

FROM AWARENESS TO ACTION: RANKING EU COUNTRIES BY CONSUMER READINESS TO ADOPT SUSTAINABLE PRODUCTS USING A HYBRID M-M METHODOLOGY

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Abstract

In light of growing economic, environmental and sustainability challenges, increasingly more attention from policymakers, companies and researchers is being devoted to consumption patterns and understanding the factors that shape consumer behavior. The adoption of sustainable products within the European Union is actively promoted through a series of policies and initiatives aligned with the principles of the circular economy, to provide consumers with more transparent and accessible information, thereby empowering them to make eco-friendly choices. Nevertheless, consumer acceptance of sustainable products appears to vary considerably and is influenced by complex interactions among diverse factors. This study examines consumer readiness for sustainable products across twenty-seven EU countries using nine indicators across three dimensions: environmental awareness, financial readiness and trust in institutional sustainability mechanisms. A hybrid MEREC–MARCOS methodology was employed for ranking countries. This novel methodological approach allows for a detailed cross-country comparison and identification of areas for improving policies that incentivize sustainable consumption across the EU. Sweden emerges as the top-ranked country, followed by Cyprus and the Netherlands, while Latvia and Estonia rank lowest. The results suggest considerable divergence among EU Member States and potentially offer valuable insight into gaps in sustainable consumer behavior.

Keywords: consumer behavior, sustainable products, cross-country comparison, multi-criteria decision analysis (MCDA)

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1. INTRODUCTION

The European Union has consistently promoted the acceptance of sustainable and circular products through a range of policies, regulations, strategic documents, and initiatives aimed at improving environmental resource efficiency, extending product life, and encouraging sustainable production and consumption. One of the key instruments for improving the sustainability of products in the EU market, the Ecodesign for Sustainable Products Regulation (ESPR), entered into force in July 2024 with a primary focus on the design of products that are more durable, repairable, recyclable, energy efficient and chemically safe. The goal of these efforts is to reduce the ecological and climate footprint of products through the application of circular economy principles during the entire life cycle.

One of the goals of the European Union's ESPR initiatives in the field of sustainable consumption is to enhance consumer awareness of the environmental characteristics of products and empower them to make more informed and responsible choices when purchasing. Through the principles of the circular economy, the EU strives to promote sustainability, but also to provide consumers with clear and reliable information that enables them to make decisions in accordance with their own values and concern for the environment (European Commission, 2024). Based on the European Green Deal, which emphasizes the necessary and urgent transition to a circular economy and prioritizes energy efficiency and decarbonization of the energy sector, and the new Circular Economy Action Plan, which represents a regulatory framework for a cleaner and more competitive Europe, the importance of citizens, i.e. consumers, in the

circular economy is emphasized. Through the fulfillment of set requirements, consumers will have access to products that are high quality, functional and safe, while being affordable, lasting longer, easy to repair, reuse and can be recycled. To provide consumers with clear and easy-to-understand information about the product, features such as the product's digital passport, labels (like Ecolabel), and points for reparability and durability are being introduced.

This approach is becoming increasingly important, bearing in mind that climate change and environmental degradation are topics that an increasing number of consumers recognize as personally relevant. According to a Bain & Company report, as many as 61% of consumers stated that their concerns about climate change have increased over the past two years, but at the same time, 49% of respondents say it would be more expensive to live a sustainable lifestyle (Blasberg et al., 2024). Thus, many consumers already exhibit a proactive attitude towards sustainability, are willing to boycott companies with a poor social and environmental image, and even express a willingness to pay more for environmentally friendly products (Sun & Yoon, 2021; Hu et al., 2024). However, the actual behavior of users when it comes to acting in accordance with ecological principles may be limited by factors such as inflation, economic instability and rising costs of living (PwC, 2024; Deák, 2025).

Additionally, numerous studies indicate that the level of awareness regarding concepts such as the circular economy remains low (Sijtsema et al., 2020; Almulhim & Abubakar, 2021). As stated in the Circularity Gap Report 2024, although the concept of the circular economy has become a global megatrend and is

increasingly mentioned in political and business discourse, implementation still lags behind ambitions. The report emphasizes that changes in consumer behavior are necessary to close the global "circular gap," as actual progress can only be achieved when consumers actively participate in the transition from a linear to a circular consumption model (Circle Economy Foundation, 2024). In this sense, clear information, the availability of sustainable options, and the encouragement of environmentally responsible consumption are not only additional values but basic prerequisites for the long-term sustainability of the market and society as a whole.

Despite numerous efforts and measures taken to support the circular economy and its business models, the level of acceptance in EU countries seems to be significantly different. Most existing studies focus on individual countries or limited geographic areas, with few comprehensive comparative analyses at the EU level (Wurster & Schulze, 2020; Cheba et al., 2022; Deák et al., 2024; Šostar & Ristanović, 2024). Additionally, no studies have been found that rank consumer readiness or perceptions of sustainable products across multiple EU countries simultaneously on various indicators. Despite the broad use of various techniques in the sustainability field, a gap still exists in applying multifaceted and hybrid methodological frameworks to consumer attitudes and perception.

Given that the acceptance of the principles of the circular economy is complex and important for each country individually, as well as for the whole of Europe, this paper adopts a new approach to tackle this topic. The research employed nine indicators that determine consumer acceptance of sustainability and are related

to environmental awareness, willingness to act in favor of sustainable products, and attitudes toward institutional and market mechanisms related to sustainable consumption. The data used in this research are the most recent available datasets from the Eurobarometer surveys conducted periodically among EU consumers, using a unified collection methodology that enables comparative analysis. In that sense, the research aims to, by means of using a hybrid MEREC-MARCOS (M-M model), rank the EU countries according to consumers' willingness to accept sustainable products, based on knowledge, attitudes and experiences related to environmental protection and circular consumption practices. The MEREC (Method based on the Removal Effects of Criteria) method enables the precise calculation of criteria weights based on their contribution to the total variability, while the MARCOS (Measurement Alternatives and Ranking based on COMpromise Solution) methodology enables the evaluation and comparison of alternatives in relation to ideal and anti-ideal solutions, resulting in a robust and informative ranking of countries according to the degree of consumer readiness to accept sustainable products.

2. THEORETICAL BACKGROUND

2.1. Consumer behavior models in sustainable consumption

Consumer behavior is a complex phenomenon that researchers have studied from different angles, applying various methodological approaches. Consumer purchasing behaviors have been integrated into approximately 40 various theoretical

models designed to elucidate individual and group consumer behavior in social and economic contexts (Paz & Vargas, 2023). These models can be categorized into three main methodological approaches: aprioristic, empirical, and eclectic (Lopes & da Silva, 2012; Paz & Vargas, 2023). The aprioristic approach views consumer behavior as a dimension of human conduct shaped by its relationship to social phenomena, emphasizing motivation and attitudes. The empirical approach derives laws from observed behavioral patterns using panel and survey data, while the eclectic approach combines elements of both aprioristic and empirical methodologies (Paz & Vargas, 2023).

From an economic perspective, theoretical models are often divided into microeconomic and macroeconomic models (Boland, 2013). Microeconomic models focus on the relationship between goods and prices, assuming a rational "standard consumer" who seeks to optimize cost-benefit outcomes. In contrast, macroeconomic models examine aggregate economic activity and the allocation of income for spending and saving, typically prioritizing economic variables and overlooking psychological factors (Hardt & O'Neill, 2017; Paz & Vargas, 2023).

In sustainable consumption research, the most frequently mentioned theory is the Theory of Planned Behavior (TPB), which also emphasizes attitudes, subjective norms and perceived behavioral control as factors that influence sustainable consumption (Agarwal & Dubey, 2024; Syed et al., 2024). Within the framework of research related to TBP, attitudes and awareness are seen as key components of sustainable behavior, and they tend to evolve as environmental and sustainability-related knowledge increases

(Geng et al., 2017; Kumar et al., 2017). Besides attitudinal factors, such as values and beliefs, and environmental knowledge, demographic characteristics play significant roles in shaping consumer attitudes and beliefs towards sustainable choices as well (Islam & Ali Khan, 2024).

Recent models have increasingly recognized the interplay between psychological and economic factors in shaping consumer behavior. Research shows that psychological factors such as environmental concern, personal responsibility, attitudes, beliefs, motivations, emotions, and perceived consumer effectiveness are consistently identified as key drivers of green purchasing decisions (Joshi & Rahman, 2019; White et al., 2019; Islam & Ali Khan, 2024; Sivarajah, 2024; Krstić et al., 2025). The drive for environmental responsibility and the belief that individual actions can make a difference (perceived consumer effectiveness) significantly predict sustainable purchase behavior, especially among younger consumers (Taufique & Vaithianathan, 2018; Joshi & Rahman, 2019). Attitudes and knowledge about environmental issues, as well as emotional responses such as pride or guilt, further influence the likelihood of engaging in pro-environmental actions (Han, 2021; Sivarajah, 2024).

On the other hand, sustainable behavior encompasses a range of activities related to the purchase of products with a reduced environmental impact, as well as responsible use and proper disposal after use, accompanied by emotional, mental, and behavioral responses (Soyer & Dittrich, 2021). Therefore, willingness to pay for eco-friendly products, perceptions of economic sufficiency, and the availability and pricing of sustainable options are important

determinants of green consumer behavior (Zannakis et al., 2019; Raghavendra & Diddimani, 2025). Consumers often weigh the monetary costs of sustainable choices against psychological gains, such as increased well-being or social approval (Zannakis et al., 2019). Contextual factors, including green marketing strategies and product accessibility, further shape purchasing patterns by making sustainable options more visible and attractive (White et al., 2019; Raghavendra & Diddimani, 2025).

Also, research on models of sustainable consumer behavior indicates that in addition to internal motives, external factors such as social norms and policy interventions can have a significant impact (Syed et al., 2024). Furthermore, the Purchasing Behavior Model by Kotler and Keller (2012) incorporates not only marketing stimuli such as product, price, distribution, and communication, but also external economic, technological, political, and cultural influences. Social and cultural influences, including social norms, peer pressure, and cultural values like collectivism, can strengthen or moderate the impact of psychological and economic factors (Ghali-Zinoubi, 2022; Sivarajah, 2024). Integrating these psychological and economic determinants into policy and marketing strategies is essential for fostering lasting shifts towards sustainable consumer behavior (Joshi & Rahman, 2019; Sivarajah, 2024; Plotnic et al., 2024; Raghavendra & Diddimani, 2025).

Although the existing theoretical framework is broadly comprehensive, key aspects of consumer behavior, such as awareness, behavior, and trust in institutional mechanisms, are often examined separately in many studies. Moreover, insufficient attention has been paid to consumer behavior

across a broader geographical context, such as the European Union, which strives for a unified market.

Based on the identified research gaps and topic relevance, several key research questions can be formulated:

RQ1: What are the positions of EU countries in terms of consumers' willingness to accept sustainable products?

RQ2: Can clear differences be established between countries?

Recognizing these gaps and given the high relevance of the topic for understanding sustainability-oriented consumption patterns in the EU, this study adopts a comprehensive approach that has been largely absent from previous research. This approach enables a deeper understanding of cross-national differences.

2.2. The application of MCDA in sustainability research

In the domain of sustainable consumption and consumer behavior, prior research has shown that the most commonly used data collection method was surveys, while the most commonly used method for data analysis was structural equation modeling (SEM) (Hael et al., 2025). However, several studies have applied MCDA to analyze consumer preferences for sustainable products, assess willingness to pay for eco-labels, and rank factors influencing sustainable consumption decisions (Govindan et al., 2015). Specifically, studies have employed the AHP method to weight consumer preferences and behavioral influences (Šostar & Ristanović, 2023), as well as multi-objective optimization

techniques to create personalized basket recommendations that balance sustainability goals and consumer values (Asikis et al., 2021).

Hybridizing MCDA methods is becoming increasingly popular to enhance robustness, address uncertainty, and integrate subjective and objective data. Dewi and Ramadhani (2023) demonstrate in their study that incorporating ANP-derived weights into the MARCOS framework provides an intuitive, compromise-based ranking system that is very suitable for decision-making scenarios which are focused on sustainability and consumers. The inclusion of the MARCOS ideal/anti-ideal solution approach ensures that any expanded set of ecological or “green” criteria can be directly comparable and evaluated against economic and technical factors. This flexibility makes this hybrid framework especially powerful for sustainable supplier selection and environmental impact evaluation, while also being capable of incorporating consumer behavior parameters, such as environmental awareness or consumers’ extra willingness to pay. In environmental assessment contexts, MARCOS has been applied to wind farm site selection using BWM-AHP-MARCOS integrated approaches, where safety, environmental impact, and economic viability must be simultaneously considered (Badi et al., 2023).

While existing studies demonstrate the utility of MCDA methods in sustainability and consumer-related decision-making, few have explicitly focused on ranking EU countries by consumer readiness for sustainability using hybrid methodologies. This study aims to fill that gap by applying an innovative hybrid multi-criteria decision analysis approach to evaluate and rank the countries of the European Union based on

consumer readiness to adopt sustainable products. This methodological framework enables an integrated consideration of multiple factors that jointly contribute to decision-making in complex socio-economic contexts, particularly in assessing consumer behavior and sustainability.

3. METHODOLOGY

3.1. Data sources and criteria selection

The degree of acceptance of sustainable products in European Union countries was assessed using data from the Eurobarometer database. The Eurobarometer is a set of publicly available data collected by surveying EU citizens on various topics, which contains representative samples that allow for different types of analysis. The surveys were carried out using a unified method for sampling and data collection set by the European Commission. This research used data from the Eurobarometer 550 on attitudes towards the environment, conducted as part of Eurobarometer Wave 101.2 in 2024 and Flash Eurobarometer 535 on the EU Ecolabel conducted in 2023, as the latest available and comprehensive sources of information on consumer attitudes and behavior (European Commission, 2023, 2024). This approach ensures comparability and reliability of the datasets used in this research.

The analysis used a set of nine quantitative criteria that enabled comparability between countries, as well as a simple and consistent interpretation of the results. The indicators were selected based on their relevance to the research objectives and their alignment with established theoretical and empirical frameworks in

sustainable consumer behavior, particularly guided by the Theory of Planned Behavior. This theoretical foundation emphasizes the importance of awareness, attitudes, and trust as key factors influencing people's choices towards sustainable and eco-friendly products (Gregory-Smith et al., 2017). From the Eurobarometer datasets, indicators were selected that best capture these aspects, ensuring that the study is both grounded in solid theory and relevant in real-world contexts across EU countries. The selected indicators are presented in Table 1.

The first group of indicators includes general awareness of the impact of products on the environment, which is important because more knowledge and information about environmental issues encourages more positive attitudes and willingness to make sustainable choices in consumption (Geng et al., 2017; Kumar et al., 2017; Islam & Ali Khan, 2024).

The second element of sustainable consumption refers to the concrete behavior of consumers and their willingness to actively support sustainable products, including additional financial investments in products that are recyclable, durable or

repairable. The acceptance of sustainable products encompasses not only attitudes but also the willingness to act and take responsibility through consumer decisions (Raghavendra & Diddimani, 2025).

The third dimension includes consumer attitudes about institutional and regulatory support, as well as trust in environmental protection mechanisms. This is crucial because various institutional and political factors, including belief in legislative frameworks and environmental labels, can significantly influence the formation and stability of consumer attitudes (Sivarajah, 2024).

3.2. Hybrid M-M method

Among other MCDA methods, the MEREC (Method based on the Removal Effects of Criteria) and MARCOS (Measurement Alternatives and Ranking based on COMpromise Solution) methods stand out for their innovative approaches to criteria weighting and alternative ranking, respectively.

In the context of environmental and sustainability decision-making, the need for

Table 1. Dimensions and corresponding criteria for evaluating consumer readiness to adopt sustainable products

Criteria	Criteria label	Source
Environmental awareness		
C1	Importance of environmental impact when purchasing products	DX1_1 (European data, 2023)
C2	Belief that purchasing low environmental impact products contributes to environmental protection	DX2_1 (European data, 2023)
Behavior and willingness toward sustainable product choices		
C3	Experience in purchasing products with lower environmental impact	DX2_2 (European data, 2023)
C4	Frequency of purchasing products with environmental labels	Q3_1 (European data, 2023)
C5	Willingness to pay more for sustainable product features (more recyclable, durable, or repairable)	QB8 (European data, 2024)
Trust in regulation and institutional mechanisms		
C6	Support for EU environmental legislation as necessary for national protection	QB3_1 (European data, 2024)
C7	Support for public authorities funding the cleanup of pollution	QB4_1 (European data, 2024)
C8	Support for companies covering the costs of the pollution they cause	QB4_2 (European data, 2024)
C9	Trust in the EU Ecolabel as a sign of lower environmental impact	Q7_1 (European data, 2023)

an objective approach to weighting becomes particularly critical due to the complexity and interdisciplinary nature of sustainability criteria. Traditional subjective weighting approaches, while valuable for incorporating expert judgment, often introduce bias and inconsistency that can compromise the reliability of sustainability evaluations (Sahoo & Goswami, 2023). The MEREC method derives criterion weights objectively by measuring each criterion's impact when removed (Keshavarz-Ghorabae et al., 2021). For example, Pelit and Avşar (2025) applied MEREC to weight emission-related criteria in a carbon-emissions ranking of countries, finding that MEREC generates unbiased weights driven purely by the data. Similarly, Kara et al. (2024) combined MEREC with an order-ranking method to assess national sustainable competitiveness, highlighting the transparency of this method and simplicity in assigning weights to diverse sustainability indicators. The MEREC method's ability to identify the relative importance of criteria based on their removal effects, rather than relying on decision makers' judgment, makes it particularly suitable for sustainability assessments where criterion interactions are complex and not immediately apparent.

The MARCOS method has emerged as a powerful tool for alternative ranking in complex decision-making scenarios, particularly in sustainability assessments. The method, developed by Stević et al. (2020), has a compromise solution approach which aligns particularly well with the fundamental principles of sustainable development, which involve balancing competing objectives across economic, environmental, and social dimensions. The MARCOS method's distinctive approach ranks alternatives by measuring their

proximity to ideal and anti-ideal solutions, providing a compromise solution that balances multiple criteria. Its robustness makes it particularly effective in sustainability-related decision-making. For instance, Stević et al. (2020) utilized MARCOS for sustainable supplier selection in healthcare industries, demonstrating that it is simple, flexible, and capable of handling multiple criteria regarding the evaluation of supplier sustainability.

The hybrid M-M approach has been successfully applied in various domains beyond environmental assessment. Arıkan Kargı (2025) demonstrated the methodology's effectiveness in the performance evaluation of individual pension companies in Turkey. This study showed that this hybrid approach offers superior reliability compared to traditional methods, with high stability across different weighting scenarios as confirmed through sensitivity analysis. The hybrid approach has also found application in airport service quality evaluation, where researchers combined MEREC with both MARCOS and CoCoSo methods to analyze five-star airports based on multiple service criteria (Sarıgül et al., 2023). This application demonstrated the methodology's flexibility and robustness across different evaluation contexts. This hybrid model utilizes the objective weighting capabilities of MEREC with the comprehensive and flexible ranking framework of MARCOS, creating a powerful tool for complex sustainability assessments. The hybrid M-M methodology leverages the strengths of both methods to provide a robust framework for assessing consumer readiness for sustainable products across EU countries.

The algorithm for hybrid M-M methodology is based on the seminal

methodological contributions of Keshavarz-Ghorabae et al. (2021) and Stević et al. (2020), integrating MEREC's objective weighting process and MARCOS's compromise ranking logic, as well as the One-at-a-time sensitivity analysis approach outlined by Wang et al. (2024) (Figure 1). It presents a sequential framework tailored to assess and rank EU countries by consumer readiness for sustainable products.

When analyzing the results obtained by MCDA techniques, robustness and reliability testing are a necessary step and are carried out through the sensitivity analysis procedure (Więckowski & Sałabun, 2023). The importance of criteria weights cannot be emphasized enough, because weights represent a key element in showing the importance of criteria and have a significant impact on the final ranking of alternatives. In this sense, sensitivity analysis is of particular importance because the results obtained by MCDA models often depend on initial criteria weights that can be influenced by various factors, such as personal attitudes, cognitive biases and measurement errors (Pamučar et al., 2017; Demir et al., 2024). The sensitivity of the model is determined using the one-at-a-time (OAT) method.

4. RESULTS

The data collected in the research were processed using the proposed hybrid MEREC-MARCOS methodology. In the first step, the MEREC method was applied to determine the weights of the criteria. All indicators represent benefit criteria, since higher values represent greater levels of sustainable behavior or awareness. The resulting weight coefficients for the criteria are: $C1=0.056$, $C2=0.233$, $C3=0.162$,

$C4=0.175$, $C5=0.085$, $C6=0.121$, $C7=0.061$, $C8=0.071$, and $C9=0.037$.

Based on the value of the utility function $f(K_i)$, which represents the relative utility of each alternative in the MARCOS method, a ranking of 27 European Union Member States was performed according to the degree of acceptance of sustainable products by consumers. The ranking results are shown in Table 2.

In order to examine the robustness and validity of the obtained results, a sensitivity analysis was conducted. In the OAT sensitivity analysis, a single input parameter in the model was systematically varied, while the remaining parameters were proportionally adjusted to assess the effect of that change on the final results. The range of percentage change (RCP) was set to $\pm 25\%$, and the increment of percentage change (IPC) was set to $\pm 5\%$ (Wang et al., 2024). At the same time, the remaining weights were proportionally adjusted to maintain the relative relationships among the other criteria. Once the weight of a single criterion was modified, and the remaining weights were proportionally adjusted, the results were recalculated using the MEREC method. In this way, the sensitivity of the output values to changes in the input parameters was assessed, and the stability of the country ranking was tested under different weight-setting scenarios.

In this case, the criterion with the highest weight obtained by applying the MEREC procedure (C2) was gradually modified, and the weights of the remaining criteria were proportionally adjusted. Criterion C2 was selected as the reference criterion due to its highest contribution to the overall ranking. The MARCOS procedure was then iteratively applied for all proposed combinations of criteria weights, and

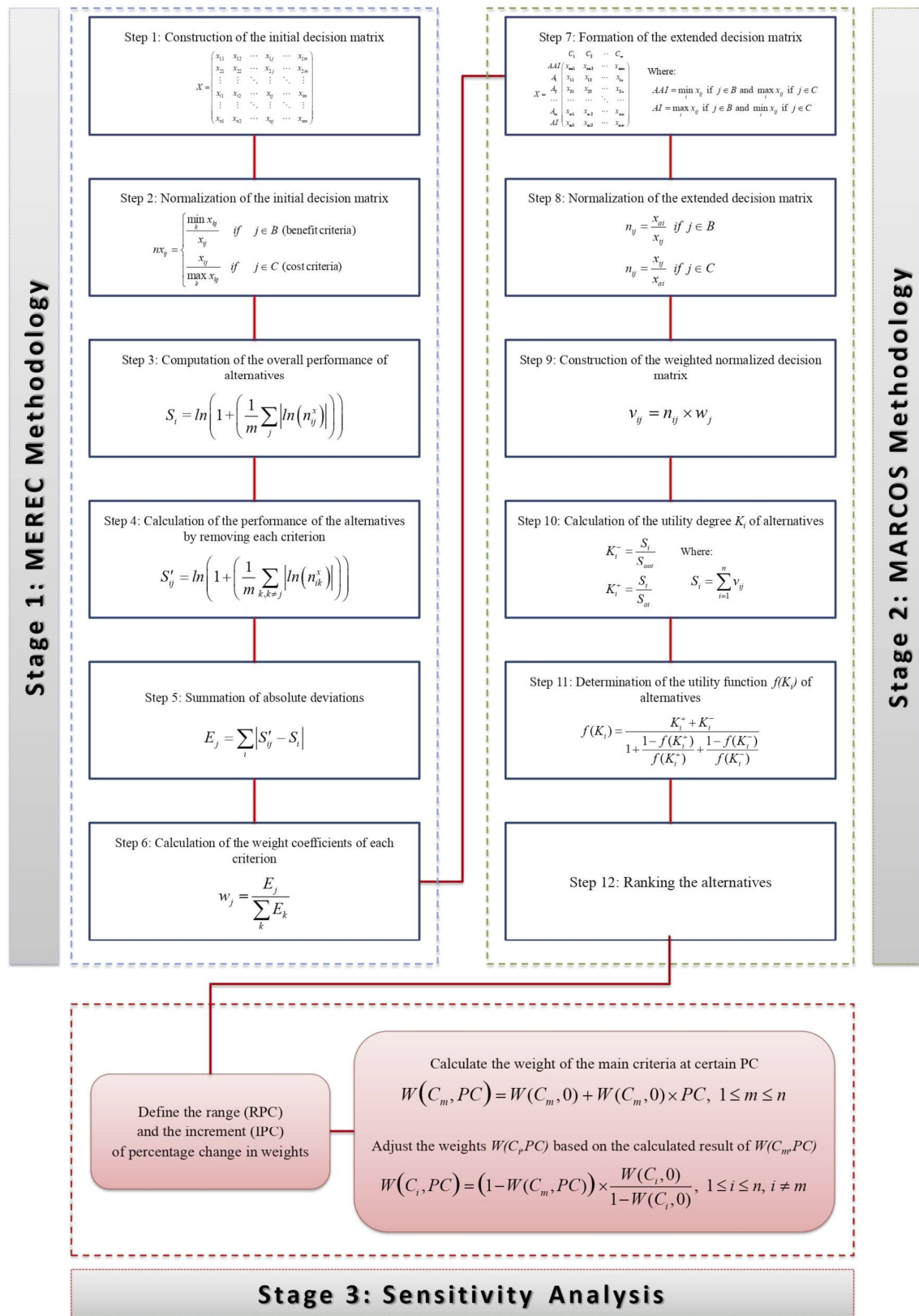


Figure 1. Flowchart illustrating the sequential stages of the proposed hybrid MCDA methodology

Table 2. Rankings of the countries based on the hybrid MEREC-MARCOS method

Rank	Country	S	K ⁻	K ⁺	f(K ⁻)	f(K ⁺)	f(K _i)
1	Sweden	0.907	1.489	0.907	0.379	0.621	0.737
2	Cyprus	0.870	1.429	0.870	0.379	0.621	0.707
3	Netherlands	0.868	1.426	0.868	0.379	0.621	0.706
4	Spain	0.860	1.412	0.860	0.379	0.621	0.699
5	Ireland	0.855	1.404	0.855	0.379	0.621	0.695
6	Malta	0.852	1.399	0.852	0.379	0.621	0.693
7	Croatia	0.852	1.399	0.852	0.379	0.621	0.692
8	Finland	0.850	1.395	0.850	0.379	0.621	0.690
9	Luxembourg	0.848	1.392	0.848	0.379	0.621	0.689
10	Slovenia	0.846	1.389	0.846	0.379	0.621	0.688
11	Italy	0.845	1.387	0.845	0.379	0.621	0.686
12	Germany	0.836	1.373	0.836	0.379	0.621	0.680
13	Greece	0.832	1.366	0.832	0.379	0.621	0.676
14	Romania	0.831	1.364	0.831	0.379	0.621	0.675
15	Bulgaria	0.808	1.327	0.808	0.379	0.621	0.657
16	Belgium	0.803	1.318	0.803	0.379	0.621	0.652
17	Portugal	0.798	1.309	0.798	0.379	0.621	0.648
18	Austria	0.787	1.292	0.787	0.379	0.621	0.640
19	Denmark	0.787	1.292	0.787	0.379	0.621	0.640
20	France	0.785	1.289	0.785	0.379	0.621	0.638
21	Lithuania	0.780	1.281	0.780	0.379	0.621	0.634
22	Slovakia	0.776	1.273	0.776	0.379	0.621	0.630
23	Hungary	0.774	1.270	0.774	0.379	0.621	0.629
24	Poland	0.758	1.244	0.758	0.379	0.621	0.616
25	Czech Republic	0.752	1.235	0.752	0.379	0.621	0.611
26	Latvia	0.740	1.215	0.740	0.379	0.621	0.601
27	Estonia	0.708	1.162	0.708	0.379	0.621	0.575

changes in the rankings of EU member states were recorded. The obtained results, shown in Figure 2, indicate a high consistency of the ranks, especially at the top and bottom of the list.

Additionally, the visualization through a heat map clearly revealed the geographical patterns and the concentration of high and low values (Figure 3), thereby facilitating the identification of priority areas for interventions and targeted policies.

A gradient from red to green is employed,

where deeper red tones indicate the lowest values or performance levels for a given criterion, suggesting areas where consumer readiness is less pronounced. Conversely, increasingly vibrant green tones represent the higher values, highlighting strong consumer readiness. Intermediate shades convey the varying degrees between these extremes, enabling a quick visual assessment of each EU country's relative strengths and weaknesses across the nine indicators.

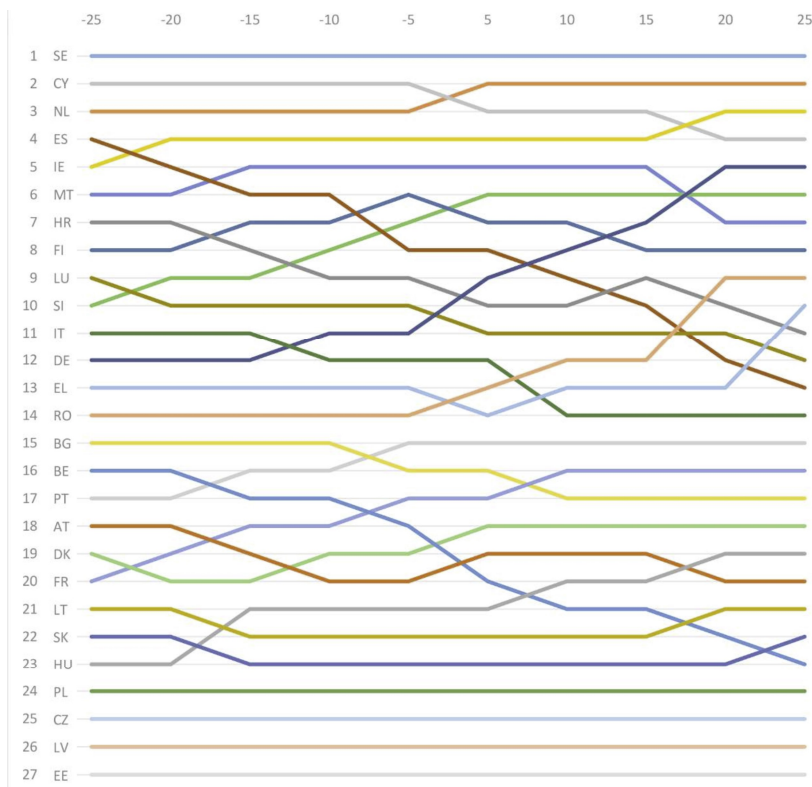


Figure 2. Sensitivity analysis based on the One-at-a-time method

Rank	Country	C1	C2	C3	C4	C5	C6	C7	C8	C9
1	Sweden	80.7	62.8	86	86	84	100	69.1	77.5	85.8
2	Cyprus	88.8	71.1	57	80	91	88	74.2	81.4	91
3	Netherlands	83.8	52.5	76	89	83	96	73.5	83.7	89.2
4	Spain	85.6	64.3	60	80	91	95	77.7	78.5	85.2
5	Ireland	80.7	60.1	60	84	88	96	73.2	87.3	86.3
6	Malta	89.6	64.2	54	82	77	99	79.7	80.4	91.2
7	Croatia	85.6	61.2	60	74	93	93	80.8	89.9	91.4
8	Finland	78.2	51.1	84	81	77	96	75.7	76.8	85.8
9	Luxembourg	75	54.3	69	84	88	94	72.8	83.5	92.1
10	Slovenia	72.3	55.7	70	80	89	96	73.8	82.8	87
11	Italy	87.5	74.2	51	73	84	90	81.6	71.8	83.9
12	Germany	76.6	53.7	68	86	84	92	69	81.2	86.2
13	Greece	86.3	70.9	54	63	93	87	73.9	85.2	90.3
14	Romania	88.8	78.1	46	72	71	72	87.9	85.6	93.2
15	Bulgaria	84.2	68.4	47	60	87	92	79.4	84.1	90.5
16	Belgium	77.1	48.9	63	78	91	93	71.2	75.6	87.4
17	Portugal	92.3	69	41	51	94	94	77.9	88.6	91.5
18	Austria	76.9	55.4	52	73	76	93	72.9	85.4	88.9
19	Denmark	73.9	35.3	77	83	86	97	69	68.4	81.3
20	France	74.3	50.7	63	72	84	93	68	74.8	87.6
21	Lithuania	81.4	58.7	52	61	88	93	80.4	72.2	84.8
22	Slovakia	82.1	51.3	46	75	91	95	71.6	74.2	85.4
23	Hungary	81.7	49.9	47	70	94	92	81.8	78.6	87.7
24	Poland	83.2	56.7	50	62	81	85	80.3	71.2	88
25	Czech Republic	81.2	56.8	51	61	74	93	65.5	76.2	83.5
26	Latvia	75.1	45.5	50	69	80	95	68.1	76.6	87.6
27	Estonia	77.8	41.3	46	66	76	93	66.6	75.2	88.4

Figure 3. Heat map visualization of EU countries' performance across nine consumer readiness criteria for sustainable product acceptance

5. DISCUSSION

In light of the European Union's continuous efforts to promote the circular economy and improve sustainable consumer behavior, especially through mechanisms such as the EU Ecolabel system, legislative initiatives and educational campaigns, it is becoming increasingly important to understand how consumers in different member states perceive and accept sustainable products. The EU works intensively to raise awareness of the importance of environmental responsibility and to encourage the purchase of products with a lower environmental impact. In this context, the aim of this study was to identify similarities and differences in consumer attitudes among EU Member States when it comes to the acceptance of sustainable products. The analysis focused on examining the position of each member based on a combination of indicators that reflect the level of knowledge, willingness to invest in sustainable products, as well as trust in institutional support mechanisms.

To achieve this goal, a hybrid M-M methodology was employed, incorporating the MEREC and MARCOS methodologies and Eurobarometer survey data. The MEREC method is optimal for this research because it objectively determines the weights of the nine selected criteria based on their impact on overall performance. The MARCOS method complements MEREC by offering a reliable ranking system that evaluates countries relative to ideal and anti-ideal solutions, ensuring a balanced and comprehensive assessment. The used hybrid methodology addresses the complexity of consumer behavior across diverse EU contexts while maintaining data-driven objectivity.

The results of the ranking confirmed the differences in the EU countries regarding the acceptance of sustainable products, which indicates the existence of different patterns of consumer behavior and the degree of involvement in the principles of the circular economy. Firstly, the obtained values of the weighting coefficients indicate significant variations between individual criteria, with criteria C2, C4, and C3 being singled out as the most influential, respectively. This indicates that there is the greatest disparity in respondents' attitudes regarding their personal experiences with purchasing products with less impact on the environment, the frequency of such purchases and the perception of their benefits for environmental protection. On the other hand, the criteria with the lowest values of the weighting coefficients, such as C9 and C1, indicate that respondents' answers regarding trust in the EU Ecolabel and the importance of the product's environmental impact when purchasing were fairly uniform. Little variability in attitudes on these questions resulted in lower weights, suggesting that these criteria have limited influence on the overall differentiation of countries in terms of acceptance of sustainable products.

The results clearly indicate that Sweden is the leader in consumer acceptance of sustainable products, followed by Cyprus and the Netherlands. At the opposite end of the ranking list are Latvia and Estonia, showing the lowest overall values according to the analyzed criteria. By looking at the individual criteria, it becomes clear that the highest-ranked countries are not necessarily the best-ranked according to each criterion, but overall they achieve consistently high results on most of them. A more detailed analysis is contributed by the utilization of

the heat map shown in Figure 3. Thus, for example, in the case of Sweden, high values are especially dominant in the criteria related to the support of EU legislation for environmental protection and the purchase of products with a lower impact on the environment. These findings are broadly compatible with Cheba et al. (2022), which places Sweden at the top in the green economy ranking, driven by strong performance in environmental productivity, natural asset base, socio-economic context, and quality of life. In the case of Cyprus, criteria such as the importance of the impact on the environment when making a purchase decision and the belief that purchasing products with a lower impact significantly contributes to environmental protection stand out. The Netherlands, on the other hand, records high values in the actual experiences of purchasing sustainable products and the frequency of purchasing products with ecological labels, which suggests a pronounced environmental behavior of consumers.

Countries at the bottom of the ranking generally show low performance in all criteria, without clear focus or pronounced strength in individual dimensions. These resulting ranking positions reflect the general lack of adequate information, as well as the engagement of consumers in matters of sustainable consumption. The lack of knowledge about the concept of sustainability and the difficulty in defining the specific ecological impact of their buying behavior were highlighted as significant barriers in previous research (Sheoran & Kumar, 2022; Van Bussel et al., 2022)

An interesting insight is provided by the analysis of countries traditionally considered leaders in the green economy, such as Denmark and Germany, which did not

achieve high positions in this ranking (Cheba et al., 2022). This outcome can be partly explained by the specific choice of criteria and the distribution of weights obtained by the objective MERECE method. Namely, criterion C2 (Belief that purchasing products with a lower impact contributes to the preservation of the environment), which had the highest weight coefficient, showed low values among respondents from Denmark and Germany, which significantly contributed to their lower position in the overall ranking. On the other hand, these respondents show high trust in the EU legislative framework indicating a strong institutional awareness, but at the same time a potential gap between institutional trust and individual belief in the effectiveness of their own behavior. Nevertheless, in the criteria related to ecological labels, it is interesting to note that the respondents in Denmark and Germany buy products with ecological labels in a high percentage, but they recognize the EU Ecolabel as a key indicator to a much lesser extent. Since these countries are the pioneers in the development and promotion of national environmental labels, it is assumed that consumers trust domestic labeling systems more than pan-European labels (Courtat et al., 2023). In contrast, countries such as Greece, Bulgaria and Romania show a significantly higher level of trust in the EU Ecolabel, which may indicate less developed national labeling systems and greater reliance on EU mechanisms as a source of legitimacy.

It is also interesting to note that some smaller countries, which might not have been expected at the top of the list, such as Cyprus or Malta, showed a high level of knowledge about the importance of environmentally responsible consumption, expressed trust in institutional mechanisms,

as well as a strong commitment to the responsibility of the state and companies in environmental protection. These factors significantly contributed to their high position in the ranking.

Finally, it is important to distinguish between the expressed intention to pay a higher price for sustainable products and the actual purchase of such products. Previous research, as well as the results of this work, confirm the existence of a discrepancy between the declarative attitude and the actual behavior of consumers, which represents a challenge for the further promotion of sustainable consumption (Kim & Lee, 2023).

6. CONCLUSIONS

The fundamental research question was to assess the position of EU countries in terms of consumer readiness to accept sustainable products, which was achieved by applying the innovative hybrid MCDA approach. The integration of MEREC and MARCOS methods into a hybrid M-M framework represents a significant methodological advancement in sustainability research, as this approach remains underutilized in the academic literature. The application of the M-M methodology offers a unique contribution by providing an objective, data-driven framework for comparing EU countries based on consumer sustainability readiness.

Recent research suggests that while economic models provide valuable insights, integrating psychological drivers is essential for a comprehensive understanding of consumer behavior, especially in the realm of sustainable consumerism (Gregory-Smith et al., 2017). In line with this perspective, in

order to fill the perceived literature gap, the present study adopts a multidimensional approach that incorporates not only indicators of consumer buying behavior, but also aspects such as awareness, trust, responsibilities and initiatives related to sustainable products. In this way, the analysis provides a more holistic view of the factors that influence consumers' willingness to adopt sustainable consumption practices.

Furthermore, the study expands the literature with a comprehensive analysis of consumer attitudes at the EU level. Despite a significant number of published works in this area, most of them refer to individual countries or smaller clusters of several countries (Soyer & Dittrich, 2021; Šostar & Ristanović, 2024), and analyze the level of acceptance of specific products by consumers (Wurster & Schulze, 2020).

The study's findings confirm the existence of substantial differences in the level of acceptance of sustainable products across EU Member States, where Sweden emerges as a clear leader, whereas several member states exhibit comparatively weak performance in this domain. These results reveal variation in the effectiveness of existing policy measures at both the national and EU levels and can serve as an empirical basis for the further design of policies aimed at promoting sustainable consumption. Notably, countries that rank highly on acceptance of sustainable products also appear to demonstrate strong public support for EU environmental legislation. Future European-level policy directions should seek to narrow differences across member states regarding the level of acceptance of sustainable products and circular practices, while acknowledging that no single solution will fit all member states.

Furthermore, the analysis uncovered a

persistent gap between consumers' stated intentions and their actual sustainable behaviors. This discrepancy between intention and behavior offers important insights into consumer patterns and can be particularly valuable for multiple stakeholders, including policymakers, private enterprises, and civil society organizations. In the context of achieving the objectives of the European Green Deal and advancing the transition to a circular economy, certain countries and segments of the consumers will require additional support, particularly in terms of advancing knowledge and measures designed to change attitudes and lower practical barriers to sustainable choices. In this process, member states with high levels of sustainability acceptance can play a valuable role as sources of good practice and serve as benchmarks for implementing successful strategies.

This study has several limitations that should be considered when interpreting the findings. The Eurobarometer survey captures responses about intended behavior rather than actual purchasing data, which may overestimate consumers' environmental commitment. The nine selected indicators, while carefully chosen, might not fully capture nuances like regional cultural differences or emerging digital influences on purchasing habits, potentially overlooking subtler aspects of consumer behavior. The cross-sectional nature of the study also limits insights into how readiness evolves over time, especially in response to evolving policy conditions and economic pressures. Future studies can incorporate longitudinal research to track these trends, perhaps including non-EU countries to place the EU results within a wider international perspective. In addition, macroeconomic

disparities, educational differences, and cultural orientations may further be used to explain cross-national variations in sustainable consumption readiness. Therefore, future research could also focus on the development of integrated models that incorporate behavioral, cultural, and economic determinants to overcome the limitations identified in this study.

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ОД СВЕСТИ ДО АКЦИЈЕ: РАНГИРАЊЕ ЗЕМАЉА ЕУ ПРЕМА СПРЕМНОСТИ ПОТРОШАЧА ДА УСВОЈЕ ОДРЖИВЕ ПРОИЗВОДЕ КОРИШЋЕЊЕМ ХИБРИДНЕ М-М МЕТОДОЛОГИЈЕ

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Извод

У светлу растућих економских, еколошких и изазова одрживости, све више пажње креатора политике, компанија и истраживача посвећује се обрасцима потрошње и разумевању фактора који обликују понашање потрошача. Усвајање одрживих производа у Европској унији активно се промовише кроз низ политика и иницијатива усклађених са принципима циркуларне економије, како би се потрошачима пружиле транспарентније и приступачније информације, чиме би се оснажили да доносе еколошки прихватљиве изборе. Ипак, прихватање одрживих производа од стране потрошача значајно варира и под утицајем је сложених интеракција између различитих фактора. Ова студија испитује спремност потрошача за одрживе производе у двадесет седам земаља ЕУ користећи девет индикатора у три димензије: еколошка свест, финансијска спремност и поверење у институционалне механизме одрживости. За рангирање земаља коришћена је хибридна MEREC-MARCOS методологија. Овај нови методолошки приступ омогућава детаљно поређење између земаља и идентификацију области за побољшање политика које подстичу одрживу потрошњу широм ЕУ. Шведска се појављује као најбоље рангирана земља, а следе Кипар и Холандија, док су Летонија и Естонија најниже рангиране. Резултати указују на значајне разлике међу државама чланицама ЕУ и потенцијално нуде вредан увид у празнине у одрживом понашању потрошача.

Кључне речи: понашање потрошача, одрживи производи, поређење међу земљама, вишекритеријумска анализа

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