

DOI: 10.28934/jwee26.12.pp50-72

JEL: Q50, Q53, Q56, L26

ORIGINAL SCIENTIFIC PAPER

Application of Circular Economy Principles in Women's Entrepreneurship: The Case of Serbia



Sanja Popović Pantić¹ 

Institute Mihajlo Pupin, Belgrade, Serbia

Nenad Ravić² 

Visoka ekonomska škola strukovnih studija, Belgrade, Serbia

Daniela Kuzmanović³ 

Institute Mihajlo Pupin, Belgrade, Serbia

ABSTRACT

This study explores the application of circular economy (CE) principles among women entrepreneurs in Serbia. Using survey data from 35 women-owned enterprises collected in 2024, the research analysed awareness, adoption patterns, and key drivers of CE implementation through Spearman's rho correlation and descriptive statistics (IBM SPSS v29). Findings reveal high awareness of CE principles but modest practical adoption, mainly in waste reduction, reuse, and renewable material use. No significant link was found between enterprise size and CE adoption, suggesting that firm size does not determine circular engagement. Managerial mindset, environmental commitment, and consumer expectations emerged as the strongest motivators, while limited technical knowledge and financing remain major barriers. The study contributes to understanding gendered entrepreneurship in sustainability contexts and calls for targeted CE training,

¹ E-mail: sanjap.pantic@pupin.rs

² Corresponding author, e-mail: nenad.ravic@vpsbeograd.edu.rs

³ E-mail: daniela.kuzmanovic@pupin.rs

access to green financing, and stronger institutional support to advance women's participation in the circular transition.

KEYWORDS: *women's entrepreneurship, SMEs, circular economy, sustainable development*

Introduction

The focus of this paper is on the results of research conducted as part of the project "Strengthening Digital and Industrial Capacities for Sustainable Circular Transition of Female Entrepreneurs in the Danube Region." The project is funded under the Danube Transnational Programme - WE.Circular¹.

This research aims to enhance opportunities for women's participation in the sustainable economy by identifying existing skill gaps and labour market needs, with particular emphasis on women's role in the transition to a circular economy. In Serbia, as in other countries in the region, the concept of the circular economy is gaining increasing relevance. However, women continue to face structural barriers related to limited access to knowledge, resources, and employment opportunities in "green" sectors. By addressing these issues, the present study contributes to a deeper understanding of the challenges faced by women in this context and provides evidence-based recommendations to support their greater involvement in sustainable development.

The research topic addressed in this paper is significant on multiple levels. The study examines the application of circular economy principles in women's entrepreneurship in Serbia, an area with the potential to generate substantial business and environmental benefits, including the use of renewable energy sources, product regeneration and reuse, recycling, waste minimisation, and related practices. By focusing on this topic, the paper draws the attention of both academic and professional audiences to the potential of the circular economy, which remains insufficiently explored and implemented in the Serbian context. Furthermore, the existing body of scientific literature on the application of circular economy principles in Serbia is limited. When the focus is further narrowed to women's

¹ WE. Circular project (Boosting digital and industrial capacity for sustainable circular transition of women entrepreneurs in the Danube Region, more information available at: <https://interreg-danube.eu/projects/wecircular> (EU, 2024))

entrepreneurship, relevant scientific research is almost entirely absent. As a result, there is a lack of empirical evidence and established findings from previous studies. These circumstances underscore the innovative character of the present research, as well as the relevance, originality, and timeliness of the topic under investigation.

Several existing studies are only partially related to the present research, as they address the circular economy in Serbia but do not specifically examine it within the context of women's entrepreneurship. The findings of Vučinić et al. (2022) show that the achieved level of circularity in the Republic of Serbia is still exceptionally low. Research findings also indicate that organic production has significant potential for applying the circular economy, thereby confirming the fundamental assumption on which this paper is based. Among the most important recommendations for accelerating the transition from a linear to a circular economy in the Republic of Serbia are (Ibid):

1. Aligning environmental laws and standards with European Union legislation;
2. Increasing the area under organic production;
3. Raising the recycling rate of materials;
4. Using energy from renewable sources;
5. Increasing public and business awareness of the circular economy concept.

Gajić (2024) examined the progress of Western Balkan countries in adopting the circular economy, highlighting the application of innovative technologies and scientific methodologies in addressing regional challenges. The results of his research show that the Western Balkan countries have adopted an environmentally sustainable development approach, prioritizing both environmental protection and the improvement of quality of life. Through the Berlin Process, a framework has been established to support innovative projects, particularly those focusing on green economy principles such as the circular economy and the bioeconomy.

According to Kokeza et al. (2021), implementing the circular economy in the domestic textile industry and across the economy can have positive impacts on the economy, society, and the environment. These benefits include increased economic competitiveness, the creation of new jobs, the introduction of "sustainable" and "eco-friendly" standards and certifications, higher final product values, increased public awareness of issues related to future development, the preservation of natural resources, and more.

In their study, Urošević et al. (2024) concluded that Serbia's development policy has acknowledged the circular economy and its potential for future economic growth.

A limitation of the study is the small number of respondents, but it should be emphasised that the questionnaire was filled out only by women-owned enterprises, most of which apply at least one circular economy model. Due to the limited sample size, the results of this study are indicative.

Although existing studies address circular economy practices in Serbia and the Western Balkans, empirical evidence on the application of circular economy principles within women-owned enterprises remains extremely limited. In particular, there is a lack of primary data-based studies examining women entrepreneurs' awareness, adoption of circular models, and the role of digital technologies in supporting circular transition. This research gap limits the understanding of gender-specific challenges and opportunities in the circular economy transition in emerging economies such as Serbia.

Therefore, building on the identified research gap, the objective of this paper is to examine the level of awareness, application, and key drivers of circular economy principles among women-owned enterprises in Serbia, with particular attention to the role of digital technologies. The study contributes to the literature by providing original empirical evidence, while also offering practical insights for policymakers and support organisations aiming to strengthen women's participation in the circular economy.

Literature Review

Sustainable development has been recognised as a dominant development paradigm of the 21st century, prompting businesses to adapt their models and processes to sustainability requirements (Vićentijević, 2023).

Within this context, the circular economy represents an economic strategy aimed at transforming linear production and consumption systems into circular ones, focusing on resource efficiency, waste reduction, and environmental optimization (Singh & Ordonez, 2016).

Unlike traditional growth-oriented models, the circular economy promotes multidimensional progress, including environmental quality, human well-being, and long-term economic resilience, while enhancing

business competitiveness through innovation, cost reduction, and efficient resource use (Vićentijević, 2023; Velenturf & Purnell, 2021)

The circular economy paradigm is commonly structured around five core pillars: sustainable resources, product-as-a-service models, sharing platforms, extended product lifecycles, and new lifecycle systems. Circular business models emphasise renewable energy use, waste prevention, product durability, reuse, and regeneration, creating opportunities for economic growth, employment, and environmental protection. Importantly, the circular economy shifts the purpose of economic activity toward maintaining social well-being and environmental quality (Velenturf & Purnell, 2021).

Women-owned businesses are predominantly micro and small enterprises, often operating in traditional sectors, characterized by lower revenues and slower growth. These enterprises frequently face barriers related to access to finance, procurement opportunities, certification, and digital technologies, limiting their capacity for innovation and integration into higher value chains (Popović-Pantić, 2020).

Digitalisation has been identified as a critical pathway for reducing these gaps, supporting both green transition and compliance with EU Green Agenda standards, while enabling faster internationalisation and increased competitiveness of women-owned enterprises (Popović Pantić et al., 2020).

Leadership strategies that prioritise inclusivity, innovation, and digital adaptation play a key role in fostering sustainable growth among women-led SMEs (Radović Marković et al., 2025). At the same time, organisational contexts, such as enterprise size and governance structures, can either support or constrain transformational leadership behaviours (Al-Dalahmeh et al., 2025).

In Serbia, the development of women's entrepreneurship requires targeted public policies that support skill development, innovation, and professional management practices, particularly in the area of green entrepreneurship (Ravić & Nikitović, 2016). Additionally, implementing a professional approach to management and organization is necessary for small firms to achieve growth and development (Ravić et al., 2021). Broader conceptual discussions also question the assumed neutrality of entrepreneurship and highlight structural inequalities affecting women entrepreneurs (McAdam, 2022). Circular business model innovation has been identified as a key driver of both digital and green transitions (Bocken, 2024). Recent research increasingly confirms that women entrepreneurs are

key actors in advancing sustainable and inclusive business models, including those aligned with circular economy principles. Women-led micro, small and medium-sized enterprises (MSMEs) and social enterprises have been identified as particularly well positioned to drive sustainable transformation, due to leadership styles characterised by collaboration, participatory decision-making, and strong value orientations (Damayanti, 2025). These attributes support the integration of social and environmental considerations into business practices and enable a more holistic approach to sustainability. Accordingly, Damayanti and Sofilda (2025) propose a gender-sensitive circular economy business model that promotes an inclusive, phased, and context-specific transition toward sustainability.

The sustainability orientation of women entrepreneurs is also reflected in their strategic priorities. Empirical evidence shows that the gender of the CEO significantly influences how the Sustainable Development Goals (SDGs) are prioritised within organisations. Female CEOs tend to place greater emphasis on gender equality (SDG 5), quality education (SDG 4), and good health and well-being (SDG 3), reflecting a stronger commitment to long-term societal well-being and sustainable development, whereas male CEOs more often prioritise short-term economic performance (Kapse et al., 2024). This long-term, socially oriented perspective aligns closely with the principles of the circular economy, which emphasises resource efficiency, environmental responsibility, and systemic change rather than short-term profit maximisation.

At the same time, the ability of women entrepreneurs to translate sustainability-oriented leadership into successful business outcomes depends on access to different forms of capital. Research by Feranita et al. (2024) demonstrates that human, financial, physical, and intellectual capital have a significant positive impact on women's entrepreneurial performance, while social capital, although positive, is less decisive. These findings highlight the importance of strengthening women entrepreneurs' access to resources in order to enable them to implement more complex and innovative circular business models. Growing empirical evidence further indicates that women entrepreneurs display a relatively high level of environmental awareness and engagement in sustainable business practices. Activities such as recycling, reduced resource consumption, and the use of eco-labelled products are increasingly embedded in women-led enterprises, often as part of broader ethical and socially responsible business approaches (Ambepitiya, 2016; Bartik et al., 2020; Bulut et al., 2017; Grandy et al.,

2020; International Labour Organization, 2022; Khan & Trivedi, 2015; Yaccato & Jaeger, 2004). These behavioural patterns are consistent with findings showing that women entrepreneurs exert a positive influence on social, economic, and environmental outcomes (Clausen, 2025) and that women's active participation in corporate and entrepreneurial decision-making is associated with stronger commitments to environmental protection, human development, and long-term economic prosperity, driven by their distinctive knowledge and leadership spillovers (Enciso-Alfaro & García-Sánchez, 2024). Together, these insights suggest a strong compatibility between women's entrepreneurial practices and the operational logic of the circular economy.

However, while women entrepreneurs demonstrate strong sustainability orientations, research remains limited regarding the underlying mechanisms through which they translate these values into concrete circular and sustainable business strategies, particularly in terms of their entrepreneurial effectuation, mindsets, and decision-making drivers (Mahajan & Bandyopadhyay, 2021). At the same time, their capacity to engage in circular business practices is also shaped by access to financial and institutional resources. Green practices and entrepreneurial innovation have been shown to improve vendors' income and business resilience, especially when supported by financial inclusion (Kodariyah et al., 2025). Financial inclusion plays a crucial role in empowering women to start, grow, and sustain businesses, allocate resources efficiently, and participate more actively in economic life (Antonijević et al., 2024), with education, income, and employment identified as key predictors of such inclusion (Antonijević et al., 2024). Nevertheless, existing studies still provide insufficient insight into the specific institutional and contextual conditions under which women entrepreneurs operate, despite their decisive importance for enabling the adoption and scaling of circular economy models (Mahajan & Bandyopadhyay, 2021).

In the Serbian context, women's entrepreneurial potential is strongly influenced by the legal and institutional environment. Đuričin and Beraha (2024) show that although Serbia has established a relatively solid framework for supporting women's entrepreneurship, existing policies often fail to adequately address the specific challenges women face. The authors emphasise the need for targeted support programmes, systematic integration of gender perspectives into legal and institutional frameworks, and continuous alignment with European and international standards (Đuričin &

Beraha, 2024). Such conditions are essential for enabling women entrepreneurs to fully realise their capacity to adopt and scale circular and sustainable business models.

The circular economy itself encompasses a wide range of technologies and practices, including waste and pollution minimisation, repair, reuse, recycling, renewable materials, extended product lifecycles, sharing platforms, and digital tools for resource optimisation (Vasiljević & Petrović, 2020). Rather than focusing only on waste management, it promotes product design for durability, repairability, and recyclability, leading to significant environmental and resource efficiency gains (Mitrović et al., 2017). In Serbia, the implementation of circular economy principles is closely linked to corporate social responsibility (CSR) and ESG standards and requires targeted institutional support, particularly for SMEs and women-owned enterprises (Kuzmanović et al., 2023; Vasiljević & Petrović, 2020).

Considering that women entrepreneurs represent an increasingly important economic force in Serbia, accounting for 34% of sole proprietors and 27.3% of companies, their capacity to adopt and implement circular economy principles is both economically significant and highly policy-relevant. Examining how women entrepreneurs combine sustainability-oriented leadership, access to capital, and institutional support to drive circular business models is therefore critical for advancing both gender equality and sustainable development in the Serbian economy.

The results of research conducted by the authors (Vujadinović & Marjanović, 2025) show that women's entrepreneurship in rural areas of the Republic of Serbia has significant potential for development and can play an important role in the socio-economic empowerment of women. The same authors state that a comprehensive strategy that integrates economic activity with education, policy support, and local community engagement is needed to empower women in rural areas of the Republic of Serbia through entrepreneurial projects.

Methodology

This study is based on empirical research conducted using a structured survey questionnaire distributed to women entrepreneurs in Serbia, primarily members of the Association of Business Women in Serbia, as well as members of other female entrepreneurial associations reached through their organisational databases. Secondary sources, including OECD reports

and the EU Progress Report 2023, were used solely to provide background context and policy relevance.

The subject of the research is the application of circular economy principles in women's entrepreneurship in Serbia.

The aim of the study is to examine the extent to which women-owned businesses in Serbia implement circular economy principles and to explore whether observable differences exist in the application of circular economy models across enterprises of different sizes.

The research was conducted between 24 April and 31 May 2024. A total of 35 respondents from various sectors participated, completing the questionnaire via the SurveyMonkey platform. The survey collected both quantitative data and qualitative insights, enabling an analysis of prevailing skills gaps and entrepreneurial needs.

The research questionnaire was structured into four sections: 1) Basic Information, 2) Understanding Circular Economy, 3) Digitalisation and Industry 04 4) Smart Specialisation Strategy (S3) and external influences.

This paper analyses Sections 1 and 2, focusing on company characteristics and familiarity with CE principles. Respondents could provide multiple answers per question, with responses ranked by frequency.

The research seeks to answer the following questions:

- What is the level of awareness of circular economy principles among women-owned enterprises?
- Which circular economy technologies or models are applied in women-owned businesses?
- What are the main drivers and barriers influencing the adoption of circular economy principles?

Based on these research questions, the following hypotheses (H) were formulated:

H1: As the size of the enterprise increases, the application of circular economy principles increases.

H2: Managerial mindset, knowledge, commitment, and engagement in the green transition represent the most important drivers for the adoption of circular economy technologies or models.

H3: Women entrepreneurs demonstrate an increasing level of awareness of the circular economy and sustainable development principles.

Description of the Sample

The sample consists of 35 female entrepreneurs, which represents a limitation of the study and renders the findings indicative rather than generalisable. Although the survey was distributed to 300 members of the Association of Business Women in Serbia, the low response rate reflects the early stage of circular economy (CE) implementation and sustainability reporting in the Serbian business sector. As sustainability and ESG reporting remain voluntary, particularly among micro and small enterprises, only a limited number of companies systematically apply CE practices. Even among large companies, sustainability reporting is not yet standard practice; for instance, only 21 of the 50 largest companies in Serbia published sustainability reports in 2020 (Novaković & Cvetanović, 2022). In this context, identifying a larger number of women-led enterprises actively applying CE principles proved challenging, due to low awareness, limited institutional support, insufficient financial and technical resources, and an underdeveloped regulatory framework.

Most respondents (91.43%) confirmed that their businesses are women-owned. Among the 31 respondents who specified their sector, the largest share (35%) selected "Other," followed by "Food and Agriculture" and "Manufacturing and Production," each at 16.13%. "Textiles and Fashion" accounted for 9.68%, while "Technology, Electronics, and IT" and "Healthcare" represented 6.45% each. The least represented sectors, each with 3.23%, were "Construction and Real Estate," "Waste and Water Management," and "Retail and E-commerce."

Regarding company age ($n = 31$), 45.16% have been operating for over 10 years, 25.81% for 1-3 years, 25.81% for 3-10 years, and 3.23% for less than a year. Most businesses are small: 67.74% have fewer than 10 employees, 22.58% have 10-49 employees, and 9.68% employ 50-249 people.

This structure confirms the dominance of long-established, women-owned micro-enterprises, with diverse sector representation but limited size and younger companies being less prevalent.

The survey method served as the primary research tool, supported by descriptive, inductive, and content analysis methods to interpret and contextualise findings. Quantitative data were analysed using IBM SPSS Statistics version 29.

To test the hypotheses, the following statistical procedures were applied:

- H1:** A *Spearman's rho correlation test* examined the relationship between enterprise size (1 = micro, 2 = small, 3 = medium) and the application of CE models (1 = yes, 0 = no).
- H2:** *Descriptive statistics* (frequency and percentage distributions) were applied to identify the main drivers of CE adoption among women-owned enterprises.
- H3:** *Awareness of CE principles* was measured using a 10-item Likert scale (1 = absolutely unfamiliar, 5 = absolutely familiar), with mean (M) and standard deviation (SD) reported to construct an overall awareness index.

Results and Discussion

Awareness and Understanding of Circular Economy Principles

To assess the level of awareness and understanding of circular economy principles, respondents were asked to indicate their level of agreement with a series of statements beginning with "I am familiar with..." A total of 24 respondents provided valid responses. The descriptive results are presented in Table 1, while Figure 1 illustrates the distribution of responses across individual statements. Respondents assessed their familiarity with CE principles using a five-point Likert scale. Results (Table 1; Figure 1) indicate that most women entrepreneurs demonstrate a strong understanding of CE concepts, including waste and pollution reduction, product longevity (repair, reuse, recycling), and regeneration of natural systems. More than 50% strongly agree or are fully familiar with these principles, while one-quarter are undecided and fewer than 10% disagree. These findings confirm high awareness levels, consistent with H3 (M = 5.00, SD = 0.00) (Table 4), suggesting a growing alignment with sustainable business practices noted in previous research (Ambepitiya, 2016; Grandy et al., 2020).

Respondents also reported familiarity with advanced CE strategies such as redesigning business models toward products-as-a-service, using renewable materials, and adopting sharing-economy approaches, though familiarity with digitalisation-related aspects was somewhat lower. This

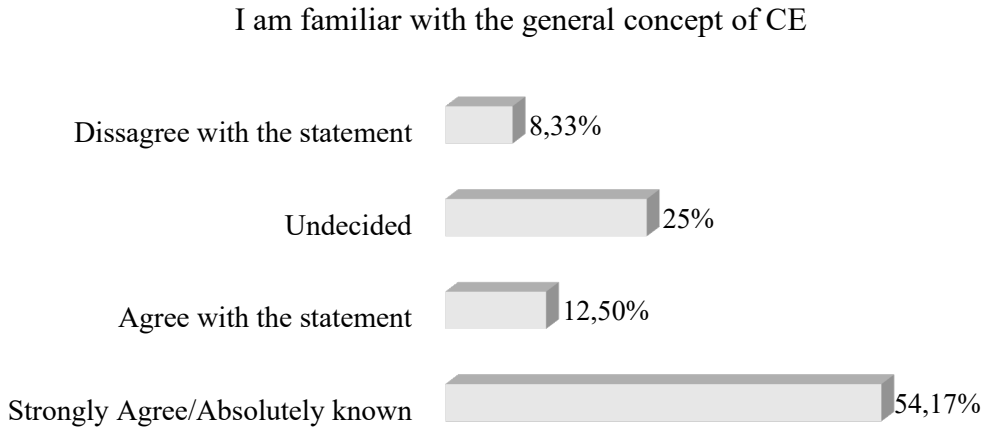
supports the view that awareness precedes but does not automatically translate into adoption, echoing patterns identified by Kokeza et al. (2021) and Vučinić et al. (2022).

Table 1: Familiarity of Women Entrepreneurs with Circular Economy Principles

CE principles	Strongly disagree/ Absolutely unknown		Disagree		Undecided		Agree		Strongly agree/ Absolutely known	
	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%
The general concept of the circular economy	/	/	2	8.33	6	25	3	12.5	13	54.17
Designing products and processes to minimise waste and pollution	/	/	/	/	7	29.17	4	16.67	13	54.17
Keeping products and materials in use (repair, reuse, recycling)	1	4.17	/	/	4	16.67	5	20.83	14	58.33
Regenerating natural systems	/	/	/	/	5	20.83	5	20.83	14	58.33
Rethinking business models (products-as-a-service)	/	/	/	/	7	29.17	5	20.83	12	50
Products-as-a-service business model										
Use of renewable, recyclable, or biodegradable resources	1	4.17	2	8.33	4	16.67	7	29.17	10	41.67

Source: Author's research

Figure 1: The familiarity of women entrepreneurs with the circular economy principles



Source: Author's research

Application of Circular Economy Practices

Out of 24 respondents, 16 reported adopting CE technologies or models.

The most frequent practice was minimising waste and pollution in product and process design (80%), followed by repair, reuse, and recycling (53.3%), and the use of renewable materials (46.7%) (Table 2). These results reveal that CE application among women-owned businesses primarily occurs in early-stage or low-cost areas, reflecting practical constraints of smaller enterprises. These findings align with international evidence (Rizos et al., 2016) showing that small firms often adopt CE practices incrementally, focusing first on cost-saving and efficiency improvements rather than full model innovation.

Table 2: Application of Circular Economy Technologies and Models among Women Entrepreneurs

Circular practice applied	Respondents	%
Minimising waste and pollution in product and process design	12	80.0
Repair, refurbishment, reuse, and recycling	8	53.3
Use of renewable, recyclable, or biodegradable resources (<i>not standard CE practice</i>)	7	46.7
End-of-life recovery and regeneration of products/materials	4	26.7
Extending product lifespan through durability and repairability	3	20.0
Other circular models	1	6.7

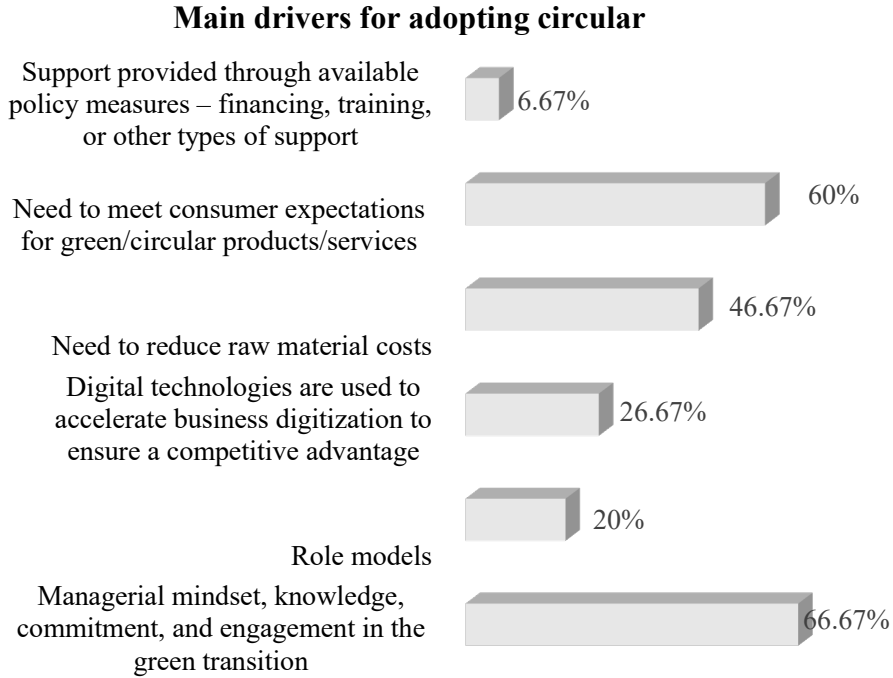
Source: Author's research

Drivers and Barriers to Circular Economy Adoption

To identify the key factors motivating women entrepreneurs to adopt circular economy technologies and models, respondents who confirmed the application of circular practices were asked to indicate the main drivers influencing their decision.

As shown in Figure 2, two-thirds of respondents identified managerial mindset, knowledge, and green commitment as the main drivers of CE implementation, followed by consumer expectations (60%) and cost reduction (46.7%). These results empirically confirm *H2*, highlighting the pivotal role of leadership orientation and environmental values in enabling circular transitions. This is consistent with the work of Radović Marković et al. (2025) and Popović-Pantić (2020), who link sustainability-oriented leadership to women entrepreneurs' competitiveness.

Figure 2: Main drivers of women entrepreneurs for adopting circular technology/circular models



Source: Author's research

Key barriers to CE adoption remain a lack of technical knowledge, limited awareness of Industry 4.0 tools, and restricted access to finance, similar to those outlined in Rizos et al. (2016).

Training Needs

Out of 22 respondents, two-thirds prioritised training in sector-specific circular economy applications, access to finance, and introductory knowledge. About half also emphasised digital tools, AI, and digital skills for transition.

Most Common Circular Practices

Most frequently reported practices were:

- Minimising waste and pollution in design (12 responses),
- Repair, refurbishment, reuse, and recycling (8),
- Use of renewable, recyclable, or biodegradable resources (7).

These were most often linked to the drivers “Managerial mindset and green engagement” and “Meeting consumer expectations,” with waste minimisation consistently ranked highest.

Familiarity and Adoption of Circular Economy by Enterprise Size

To explore differences in the level of familiarity with circular economy principles across enterprises of different sizes, the authors conducted a comparative analysis based on the number of employees. Average familiarity scores for key circular economy dimensions are presented in Table 3.

Table 3: Familiarity with Circular Economy Principles by Enterprise Size

Circular economy dimension	Micro enterprises (average familiarity)	Small enterprises	Medium enterprises
Circular economy basics	4.1–4.4	4.2–4.5	4.0–4.5
Waste and pollution reduction in design	4.3	4.6	5.0
Regeneration of natural systems	4.2	4.8	4.5
Extending product lifespan	4.1	4.7	4.3
Sharing economy	3.8–3.9	3.8	3.5
Digital technologies for CE	4.0	4.4	3.5

Source: Author's research

Note: Average familiarity scores represent mean values calculated on a five-point Likert scale (1 = strongly disagree/absolutely unknown; 5 = strongly agree/absolutely known)

To test H1, Spearman's rho was used to assess the association between enterprise size and CE adoption. Results revealed a positive but non-significant correlation ($\rho = 0.414$, $p = 0.056$), indicating firm size does not predict the likelihood of CE adoption. Actually, micro-enterprises apply circular technology/models to a greater extent than small and medium-sized enterprises. Interestingly, the smallest application of circular technology/models was recorded among medium-sized enterprises, thus

disproving the assumption that with an increase in the size of the business measured by the number of employees, there is a greater application of circular technology/models. Thus, Hypothesis 1 (H1) was rejected.

Supporting H2, the results indicate that 66.7% of women entrepreneurs have adopted CE models, mainly driven by managerial mindset and green engagement (67%), consumer expectations (60%), and cost reduction (50%). Therefore, Hypothesis 2 (H2) is confirmed, emphasizing that managerial mindset and green engagement represent the strongest drivers of circular model adoption.

Regarding Hypothesis 3 (H3), the awareness index yielded a mean score of $M = 5.00$ and a standard deviation of $SD = 0.00$, confirming high familiarity with CE concepts (Table 4). Consequently, the hypothesis that awareness of sustainable development issues among women entrepreneurs is increasing is also supported.

Table 4: Summary of Statistical Results

Hypothesis	Test	Variables	ρ / Mean / %	P-value	Interpretation
H1	Spearman's rho	Enterprise size \times CE application	$\rho = 0.414$	0.056	Not significant
H2	Descriptive	CE model adoption	66.7%	-	Managerial mindset drives adoption
H3	Descriptive	Awareness index	Mean=5.00 SD = 0.00	-	High awareness

Source: Author's research

The comparative analysis is consistent with Kokeza et al. (2021) and Vućinić et al. (2022), who note high awareness but limited structural support. These findings emphasize the need for digitalization and institutional incentives to enhance women's engagement in circular models.

Conclusion

This study provides valuable insights into the implementation of circular economy (CE) principles among women entrepreneurs in Serbia. Despite the limited sample size, the findings offer a meaningful snapshot of the current stage of CE adoption, revealing both progress and persistent barriers. The results show that women-led enterprises demonstrate high awareness and conceptual understanding of CE principles, yet their practical application remains constrained by limited institutional support, financial resources, and technological capacities. Micro-enterprises, in particular, exhibit greater flexibility and readiness to experiment with circular practices, whereas medium-sized enterprises appear less active, suggesting that business size alone does not determine the level of CE engagement.

Overall, the study contributes novel empirical evidence to the underexplored intersection of gender, entrepreneurship, and the circular economy in Serbia. The findings enrich the theoretical understanding of gendered entrepreneurship by illustrating how managerial mindset, environmental commitment, and leadership orientation shape the adoption of CE among women-owned SMEs. Practically, the research highlights the need to strengthen support mechanisms for women entrepreneurs through targeted CE training, capacity-building initiatives, and greater access to green financing instruments.

From a policy perspective, the results underscore the importance of creating enabling conditions for women's participation in the green transition. Policymakers should develop tailored financial incentives and simplified procedures for accessing EU green and innovation funds. In parallel, national and local institutions should promote digitalisation as a key driver of circular innovation, integrating it into entrepreneurship support programmes. Establishing structured partnerships among business associations, research institutions, and government agencies would further enhance women's access to the knowledge, resources, and networks necessary to implement CE practices.

Finally, future research should expand the scope and scale of analysis by including larger and cross-national samples, as well as longitudinal data, to track the evolution of CE adoption over time. Such efforts would provide a stronger empirical foundation for designing policies and interventions that accelerate the circular transition within women-led enterprises across the region.

Acknowledgments

The research presented in this paper was funded under the Danube Transnational Programme - WE.Circular – „Boosting Digital and Industrial Capacity for Sustainable Circular Transition of Women Entrepreneurs in the Danube Region”.

References

- [1] **Antonijević, M., Domazet, I., Kojić, M., & Simović, V.** (2024). Financial Inclusion - A Driving Force for Women's Entrepreneurship Development. *Journal of Women's Entrepreneurship and Education* (3/4), 73-92. <https://doi.org/10.28934/jwee24.34.pp73-92>
- [2] **Al-Dalahmeh, M., & Csordas, A.** (2025). Technological innovation versus gender equality: Perspectives in the dairy sector. *Journal of Women's Entrepreneurship and Education*, (1-2), 217-241. <https://doi.org/10.28934/jwee25.12.pp217-241>
- [3] **Ambepitiya, K. R.** (2016). The role of women entrepreneurs in establishing sustainable development in developing nations. *World Review of Business Research*, 6(1), 161-178.
- [4] **Bartik, A. B., Bertrand, M., Cullen, Z., Glaeser, E. L., Luca, M., & Stanton, C.** (2020). The impact of COVID-19 on small business outcomes and expectations. *Proceedings of the National Academy of Sciences*, 117(30), 17656-17666. <https://doi.org/10.1073/pnas.2006991117>
- [5] **Bocken, N. M.** (2024). Circular business model innovation: New avenues and game changers. In A. Aagaard (Ed.), *Business model innovation: Game changers and contemporary issues* (pp. 193-225). Palgrave Macmillan. https://doi.org/10.1007/978-3-031-57511-2_7
- [6] **Bulut, Z. A., Cimrin, F. K., & Dogan, O.** (2017). Gender, generation and sustainable consumption: Exploring the behaviour of consumers from Izmir, Turkey. *International Journal of Consumer Studies*, 41(5), 597-604. <https://doi.org/10.1111/ijcs.12371>
- [7] **Clausen, L.** (2025). Women entrepreneurs in the circular economy: Global experiences. Emerald Publishing Limited. <https://doi.org/10.1108/978-1-83708-254-4202510012>
- [8] **da Costa Fernandes, S., Pigosso, D. C. A., McAlone, T. C., & Rozenfeld, H.** (2020). Towards product-service system oriented to circular economy: A systematic review of value proposition design approaches. *Journal of Cleaner Production*, 257, 120507. <https://doi.org/10.1016/j.jclepro.2020.120507>

- [9] **Damayanti, L.** (2025). An Analysis of Circular Economy Implementation In Women-Led Msmes and/or Social Enterprises. *Journal Research of Social Science, Economics & Management*, 5(1), 1989-2004. <https://doi.org/10.59141/jrssem.v5i1.993>
- [10] **Đuričin, S., & Beraha, I.** (2024). Promoting Economic Inclusivity in Serbia - Recommendations for Enhancing National and Local Policies in Women's Entrepreneurship. *Journal of Women's Entrepreneurship and Education* (3-4), 138-159. <https://doi.org/10.28934/jwee24.34.pp138-159>
- [11] **Enciso-Alfaro, S.-Y. & Garcia-Sanchez, I.-M.** (2024). Are innovative firms more circular when women hold upper positions? *Journal of Innovation & Knowledge*. 9(4), 100556. <https://doi.org/10.1016/j.jik.2024.100556>
- [12] **Feranita, N.V., Mahendrawan, A.D., & Asmuni, A.** (2024). Determinants of Digital Technology Adoption Among Women Entrepreneurs. *Journal of Women's Entrepreneurship and Education* (1-2), 66-92. <https://doi.org/10.28934/jwee24.12.pp66-92>
- [13] **Interreg Danube Region Programme.** (2024). *WE.Circular*. <https://interreg-danube.eu/projects/wecircular>
- [14] **Gajić, A.** (2024). Inovacije i primena savremenih tehnologija u oblasti cirkularne ekonomije zemalja Zapadnog Balkana. *Zbornik radova Internacionalnog univerziteta Travnik* (pp. 154–164). Internacionalni univerzitet Travnik.
- [15] **Grandy, G., Cukier, W., & Gagnon, S.** (2020). (In)visibility in the margins: COVID-19, women entrepreneurs and the need for inclusive recovery. *Gender in Management: An International Journal*, 35(7/8), 667–675. <https://doi.org/10.1108/GM-07-2020-0207>
- [16] **International Labour Organization.** (2022). *Women entrepreneurs leading the way: Promoting a circular economy and more sustainable practices in the garment sector*. <https://www.ilo.org/publications/women-entrepreneurs-leading-way-promoting-circular-economy-and-more>
- [17] **Jensen, J. P., Prendeville, S. M., Bulut, N. M. P., & Peck, D.** (2019). Creating sustainable value through remanufacturing: Three industry cases. *Journal of Cleaner Production*, 218, 304–314. <https://doi.org/10.1016/j.jclepro.2019.01.301>
- [18] **Kapse, M., Radović-Marković, M., Sharma, V., Mahajan, Y., & Hiremath, R.B.** (2024). The Influence of Women's Leadership on Organizational Alignment with Sustainable Development Goals: A Discriminant Analysis Approach. *Journal of Women's Entrepreneurship and Education* (3/4), 230-248. <https://doi.org/10.28934/jwee24.34.pp230-247>
- [19] **Khan, N. T., & Trivedi, A.** (2015). Gender differences and sustainable consumption behavior. *British Journal of Marketing Studies*, 3(3), 29–35.

- <https://www.eajournals.org/wp-content/uploads/Gender-Differences-and-Sustainable-Consumption-Behavior.pdf>
- [20] **Kodariyah, L., Suseno, B.D., & Sari, G.I.** (2025). Financial Inclusion: Boosting Green Practices and Innovation for Female Vendors Well-Being. *Journal of Women's Entrepreneurship and Education*, 1-2, 83-106. <https://doi.org/10.28934/jwee25.12.pp83-106>
- [21] **Kokeza, G., Josipović, S., & Urošević, S.** (2021). Application of the concept of circular economy: A chance for the textile industry. *Proceedings of the IV International Scientific Conference Contemporary Trends and Innovations in the Textile Industry (CT&ITI 2021)* (pp. 175–186). Faculty of Technology and Metallurgy, University of Belgrade.
- [22] **Kuzmanović, D., Popović Pantić, S. & Dejanović, M.** (2023). Primena odabranih eko-standarda u poslovanju ženskih preduzeća. In *Tehnologija, kultura, razvoj* (pp. 232–245). Institut Mihajlo Pupin. <https://www.pupin.rs/cirnt/wp-content/uploads/2024/03/TKR30-zbornik-final-2.pdf>
- [23] **McAdam, M.** (2022). *Women's entrepreneurship*. Routledge.
- [24] **Mahajan, R., & Bandyopadhyay, K.R.** (2021). Women entrepreneurship and sustainable development: Select case studies from the sustainable energy sector. *Journal of Enterprising Communities: People and Places in the Global Economy*, 15(1), 42-75. <https://doi.org/10.1108/JEC-11-2020-0184>
- [25] **Mitrović, S., Radosavljević, I., & Veselinov, M.** (2017). *Cirkularna ekonomija kao šansa za razvoj Srbije*. OEBS. <https://serbia.osce.org/sr/node/292306>
- [26] **Novaković, I., & Cvetanović, N.** (2022). *Izveštavanje o održivosti 50 najvećih kompanija u Srbiji*. Centar za savremene politike. <https://centarsavremenepolitike.rs/biblioteka/izvestavanje-o-odrzivosti-50-najvecih-kompanija-u-srbiji/>
- [27] **Popović-Pantić, S., Semenčenko, D., & Vasilić, N.** (2020). Digital technology and the financial performance of female SMEs in Serbia: The mediation role of innovation. *Economic Annals*, 65(224), 53–81. <https://doi.org/10.2298/EKA2024053P>
- [28] **Popović-Pantić, S.** (2020). *Dve decenije ženskog preduzetništva u Srbiji*. Institut Mihajlo Pupin. <http://www.pupin.rs/cirnt/wp-content/uploads/2020/11/Dve-decenije-%C5%BEenskog-preduzetni%C5%A1tva-u-Srbiji.pdf>
- [29] **Radović Marković, M., Srebro, B., Dedjanski S., & Vrbanac, M.** (2025). Gender Perspectives on SME International Trade and Revenue in the Digital Era: Evidence from Serbia. *Journal of Women's Entrepreneurship and Education* (1-2), 198-216.
- [30] **Ravić, N., Đekić, M., & Radić, N.** (2021). Profesionalizacija menadžerskih funkcija u MSP u Srbiji. *Megatrend revija*, 18(3), 71–88.

- [31] **Ravić, N., & Nikitović, Z.** (2016). Entrepreneurial education as a new paradigm of the development of women entrepreneurship in Serbia. *Journal of Women's Entrepreneurship and Education*, 3–4, 102–116.
- [32] **Rizos, V., Behrens, A., Van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., & Topi, C.** (2016). Implementation of circular economy business models by SMEs: Barriers and enablers. *Sustainability*, 8(11), 1212. <https://doi.org/10.3390/su8111212>
- [33] **Singh, J., & Ordoñez, I.** (2016). Resource recovery from post-consumer waste: Important lessons for the circular economy. *Journal of Cleaner Production*, 134, 342–353. <https://doi.org/10.1016/j.jclepro.2015.12.020>
- [34] **Tukker, A.** (2004). Eight types of product–service systems: Eight ways to sustainability? *Business Strategy and the Environment*, 13(4), 246–260. <https://doi.org/10.1002/bse.414>
- [35] **Tukker, A.** (2015). Product services for a resource-efficient and circular economy: A review. *Journal of Cleaner Production*, 97(3), 76–91. <https://doi.org/10.1016/j.jclepro.2013.11.049>
- [36] **Urošević, S., Urošević, I., & Vuković, M.** (2024). Case Circular Economy of Serbia. In G. Guxho, T. Kosova Spahiu, V. Prifti, A. Gjeta, E. Xhafka, & A. Sulejmani (Eds.), *Proceedings of the Joint International Conference: 10th Textile Conference and 4th Conference on Engineering and Entrepreneurship*. ITC-ICEE 2023. (pp. 56–64) Lecture Notes on Multidisciplinary Industrial Engineering. Tirana: Springer, Cham. https://doi.org/10.1007/978-3-031-48933-4_6
- [37] **Vasiljević, D., & Petrović, D.** (2020). *Izveštaj o sprovedenoj ex ante analizi efekata za oblast cirkularne ekonomije* (Policy and Legal Advice Centre – PLAC III). https://www.ekologija.gov.rs/sites/default/files/2021-01/exante-analiza_efekata-za-oblast-cirkularne-ekonomije.pdf
- [38] **Velenturf, A. P. M., & Purnell, P.** (2021). Principles for a sustainable circular economy. *Sustainable Production and Consumption*, 27, 1437–1457. <https://doi.org/10.1016/j.spc.2021.02.018>
- [39] **Vićentijević, K.** (2023). Održivost i cirkularna ekonomija. In *Mediji i ekonomija* (pp. 287–299). Banja Luka: Banja Luka College, Ekonomski fakultet Univerziteta Plekhanov Moskva.
- [40] **Vujadinović, J., & Marjanović, D.** (2025). Empowering Women in Serbian Rural Areas with Entrepreneurial Initiatives. *Journal of Women's Entrepreneurship and Education*, 1(2), 40–58. <https://doi.org/10.28934/jwee25.12>
- [41] **Vučinić, I., Arsić, Lj., & Vujović, S.** (2022). Mogućnosti primene koncepta cirkularne ekonomije u organskoj proizvodnji. *Ecologica*, 29(107), 373–381.
- [42] **Yaccato, J. T., & Jaeger, J.** (2004). *The 80% minority: Reaching the real world of women*. Penguin Canada.

Article history: Received: October 3, 2025
Accepted: February 24, 2026
First Online: March 3, 2026