



Bridging Awareness and Action: Understanding Consumer Profile for a Circular Economy in Kosovo



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ABSTRACT

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The transition towards a circular economy (CE) is essential even for emerging countries. Kosovo, as an emerging country, has demonstrated its commitment in this way. However, significant gaps remain in raising consumer awareness and building the infrastructure needed to support sustainable practices fully. This study investigates the impact of consumers on the adoption of circular economy (CE) practices in Kosovo. Through a structured survey of 387 respondents, we examine how key variables such as CE awareness, behavior, perceptions of government actions needed, and socio-economic factors, influence consumers' willingness to change purchasing habits for a more sustainable economy. Results show that while higher awareness positively correlates with CE adoption, it is not a standalone predictor of behaviour change. Significant predictors include government actions, infrastructure support and prior sustainable behaviours. Demographic factors, such as income and education levels, also impact willingness to adopt sustainable practices, with lower-income groups facing financial barriers that hinder eco-friendly purchasing decisions. The findings underscore the awareness-behaviour gap, emphasising that awareness must reach a critical level, supported by incentives and adequate infrastructure, to drive meaningful change. Recommendations highlight the need for targeted policies, such as infrastructure development, subsidies, and public awareness campaigns, to foster an inclusive and accessible circular economy transition in Kosovo.

1. INTRODUCTION

As the world faces growing environmental challenges, shifting to a circular economy isn't just a hopeful vision, it's an urgent call to action. For emerging nations like Kosovo, embracing this shift means rethinking how we consume, produce, and engage with our resources, aligning with a global movement towards sustainability. The circular economy (CE) represents a model of sustainable development that seeks to minimise waste, optimise resource use and promote recycling and reuse within economies [1]. This paradigm shift away from the traditional linear economy has gained significant traction worldwide, particularly within the European Union (EU), which has adopted comprehensive frameworks to drive the growth of the circular economy. The European Union consists of countries with varying income levels, resulting in differences in how CE initiatives are implemented. However, the adoption of CE principles by emerging economies, aspiring to be EU members, faces unique challenges, including resource availability, diverse government policies and consumer awareness and behaviour, which differ from those encountered in more developed economies [2].

Kosovo has been working to raise awareness about the circular economy (CE) and engage citizens in sustainable practices. A major initiative is the Circular Economy for Green

Transition (CE4GT) project, funded by the European Union and co-funded by the Czech Republic. This three-year project aims to educate the public on waste reduction, recycling and sustainable consumption. The project places a special focus on tackling textile waste and has introduced community-based programs, such as setting up collection points and transforming textile waste into reusable products. The Ministry of Environment, with support from the United Nations Development Programme (UNDP), developed a Circular Economy Roadmap to guide Kosovo's shift towards sustainability. This roadmap includes public workshops to involve various stakeholders in brainstorming practical approaches to CE and educating the public on sustainable living. Through these events, citizens gain insight into the value of reusing materials and recycling, and they become more informed about the environmental impact of their consumption habits [3].

These initiatives demonstrate Kosovo's commitment to the transition towards a circular economy. However, significant work remains to be done in several areas, among others consumer awareness and behaviour, and building the necessary infrastructure to fully support sustainable practices. Research specifically examining consumer behaviour towards circular economy practices in Kosovo is sparse. A few reports touch on waste management and environmental awareness [4,

5], but there is little empirical research that delves into how Kosovar consumers perceive and adopt CE practices.

There is a paucity of comparative studies that position Kosovo within the broader context of the Western Balkans regarding the adoption of circular economy practices. While some research has explored sustainability in the region [5], few studies compare Kosovo's progress with neighbouring countries that are also striving to meet EU environmental requirements [6]. Such a comparative approach could provide valuable insights into best practices and common challenges faced across the region, helping to contextualise Kosovo's efforts. However, none of these studies delves into the analysis of customer behaviour.

This research aims to contribute to that effort by providing insights into how consumer behaviour can be influenced to accelerate this transition. The primary aim of this study is to analyse the factors that influence the behaviour of consumers in Kosovo in relation to the adoption of circular economy practices. Specifically, this study aims to reveal the relationship between the current level of consumer awareness, sustainable behaviour and other factors, and the willingness to change purchasing habits to contribute to the adoption of circular economy principles in Kosovo; to identify key demographic factors (age, income, education, etc.) that influence consumer adoption of circular economy practices; and to explore the main barriers preventing consumers from adopting sustainable behaviours, such as purchasing eco-friendly products, reducing waste, reusing and recycling.

Following the aim of the paper and the existing field literature, the study will test the following hypotheses:

H1: *Circular economy awareness positively influences consumers' willingness to change purchasing habits for a sustainable economy.*

H2: *Government actions positively influence consumers' willingness to change purchasing habits.*

H3: *Lower income and education levels decrease consumers' willingness to change purchasing habits for a sustainable economy.*

Hypotheses are formulated based on a growing body of literature that has explored how CE awareness [7], consumer behaviour [2], government infrastructure [8], as well as demographic factors such as age, education and income influence consumer attitudes towards sustainability. In this context, Aertsens et al. [9] showed that younger consumers, for example, tend to be more environmentally conscious and more likely to embrace sustainable buying habits. Education as well, is proved to play a pivotal role, with higher-educated consumers generally being more informed and active in adopting eco-friendly behaviours [10]. Furthermore, Belbağ et al. [11] conclude that income levels influence consumers' ability to purchase eco-friendly products, as green products are often associated with higher costs, creating a barrier for lower-income groups.

Those hypotheses aim to contribute to a deeper understanding of consumer motivations and obstacles that will guide Kosovo and other emerging countries in developing more effective public awareness campaigns and infrastructural improvements to facilitate the widespread adoption of sustainable practices.

The remainder of this paper is structured as follows. Section 2 presents a review of the relevant literature. Section 3 describes the data used and the empirical model. Section 4

reports the empirical results, while section 5 consists of conclusions.

2. LITERATURE REVIEW

The concept of the circular economy (CE) has gained substantial attention as a critical framework for achieving sustainability by maintaining products, materials, and resources in the economic cycle for as long as possible, thereby minimising waste. Numerous scholars have explored the implementation and success factors of CE across different sectors and regions. This literature review examines the factors influencing the adoption of circular economy (CE) principles. The focus is primarily on consumer behaviour as a critical driver for CE success, with particular attention to the role of consumer awareness and governmental support.

2.1 Consumer awareness and behavioural engagement in the circular economy

In a circular economy, compared to the traditional one, the emphasis shifts towards maintaining products at their highest value for as long as possible [12], making consumer behaviour a crucial element of this system [2]. Therefore, raising awareness and educating consumers is regarded by many authors as crucial for accelerating the growth of the circular economy [7, 13, 14]. However, research indicates that awareness alone may not be sufficient unless accompanied by sustainable business models and products [15, 16], as well as well-developed public infrastructure [8].

Some authors attribute the primary role in the growth of the circular economy to consumer knowledge of CE and their willingness to engage in sustainable consumption behaviours, while businesses and governments play a facilitative role in enabling circular practices. In this regard, Wastling et al. [12] argue that consumers must be educated on the benefits of CE and provided with accessible options for participating in circular practices, such as product reuse, recycling and choosing sustainably designed products. Moreover, Habib et al. [17] argue that increasing consumer knowledge about the ecological benefits of recycling and the long-term advantages of adopting circular products is essential for driving behavioural change. In addition, Aboelmaged [18] and Baldé et al. [19] found that increasing consumer awareness and behavioural control in e-waste recycling, along with incentives for repair services, can significantly boost recycling efforts and encourage greater participation in CE practices. These insights emphasise the need for widespread education to elevate consumer participation in circular practices.

Despite the recognised role of circular economy awareness, in addressing environmental impacts, it remains critical yet limited across various sectors, countries, and regions [20]. This is evident in the fashion and clothing industry [21] and the plastics industry [22, 23], where the adoption of reusable alternatives remains slow due to factors such as convenience, cost, and a lack of accessible infrastructure for recycling and reusing materials [24, 25].

The underdevelopment of CE awareness is evident not only in Western Balkan countries [26] but also in more advanced economies like Slovakia [14]. However, as noted by Van Weelden et al. [27], even when customers recognise the benefits of circular products, these advantages rarely serve as the primary factor influencing their purchasing decisions.

Therefore, the transition from awareness to sustained behavioural change is insufficiently explored. Future research should investigate the psychological and socio-economic factors that influence this shift.

On the other side, Geissdoerfer et al. [28] in their global review, point out that the role of consumers in the CE ecosystem is often underestimated. They suggest that to unlock the full potential, businesses and governments need to develop strategies that not only reduce environmental impact but also make sustainable choices more attractive and convenient for consumers. A deeper understanding of how cultural and regional contexts, particularly in the Western Balkans, influence consumer behaviour towards CE practices is essential. Exploring these variations could provide actionable insights for localised CE initiatives.

2.2 The role of government intervention and infrastructure in enhancing participation in CE

The transition to a circular economy faces several barriers, especially in emerging markets like Kosovo. The cost of eco-friendly products [10, 26], the lack of governmental support, underdeveloped infrastructure [8, 26], as well as the insufficient consumer engagement and knowledge [29] are some challenges that create significant obstacles to the widespread adoption of circular practices. Addressing these challenges requires a coordinated effort between government bodies, businesses, and civil society [30, 31].

Infrastructure development is equally vital for supporting the transition to a CE. Well-established recycling facilities, eco-product distribution networks, and accessible repair services are essential for promoting sustainable consumption [19, 26]. Relating to this, Akomea-Frimpong et al. [8] argue that in the absence of such infrastructure, consumers and businesses alike face practical barriers to engaging in circular behaviours. To overcome these obstacles, research shows that government initiatives and policy frameworks can make a real difference. Measures like government subsidies, tax incentives and educational campaigns can promote sustainable consumption and encourage people to make sustainable choices [1, 32]. In this regard, Rizos et al. [32] emphasise that financial incentives for consumers, such as subsidies for eco-friendly products or tax breaks for sustainable businesses, can significantly increase the adoption of circular economy practices. Additionally, educational campaigns and public awareness programs are essential for raising consumer consciousness regarding the environmental and economic advantages of circular economy practices. In this context, Kirchherr et al. [1] argue that such initiatives are particularly effective in addressing the knowledge gap among consumers regarding the environmental impact of their consumption choices. Moreover, Hartley et al. [33] aimed at identifying the policy measures proposed by EU-based CE experts to facilitate the transition to a circular economy highlights several key recommendations. These include enforcing stricter standards and norms in production, expanding circular procurement practices, providing tax relief for circular products, liberalising and facilitating waste trading through virtual platforms, supporting eco-industrial parks, and conducting awareness-raising campaigns.

Examples from emerging markets like India demonstrate how targeted government policies and investments in recycling infrastructure can enhance participation in the circular economy. A systematic review by Halog and Anieke

[31] highlights that developing countries like India have successfully adopted circular models with the participation of key stakeholders, demonstrating that the implementation of robust infrastructural support and partnerships can yield substantial benefits in managing waste and supporting CE practices.

However, there is limited empirical evidence evaluating the effectiveness of specific government interventions in emerging markets like Kosovo. Future research could measure how subsidies, tax benefits, and other policies influence CE adoption on a broader scale. Additionally, the literature lacks a detailed exploration of which specific infrastructural elements are most critical for enabling CE participation in emerging markets.

3. METHODOLOGY

As shown in Figure 1, the conceptual framework illustrates the interplay between key factors, including circular economy awareness, sustainable consumer behaviour, demographic factors, and government actions, which collectively influence consumers' willingness to change purchasing habits.

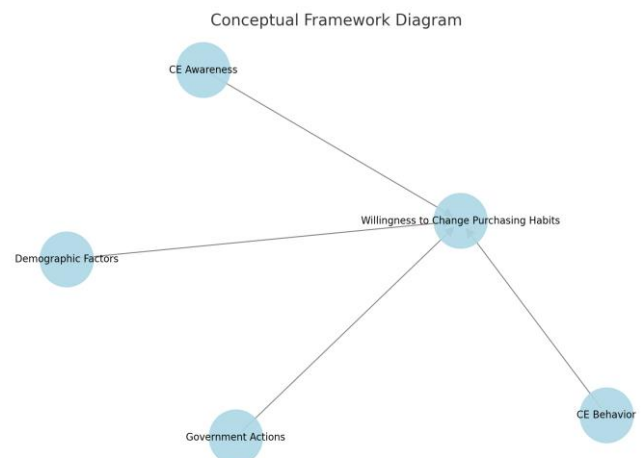


Figure 1. Conceptual framework diagram for the relationships among key variables

The study utilised a structured survey administered to 387 respondents from diverse demographic groups across Kosovo. The survey was designed to evaluate awareness, attitudes and behaviours related to sustainability, focusing on a key aspect: respondents' willingness to change purchasing habits for a more sustainable economy. The main variables included respondents' awareness of sustainability, behaviours towards sustainable practices, and perceptions of government actions supporting sustainability. A random sampling technique was employed to ensure that the sample was representative of the population in Kosovo. Data collection was carried out through both online platforms, such as Google Forms, and face-to-face interactions to ensure inclusion, particularly for elderly participants and individuals who do not actively engage with social media. For face-to-face interactions, participants were targeted in community hubs such as local markets, public squares and community centers in both urban and rural areas. This mixed approach aimed to capture a broader and more representative sample of the population.

The survey questions were developed based on a comprehensive review of existing literature on circular

economy adoption [12, 17]. Constructs such as awareness, behaviour, and willingness to pay were conceptualised to reflect common metrics used in similar studies. A pilot test was conducted with 25 participants from the target population. Feedback was gathered regarding the clarity and relevance of the questions, leading to minor adjustments in wording and response scales.

The sample size for the study was calculated using the formula:

$$n = \frac{N}{1 + N * e^2} = \frac{1,110,661}{1 + 1,110,661 * 0.06^2} \approx 278 \quad (1)$$

where, N is the population size (1,586,659, the estimated population of Kosovo [34], with approximately 31% under 18 years old [35]), e is the margin of error (set at 6%). Thus, the required sample size was determined to be approximately 278 respondents. Given the final collected sample of 387 respondents, the study exceeded the stated target, providing a robust representation of the population for statistical analysis.

3.1 Questionnaire reliability

We checked for instrument reliability. The reliability analysis presented in Table 1 reports Cronbach's Alpha for three constructs related to Circular Economy (CE) practices: CE Awareness, CE Customer Behaviour, and CE Government Actions. The overall reliability of the questionnaire, combining all items from these constructs, was 0.8687, indicating good internal consistency across the entire instrument.

Table 1. Reliability analysis for CE constructs

Construct	Cronbach's Alpha
Circular Economy Awareness	0.7422
Circular Economy Customer Behaviour	0.7534
Circular Economy Government Actions	0.9439
Overall Questionnaire	0.8687

The Circular Economy Awareness and CE Customer Behaviour constructs show reliability scores of 0.7422 and 0.7534, respectively, which fall within the acceptable range, indicating that the items measuring customer behaviours are relatively consistent. The CE Government Actions construct has the highest Cronbach's Alpha value of 0.9439, suggesting excellent reliability and strong internal consistency among the items measuring government-related actions towards the circular economy.

3.2 Model and variables specification

In this study, we utilised the ordered logistic regression (ologit) model to examine the factors influencing the dependent variable: willingness to change purchasing habits to support a more sustainable economy. The dependent variable was measured on a 5-point Likert scale, where 1 indicated the least willingness and 5 indicated the most willingness. This model was chosen because it is designed for ordinal outcome variables, where the categories have a natural order, but their intervals are not assumed to be equal [36, 37]. The use of ordered logistic regression allowed us to estimate the cumulative odds of respondents falling into higher categories of willingness to change purchasing habits or pay more for

eco-friendly products.

Factor analysis was used to reduce the complexity of multiple correlated variables into latent factors that capture distinct aspects of circular economy awareness, behaviour and governmental actions. Specifically, we used the principal factor method, which is suitable when the goal is to identify underlying structures in the data rather than simply reduce the dimensions [38]. From the factor analysis results, we retained a limited number of factors based on eigenvalues greater than one and loadings that exhibited substantive correlations with the observed variables. Generally, factor loadings above 0.5 are considered substantive in social sciences, indicating a strong relationship between the variable and the factor [38].

For example, in analysing government actions, the first factor captured over 96% of the variance, making it the primary factor used to represent the influence of governmental interventions. This method allowed us to reduce multicollinearity issues while preserving the conceptual integrity of our constructs [39]. The retained factors were subsequently used as predictors in the regression models.

The independent variables for both models were derived from a combination of factor analysis and demographic controls:

- `ce_awareness_factor`: this composite factor summarises respondents' awareness of sustainability impacts. It incorporates variables such as general awareness of the circular economy (CE) concept, concern about climate change, knowledge of environmental benefits, and awareness of eco-friendly initiatives. Specifically, the variables 'ceawareness,' 'understanding environmental benefits,' and 'concern about climate change' demonstrated strong factor loadings of 0.7486, 0.8345, and 0.8488, respectively. The eigenvalue for this factor was 1.977, accounting for 65.91% of the total variance.
- `ce_behaviour_factor`: this composite factor represents respondents' sustainable behaviours, encompassing variables such as the frequency of recycling, efforts to reuse or repair products, preference for sustainable products, and preference for eco-labelled products. The respective factor loadings for these variables were 0.7713, 0.7025, 0.7035, and 0.7093. This factor had an eigenvalue of 2.086, explaining 52.16% of the total variance.
- `ce_government_actions_needed_factor`: this factor summarises perceptions of government actions required to support sustainable practices. It aggregates variables such as subsidies and grants (loading: 0.8071), improvements in recycling infrastructure (loading: 0.7063), public awareness programs (loading: 0.7893), tax reductions (loading: 0.9220), enhanced access to ecological products (loading: 0.9199), stricter regulations (loading: 0.8763), low-interest loans (loading: 0.8175), and collaboration between the private sector and government (loading: 0.9457). The eigenvalue for this factor was 5.800, with 72.5% of the variance explained.

To account for potential demographic influences on the dependent variables, the following controls were included:

- Age, categorised into six age groups ranging from under 18 to 64 years, and coded as dummy variables.
- Education, measured in four categories from primary school to doctoral degrees, and coded as dummy variables.
- Gender, a binary variable where 1 indicates female and 0 indicates male.
- Residence, a binary variable coded as 0 for urban (city) and 1 for rural (village) locations.
- Income, measured in six brackets, ranging from "Less than 300 Euros" to "More than 2,000 Euros", and also coded

as dummy variables.

The two models were specified as follows:

Model 1:

$$Y_i = \alpha + \beta_1 \text{ce_awareness_factor}_i + \beta_2 \text{ce_government_actions_factor}_i + \beta_3 \text{ce_infrastructure}_i + \beta_4 \text{Gen}_i + \beta_5 \text{Res}_i + \beta_6 \text{Age}_i + \beta_7 \text{Edu}_i + \beta_8 I_i + \varepsilon_i \quad (2)$$

Model 2:

$$Y_i = \alpha + \beta_1 \text{ce_behaviour_factor}_i + \beta_2 \text{ce_government_actions_factor}_i + \beta_3 \text{ce_infrastructure}_i + \beta_4 \text{Gen}_i + \beta_5 \text{Res}_i + \beta_6 \text{Age}_i + \beta_7 \text{Edu}_i + \beta_8 I_i + \varepsilon_i \quad (3)$$

Dependent Variable Y_i -represents willingness_to_change_purchasing_hab. α - the intercept term. β - coefficients: represent the effect sizes for each factor or dummy variable of categorical groups (e.g., age, education, income).

4. EMPIRICAL RESULTS

4.1 Descriptive statistics

Table 2 presents descriptive statistics for key demographic variables used in the analysis, providing insight into the

characteristics of the 387 respondents in the sample. The descriptive statistics provide a snapshot of the sample's demographic composition, which is slightly skewed towards younger, urban, middle-income individuals with a mix of education levels and a slight male majority.

The mean value of 2.30 for age, suggests that the sample is skewed slightly towards younger age groups. The variable ranges from 1 to 5, with each category corresponding to specific age ranges (e.g., 1 for "<34", 2 for "35–44", and so on). Gender's mean of 0.39 indicates that approximately 39% of the respondents are female, while 61% are male. This distribution aligns with common trends in Kosovo's survey samples, which often show a slight male majority due to factors such as employment patterns and survey reach. The mean value for residence of 0.35, suggests that around 35% of the sample resides in rural areas, while the remaining 65% are urban residents in Kosovo.

Education, which is categorised into four levels, ranging from 1 (Primary School) to 4 (Higher education such as PhD and Master's degrees) shows a mean value of 2.20, suggesting that most respondents have a Bachelor's degree or Secondary School education. This is typical in Kosovo, where secondary education is accessible, though tertiary education is less prevalent compared to Western European standards. On the other hand, income is divided into six categories, ranging from 1 (<300€) to 6 (>2,000€). The mean income category is 3.15, indicating that most respondents fall within the middle-income brackets (600-999€). This finding aligns with Kosovo's economic context, where many households belong to middle-to lower-income groups.

Table 2. Respondents demographic data, N=387

Variables	Categories	Mean	Std. Dev.	Min	Max
Gender	Male, Female	.387596	.487832	0	1
Age	< 34, 35 – 44, 45 – 54, 55 – 64, 65+	2.30232	1.39542	1	5
Residence	Urban, Rural	.3462532	.476391	0	1
Education	PhD/Master, Bachelor, Secondary, Primary	2.19638	.880230	1	4
Income	< 300€, 300 – 599€, 600 – 999€, 1,000 – 1,499€, 1,500 – 1,999€, > 2,000€	3.15245	1.49091	1	6

4.2 Model results

Before running the ordered logistic regression models, we conducted a pairwise correlation analysis to assess the relationships between key independent variables (circular economy awareness, behaviour, and government actions) and the dependent variable (willingness to change purchasing habits). The results revealed moderate correlations between awareness and behaviour ($r = 0.2500$) and between behaviour and willingness to pay more ($r = 0.2626$). No substantial multicollinearity was detected among the independent variables, with the strongest correlation at 0.2500. This supports the use of the ordered logistic regression model to examine the predictors of willingness to change purchasing habits.

Table 3 presents the ordered logistic regression model results [40].

The model goodness-of-fit data show that the R^2 values of the respective models are 0.1943 for Model 1 and 0.2081 for Model 2, indicating that the models explain about 20% of the variance in the respective dependent variables. While the

explanatory power is moderate, this is typical in social sciences, where behaviour is influenced by multiple factors [41]. Prob > chi² is 0.0000 for both models, indicating that the overall models are statistically significant and that the independent variables collectively predict the dependent variables better than chance.

Regarding the coefficients, in Model 1, the coefficient for awareness is positive but not significant ($OR = 1.134$, $p > 0.1$), suggesting that being more aware of the circular economy alone does not make consumers more willing to adjust their purchasing habits for sustainability. The odds ratio suggests a modest practical effect, indicating that consumers who are more aware of the CE are 13.4% more likely to change their habits compared to those with less awareness.

In Model 2, we replaced the ce_awareness_factor variable with ce_behaviour_factor, which captures respondents' actions and practices aligned with circular economy principles, such as recycling, reducing waste, and supporting eco-friendly products. The coefficient is positive and significant ($OR = 1.620$, $p < 0.01$), indicating that individuals who engage in circular economy behaviours are 62% more likely to adjust

their purchasing habits towards sustainability compared to those who do not. This suggests that consumers who already

practice circular behaviours (even unconsciously) are much more likely to pay more for eco-friendly products in the future.

Table 3. Ordered logistic regression results for Models 1 and 2

Dependent Variable willingness to change purchasing hab	Model 1	Model 2
ce_awareness_factor	1.134 (0.131)	
ce_behaviour_factor		1.620 (0.190) ***
ce_government_actions_factor	1.763 (0.217) ***	1.726 (0.213) ***
ce_infrastructure	3.056 (1.204) ***	2.618 (1.047) ***
gender	0.920 (0.192)	0.868 (.181)
residence	3.375 (0.790) ***	3.121 (0.741) ***
Age (<34)		
35 - 44	1.110 (0.404)	1.185 (0.431)
45 - 54	1.445 (0.443)	1.370 (0.424)
55 - 64	1.837 (0.610) *	1.584 (0.539)
> 65	0.449 (0.165) **	0.255 (0.100) ***
Education (Master +)		
Bachelor	1.380 (0.395)	1.111 (0.326)
Secondary	0.825 (0.260)	0.768 (0.243)
Primary	0.146 (0.081) ***	0.119 (0.066) ***
Income (> 2000€)		
1,500 - 1,999€	1.246 (0.437)	1.221 (0.433)
1,000 - 1,499€	0.527 (0.176) **	0.481 (0.163) **
600 - 999€	0.167 (0.059) ***	0.131 (0.047) ***
300 - 599€	0.054 (0.022) ***	0.038 (0.016) ***
< 300€	0.064 (0.035) ***	0.064 (0.033) ***
R ²	0.1943	0.2081
Prob > chi ²	0.0000	0.0000
N	387	387
LR chi ² (17)	221.59	227.60

Odds ratios and their respective standard errors are presented in parentheses. The notations *, ** and *** correspond to significance levels of 0.1, 0.05, and 0.01, respectively

The coefficient for Government Actions (ce_government_actions_factor) is positive and significant in both models (OR = 1.763, OR = 1.726, respectively, $p < 0.01$). This suggests that respondents who perceive government actions such as subsidies, improved recycling infrastructure, or public awareness campaigns as important are approximately 76% and 73% more likely, respectively, to express a willingness to change their purchasing habits.

Similarly, the results for the ce_infrastructure variable derived from the question "Do you believe that the Republic of Kosovo provides sufficient infrastructure to support a circular economy?" show positive and highly significant coefficients in both models (OR = 3.056, OR = 2.618, respectively, $p < 0.01$). This suggests that respondents who perceive Kosovo's infrastructure as supportive of a circular economy are approximately 205% and 162% more likely, respectively, to express a willingness to change their purchasing habits. The magnitude of these odds ratios is plausible considering that infrastructure is a critical enabler of sustainable behaviours, as shown in the literature review section.

In terms of gender, this variable is not significant, indicating no major differences in willingness to change purchasing habits between men and women. However, for residents, the coefficient is positive and highly significant ($p < 0.01$), indicating that individuals living in rural areas are much more willing to change their purchasing habits compared to urban residents.

Regarding age, the results indicate that younger individuals are more willing to change their purchasing habits to contribute to economic sustainability, although this effect is not statistically significant. Conversely, individuals aged 65

and older demonstrate a clear reluctance to adjust their purchasing behaviours. The odds ratios for this group are 0.449 in Model 1 and 0.255 in Model 2 ($p < 0.01$), suggesting that older respondents are 55% and 75% less likely, respectively, to express a willingness to change their purchasing habits compared to those under 34. When it comes to education, only those with primary education show a strong negative and significant relationship with changing their habits for sustainability (OR = 0.146; OR = 0.119, respectively, $p < 0.01$). This means that consumers with a primary education are much less likely to adopt their purchasing habits in favour of sustainability. Although individuals with a secondary education also show some resistance (OR = 0.825, OR = 0.768 respectively), this finding is not statistically significant. Interestingly, those with a bachelor's degree display a slight but positive willingness to change their habits, though this effect is not statistically strong.

Another important exploratory variable is income level. In this regard, both models show that as income decreases, the willingness to change purchasing habits to support a sustainable economy shows stronger negative effects. The data reveal that consumers with lower incomes, those belonging to the bracket of 600-999€, 300-599€, and <300€, compared to those with income >2000€, are significantly less likely to change their purchasing habits. Those earning between 300-599€ are much less willing to change their purchasing habits (OR = 0.054, OR = 0.038, respectively, $p < 0.01$), and this reluctance is even greater for those earning less than 300€ (OR = 0.064, $p < 0.01$). Moreover, consumers earning between 1,000-1,499€ also show significant negative willingness to change their purchasing habits (OR = 0.527, OR = 0.481, respectively, $p < 0.05$). In contrast, higher income categories,

those earning between 1,500-1,999€, display positive but statistically nonsignificant effects, indicating no strong evidence of higher-income consumers being more willing to change their habits.

4.3 Exploring the non-significant impact of circular economy awareness

While the existing literature suggests that awareness of circular economy (CE) principles plays a crucial role in shaping consumer behaviour towards sustainability [12, 17], the results of this study reveal that circular economy awareness is not a significant predictor of willingness to change purchasing habits in Kosovo.

To further explore this unexpected finding, an additional model was developed incorporating CE awareness as an independent variable, measured by the question: "How much knowledge do you believe you have about the circular economy?". This was rated on a Likert scale from 1 (no knowledge) to 5 (extensive knowledge). Alongside CE awareness, other factors such as government actions, infrastructure, age, gender, education, income, and residence were also included. The model results are presented in Table 4.

Table 4. The impact of circular economy awareness and other factors on willingness to change purchasing habits

Dependent Variable willingness_to_change_purch asing_habits	Model 3
ce_awareness_level 2	1.094 (0.648)
ce_awareness_level 3	1.268 (0.729)
ce_awareness_level 4	1.195 (0.666)
ce_awareness_level 5	12.815 (8.818) ***
ce_government_actions_factor	1.878 (0.253) ***
ce_infrastructure	2.435 (0.974) **
gender	0.689 (0.149) *
residence	3.075 (0.771) ***
Age (<34)	
35 - 44	1.090 (0.405)
45 - 54	1.393 (0.427)
55 - 64	2.308 (0.811) **
>65	0.495 (0.184) *
Education (Master +)	
Bachelor	1.819 (0.548) **
Secondary	1.273 (0.417)
Primary	0.184 (0.103) ***
Income (>2000€)	
1,500 - 1,999€	1.701 (0.627)
1,000 - 1,499€	0.509 (0.180) **
600 - 999€	0.197 (0.737) ***
300 - 599€	0.473 (0.020) ***
<300€	0.060 (0.033) ***
R ²	0.2253
Prob > chi ²	0.0000
N	387
LR chi ² (17)	246.48

Odds ratios and their respective standard errors are presented in parentheses. The notations *, ** and *** correspond to significance levels of 0.1, 0.05 and 0.01, respectively

The results in Table 4 show that while the coefficients for moderate levels of CE awareness (levels 2, 3, and 4) are positive, they are not statistically significant (OR = 1.094, OR = 1.268, OR = 1.195, $p > 0.1$, respectively). This suggests that moderate awareness alone may not strongly motivate changes in purchasing habits. However, at the highest level of CE

awareness (level 5), there is a significant positive effect (OR = 12.815, $p < 0.01$), indicating that individuals with the deepest understanding of CE are much more likely to adjust their purchasing behaviours. Other variables remained almost unchanged.

4.4 Hypotheses verification

In the following section, we present the results from the models that provide valuable insights into the verification of these hypotheses.

The first hypothesis explored whether awareness of the circular economy (CE) would encourage consumers to change their purchasing habits. While we initially expected higher awareness to lead to greater willingness to adopt sustainable behaviour, the results show a more nuanced picture. Specifically, Model 3 indicates that only the highest level of CE awareness (level 5) significantly impacts consumers' willingness to make these changes. This suggests that those with the deepest understanding of CE are indeed more likely to shift their habits towards sustainability. However, lower levels of CE awareness (levels 2–4), and the CE awareness factor, did not show a significant effect, indicating that general awareness alone does not translate into behavioural change for the majority of consumers. This partial verification suggests that while awareness is important, it must reach a critical level to drive behaviour change. As discussed in the Results section, this underscores the awareness-behaviour gap, where awareness without sufficient support, incentives, or infrastructure fails to induce behavioural shifts [42].

The second hypothesis, which suggested that government actions positively influence consumers' willingness to change their purchasing habits, is fully supported by the findings. The data reveal a strong connection, as government initiatives (measured by the ce_government_actions_factor) have a significant positive impact on consumers' willingness to adapt their buying behaviours across three models: (OR=1.763, OR = 1.726, OR=1.878, $p < 0.01$). This indicates that when the government actively promotes sustainability through effective policies and interventions, people are more likely to respond by changing their purchasing habits.

The third hypothesis which examined the implications of lower income and education level on consumers' willingness to change purchasing habits, is fully supported. As per our expectations, lower levels of income decrease the willingness to change purchasing habits. This is because consumers earning less than 1,500€ per month show significant negative coefficients (e.g., Model 1 and 2: OR=0.064, $p < 0.01$ for income <300€), suggesting that financial constraints hinder the ability of lower-income groups to engage in sustainable consumption. On the other hand, the coefficient representing education shows that a bachelor's degree holder is more willing to change purchasing habits compared to a PhD or master's degree holder, but this is not statistically significant. Conversely, those with primary education show negative and statistically significant level (Model 1: OR=0.146; Model 2: OR = 0.119) of willingness to change purchasing habits.

5. DISCUSSION

The findings of this study reveal several important insights regarding consumer behaviour and the adoption of circular economy (CE) practices in Kosovo. One of the most

significant observations of this study is the gap between circular economy awareness and actual willingness to change purchasing habits to contribute to a more sustainable economy. Despite expectations that greater awareness would lead to more sustainable behaviour, the results indicate that circular economy awareness alone is not a strong predictor of consumers' willingness to adopt more sustainable purchasing behaviours.

This finding indicates that although people may know about the circular economy, higher awareness alone does not mean they will spend more on eco-friendly products. These findings are in line with previous studies [8, 15, 16]. The reason for this may be financial limitations, especially in low-income families, considering the income levels in Kosovo. Therefore, we believe that financial constraints play a significant role in this reluctance. This outcome is consistent with prior research findings suggesting that awareness does not automatically translate into action. Other barriers, such as financial constraints or lack of infrastructure, often prevent individuals from adopting sustainable practices [16, 42-44]. However, there are also many studies that find a positive impact of awareness on increasing consumer participation in circular economy practices [17, 18].

After running the two models where CE awareness was expressed as a composite factor of several awareness variables, we further explored the non-significant impact of circular economy awareness by measuring it as a direct measure by respondents. The results reveal that only individuals with the deepest understanding of CE are much more likely to adjust their purchasing behaviours. These findings underscore the need for further analysis, as awareness alone does not lead to more sustainable purchasing behaviour. Therefore, additional measures are needed to bridge the gap between awareness and financial willingness to support eco-friendly products. When interpreting these results, we must also consider the economic context in Kosovo, where consumers despite their awareness of the circular economy, remain highly price-sensitive.

Moreover, these results are in line with Collective Action Theory [45], according to which individuals often hesitate to take actions that have shared benefits if they feel that their individual efforts are insufficient to make a significant difference. In this context, consumers may expect the government to intervene by creating policies or incentives that promote sustainable behaviour, as they feel their individual actions are limited in overall impact.

An interesting finding of this study is the statistically significant positive relationship between "unconscious" CE behaviour and the willingness to change purchasing habits for a more sustainable economy. We label these actions as "unconscious" because respondents might engage in recycling and reuse primarily due to financial constraints, rather than circular economy awareness. Interestingly, these respondents showed a higher likelihood of changing their buying habits towards sustainability, suggesting that consumers who already are engaged in circular behaviours (even unconsciously) are much more likely to purchase eco-friendly products in the future. However, this study does not examine the cost of these products, nor does it assess whether respondents know if eco-friendly options are more expensive than non-sustainable ones. Exploring this could be an interesting focus for future research.

This study confirms the importance of governmental actions and infrastructure improvements in fostering sustainable behaviours in Kosovo. Results show that consumers perceive strong governmental involvement, such as subsidies,

regulations, or public campaigns, as critical factors influencing their decisions to adopt more sustainable purchasing habits. Additionally, access to infrastructure that facilitates circular practices, such as recycling facilities or the availability of eco-friendly products, plays a crucial role in enabling consumer behaviour change. These findings align with previous studies [46], that highlight the need for robust infrastructure and policy frameworks to support the transition to a circular economy.

The study's findings indicate that governmental actions, improved infrastructure, and consumer behaviour significantly influence the probability of circular economy adoption in Kosovo. In comparison to other Balkan countries, the analysis illustrates similar challenges and the potential impact of enhanced policy measures. For instance, in Croatia and Slovenia, active policy support has facilitated a shift towards sustainable practices, while countries like Bosnia and Herzegovina and Serbia remain constrained by limited awareness and inadequate resource allocation [25]. This regional context emphasises the need for Kosovo's policymakers to adopt comprehensive, targeted measures to drive circular economy (CE) engagement, echoing the importance of broader systemic support identified in other Balkan nations. Addressing these challenges through policies, incentives, and public awareness could substantially enhance CE participation across the Balkans, including Kosovo.

The aforementioned results become clearer when we analyse the customer profile in terms of demographic factors. These results show that income and education also play critical roles in shaping consumer behaviour, suggesting that lower-income consumers are significantly less willing to engage in sustainable practices, likely due to financial barriers. Similarly, consumers with lower levels of education are less willing to adopt circular economy behaviours, likely due to a lack of knowledge. Moreover, the analysis reveals that younger consumers are more willing to change purchasing habits for a more sustainable economy, while older consumers (aged 65 and above) demonstrated a significant reluctance to adopt new purchasing habits. This might be because they have lower incomes, compared to other groups of customers and are less inclined to prioritise future-oriented decisions.

When asked about the biggest barrier to adopting circular economy practices, a lack of consumer awareness was identified as the most significant barrier, accounting for about 41% of the responses. This suggests that a large proportion of consumers are not sufficiently informed about circular economy principles, which impedes their ability to engage in sustainable purchasing behaviours. The second major barrier was the perception of higher costs of ecological products, as mentioned by 27% of the respondents. This reflects the concern that eco-friendly products are perceived as less affordable, even among consumers who may already be aware of their benefits. The third barrier mentioned is the lack of adequate infrastructure for product recirculation, which refers to the limited availability of systems for recycling and reusing products. This constraint discourages consumers from adopting circular economy practices, as the necessary systems for sustaining such behaviour in Kosovo are underdeveloped.

Conversely, when asked about the sources of information the results indicate that social media is the most commonly cited source of information on the circular economy, suggesting that digital platforms play a crucial role in disseminating knowledge in this area. Traditional media, such as TV and radio, also serve as important channels for

spreading information, especially among elders, followed by educational institutions, which further highlights the role of formal education in raising awareness. Additionally, family and friends are mentioned as well, underscoring the influence of personal networks. However, government campaigns and other sources were less frequently cited, pointing to potential areas for further public outreach and institutional involvement in promoting circular economy practices.

To support the adoption of circular economy (CE) practices in Kosovo, the government should focus on targeted awareness campaigns that deepen public understanding of CE, as the results show that only high levels of awareness drive behaviour change. Enhanced government actions, such as expanded subsidies and tax incentives, are crucial to making sustainable products more accessible, especially for lower-income households facing financial barriers. Investing in recycling and repairing infrastructure is also vital, as it significantly influences consumer willingness to adopt CE practices. Additionally, tailored educational programs should address knowledge gaps among less-educated individuals, and community-based initiatives in rural areas, where residents show higher readiness, could further promote CE practices. These steps, informed by the study's findings, could significantly enhance Kosovo's shift towards sustainability.

6. CONCLUSIONS

This study explores several key factors influencing the adoption of circular economy practices in Kosovo. The results show that while awareness is an important driver of behaviour change, it does not always translate into a willingness to make financial sacrifices for sustainability, primarily because many families in Kosovo have limited incomes, making it challenging to prioritise sustainability over affordability. Moreover, the study reveals that prior sustainable behaviour is a strong predictor of both continued behavioural change and financial commitment to eco-friendly products. This finding suggests that efforts to encourage initial engagement with circular economy practices, through government policies or grassroots initiatives, can have long-term benefits in fostering deeper consumer involvement in sustainability.

Finally, the analysis of demographic factors highlights the importance of tailoring circular economy initiatives to specific consumer groups. The results show that women, younger consumers, and rural residents are more receptive to adopting circular economy practices, whereas lower-income and less-educated individuals face significant barriers. Addressing these barriers through targeted policies will be essential for promoting more widespread adoption of sustainable consumption behaviours in Kosovo.

We believe that the findings of this study provide a strong foundation for policymakers and businesses seeking to accelerate the transition to a circular economy. By addressing both the awareness-behaviour gap and the financial constraints faced by consumers, Kosovo can make meaningful progress towards achieving its sustainability goals.

6.1 Study limitations

This study has some limitations. First, the lack of longitudinal data limits the ability to observe changes in consumer behaviour over time. A longitudinal study would provide deeper insights into how awareness campaigns or

government policies might shift behaviour in the long run.

Second, although the sample comprises 387 respondents from diverse demographic backgrounds, certain groups, such as individuals residing in highly rural areas or those with limited access to technology, may be under-represented. This limited representation could constrain the generalisability of the findings, particularly when extrapolating results to the broader population.

Finally, while the study relies on self-reported data, it is important to acknowledge potential biases, such as social desirability bias, where respondents may overstate their willingness to engage in sustainable behaviours to align with perceived societal norms. Incorporating observational methods or secondary data analysis in future research could help validate and triangulate self-reported behaviours, providing a more robust picture of consumer actions and attitudes.

Future research could delve into specific strategies and approaches for achieving a higher level of CE participation, such as exploring which types of incentives resonate most with different consumer groups, or how public infrastructure improvements: such as recycling facilities or eco-friendly product labelling, might further motivate sustainable choices. Understanding these mechanisms in more depth would offer valuable insights for policymakers aiming to foster a more inclusive and effective transition to circular economy practices.

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APPENDIX

Survey questions

Part 1: Demographic data

1. Age

- ☐ Under 34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 and more

2. Gender

- ☐ Male
- ☐ Female
- ☐ I don't prefer to declare

3. Residence:

- ☐ Rural
- ☐ Urban

4. Education

- ☐ Primary School
- ☐ High School
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Doctorate
- ☐ Other (please specify)

5. Family Income (monthly):

- ☐ Less than 300 EUR
- ☐ 300-599 EUR
- ☐ 600-999 EUR
- ☐ 1,000-1,499 EUR
- ☐ 1,500-1,999 EUR
- ☐ 2,000 EUR or more

6. What is the number of members in your family:

Part 2: Awareness and Knowledge

(Please select one option that best represents your level of knowledge: 1 - No knowledge at all; 2 - Little; 3 - Moderate; 4 - Good; 5 - Excellent)

7. How would you rate your overall knowledge about the concept of the circular economy?

8. How well do you understand the environmental benefits of recycling and reusing products?

9. How concerned are you about climate change and its impacts on the environment?

10. Have you heard about Kosovo's initiatives to align with the EU's circular economy goals?

11. From which source of information have you received knowledge about the circular economy?

Part 3: Behaviour and Practices

12. How often do you recycle waste (plastic, paper, glass, etc.)?

13. When shopping, do you prioritise purchasing products made from sustainable or recycled materials?

14. How often do you try to repair or reuse products instead of buying new ones?

15. When shopping, do you prefer products with eco-labels or certifications that prove they are produced according

to specific environmental and sustainability standards?

16. How much more are you willing to pay for eco-friendly products?

17. What do you think is the biggest barrier to adopting circular economy product purchasing practices?

18. Do you think Kosovo provides sufficient infrastructure to support a circular economy?

(e.g., recycling centers, waste management and processing systems, waste processing factories, collection points for recyclable waste)

19. What would motivate you to adopt more circular economy practices?

Part 4: Perceived Importance of Government Actions to Promote Circular Economy Practices

(Please rate each action on a scale from 1 to 5, where 1 is 'Not

at all important' and 5 is 'Very important')

20. Providing subsidies or grants to businesses that adopt eco-friendly practices

21. Investing in improving infrastructure for recycling

22. Creating public education programs and awareness campaigns on recycling

23. Offering tax reductions or financial incentives for businesses and consumers

24. Facilitating access to eco-friendly products

25. Implementing stricter regulations for businesses that do not follow sustainability practices

26. Providing low-interest loans to businesses investing in sustainable technologies

27. Promoting collaboration between the private sector and the government for joint projects