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CONTENT

EDITORIAL COMMENTARY

- Patricija Jankovič, Marko Hrženjak**
Crucial role of contracts in tourism industry 1
- Patricija Jankovič, Ivana Tadić**
The impact of the pandemic on the transport sector 24
- Jovana Kisin, Azemina Mashalović, Jelena Ignjatović**
Energy crisis as an opportunity to accelerate the green transition and sustainable economic development: evidence from the western balkans 48
- Sašo Murtič, Ingrid Franko Uhernik, Šejla Murtič**
Vpliv mednarodnih sprememb na menedžment proizvodnih in storitvenih sistemov v sodobnem industrijskem razvoju industrijske generacije 4.0 69
- Jelena Jesić, Simonida Vukadinović, Andrea Andrejević Panič, Borut Vojinović**
Circular economy and eco-innovation indicators as inputs for EU sustainable development strategies 92
- Ksenija Babanić, Tihana Rogač, Viktorija Laza, Milica Miškov**
Circular economy as a pathway to sustainable economic growth and development 104
- Matej Trapečar**
Forensic examination and factors of traffic accidents 113
- Ružica Zelenović**
Towards a circular economy: trends, opportunities, challenges and perspective 124
- Tilen Medeot**
Artificial intelligence and sustainability: how AI can improve sustainable decision-making in modern organizations 132
- Natali Grujić**
Sustainability as pillar of competitive businesses: Evidence from Comtrade Group 147

Robert Mašera, Lovro Stojnšek <i>Future of transport technology</i>	156
Damjan Plut <i>Automation of internal flows car production</i>	166
Robert Mašera <i>Discrimination and diversity of human resources</i>	179

EDITORIAL COMENTARY

Dear colleagues and readers,

Vol. IV of the IJRD is presenting the latest thinking and research of the international scientific conference, which was held in may 2023 at AREMA, under the title Sustainable economy in modern organisations.

We are particularly pleased by the fact that not only AREMA students, but also students from our partner academic organization Educons from Novi Sad, Serbia, actively participated in the conference. This kind of cooperation between professors and students and joint participation in international conferences are a decisive building block in creating a successful future for our young colleagues.

As always, we are cordially inviting professionals, academics, researchers and students to join us as international editorial members as well as researchers who would like to publish their original scientific research work and projects.

Looking forward to cooperate with you

Dr. Patricija Jankovič
Editor In-chief

SCIENTIFIC ARTICLES¹

¹ original scientific articles; sicris / cobiss methodology 1.01

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CIRCULAR ECONOMY AND ECO-INNOVATION
INDICATORS AS INPUTS FOR EU SUSTAINABLE
DEVELOPMENT STRATEGIES

Abstract:

The overall aim of the EU Sustainable Development Strategy was to identify and develop actions to enable the EU to achieve a continuous long-term improvement of quality of life through the creation of sustainable communities able to manage and use resources efficiently. Based on ecological and social innovations, circular economy, as an economic model that aims to keep resources in use for as long as possible by reducing waste, reusing products and materials, and recycling them at the end of their life, has substantial potential to improve policy strategies in the future. Major environmental challenges faced by many countries around the world could be

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mitigated with key benefits of a circular economy, helping to reduce waste and pollution. The European Union has recognized the importance of eco-innovations as a key driver of sustainable development and has implemented various policies and initiatives to implement the principles of circular economy in practice. Eco-innovation refers to the development and implementation of new technologies, products, and services that have a positive environmental impact while also contributing to economic growth. The subject of this paper is the analysis of the impact of measuring circular economy indicators on sustainable development goals for easier definition of sustainable development strategies and policies in developing countries. The goal of this work is to support the initiative of joint synergistic action of all actors based on the principle of the quintuple helix concept and to make contribution for initiating those actions at the local and regional levels.

Introduction

Measuring the impact of circular economy and eco-innovation on EU sustainable development strategies includes indicators which should identify areas where further action is needed for promoting and operationalizing sustainable development. In present time, we could form several groups of indicators:

- Environmental performance indicators: These indicators measure the environmental impact of eco-innovation, such as reductions in greenhouse gas emissions, water use, and waste generation.
- Economic indicators: These indicators measure the economic benefits of eco-innovation, such as job creation, increased productivity, and reduced costs.
- Innovation indicators: These indicators measure the level of eco-innovation activity in the EU, such as the number of patents filed, research and development expenditures, and collaboration between businesses and research institutions.
- Policy indicators: These indicators measure the effectiveness of EU policies and initiatives in promoting eco-innovation, such as the number of projects funded, the uptake of eco-innovation by businesses, and the level of public awareness.

With the respect of the main purpose of our conference and its practical nature, aim of this paper will be to create a brief overview of impacts of circular economy on sustainable development strategies as a foundation for discussion arising from different perspectives: social impact of eco-innovations, economic impact of eco-innovations, technology impact of eco-innovations, the impact of eco-innovations on the natural environment. The impact of eco-innovations on natural environment is one of the leading points of the reasons for criticism, by authors and individuals who are restrained or even opposed.

The concept of circular economy (CE) is increasingly attracting the attention of companies and the academic community and policy makers as a practical approach to solving current sustainability challenges, transforming the linear model of production and consumption, which takes place according to the "take-use-discard", into a circular form of resource management¹⁷. In the continuation of the work, we will also, briefly refer to the criticisms of this way of understanding the necessary concept for enabling improvements in the functioning of human civilization that will not endanger nature on the planet Earth. This paper brings evidence and foundation on the impact for the promotion and actualization of Circular Economy and its measurement tools. Inspired by the quintuple helix logic on local and regional levels we could have brighter picture for analysis of sustainable development strategies and its formation in the future. The structure of the paper supports a reasonable discussion on the following sub-topics: Innovation ecosystems based on the quintuple helix model, circular economy, quintuple helix model and eco-innovation indicators as important inputs for EU sustainable development strategies, possibilities and availability of measurements according to CE definition and CE strategies, conclusions and implications for further research.

1. Innovation ecosystems based on the quintuple helix model

Eco-innovation in companies leads to reduced costs, improves capacity to capture new growth opportunities and enhances their reputation among customers. Eco-innovation is therefore a powerful instrument to protect the environment with a positive impact on the economy and society. The Eco-innovation Scoreboard gathers data on eco-innovation performance across the EU and beyond, thus helping to monitor and evaluate progress made since 2010.¹⁸

Eco-innovation, by reducing impacts on the environment, increasing resilience against external pressures and using resources more efficiently, is vital in supporting this transition to a circular economy and achieving the objectives of the European Green Deal. The EU's 8th Environment Action Programme supports the

¹⁷ Vukadinovic, S. (2022), Circular economy and employment in the European Union, monograph, University Educons.

¹⁸ https://green-business.ec.europa.eu/eco-innovation_en

environment and climate action objectives of the European Green Deal by accelerating the transition to a regenerative economy that gives back to the planet more than it takes, in particular “through continuous innovation, adaptation to new challenges and co-creation”. The [biennial thematic report](#) presents good practices, drivers and challenges for eco-innovation to support a circular industrial transformation. This approach is in contrast to the traditional linear economy, where resources are extracted, used, and then discarded.

As highlighted in the author's work Del Vecchio et al.,¹⁹ the environmental sustainability dimension is well recognized in the innovation ecosystems debate,²⁰ such as in the quintuple helix model through the helix of natural and environmental transitions,^{21 22 23} the research in this field has failed to understand how innovation ecosystems can support the development of value creation processes in line with the Circular Economy principles.

The shift towards a circular perspective in the debate on the innovation ecosystem is coherent with the nonlinear innovation model depicted by author [Leydesdorff](#)²⁴ in the analysis of society as a knowledge-based context in continuous transformation originating from the advancement of technology and science. By focusing on the Circular Economy, the eco-innovation ecosystems can offer an important contribution to the operationalization and implementation of sustainable development strategies, based on relevant eco-indicators and inspired by

¹⁹ Pasquale Del Vecchio, Giuseppina Passiante, Grazia Barberio, Carolina Innella, Digital Innovation Ecosystems for Circular Economy: the Case of ICESP, the Italian Circular Economy Stakeholder Platform, *International Journal of Innovation and Technology Management*, Vol. 18, No. 01, (2021). <https://doi.org/10.1142/S0219877020500534>

²⁰ Etzkowitz, H. and Ranga, M. [2015] Triple helix systems: An analytical framework for innovation policy and practice in the knowledge society. *Entrepreneurship and Knowledge Exchange*. Routledge, London, pp. 117–158.

²¹ Grundel, I. and Dahlström, M. [2016] A quadruple and quintuple helix approach to regional innovation systems in the transformation to a forestry-based bioeconomy. *Journal of the Knowledge Economy*, 7, 4, 963–983.

²² Romano, A., Passiante, G., Del Vecchio, P. and Secundo, G. [2014] The innovation ecosystem as booster for the innovative entrepreneurship in the smart specialization strategy. *International Journal of Knowledge-Based Development*, 5, 3, 271–288.

²³ Carayannis, E. G. and Campbell, D. F. [2009] Mode 3 and quadruple helix: Toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management*, 46, 3–4: 201–234

²⁴ Leydesdorff, L. [2012] The triple helix, quadruple helix,, and an N-tuple of helices: Explanatory models for analyzing the knowledge-based economy? *Journal of the Knowledge Economy*, 3, 1: 25–35., Leydesdorff, L. [2013] N-Tuple of Helices. *Encyclopedia of Creativity, Innovation, and Entrepreneurship*. Springer, New York, pp. 1400–1402.

sustainability principles required by the Circular Economy and quintuple helix model.

The quintuple helix model promotes environmental sustainability that presents interesting points of contact with other well-debated issues such as ecosystem services. This approach to ecological economics is focused on understanding nature and the environment's value in the decision-making process²⁵. It also allows identifying innovative ideas and solutions for environmental management and sustainability²⁶. Despite the topic of innovation being intrinsically linked to the Circular Economy paradigm, the comprehension of its meaning and dynamics in innovation systems is marginally explored.

Supported by the author Gemma Durán – Romero et al.²⁷ the concept of Circular Economy (CE) emerged aiming to increase the resource use efficiency and minimize resource inputs, waste and emissions generation. However, the contribution of CE eco-innovations to climate change mitigation goals, pushed by the Quintuple Helix Model (QHM) actors, is still unknown. Climate change represents an increasing threat to society and demands collaborative actions for changing technologies, production methods, and consumption. This analytical review intends to fulfil this gap by investigating the main elements of the QHM that contribute to CE eco-innovations, namely companies, government, society, academia, and the natural environment. An analytical framework and theoretical propositions for future research are proposed. Eco-innovation technologies from energy, waste, transportation, construction and manufacturing sectors are discussed. Practical recommendations and implications for policymakers associated with CE and climate change policies and their interrelationship in terms of eco-innovations are also provided. Also in different perspectives of social, economic and environmental impacts, we must investigate the main characteristics and ways that a eco-

²⁵ Rau, A. L., von Wehrden, H. and Abson, D. J. [2018] Temporal dynamics of ecosystem services. *Ecological Economics*, 151, 122–130.

²⁶ Evans, N. M. [2019] Ecosystem services: On idealization and understanding complexity. *Ecological Economics*, 156, 427–430

²⁷ Gemma Durán - Romero, Ana M. Lopez, Tatiana Beliaeva, Marcos Ferasso, Christophe Garonne, Paul Jones, *Technological Forecasting and Social Change*, [vol. 160](#). Bridging the gap between circular economy and climate change mitigation policies through eco-innovations and Quintuple Helix Model.

<https://doi.org/10.1016/j.techfore.2020.120246>

innovations as a basics of future industry, way of living and human communities in general can support the creation of sustainable development strategies for the achievement of goals related to the circular economy. Environmental, economical and social implications of circular economy concept highlight the need for active involvement of users and their encouragement of more sustainable and responsible behaviors ²⁸.

2. Circular economy, quintuple helix model and eco-innovation indicators as important inputs for EU sustainable development strategies

Circular economy and eco-innovation indicators can be important inputs for EU Development strategies as they provide valuable information on the progress and impact of policies and initiatives related to sustainable development.

Some examples of circular economy indicators that can be used include:

- Resource productivity: This indicator measures the amount of economic output generated per unit of material input. A higher resource productivity indicates that the economy is using resources more efficiently.
- Recycling rates: This indicator measures the percentage of waste that is recycled. Increasing recycling rates can reduce the amount of waste sent to landfill and promote the reuse of resources.
- Circular design: This indicator measures the proportion of products and services designed with circularity in mind, such as the use of recyclable materials and the ease of disassembly for repair or recycling.
- Circular business models: This indicator measures the adoption of circular business models, such as product-as-a-service, remanufacturing, and sharing platforms.
- Some examples of eco-innovation indicators that can be used include:
- Green patent applications: This indicator measures the number of patent applications related to environmental technologies and innovations.
- Eco-innovation investments: This indicator measures the level of investment in eco-innovation activities, such as research and development and the adoption of new technologies.

²⁸ Urbinati, A., Chiaroni, D. and Chiesa, V. [2017] Towards a new taxonomy of circular economy business models. *Journal of Cleaner Production*, 168, 487–498.

- Eco-innovation performance: This indicator measures the environmental and economic benefits of eco-innovation, such as reductions in greenhouse gas emissions and improvements in resource efficiency.

By monitoring these indicators, policymakers can assess the effectiveness of their policies and initiatives and identify areas where further action is needed to promote sustainable development. This information can then be used to inform the development of EU Development strategies and ensure that they are aligned with the goals of a circular and sustainable economy.

As mentioned in paper signed by authors Arsova et al.²⁹ an important but unexplored research issue is understanding how digital innovation ecosystem and a quintuple helix model can support the promotion of Circular Economy. They presented the evidence of a single and extreme case study related to the Italian Circular Economy Stakeholder Platform (ICESP). This is shown as good practice of a digital platform for stakeholders' engagement, supporting the creation of a digital innovation ecosystem focused on the Circular Economy.

3. Possibilities and availability of measurements according to CE definition and CE strategies

Assessment of direct and indirect effects of the circular economy can rely on direct and indirect indicators when data is unavailable. However, it is difficult to define what direct or indirect mean. For further addressing the problem authors Moraga et al., proposed that “indicators may be direct or indirect in relation to the definition in sensu stricto or latu”. Circular economy indicators can be classified into three measurement types:³⁰

- a) Direct CE with Specific Strategies: indicators can focus on one or more identifiable CE strategies, *e.g.* Recycling Rate³¹ is specific to materials.

²⁹ [Sanja Arsova](#), [Andrea Genovese](#), [Panayiotis H. Ketikidis](#), [Josep Pinyol Alberich](#), [Adrian Solomon](#), Implementing Regional Circular Economy Policies: A Proposed Living Constellation of Stakeholders

Sustainability 2021, 13(9), 4916; <https://doi.org/10.3390/su13094916>

³⁰ Gustavo Moraga, Sophie Huysveld, Fabrice Mathieux, Gian Andrea Blengini, Luc Alaerts, Karel Van Acker, Steven de Meester, [Jo Dewulf](#), Circular economy indicators: What do they measure?, [Resources, Conservation and Recycling](#), vol. 146, 2019, p. 452-461.

³¹ [Graedel et al., 2011](#) T.E. Graedel, J. Allwood, J.

P. Birat, M. Buchert, C. Hagelüken, B.K. Reck, S.F. Sibley, G. Sonnemann, What do we know

- b) Direct CE with Non-specific Strategies: indicators always focus on more than one strategy, and it is not possible to recognise the explicit strategies, *e.g.* water withdrawal³².
- c) Indirect CE: indicators may evaluate aspects of CE strategies but with the use of [ancillary](#) approaches to assess CE, *e.g.* the indicator ‘Eco-innovation index’ from the Resource Efficiency Scoreboard³³ (EC, 2016) rank European countries in relation to eco-innovation factors; the indicator may provide information on CE, but it is not direct to a CE definition.

By designing products and materials with reuse and recycling in mind, policymakers can help to reduce the amount of waste generated and minimize the environmental impact of consumption. In addition, a circular economy can also create new economic opportunities and jobs in areas such as repair, remanufacturing, and recycling. This can help to drive economic growth while also reducing the strain on natural resources.

Overall, by incorporating circular economy principles into policy strategies, policymakers can help to address a range of environmental and economic challenges while also promoting sustainable development.

Although there are numerous critiques³⁴ addressed to the circular economy and circular business models, claiming that the circular economy has diffused limits, unclear theoretical grounds, and that its implementation faces structural obstacles. Circular economy is based on an ideological agenda dominated by technical and economic accounts, which brings uncertain contributions to sustainability and depoliticizes sustainable growth.

Critics of the circular economy concept have raised several concerns regarding its implementation in practice. Some of the common criticisms include (Table 1):

Table 1: Points of critics of the circular economy concept

about metal recycling rates? *J. Ind. Ecol.*, 15 (2011), pp. 355-366, [10.1111/j.1530-9290.2011.00342.x](https://doi.org/10.1111/j.1530-9290.2011.00342.x)

³² [Geng et al., 2012](#) Y. Geng, J. Fu, J. Sarkis, B. Xue Towards a national circular economy indicator system in China: an evaluation and critical analysis *J. Clean. Prod.*, 23 (2012), pp. 216-224, [10.1016/j.jclepro.2011.07.005](https://doi.org/10.1016/j.jclepro.2011.07.005)

³³ [EC, 2016](#), EU Resource Efficiency Scoreboard 2015 European Commission (2016)

³⁴ Hervé Corvellec, Alison F. Stowell, Nils Johansson (2021), Critiques of the circular economy, *Journal of Industrial Ecology*, Wiley. <https://doi.org/10.1111/jiec.13187>

Lack of concrete action	Circular economy is often discussed in theory, but there is a lack of concrete action to implement it. They argue that many of the policies and initiatives are not enforced, and there is a lack of accountability for businesses that do not follow circular principles.
Limited scope	Circular economy only focuses on the end-of-life stage of products and materials and does not address the full lifecycle. Circular economy should also consider the extraction, production, and distribution stages to ensure that resources are used sustainably from the beginning.
Technical challenges	Implementing a circular economy requires significant technical expertise and investment, which may be difficult for small businesses and developing countries. There is a need for more research and development to develop new technologies and solutions that can enable a circular economy
Limited impact	Circular economy may have limited impact on the overall economy and environment. Circular economy may only address a small portion of the environmental challenges faced by society, and that broader systemic changes may be needed to achieve with more practical sustainable development strategies

Source: Authors consideration

Despite these criticisms, proponents of the circular economy argue that it is a necessary shift towards a more sustainable and resilient economy. The circular economy has the potential to create new economic opportunities and jobs, reduce waste and pollution, and promote sustainable consumption and production patterns.

Under a circular economy, materials from products at the end of their lifecycle are recovered through dismantling and recycling and consequently re-injected into the beginning of the product lifecycle, thereby reducing environmental impacts and production costs. Recycling is therefore a necessary precondition for a circular

economy – resources and materials are recycled, returned back to the economy and used again. However, to maximise the effectiveness of recycling and the economic potential of secondary raw materials, eco-innovation is key. Eco-innovation allows for the possibility to transform waste into a valuable resource through the development of new technologies, processes, services and business models. SMEs, including a qualified workforce working in eco-industry sectors related to recycling, repair, and reuse are therefore a necessary contribution to the circular economy and act as vectors for boosting the recycling and reuse market.³⁵ By analyzing these indicators, policymakers can assess the impact of eco-innovation on EU development strategies and identify areas where further action is needed to promote and operationalize sustainable development.

Conclusion

By the Sofia Declaration on the Green Agenda for the Western Balkans from 2020, the countries of the Western Balkans have undertaken to implement measures in the field of climate 4 change and pollution prevention, energy development, transport and circular economy, as well as biodiversity development, sustainable agriculture and food production.³⁶

Capacities are insufficiently developed at the local level, but there are also large differences in economic power in different regions in Serbia. The time frame and respect for the time frame by the executive authority and agility in the creation of public policies can greatly contribute to the acceleration of the transition and the stimulation of the economy towards new investments. The infrastructure and economic justification for business connections between companies is insufficiently developed. Insufficient industry knowledge of new business models and sources of industry financing to change the way of doing business in the context of the circular economy. It is necessary to change the resource policy in such a way that the state will influence the preservation of natural resources through various measures and

³⁵ Asel Doranova, Laura Roman (Technopolis Group, Belgium) Bettina Bahn-Walkowiak, Henning Wilts, Meghan O'Brien (Wuppertal Institute for Climate, Environment, Energy, Germany) Stefan Giljum (Vienna University of Economics and Business, Austria) Mary Ann Kong, Mathieu Hestin (BIO by Deloitte, France), Policies and Practices for Eco-Innovation Uptake and Circular Economy Transition EIO bi-annual report November 2016

³⁶ Simonida Vukadinović, 2022, Circular economy in the Western Balkans countries, Proceedings International Conference "The circular economy: "the number one priority" for the European Green Deal", September 19-21, Sremska Kamenica, Novi Sad, Republic of Serbia.

emphasize through public policies the sustainable reuse of already used resources and materials.³⁷

In order to overcome the debates about the economic profitability and justification of the circular economy and what science teaches us that the output of these energy sources is questionably small in relation to energy needs, measuring the results as precisely as possible and recording the good and bad sides implemented in practice can only help with people's awareness. As it is extremely difficult to change human consciousness, even if it is obvious that the individual or group is doing something to the detriment of himself and his environment, we are left with - measurement and precise information about the effect of the circular economy.

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³⁷ Circular economy course in University Educons new curriculum with best practice case study firm Biofor System in eco-innovations, Jelena Jesic, Simonida Vukadinović, Proceedings International Conference "The circular economy: "the number one priority" for the European Green Deal", September 19-21, 2022, Sremska Kamenica, Novi Sad, Republic of Serbia.

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CIRCULAR ECONOMY AS A PATHWAY TO SUSTAINABLE ECONOMIC GROWTH AND DEVELOPMENT

Abstract:

Circular economy (CE), as a concept of sustainable development, is a topic that is gaining more and more importance, especially in the last few years, that is, since the beginning of the war in Ukraine and the energy crisis, when the concept of green transition is gaining momentum. There is a great need for a circular economy in the world, with recycling being considered the leading instrument of this model of economy. As one of the newer economic paradigms, the circular economy is becoming imperative for achieving sustainable economic growth and development. Respecting the importance of this topic, the aim of our student work will explore the concept of the circular economy, its advantages, and how it can be applied, with special emphasis on Serbia. The paper is conceived in three parts. The first part is based on the analysis of the essence, principles, and advantages of the circular economy. The second part presents the application of the circular economy concept in various branches of the economy and business. The third part focuses on the circular economy in the Republic of Serbia and roadmap for its implementation.

Keywords: circular economy, sustainable development, Serbia

Introduction

In the 21st century, global economic growth and technological advancement have led to the rapid depletion of natural resources, environmental pollution, and climate change. This unsustainable way of life has led to a call for a more sustainable and circular economy that seeks to reduce waste, conserve resources, and minimize pollution. In modern business, which is characterized by major economic,

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technological and environmental changes, the circular economy (CE) plays a significant role. The concept of circular economy as a paradigm of sustainable development takes into account the issue of waste management, its further recycling and the real new value that multiplies the company's further continuation of the product's life cycle. By actors in the circular economy, that are companies, consumers, citizens and representatives of non-governmental organizations. Also, states are considered a critical supporter of CE implementation.

The circular economy is an economic model that seeks to retain the value of products and materials in the economy for as long as possible, while reducing waste and pollution. The circular economy seeks to keep resources in use for as long as possible. This is achieved by designing products and services with durability, reuse, and recycling in mind. The circular economy means a departure from the traditional linear economic model, which is based on the principle of take-make-use-dispose. This model relies on large quantities of cheap, readily available materials and energy. In contrast, the circular economy model is based on a closed-loop system that aims to create economic, social, and environmental benefits.

The circular economy model is based on three principles: design out waste and pollution, keep products and materials in use, and regenerate natural systems. The first principle seeks to eliminate waste and pollution by designing products and processes that minimize waste and pollution. The second principle aims to keep products and materials in use for as long as possible by promoting reuse, repair, and recycling. The third principle seeks to regenerate natural systems by promoting ecosystem restoration and the use of renewable resources.

1. Advantages and challenges of the circular economy

The circular economy offers several advantages compared to the linear economic model. The first benefit is the reduction of waste and pollution. The circular economy aims to design out waste and pollution, resulting in a cleaner environment and reducing the negative impact of waste on human health. The second advantage is the preservation of resources. The circular economy seeks to keep products and materials in use for as long as possible, reducing the demand for natural resources and preserving them for future generations. The third benefit is the creation of new economic opportunities. The circular economy creates new jobs in the recycling, repair, and refurbishment industries. Additionally, the circular

economy can help promote innovation and collaboration. By working together to develop new solutions and sharing resources, businesses can overcome challenges and find new ways to reduce waste and preserve resources. This can help drive innovation and promote a more sustainable future.

The development of the circular economy plays a significant role in the fight against climate change, and it has numerous benefits. This form of economy in which materials and resources circulate, aiming for zero waste, has many advantages over the linear model, including:

1. Protection of resources and the environment
2. Energy savings
3. Reduction of unemployment
4. Promotion of innovation and increased competitiveness

These benefits have been recognized by the European Commission, which adopted the "zero waste" program three years ago. This program aims to increase recycling and prevent the loss of important resources, create jobs, drive economic growth and new business models, as well as reduce greenhouse gas emissions. Specifically, the goal of this program is to achieve 70% recycling of municipal waste and 80% recycling of packaging waste by 2030. The Commission estimates that the circular economy could save businesses in the European Union a total of 600 billion euros.

Strategic management is a field of management that helps companies carefully evaluate circular economy-inspired ideas and firmly separate and explore where circularity seeds can be found or integrated. Previous research has identified that strategic development for circularity can be a challenging process for companies, requiring multiple repeated strategic cycles. The book *Strategic Management and the Circular Economy* defined circular economy for the first time as a strategic decision-making process that covers the phases of analysis, formulation, and planning. Each phase is supported by frameworks and concepts popular in management consulting - such as the idea tree, value chain, VRIE, Porter's five forces, PEST, SWOT, strategic clock or internationalization matrix - all adapted through a circular economic lens. Although still to be tested, it is claimed that all standard tools for strategic management can and should be calibrated and applied to the circular economy.

Although the circular economy offers many advantages, there are also challenges for the implementation of this system on a large scale. One of the biggest challenges is changing consumer behaviour. Consumers are accustomed to traditional linear economies, where products are used and then discarded, and it can be difficult to convince them to accept a new way of thinking. This is particularly true in countries where consumerism is deeply rooted in the culture. Another challenge is the lack of infrastructure and support systems for the circular economy. In many cases, companies need to invest in new technology and infrastructure to enable reuse, repair, and recycling of products. This can be expensive and time-consuming, and it may take some time before these investments pay off. Finally, there is the challenge of coordination and collaboration across different industries and sectors. The circular economy requires a high degree of collaboration and coordination between companies, governments, and other stakeholders, and this can be difficult to achieve in practice.

2. Adoption and implementation of the circular economy concept by industries

Sustainability in business, which can be achieved through the application of a circular economy, is becoming an imperative today, a matter of competitiveness, social and environmental responsibility, and ultimately perhaps survival. As the concept of circular economy gains importance, more and more sectors in the economy have modalities in which they apply it. Some examples are as follows:

- **Textile Industry**

Circular economy within the textile industry refers to the practice of constantly recycling clothes and fibers, reintroducing them into the economy as much as possible, rather than ending up as waste. Circular textile economy is a response to the current linear model of the fashion industry, "where raw materials are extracted, turned into commercial goods, then bought, used and ultimately discarded by consumers." The documentary film about the fashion world, *The True Cost* (2015), explained that in fast fashion "unsafe conditions and factory disasters are justified by the necessary jobs they create for people with no alternative." It is argued that by adopting circular economy practices, the textile industry can transform into a sustainable business.

- *Construction industry*

The construction sector is one of the largest generators of waste in the world. Circular economy emerges as a useful solution for reducing the industry's impact on the environment. Construction is very important for the economy of the European Union and its member states. It provides 18 million direct jobs and contributes about 9% of the EU's GDP. The main causes of the impact of construction on the environment are found in the consumption of non-renewable resources and the production of pollutants, which are increasing at an accelerated pace.

- *Furniture industry*

When it comes to the furniture industry, most products are passive durable products, and therefore implementing strategies and business models that extend the lifespan of products would typically have lower environmental impacts and lower costs. The EU has identified huge potential for implementing a circular economy in the furniture sector. Currently, out of 10 million tons of annual discarded furniture in the EU, most ends up in landfills or is incinerated. There is a potential increase of 4.9 billion euros in gross value added by transitioning to a circular model by 2030.

- *The oil and gas industry*

The rise of the circular economy within the oil and gas industry is very poor, the opportunity for circularity has never been more apparent, or possible, than when equipment is being decommissioned. Hundreds of thousands of tons of waste are returned to shore for recycling. Unfortunately, this equates to equipment that is perfectly fit for continuous use being disposed of. Over the next 30-40 years, the oil and gas sector will need to decommission 600 installations in the UK alone.

- *Renewable energy industry*

The energy resources of oil and gas are not in line with the idea of a circular economy, given that they are defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." A circular economy can only be powered by renewable energies such as wind, solar, hydro, and geothermal.

Today, a large number of international companies and successful brands have introduced into their operations some of the principles and practices of the circular economy, which achieves sustainability in business. Representative example of a brand that uses circular economy system is one of the world's largest

brands "Adidas". They are committed to recycling their shoes and strive to reduce any form of pollution that affects the planet. On their website, various information can be found about what they plan to do and what they are already doing to improve the quality of life. Some of the steps they plan to take are:

- By 2024, they plan to replace raw polyester with recycled materials
- By 2025, they are committed to reducing carbon dioxide emissions by an average of 15% per product
- By 2030, they plan to reduce combined greenhouse gas emissions from retail, operations, and suppliers by 30%

The main factors that contribute to the creation of increasing amounts of waste are two phenomena: frequent innovations and poor product quality. Waste is also generated when there is a mismatch between the lifespan of a product and its useful life, or when the useful life is shorter than the lifespan. Frequent innovations are precisely the reason why some products are not used for a long period. The best example of this is the mobile phone. The world's largest manufacturers introduce new models almost every year, even though the old ones are still more than functional. By creating demand, discarded devices pile up. To avoid waste, waste prevention is essential in the circular economy. Prevention is achieved by designing products to have a longer lifespan, while containing eco-friendly materials that are not harmful and parts that can be easily repaired, replaced, or recycled.

3. Serbia in transition towards circular economy

The Roadmap for the Circular Economy in Serbia is a process that aims to familiarize, promote, and connect recognized actors who, with their knowledge, innovation, and creativity, can contribute to a faster transition to a circular economy. This document is a guide to transitioning to a circular economy model that focuses not only on profit but also on environmental protection and resource preservation. The economic, social, and environmental dimensions are equally important.

The goal of the Roadmap is to stimulate production through the application of circular business models, motivate industry to create new jobs, and improve business performance by finding innovative sustainable solutions for markets. This document aims to encourage society towards systemic changes in thinking, culture, and resource relationships, as well as to encourage decision-makers to commit to

changes in public policies and dialogue in the context of a circular economy. This document guides a process that provides an opportunity for all stakeholders to engage in open dialogue and joint solution creation for a more efficient and faster transition.

In Serbia, there are currently more than 3,000 illegal landfills. Currently, less than 10% of waste is recycled, and the current goal is to increase this percentage to a minimum of 50% by 2030 through laws and bylaws, which would provide an opportunity for 30,000 new jobs. The circular economy would give Serbia a great chance for a second chance. Circular economy is a regenerative economic model that positively impacts all types of capital: financial, human, social, and natural. Its goal is to regenerate devastated natural resources, retain materials in use, and extend the life cycle of products by applying appropriate design that allows products to not become waste and contribute to pollution at the end of their life cycle. Global trends are moving towards replacing deeply embedded linear economy and waste management with circular economy. Circular economy also implies protection of human rights through sustainable development, global natural resource security, combating climate change, energy security, ensuring sufficient food quantities, reducing inequalities, more transparent public finances and social security of citizens, preserving health and cleaner environment, and the rights of future generations to resources.

In today's world, we are faced with numerous global challenges such as fighting climate change, extinction of plant and animal species, endangered ecosystems, continuous growth of waste, pollution, and depletion of natural resources as a result of climate change and pollution. The circular economy can play a significant role in addressing the climate crisis and achieving UN climate goals, but a fundamental change in the global approach to fighting climate change is necessary.

The European Commission has prioritized cleaner technologies, innovation, and research to reduce harmful gas emissions and achieve the ambition for Europe to become a global leader in the circular economy. The "European Green Deal" introduced a new Circular Economy Action Plan in March 2020, with a focus on sustainable resource use, particularly in the textile and construction sectors. Within the framework of the "European Green Deal," the European Commission will supplement the macroeconomic coordination process with a focus on economic and sustainable development to achieve citizens' well-being.

Member states of the European Union are required to align their national policies with new development strategies and public policies. Between 2014 and December 2018, 14 out of 28 countries developed either a strategy, a roadmap or action plans for the transition to a circular economy. Some countries are even in the process of revising their initial strategic documents.

Improving business models and aligning business operations with the principles of circular economy in Serbia can greatly contribute to improving the competitiveness of national companies and addressing socio-economic issues. The Government of the Republic of Serbia's program for environmental protection development since 2017 has stated that environmental protection programs will be developed in accordance with circular economy principles that apply to infrastructure projects. The roadmap aims to:

- Provide information on the importance of transitioning to a circular economy, i.e. a new business model and conditions of competitiveness, opportunities for faster development of Serbia, and solving the problem of managing secondary raw materials, including waste, the need for resource and energy independence, and environmental safety.
- Identify sectors in which there is already a basis for the application of circular economy tools, without underestimating less developed sectors and traditional industries that will require more investment to transition to new production models.
- Identify key agents of change who can contribute to a faster transition to a circular economy through synchronized and joint activities.

The roadmap for Serbia presents different approaches to the reasons for transitioning to a circular economy, as well as economic models and possible ways to increase national productivity through new global trends in economic growth that lead to a reduction in the use of natural resources and negative impact on the environment.

Conclusion

In conclusion, the circular economy offers a promising vision for a more sustainable future. By keeping resources in use for as long as possible and minimizing waste, businesses can reduce their impact on the environment and create new economic opportunities. While there are challenges to implementing this system on a large scale, there is significant potential for the circular economy to

become a more widespread and influential system in the future. As consumers, businesses, and governments work together to promote a more sustainable future, the circular economy is likely to play an increasingly important role in achieving this goal.

Circular economy is an approach used in economics to reduce the negative impacts of human activities on the environment and to ensure sustainable development. Circular economy processes involve reusing, renewing, and recycling products and materials, which means reducing the consumption of resources, energy, emissions, and waste. This reduces environmental pollution and improves people's quality of life.

In this paper, we have become familiar with the fact that circular economy is of great importance for sustainable development and environmental protection. We have studied various aspects of circular economy, such as product reuse, renewable energy sources, resource usage, and recycling. We have also analyzed the positive effects of implementing circular economy, which are directly related to environmental preservation and improvement of people's quality of life.

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