CIRCULAR ECONOMY AS A STRATEGIC IMPERATIVE FOR FOSTERING SUSTAINABILITY AND CONSUMER ENGAGEMENT

DOI: 10.26341/issn.2241-4010-2025-16a-1-K02140

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Abstract
In contemporary society, the idea of a circular economy plays a crucial role in achieving sustainable development goals. It promotes efficient resource use, enabling reuse and recycling instead of single-use. It is based on economic systems and business models that replace the linear model with alternative approaches such as reducing, reusing, and repairing. As consumer needs become more complex and technologies advance, it is necessary to focus on circular strategies that enable responsible resource management and strengthen consumer awareness. This paper aims to identify barriers to implementing circular strategies by analyzing consumer education and the relationship between systems, needs, and opportunities, focusing on the local specificities of the countries involved in the COST Eco4All action. The research includes data from 30 countries collected through surveys. The results will be processed through statistical analyses to identify differences in barriers and opportunities between these countries, providing insights for creating more effective circular strategies at regional and national levels. The paper highlights the importance of consumers as catalysts for circular transformation, whose protection and engagement have a fundamental impact on the success of this concept.

Keywords: *Circular economy, Customer, Strategies, Barriers, Sustainable development*

Introduction

In today's world, the circular economy (CE) is recognized as a fundamental concept. Increasing concerns over rising resource consumption have prompted both governments and

companies to adopt circular models. These models not only help alleviate resource scarcity but also serve as a source of innovation and economic development (Alves et al., 2022). This concept has gained global significance as it addresses the issues of diminishing resources and the environmental challenges posed by the current linear economic model. It also encourages active consumer protection and education (WHO, 2018).

Therefore, to promote sustainability and effective resource management, the circular economy has emerged as an innovative approach that links industries, governments, and consumers (Brydges, 2021). It provides solutions for more efficient material use and recycling within industries while promoting policies encouraging sustainable economic growth at the government level (Alves et al., 2022). Additionally, it empowers consumers to adopt more responsible habits, engage in product reuse, and support circular business models (Jain et al., 2018; Geiger, 2018).

This concept encompasses various aspects, including adapting business models, redesigning products, and promoting responsible resource use. Of particular importance is the involvement of consumers in this process by raising awareness of the importance of circular models, educating them about sustainable practices such as recycling and reuse, and providing information about consumer rights in the context of the circular economy (Stumpf et al., 2021).

The circular economy provides numerous benefits but presents some challenges for consumers. This model operates on principles of "make-use-return" or "take-make-use" with the goal of reducing waste production. As a result, it has distinct implications for consumers (Schaik, & Klundert, 2001; Elisha, 2020). In this context, consumer protection involves ensuring that products are safe, durable, and designed for repair or reuse. To successfully implement this concept, companies need to undergo structural changes while also fostering informed consumers who comprehend the principles of circular business. This approach ultimately contributes to sustainable development as a whole (Lewandowski, 2016).

The concept of a circular economy has been extensively studied, particularly regarding general sustainable development and waste reduction strategies. However, significant research gaps exist in understanding the specific aspects of its implementation at the international level, especially when considering countries' local specificities. Most existing research focuses on macroeconomic policies, technological innovations, and industrial models, while there is relatively little emphasis on the interaction between consumer education and their specific needs. Further analysis is needed to understand how education and environmental awareness can overcome barriers to implementing a circular economy and adapt circular strategies to various socio-economic and cultural contexts. In this sense, this paper seeks to fill existing gaps through the analysis of three key research questions:

RQ1: How does work experience influence the perception of personnel, organizational, and financial barriers in managing a circular value chain?

RQ2: How does work experience influence the perception of institutional and infrastructural barriers to implementing the circular economy?

RQ3: How does the country of origin influence the perception of institutional barriers, such as the absence or low level of financial incentives and the effectiveness of recycling laws?

Hence, this research aims to examine how strategic planning and management can contribute to a more efficient application of circular economy principles, emphasizing overcoming key barriers, such as personnel, organizational and financial obstacles, and institutional, infrastructural, and legal challenges. The research will also analyze how these barriers affect the strengthening of environmental awareness and active engagement of consumers, as well as the challenges associated with implementing circular strategies that must be adapted to local socio-economic and cultural specificities in the countries involved in the COST action Eco4All.

Literature review

The circular economy is an alternative to the traditional linear economy, which relies on the "take-use-throw" model by promoting a pattern of reducing, reusing, and repairing (Özkan et al., 2020). In a circular economy, resources are kept in use for as long as possible to maximize their value. Once products and materials have served their purpose, they are returned and reused instead of being discarded (Morgan & Mitchell, 2015). According to Erkman (2001), when a product reaches the end of its life cycle, its materials tend to be retained within the economic system wherever feasible. In this way, materials can be reused, thereby continuously creating additional value.

The circular economy, as a sustainable approach, aims to reduce the negative effects of the linear economy by building long-term resilience in business and economic circumstances while providing significant environmental and social benefits (Alves et al., 2022). This model is gaining importance in developing countries and developed economies, supporting various sectors such as industry, tourism, and services. The focus is on reducing waste at all stages of the production process, from design to disposal, which not only improves sustainability but also contributes to closing the supply chain loop (Hartley et al., 2020).

According to Bocken et al. (2016), strategies play a key role in implementing circular approaches, enabling organizations to extend the life of products, reduce waste, and use resources efficiently. Well-designed strategies promote economic and environmental benefits and raise awareness of circular practices through the engagement of consumers and other relevant stakeholders. Hence, strategic management in the circular economy is a key factor for achieving sustainability and encouraging consumers' active participation.

Innovative models, driven by digital technologies, rely on close cooperation with customers, mass personalization, and sharing and collaborative economy principles. They accelerate the transition to a circular economy and encourage resource optimization, making the European economy less dependent on primary raw materials (European Commission, 2020).

The European Commission (2020) proposes changes to the law on consumer protection in the EU to encourage greater consumer participation in the circular economy. These changes aim to provide consumers at the point of sale with reliable and relevant information about products, including their lifespan, as well as the availability of repair services, spare parts, and repair manuals. Also, companies and consumers can jointly analyze the end of product life, focusing on recycling, repairing, and reusing options (Islam et al., 2021).

Consumer behaviour plays a significant role in the success of companies that apply circular principles in their business (Parajuly et al., 2020). According to Islam et al. (2021), consumer behaviour research can help companies find appropriate methods to improve aspects of the circular economy that will serve consumers through their consumption and raise awareness about disposal, recycling, and repair. Active participation of end consumers is a key factor in the transition to a circular economy, as it influences the demand for products that support this model. This includes durable, high-quality, and repairable products, as well as those that can be reused, recycled, remanufactured, repaired, or resold, and products that can be shared (Shevchenko et al., 2023).

Methodology

This paper presents the results of a survey conducted within the COST Action CA22124 - ECO4ALL framework, in which representatives from 30 countries participated. A total of 165 respondents were surveyed, which provides a significant basis for analysis. The survey aimed to collect data on the role of consumers in circular practices, with a particular focus on

activities such as waste reduction, reuse, and product repair. Conducted through a structured online questionnaire, the survey highlighted the importance of empowering consumers by informing them about their rights, obligations, and opportunities in the context of a circular economy. In addition, their impact on creating business policies and strategies was analyzed. The data obtained serve as a basis for quantitative analysis and formulating recommendations for improving public policies at the national and European levels.

Before proceeding to a detailed demographic analysis of the respondents, the measuring instrument's reliability was checked. The calculated value of Cronbach's α coefficient for the entire data set was 0.978, indicating an extremely high level of reliability of the instrument. These results confirm that the measuring instrument is adequate for assessing the selected parameters and provides justification for continuing the research with a more detailed analysis of the data. This provided a stable basis for interpreting demographics and other relevant aspects, further contributing to the conclusions' relevance and significance.

Data Analysis and Results

After data collection and initial analysis were completed, incomplete responses were eliminated from the sample, resulting in a final set of 165 valid questionnaires. Table 1 shows the demographic characteristics of the respondents.

Table 1: Demographics profile of respondents

Measure	Item	%
Gender	Male	34.5
	Female	65.5
Age	18 - 30	25.5
	31 - 40	24.8
	41 - 50	30.3
	51 - 60	14.5
	61 - 65	0.6
	65+	4.2
The level of education	High school diploma or less	6.1
	Higher school	7.9
	Basic academic studies	9.1
	Master studies	16.4
	Doctoral studies	60.6
Years of working experience	none	3.6
	up to a year	6.7
	from 1 to 5 years	17.6
	from 6 to 10 years	8.5
	from 11 to 20 years	30.3
	from 21 to 30 years	18.8
	from 31 to 40 years	11.5
	40+ years	3.0
Country	Albania	7.3
	Algeria	0.6
	Bosna and Herzegovina	4.8
	Bulgaria	1.2
	Croatia	1.2
	Cyprus	1.2
	Czech Republic	9.7

	Denmark	0.6
	Estonia	0.6
	Georgia	0.6
	Greece	1.2
	Hungary	3.6
	Indonesia	0.6
	Ireland	0.6
	Israel	6.1
	Italy	0.6
	Latvia	0.6
	Montenegro	0.6
	Munich	0.6
	North Macedonia	1.8
	Portugal	3.6
	Republic of Moldova	16.4
	Romania	0.6
	Serbia	12.7
	Slovakia	0.6
	Spain	1.8
	Sweden	0.6
	Taiwan R.O.C.	0.6
	Turkey	17.0
	United Kingdom	1.8

Table 1 shows the demographic profile of the respondents, including gender, age, education level, work experience, and countries of origin. Most respondents are women (65.5%), while men comprise 34.5%. The age groups are diverse, with the most represented respondents aged 41 to 50 (30.3%), followed by those between 18 and 30 (25.5%) and 31 to 40 (24.8%). The age group from 51 to 60 is less represented (14.5%), while respondents over 60 are rare (4.8%).

In terms of education, the majority of respondents have a doctorate (60.6%), while a smaller percentage have a master's degree (16.4%), basic academic studies (9.1%), college (7.9%) or high school or lower education (6.1%). Work experience varies, with the largest number of respondents reporting between 11 and 20 years of experience (30.3%), while groups with less than five years (21.2%) and over 30 years (14.5%) are less represented.

Respondents come from 30 different countries involved in the COST action. The most represented participants are from Turkey (17.0%), the Republic of Moldova (16.4%), Serbia (12.7%) and the Czech Republic (9.7%). A smaller percentage comes from other countries, such as Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Portugal and Spain, with less than 8% shares. This diversity, which includes participants from a broader pan-European context, provides a solid basis for analysis within the framework of international cooperation and research within the ECO4ALL action.

Further data analysis examined the relationship between demographic characteristics, such as work experience and country of origin, and barriers that limit circularly responsible consumer behavior. This approach allowed for a deeper understanding of the interrelationships between these variables, providing a basis for formulating conclusions and identifying factors that influence consumer behavior in the circular economy context.

Discussion of the results

This research analyzes the relationship between demographic characteristics, such as work experience and country of origin, and key barriers that hinder effective circular value chain management. These barriers include personnel, organizational, and financial obstacles, as well as institutional, infrastructural, and legal challenges that can hinder the implementation of circular practices.

The relationship between customers' work experience and perceptions of personnel, organizational, and financial barriers was examined: high initial investment (Barr_hii) and short-term interests of stakeholders (Barr_stis). The research question RQ1 was confirmed based on the obtained results. The results show significant differences in responses depending on the length of work experience. For the high initial investment barrier, participants with work experience of 1 to 5 years and 11 to 20 years more often perceive this barrier as extreme. For the short-term interests' barrier, participants with work experience of 11 to 20 years express the most concern. Statistically significant results ($p = 0.024$ for Barr_hii and $p = 0.000$ for Barr_stis) indicate that work experience influences the perception of these barriers, which are classified as personnel, organizational, and financial barriers, with those with more work experience more often recognizing these challenges as significant obstacles.

Within institutional and infrastructural barriers, statistically significant differences in responses related to consumers' work experience were observed for four key items. The first item, Absence or low level of financial incentives (IIB_fi), showed a significant difference in responses, with consumers with more work experience more often perceiving this barrier as significant ($p = 0.001$). The second item, Antitrust laws that prevent cooperation in the circular economy (IIB_al), also showed a statistically significant difference ($p = 0.038$), with consumers with 11 to 20 years of work experience expressing agreement with this barrier more often. The third item, Problems with responsibility, obligations and ownership of the circular economy implementation process (IIB_roo), also showed a significant difference ($p = 0.015$), with the highest percentage of responses as a significant barrier being given by consumers with work experience between 11 and 20 years. Finally, Limited reverse logistics capacities (IIB_lc) showed the highest statistical significance ($p = 0.000$), indicating that consumers with more work experience often see this barrier as an important challenge in implementing the circular economy. These differences show that work experience plays a significant role in the perception of various institutional and infrastructural barriers in the process of transition to a circular economy. Based on these findings, the research question RQ2 is confirmed. The results demonstrate that work experience significantly influences the perception of institutional and infrastructural barriers, as evidenced by statistically significant differences in responses for key items such as financial incentives, antitrust laws, responsibilities in the circular economy process, and reverse logistics capacities.

When it comes to analyzing the relationship between countries of origin and barriers within institutional and infrastructural barriers, two items showed a statistically significant difference: Absence or low level of financial incentives (IIB_fi) and Recycling laws are ineffective in achieving (IIB_r) high-quality recycling. According to the results of the Chi-Square test, IIB_fi showed a statistically significant difference (Pearson Chi-Square = 154.141, df = 116, $p = 0.010$), with countries such as Serbia, Albania and Turkey marking this item as an "Extreme barrier" more, while other countries, such as Hungary and Portugal, had a lower number of such responses. Similarly, for IIB_r (Pearson Chi-Square = 151.711, df = 116, $p = 0.015$), countries such as Turkey and the Republic of Moldova also perceived recycling laws as a significant barrier. In contrast, other countries, such as Slovakia and Portugal, were less concerned about these laws' effectiveness. These differences point to the different attitudes and challenges that countries face about recycling financing initiatives and

legislation. Based on these claims and statistically significant differences, the research question RQ3 is confirmed, indicating that countries of origin significantly influence the perception of institutional and infrastructural barriers.

Conclusion

The transition from a linear to a circular economy model is a continuous process that changes traditional production and consumption paradigms. This research examines how strategic planning and management can contribute to a more successful implementation of the circular economy principles by overcoming key barriers, including human resources, organizational, financial, institutional, infrastructural, and legal challenges. In addition, the analysis focuses on the impact of these barriers on increasing environmental awareness and active consumer involvement, with a particular emphasis on adapting circular strategies to the specificities of the countries covered by this research, which are involved in the COST action ECO4All. Given the importance of consumers in this transition, their behavior is recognized as a key factor in achieving sustainable change.

This research contributes significantly to understanding how work experience and country of origin influence the perception of key barriers to implementing a circular economy. The results highlight that work experience shapes consumer attitudes towards barriers such as high initial investments and short-term stakeholder interests, while institutional and infrastructural barriers, such as lack of financial incentives and limited reverse logistics capacities, further complicate the transition process. In addition, significant differences between countries indicate the need for a localized approach that considers specific socio-economic and cultural characteristics.

This paper's theoretical contribution lies in filling the gaps in the literature on consumer interaction with circular economy principles. The research expands the existing understanding of barriers with a focus on their perception from the consumer's perspective, which contributes to the development of more effective strategies for education and awareness raising. Analyzing work experience and origin as key determinants enables more precise modeling of obstacles and solutions in the circular economy.

The practical implications are manifold. For companies and policymakers, the findings suggest adapting strategies and communication campaigns to overcome the barriers perceived as key by different consumer groups. Educating consumers about the principles of the circular economy and providing financial incentives can significantly improve their involvement and acceptance of this model. Also, the identification of differences between countries provides a basis for developing localized policies that respond to the specific challenges of each country, thereby contributing to the global goal of sustainable development.

Acknowledgments

This abstract for the special session is based upon work from COST Action CA22124 - ECO4ALL, "EU Circular Economy Network for All: Consumer Protection through reducing, reusing, repairing," supported by COST (European Cooperation in Science and Technology—www.cost.eu).

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