between consumers who sort their waste and those who do not. The table also shows differences in the group averages. By far the highest difference was identified in the case of a closed economy, where respondents who sort waste attribute significantly higher importance. This confirms the link between sorting waste and the CE, as a closed economy is one of the basic characteristics of the CE.

Table 4: Differences in consumer behaviour depending on the sorting of waste

	Waste sorting				p-value	Difference in averages
Basic CE concepts	Yes (n=995)		No (n=91)			
	Mean	Sd	Mean	Sd		
11. Closed economy	2.51	1.325	3.8	1.496	0.001	1.29
4. Re-use of products for a different purpose	3.81	2.154	4.3	1.969	0.019	0.49
7. Collection of discarded products in public areas	2.87	1.361	3.44	2.414	0.021	0.57
6. Recycling	4.01	1.691	4.45	1.821	0.025	0.44
5. Repair of non-functional items	2.94	1.736	3.09	1.236	0.056	0.15
12. Improved quality of life	3.6	1.717	3.72	1.747	0.105	0.12
9. Waste management strategies	3.29	2.123	3.21	1.414	0.109	-0.08
3. Re-use of products	3.63	1.403	3.99	1.456	0.131	0.36
1. Renewability of natural resources	3.28	2.012	3.51	1.201	0.191	0.23
8. Reducing the amount of waste	3.89	1.414	4.31	1.356	0.234	0.42
10. Sustainable development of society	3.39	1.476	3.25	1.453	0.253	-0.14
2. Environmental protection	4.29	1.414	4.45	1.566	0.314	0.16

Source: compiled by authors, (1 = max. importance, 6 = min. importance)

Overall, we may conclude that while there are statistically significant differences in the four attributes when evaluating the importance of the various forms of behaviour, in general there is not much difference in how importance is evaluated by consumers who sort their waste and those who do not. This indicates that even though a person does not sort their waste, they are just as aware of the importance of socially responsible behaviour as someone who does sort waste. These are merely reasons why the consumer does not sort waste, which may be internal, due to the personal characteristics of that particular person, such as laziness, or external, such as the distance to their nearest sorted waste containers.

Influence of sorting questions

The respondents' responses can be highly heterogeneous when the sample comprises over a thousand respondents. Therefore, in order to determine the attitudes of the individual groups of respondents, the questionnaire included classification questions that related to education, age, gender and the size of their place of residence. *A fourth RQ* was defined: What influence do consumers' socio-demographic characteristics (education, age, gender and size of their place of residence) have on the importance evaluation of the circular economy concepts for consumers? Table 5 shows the division of respondents into individual groups.

Table 5: Influence of sorting parameters

1. Education			**2. Age**			**3. Gender**			**4. Size of residence**		
Elementary, skilled	52	4.8	18-24	211	19.4	male	633	53.4	up to 1000 inhabitants	44	4.1
Trained with graduation	254	23.4	25-34	450	41.4	female	553	46.6	1,001-5,000	123	11.3
Secondary school	532	49	35-44	122	11.2				5,001-10,000	139	12.8
University	248	22.8	45-54	95	8.7				10,001-25,000	244	22.5
			55-64	101	9.3				25,001-50,000	202	18.6
			65-74	62	5.7				50,001-100,000	177	16.3
			75 and more	45	4.1				100,001-500,000	87	8.0
									over 500,001	70	6.4
Total	**1086**	**100**	**Total**	**1086**	**100**	**Total**	**1086**	**100**	**Total**	**1086**	**100**
p-value	α=0.05	0.0354	p-value	α=0.05	0.0585	p-value	α=0.05	0.2014	p-value	α=0.05	0.3901

Source: Compiled by authors

Pearson's chi-squared test was used at the significance level of $\alpha = 0.05$ to calculate statistically significant differences. In order to evaluate the effect of the sorting questions, a hypothesis was set with four variants, one for each sorting question.

H04: There are no statistically significant differences in responses to the question of recycling.

H14: non HO4

The evaluation of the sorting questions confirmed a statistically significant difference for one sorting parameter, which is education. If the differences in the groups of respondents' answers divided according to their level of education are examined in detail, the respondents can be assigned into two groups. The first group comprising respondents with elementary education, secondary education and secondary education with a school-leaving certificate, and the second group consisting of respondents with high school and university education. The first group rates the importance of CE concepts significantly lower than the second group of more educated respondents. The most marked differences are evident in the sustainable development of society, the collection of discarded products in public areas and waste management strategies. In contrast, there was no statistically significant difference in the evaluation for gender, age and residence size.

Overall, we may conclude that the results apply to all respondents, the only exception being the respondent's level of education, where higher education is associated with greater importance being attributed to CE concepts.

DISCUSSION

The circular economy is a very broad concept and encompasses many areas, which all come under the principles of what is now known as sustainability. Some researchers, such as (Padilla-Rivera *et al*., 2020; Pauli, 2010; Repp *et al*., 2021), focus on the potential of the CE for sustainable employment, where their research demonstrates the benefits the CE has in the creation of new jobs, which, however not only do not increase costs, but also increase labour productivity. Some authors (Esposito *et al*., 2017; Jakobsen *et al.*, 2021) add that the CE not only addresses employment, but is also a type of business model that generates profit. The perception of the CE concept as a philosophy in the broadest sense is presented and backed by critical discussion, rational argumentation and systematic presentation by (Finkbeiner *et al*., 2006; Ungur, 2022). Certain authors, on the other hand, see the CE merely as a means of optimising waste management (Ghisellini *et al*., 2016; Nainggolan *et al*., 2019). Another option is to divide the CE into smaller areas, as is done by the non-profit Ellen MacArthur Foundation, striving to develop the CE, which introduces the term blue economy. This concept presents an integrated approach based on the sustainable use of oceans and coastal areas to address environmental degradation and the depletion of resources (Ellen MacArthur Foundation, 2022; Wenhai *et al.*, 2019). Another division of the CE is outlined by (Chahal *et al.*, 2020), who propose closed supply chains in a loop. The topic of reverse logistics and its involvement in the concept of the CE are dealt with by (Agrawal *et al*., 2015). These concepts often have overlapping meanings and their interchangeability results in ambiguous definitions. These are also definitions with very sophisticated content. The qualitative research presented here was intended to lead to the creation of a definition that, on the contrary, would be easy to understand for ordinary people, which is why the respondents of the research were consumers. This enabled us to create a definition of the circular economy, as perceived by consumers, one that they should understand: *The circular economy is the re-engagement of anything that a person uses for life in whatever state (recycling, repair, use for other purposes) for reuse in an endless loop for any purpose aimed at improving quality of life and environmental sustainability. The consequence of implementing such a system is a reduction of the amount of waste and more sparing use of mineral resources*. A certain link

was discovered between the identified CE concepts, based on the meaning of the concepts. Content analysis was used to place the concepts into three homogeneous groups, which were named as social, circular and reducing concepts. A slight limitation is the initial education of respondents on the principles of circular economy, which may have influenced their own interpretation of the concept.

Research into the importance of the CE based on quantitative consumer research, as in this case, has been addressed by several authors and presented in the literature overview. Many authors, such as (Choudhary *et al*., 2019; Weigend Rodríguez *et al*., 2020) state that consumers consider the circular economy to be important for the environment, but do not evaluate individual concepts associated with the circular economy, seeing the CE as a whole. The research presented in this paper has helped to reveal the importance of the individual CE concepts individually and thus provides a detailed explanation of the essence of these CE concepts. The research therefore confirmed that the most important idea of the CE for consumers is a closed economy. Respondents mentioned the collection of discarded products in public areas and subsequent processing in any form for further use as important. Similar conclusions were drawn in their research by (Craighill & Powell, 1996; da Cruz *et al*., 2012; Thompson *et al*., 2020), although they focused solely on the importance of transforming discarded items for subsequent recycling. In the research, consumers agreed that an important consequence of the CE is reducing the need for primary raw materials and possibly extending the use of primary resources that have already been used once. Another positive consequence that consumers are aware of is the reduction in the amount of waste that ends up in landfills and incinerators, thereby reducing soil, water, and air pollution.

Overall, the research confirmed the claim that the CE has a positive impact on the environment. However, there are concerns about the implementation of CE in practice. For example, Demailly & Novel (2014) and Ungerman & Dědková (2021) argue that although CE offers new opportunities for the transition to "green" economy, its implementation depends on other parameters such as cost, reparability, quality and the materials that make up the product. The purely positive environmental impact of CE is rejected by Murray *et al*. (2017), who state that the use of products designed for long life or for possible repair may require more energy than product with a shorter life and non-repairable products. This can be the case with renewable technologies such as wind farms and solar panels, which are made of technical materials that may be difficult to recycle. Also, Ghisellini *et al*. (2016) point out that although the current focus of the circular economy leads to lower resource consumption, this concept cannot exist indefinitely due to the physical limitation of the lifetime of products. After some time, new natural resources need to be put back into circulation.

In addition, the research confirmed that if consumers sort their waste, they also attribute greater importance to the CE. As the research showed that 90 % of respondents sort their waste in some way, they are just as likely to engage in the CE as a higher degree of responsible behaviour. On the other hand, the mere sorting of waste followed by recycling results in significant economic savings, as a large percentage of the value of the materials re-enters the economy after a short time, as in the case with plastic packaging materials, where it is estimated that approximately 95 % of the value is returned (da Cruz *et al*., 2012; Kaseer *et al*., 2019).

CONCLUSION

One of the most visible parts of the environmental pillar of the CSR concept is the circular economy, which is different from the linear approach, hence the name circular. The circular economy is a scientific concept of sustainable economic development model. According to (Blomsma & Brennan, 2017), the application of the circular economy is one means of ensuring economic growth and increasing the competitiveness of businesses. The main objective of the paper was to *determine how consumers currently perceive the concept of the circular economy and how important these concepts are for consumers. This objective was completely achieved and* this paper provides a comprehensive overview of the way in which the circular economy is currently perceived by consumers. First, the research was subjected to a scientific search identifying trends in the CE with a focus on consumers. Concepts that consumers perceive as comprising the CE were then identified. These concepts were subjected to a survey of importance, where most aspects of the circular economy were found to be important, although the distribution by importance did not match the distribution by homogeneous areas in the focus on the consumer. This indicates that consumer perception is very diverse and that they would rather see each area represented rather than preferring one area over another. Together with the research, the paper proved the dependence between the level of importance and the sorting of waste by consumers. A different perception of the importance of CE concepts was demonstrated for one sorting parameter, i.e. education. Respondents with a higher education and up to an age of roughly 45 attributed higher importance to environmental aspects.

The benefit and the filling of the research gap lies in determining how the CE is currently perceived by consumers, in revising the definition of the CE and in the creation of a new definition according to consumer perception. The research presented a detailed analysis of the importance of the individual concepts associated with CE, not only the term itself as aconcept. The research also demonstrated a link between the importance of the CE and the sorting of waste by consumers. Therefore, if consumers see the circular economy as being important, they also behave in a socially responsible manner. Overall, we may conclude that this research has achieved its main objective and fulfilled the research questions, and could serve as a basis for further research into consumer behaviour in order to identify the specific manner in which end-of-life items are disposed of.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

Agrawal, S., Singh, R. K., & Murtaza, Q. (2015). A literature review and perspectives in reverse logistics. *Resources, Conservation and Recycling*, *97*, 76–92. https://doi.org/10.1016/j.resconrec.2015.02.009

Bastein, A., Roelofs, E., Rietveld, E., & Hoogendoorn, A. (2013). *Opportunities for a Circular Economy in the Netherlands*. Delft: TNO.

Blomsma, F., & Brennan, G. (2017). The Emergence of Circular Economy: A New Framing Around Prolonging Resource Productivity. *Journal of Industrial Ecology*, *21*(3), 603–614. https://doi.org/10.1111/jiec.12603

Boons, F., & Howard-Grenville, J. A. (2009). *The Social Embeddedness of Industrial*

Ecology. Edward Elgar Publishing.

Camilleri, M. A. (2018). *Closing the Loop for Resource Efficiency, Sustainable Consumption and Production: A Critical Review of the Circular Economy* [SSRN Scholarly Paper]. Retrieved January 8, 2022, from https://papers.ssrn.com/abstract=3119575

Craighill, A. L., & Powell, J. C. (1996). Lifecycle assessment and economic evaluation of recycling: A case study. *Resources, Conservation and Recycling*, *17*(2), 75–96. https://doi.org/10.1016/0921-3449(96)01105-6

da Cruz, N. F., Simões, P., & Marques, R. C. (2012). Economic cost recovery in the recycling of packaging waste: The case of Portugal. *Journal of Cleaner Production*, *37*, 8–18. https://doi.org/10.1016/j.jclepro.2012.05.043

Demailly, D., & Novel, A. S. (2014). The sharing economy: Make it sustainable. *IDDRI-Institut Du Developpement Durable et Des Relations Internationales, Paris, France*, *3*(14).

Dishman, R. K., Motl, R. W., Saunders, R. P., Dowda, M., Felton, G., Ward, D. S., & Pate, R. R. (2002). Factorial Invariance and Latent Mean Structure of Questionnaires Measuring Social-Cognitive Determinants of Physical Activity among Black and White Adolescent Girls. *Preventive Medicine*, *34*(1), 100–108. https://doi.org/10. 1006/pmed.2001.0959

Dobre-Baron, O., Nițescu, A., Niță, D., & Mitran, C. (2022). Romania's Perspectives on the Transition to the Circular Economy in an EU Context. *Sustainability*, *14*(9), Article 9. https://doi.org/10.3390/su14095324

Ehrenfeld, J. R. (2007). Would Industrial Ecology Exist without Sustainability in the Background? *Journal of Industrial Ecology*, *11*(1).

Ellen MacArthur Foundation. (2022). *An economic and business rationale for an accelerated transition*. Retrieved April 18, 2023, from https://ellenmacarthurfoundation.org/ towards-the-circular-economy-vol-1-an- economic-and-business-rationale-for-an

Esposito, M., Tse, T., & Soufani, K. (2017). Is the Circular Economy a New Fast-Expanding Market? *Thunderbird International Business Review*, *59*(1), 9–14. https://doi.org/10. 1002/tie.21764

Finkbeiner, M., Inaba, A., Tan, R., Christiansen, K., & Klüppel, H.-J. (2006). The New International Standards for Life Cycle Assessment: ISO 14040 and ISO 14044. *The International Journal of Life Cycle Assessment*, *11*(2), 80–85. https://doi.org/10. 1065/lca2006.02.002

Frosch, R. A., & Gallopoulos, N. E. (1989). Strategies for manufacturing. *Scientific American*, *261*(3), 144–153.

Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner production*, *114*, 11–32.

Gureva, M. A., & Deviatkova, Y. S. (2019). Formation of the Concept of a Circular Economy. *RELIGACIÓN. Revista de Ciencias Sociales y Humanidades*, *4*(21). https://www.proquest.com/docview/2691910246/abstract/DE633241EA234B17PQ/1

He, Z., Xu, S., Shen, W., Wang, M., & Li, C. (2019). Exploring external and internal pressures on the environmental behavior of paper enterprises in China: A qualitative study. *Business Strategy and the Environment*, *28*(6), 951–969. https://doi.org/10. 1002/bse.2294

Heck, P. (2006). Circular economy-related international practices and policy trends. *Consulting Report for the World Bank Project on Policies for Promotion of a Circular*

Economy in China.

Chahal, H., Gupta, M., Bhan, N., & Cheng, T. C. E. (2020). Operations management research grounded in the resource-based view: A meta-analysis. *International Journal of Production Economics*, *230*, 107805. https://doi.org/10.1016/j.ijpe.2020.107805

Chertow, M. R. (2000). Industrial symbiosis: Literature and taxonomy. *Annual review of energy and the environment*, *25*(1), 313–337.

Choudhary, K., Sangwan, K. S., & Goyal, D. (2019). Environment and economic impacts assessment of PET waste recycling with conventional and renewable sources of energy. *Procedia CIRP*, *80*, 422–427. https://doi.org/10.1016/j.procir.2019.01.096

Jakobsen, S., Lauvås, T., Quataro, F., Rasmussen, E., & Steinmo, M. (Ed.). (2021). *Research handbook of innovation for a circular economy*. Edward Elgar Publishing.

Kaseer, F., Martin, A. E., & Arámbula-Mercado, E. (2019). Use of recycling agents in asphalt mixtures with high recycled materials contents in the United States: A literature review. *Construction and Building Materials*, *211*, 974–987.

Kipping, M., & Clark, T. (2012). *Researching Management Consulting: An Introduction to the Handbook*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199235049.013.0001

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, *127*, 221–232. https://doi.org/10.1016/j.resconrec.2017.09.005

Kislingerová, E. (2021). *Cirkulární ekonomie a ekonomika, Společenské paradigma, postavení, budoucnost a praktické souvislosti*. Grada publishing.

Księżak, P. (2017). The Benefits from CSR for a Company and Society. *Journal of Corporate Responsibility and Leadership*, *3*(4), 53. https://doi.org/10.12775/JCRL.2016.023

Lacy, P., & Rutqvist, J. (2015). *Waste to Wealth*. Palgrave Macmillan. https://link.springer.com/book/10.1057/9781137530707

Lehmann, H., Hinzmann, M., Evans, N., Kafyeke, T., Bell, S., Hirschnitz-Garbers, M., & Eick, M. (Ed.). (2018). *Factor X: Challenges,implementation strategies and examples for a sustainable use of natural resources*. Springer.

Lieder, M., & Rashid, A. (2016). Towards circular economy implementation: A comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, *115*, 36–51.

Lombardi, D. R., & Laybourn, P. (2012). Redefining industrial symbiosis: Crossing academic–practitioner boundaries. *Journal of Industrial Ecology*, *16*(1), 28–37.

Mitchell, P. (2015). Employment and the circular economy-Job Creation through resource efficiency in London. *Report produced by WRAP for the London Sustainable Development Commission, the London Waste and Recycling Board and the Greater London Authority*.

Munzarová, S., Jelínková, M., & Hoffman, M. (2023). . Circular Activities of Major Norwegian Cities Communicated through their Websites. *Hradec Economic Days*, *13*(1), 471–481. https://doi.org/10.36689/uhk/hed/2023-01-000

Murray, A., Skene, K., & Haynes, K. (2017). The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal of Business Ethics*, *140*(3), 369–380. https://doi.org/10.1007/s10551-015-2693-2

Nainggolan, D., Pedersen, A. B., Smed, S., Zemo, K. H., Hasler, B., & Termansen, M. (2019). Consumers in a Circular Economy: Economic Analysis of Household Waste Sorting

Behaviour. *Ecological Economics*, *166*, 106402. https://doi.org/10.1016/j.ecolecon.2019.106402

Nugent, N., & Rhinard, M. (2015). *The European Commission*. Bloomsbury Publishing.

Osland, G. E. (1991). Origins and Development of the Product Life Cycle Concept. *Butler University*. Retrieved May 8, 2020, from https://core.ac.uk/download/pdf/62433731.pdfes

Padilla-Rivera, A., Russo-Garrido, S., & Merveille, N. (2020). Addressing the social aspects of a circular economy: A systematic literature review. *Sustainability*, *12*(19), 7912.

Parida, V., Burström, T., Visnjic, I., & Wincent, J. (2019). Orchestrating industrial ecosystem in circular economy: A two-stage transformation model for large manufacturing companies. *Journal of business research*, *101*, 715–725.

Pauli, G. (2010). *Blue Economy-10 Years, 100 Innovations, 100 Million Jobs*. Paradigm Pubns.

Peschel, A. O., & Aschemann-Witzel, J. (2020). Sell more for less or less for more? The role of transparency in consumer response to upcycled food products. *Journal of Cleaner Production*, *273*, 122884. https://doi.org/10.1016/j.jclepro.2020.122884

Pizzi, S., Leopizzi, R., & Caputo, A. (2021). The enablers in the relationship between entrepreneurial ecosystems and the circular economy: The case of circularity.com. *Management of Environmental Quality: An International Journal*, *33*(1), 26–43. https://doi.org/10.1108/MEQ-01-2021-0011

Preston, F. (2012). *A global redesign? Shaping the circular economy*.

Repp, L., Hekkert, M., & Kirchherr, J. (2021). Circular economy-induced global employment shifts in apparel value chains: Job reduction in apparel production activities, job growth in reuse and recycling activities. *Resources, conservation and recycling*, *171*, 105621.

Rizos, V., Tuokko, K., & Behrens, A. (2017). *The Circular Economy: A review of definitions, processes and impacts*.

Sauvé, S., Bernard, S., & Sloan, P. (2016). Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research. *Environmental development*, *17*, 48–56.

Schut, E., Crielaard, & Mesman. (2016a). *Circular economy in the Dutch construction sector: A perspective for the market and government* [Report]. Rijksinstituut voor Volksgezondheid en Milieu RIVM. Retrieved January 8, 2021, from https://rivm.openrepository.com/handle/100 29/595297

Stevanovic-Carapina, H., Stepanov, J., Savic, D., & Mihajlov, A. (2011). Emission of toxic components as a factor of the best practice options for waste management: Application of LCA (Life Cycle Assessment). *Hemijska Industrija*, *65*(2), 205–209. https://doi.org/10.2298/HEMIND101006072S

Thompson, D. L., Hartley, J. M., Lambert, S. M., Shiref, M., Harper, G. D., Kendrick, E., Anderson, P., Ryder, K. S., Gaines, L., & Abbott, A. P. (2020). The importance of design in lithium ion battery recycling–a critical review. *Green Chemistry*, *22*(22), 7585–7603.

Tichy, G. (2011). Innovation, product life cycle and diffusion: Vernon and beyond. In *Handbook of Regional Innovation and Growth*. Edward Elgar Publishing.

Uhlaner Hendrickson, L., & Tuttle, D. B. (1997). Dynamic management of the environmental enterprise: A qualitative analysis. *Journal of Organizational Change*

Management, *10*(4), 363–382. https://doi.org/10.1108/09534819710175875

Ungerman, O., & Dědková, J. (2021). Current Implementation of the Circular Economy in Enterprises in the Czech Republic. *Review of Economic Perspectives*, *21*(2), 189–210. https://doi.org/10.2478/revecp-2021-0009

Ungur, C. (2022). *Circular business models: Challenges and opportunities*. Retrieved April 20, 2023, from http://dspace. ince.md/jspui/handle/123456789/1650

Weigend Rodríguez, R., Pomponi, F., Webster, K., & D'Amico, B. (2020). The future of the circular economy and the circular economy of the future. *Built Environment Project and Asset Management*, *10*(4), 529–546. https://doi.org/10.1108/BEPAM-07-2019-0063

Wenhai, L., Cusack, C., Baker, M., Tao, W., Mingbao, C., Paige, K., Xiaofan, Z., Levin, L., Escobar, E., & Amon, D. (2019). Successful blue economy examples with an emphasis on international perspectives. *Frontiers in Marine Science*, *6*, 261.

Wuttke, J. (2018). The Circular Economy Package of the European Union. In H. Lehmann (Ed.), *Factor X: Challenges, Implementation Strategies and Examples for a Sustainable Use of Natural Resources* (s. 251–262). Springer International Publishing. https://doi.org/10.1007/978-3-319-50079-9_15

Wysokińska, Z. (2016). The "New" Environmental Policy Of The European Union: A Path To Development Of A Circular Economy And Mitigation Of The Negative Effects Of Climate Change. *Comparative Economic Research. Central and Eastern Europe*, *19*(2), 57–73. https://doi.org/10.1515/cer-2016-0013

Yuan, Z., Bi, J., & Moriguichi, Y. (2008). The Circular Economy: A New Development Strategy in China. *Journal of Industrial Ecology*, *10*(1–2), 4–8.https://doi.org/ 10.1162/108819806775545321

Zhijun, F., & Nailing, Y. (2007). Putting a circular economy into practice in China. *Sustainability Science*, *2*(1), 95–101. https://doi.org/10.1007/s11625-006-0018-1

Zhongming, Z., Linong, L., Xiaona, Y., Wangqiang, Z., & Wei, L. (2014). *Resource-efficient green economy and EU policies*. http://119.78.100.173/C666//handle/2XK7JSWQ 30 62