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CIRCULAR ECONOMY - CONCEPT FOR A  
SUSTAINABLE FUTURE

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**Abstract**

*The implementation of a circular economy has appeared as a response to the need to challenge the flaws of the current linear economic system. Contrary to linear production methods, circular economy systems retain added value from products for as long as possible with the aim of eliminating the generation of waste. The circular economy creates benefits and sustainability to meet economic, environmental and social challenges. The purpose of this paper is to raise awareness of the relevant stakeholders and especially young people, to encourage the rational use and increased efficiency of resources, as well as to change the mindset and habits of youngsters in order to ensure a high level of protection and improving the quality of the environment. The growing concern for the environment and raising awareness of the importance of the circular economy will contribute to improving the quality of life, a secure future for young people and the creation of new jobs.*

**Keywords:** circular economy, sustainability, European Green Deal, youth

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## 1. Introduction

According to OECD, (OECD, 2021), population and economic growth are on track to double global material consumption by 2060.<sup>5</sup> Trends towards urbanization and higher living standards will lead to particularly high levels of materials use in cities. By 2050, 55% of the global population is expected to live in urban areas (OECD/European Commission, 2020). Already, cities represent almost two-thirds of global energy demand, produce up to 50% of solid waste and are responsible for 70% of greenhouse gas emissions (World Bank, 2009). Globally, at urban level, material consumption is expected to grow from 40 billion tons in 2010 to 90 billion tons in 2050 (UNEP, 2018). The transition to a circular economy presents not only an opportunity to address the triple planetary crises of pollution, climate change, and biodiversity loss, it is also a necessity to ensure future wellbeing.

The circular economy is a regenerative economic model that has a positive impact on all types of capital: financial, human, social and natural. It aims to restore natural resources, keep raw materials in use and extend the life of products by applying appropriate design and turns them into raw materials instead of waste, so that they do not contribute to environmental pollution (Rizos, et al, 2017). Current world trends aim to replace the deeply rooted linear economy and waste management with a circular economy. The circular economy also supports the protection of human rights, by ensuring sustainable development, global security of natural resources, action on climate change, energy security and sufficient food for all. In addition, it reduces inequalities, offers more transparent public finances, increases the social security of citizens and preserves health, a clean environment and the right of future generations to use natural resources.

This paper aims to improve understanding of the circular economy concept as well as its various dimensions and expected impacts. Based on an extensive literature review, the paper first reviews the different available definitions of the circular economy. This is followed by a presentation of the main economic, environmental and social impacts at the EU and national level of the circular economy transition according to the existing evidence in the literature. The research team furthermore conducted Research study “Attitudes of young people regarding the rational use of resources, recycling and utilization of waste - insights into the EU's Green Agenda for the Western Balkans”. The research was conducted within the project "Youth Green Agenda" supported by the Agency for Youth and Sports, Government of the Republic of North Macedonia (RNM). Finally, we present main conclusions and policy recommendations and suggest that there is limited information especially of young people about the circular economy and its economic, environmental and social benefits.

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<sup>5</sup> In 1920, the average resident of Europe with his economic activity and livelihood created about 30 kg of waste per year. In 2020 it is estimated that the planet had between 1.8 and 2 billion inhabitants. In 2020, the average resident of Europe creates about 450 kg of waste per year, or 15 times more than a hundred years ago. And the number of inhabitants is almost 4 times higher (7.8 billion).

## 2. Concept, role and meaning of circular economy in modern conditions

The current and traditional linear extract-produce-use-dump material and energy flow model of the modern economic system is unsustainable (Frosch and Gallopoulos, 1989). Circular economy provides the economic system with an alternative flow model, one that is cyclical (CIRAIG, 2015). In a circular economy, waste generation is minimized through the careful design of new products and an industrial process in which materials constantly circulate in a “closed-loop system”. Waste has become extremely present across the whole planet, and raw materials are in demand more than ever. It is estimated that around 80% of all materials and consumer goods are disposed of and that upon entering the food supply chain, over 30% of processed food is thrown away. Applying the circular economy concept encourages environmental protection and social prosperity, while enabling economic growth in line with sustainable development. A circular economy can reduce environmental devastation in the whole system, as well as increase the generation of new added value (Grdic, et al., 2020).

The current concept of a circular economy (circular economy concept) initiates a movement from the current concept of a linear economy, based on systems with intensive consumption of natural resources, high emissions, waste generation and negative effects on the environment, towards circular, less wasteful systems that use resources more efficiently and sustainably, while providing job opportunities and a high quality of life (see “Fig. 1”).

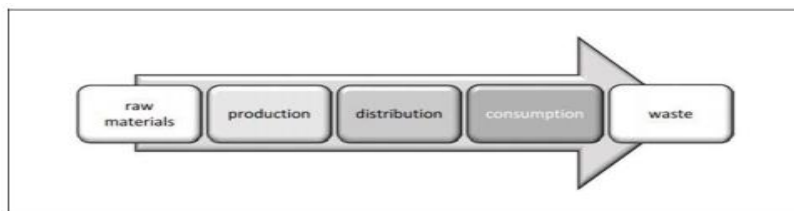


Figure 1. Phases of a linear economy model

Source: Kriško, 2015

In order to abandon the concept of a linear economy and transition to a circular economy, changes in the system are necessary in the area of:

- society organizations,
- education,
- innovations in technology and other activities,
- creation of appropriate material infrastructure,
- creation of an appropriate institutional framework,
- new design of products and business processes (production, procurement, management, etc.),
- design, implementation and development of new business and market models,
- waste management system development,

- changes in consumer priorities and habits and the development of new forms of behavior
- development of new methods for managing integrated systems,
- development of new financial instruments that support the concept of circular economy,
- defining and publishing new policies.

According to Murray et. al. 2015, “The circular economy is an economic model where planning, resource supply, procurement, production and processing are designed and managed, both as a process and as an outcome, to maximize ecosystem functioning and human well-being“.The circular economy is a new paradigm of sustainability (Bote et al. 2022). A shift to a circular economy could reduce each nation's greenhouse gas emissions by 70%, increase the workforce by 4%, and have a low-carbon economy (Masoumi, 2022) . Using waste resources by just 1% could save approximately 840 million tons of metals, fossil fuels, minerals and biomass per year, as well as saving 39.2 trillion liters of water (Rubel, Schmidt & Felde, 2017).

The concept of circular economy represents a key contribution to the 2030 Agenda for Sustainable Development (United Nations, 2015), its Sustainable Development Goals (UNDP, 2015) and other jointly agreed international goals, according to the Paris Agreement and the United Nations Conventions, related to priorities for climate changes. In 2015, the European Commission adopted a new legal framework for the introduction of a circular economy model in order to strengthen the economy through the sustainable use of resources and ensure sustainable economic growth (European Commission, 2015). The transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized, is an essential contribution to the EU's efforts to develop a sustainable, low carbon, resource efficient and competitive economy. Such transition is the opportunity to transform our economy and generate new and sustainable competitive advantages for Europe.

Reducing the rate of consumption, together with increasing the rate for circular usage of the materials, is a special priority, in the context of the new EU Green Deal strategy (European Green Deal Strategy, 2019), as Europe's new agenda for sustainable growth and development (European Commission, 2022). The European Green Deal represents a roadmap towards transforming Europe into the first climate-neutral continent by 2050 and transforming the European Union into a modern, resource-efficient and competitive economy, with no net emissions of greenhouse gases by 2050, with economic growth based on pronounced circular use of the resources. The set goals will be realized by turning climate and environmental challenges into opportunities in all areas, making the transition fair and inclusive for all.

The circular economy model implies a change in the paradigm of resource management in an efficient and smart way. Such a concept is based on eco-innovation, eco-design, advanced technologies, energy efficiency and use of renewable energy sources. Circular economy is an economy that uses a system-focused approach and includes industrial processes and economic activities that

are regenerative by design, allows the resources used in such processes and activities to retain their highest value for as long as possible, and strives to eliminate waste through superior design of materials, products and systems (including business models).

There are two sets of business models that relate to a circular economy: 1) business models that integrate and encourage reuse, repair, remanufacturing and upgrading in their operations and 2) business models that turn old goods into new resources by recycling. In this way, consumers become users and creators, while the labor market creates more skilled jobs.

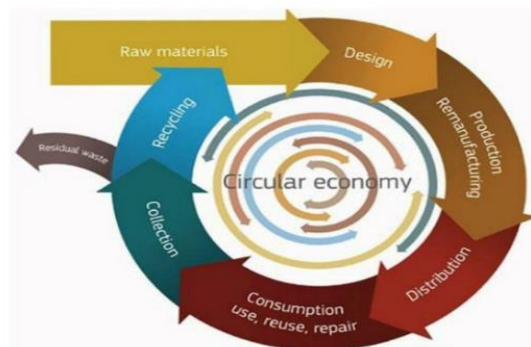


Figure 2. Circulation of resources in the concept of circular economy  
Source: Manfredi, et al., 2015

“Fig. 2” shows the stages of the circular economy model, where in each stage of the circular cycle it is possible to reduce costs and dependence on natural resources and the accumulation of waste. The circular cycle starts with good product design, so that such products are easily refurbished or disassembled. All phases are interconnected, the phase of production and processing of products is based on the concept of exchange of by-products, a waste material from one production process enters as a resource in another process. In the transport phase, efforts are made to achieve the greatest possible energy savings and the least possible environmental pollution. The end of the cycle is marked by the collection and recycling phases, where the main goal is to reduce as much as possible the amount of resources that leave the system and end up as waste. The application of the concept of circular economy aims to enable sustainable management of resources. Although the circular economy is often presented only as a plan for the collection and recycling of waste, the concept is actually much more complex and goes in the direction of the development of new technologies, innovations, designs and modular products, produced in a way that they can be constantly supplemented and processed and represent a new way of organization in companies. For many companies it often means reorganization and a new way of managing, changing many processes where there are changes in organizational structures that turn into complex networks supported by modern communication systems and computer technology. The concept of a circular economy implies the success of companies that are better than their competitors in "adding value", but also for society and the environment, for consumers and for investors.

Through the transition to a circular economy, companies can have significant benefits, in the form of (WBCSD, 2017):

- Opening of new jobs;
- Innovations and competitive advantages;
- Cost reduction;
- Reduction of energy consumption and CO2 emissions;
- Greater reliability of the supply chain and resources.

The absence of appropriate regulations, lack of environmental education, lack of environmental conservation culture and low market demand pressure are significant relevant challenges of the circular economy (Zhang, 2019).

Circular economy knowledge should be concentrated in large industries and small and medium-sized enterprises. This topic should increasingly be part of the professional and scientific research of the university academic community. It will allow companies to hire professionals who will be educated on how to reshape business models towards a circular economy. The government, through its regulations, can help the economy with appropriate green policies, taxation, promoting a circular economy and attracting green investments. Scientists have the opportunity to increase research and development on this topic and implement new methods with innovation and sustainability.

### **3. Circular economy in the Republic of North Macedonia - Legal and Institutional Framework**

Having regard to the Republic of North Macedonia as a candidate country for EU membership, it needs to apply all European standards and best practices, as well as comply with EU legislation, and it is also necessary to manage waste, which is important segment of the environment. Waste management according to the prescribed standards will not only contribute to a better environment, but will also contribute to the protection of people's health and ensure the implementation of the circular economy in the country.

The main legal basis at national level is currently found in few documents, in the continuation of the paper there will be a brief review of these documents.

The Environmental Law (2005) contains the basic principles for environmental protection, which are the basis for defining environmental management procedures, which are common to all laws that regulate separate segments of the environment.

The Waste Management Law (2020) regulates in detail the collection, transport, selection, recycling of waste, as well as its treatment and utilization, which will enable the creation of an efficient regional system for waste management, which will reach and fulfill the requirements according to the EU legislation.

The Environment and Climate Change Strategy 2014-2020 of Ministry of Environment and Spatial Planning (2015) defined the priority actions aimed at a series of benefits for the environment and society. What is important is that the strategy upgrades the legal framework of the EU environment, in the direction of better preparation for the challenges of joining the EU. The Ministry of Environment and Spatial Planning, in cooperation with the Ministry of Economy

and the Ministry Finance is in charge of preparing regulations for extended producer responsibility (packaging, batteries). The Ministry of Finance is developing economic instruments and providing funds to encourage sustainable waste management, particularly with regard to fee collections, asset management and fee recovery mechanisms.

The Republic of North Macedonia for circular economy promotion, at home, but also in the region, in its industrial policy focuses on strategic goals related to the catalysis of green industry and green production, which is covered in the New Industrial Strategy 2018-2027 (Government of RNM, Ministry of Economy 2018).

In the National Program for Competitiveness, Innovation and Entrepreneurship (Ministry of Economy, 2020), supports companies to develop projects for company assessment and introduction of the concept of circular economy, looking at the entire life cycle of products, waste reduction and modern waste management and recycling.

With the National Energy and Climate Plan 2021-2030 (Government of RSM. Ministry of Economy, 2020a), the five dimensions of the circular economy of the Energy Union have been adopted, i.e. decarbonization, energy efficiency, security of energy supply, internal energy market and research, innovation and competitiveness. In this plan, around 63 specific policies and measures are proposed to achieve established goals for each of the five dimensions. Estimates for North Macedonia show that by 2030, the application of practices inherent to the circular economy in the selected waste streams expressed through three indicators can ensure (Ministry of Environment and Spatial Planning, 2020):

- Savings of 951 Gg CO<sub>2</sub>eq/year of emitted greenhouse gases compared to 2016;
- 2740 new jobs;
- 47.17 million euros of economic benefit

North Macedonia has already ratified the Paris Climate Agreement (Law for Ratification of Paris Agreement, 2017), contributing to the global effort to reduce greenhouse gas emissions caused by the burning of fossil fuels by 30%, a trend of 36% higher, by 2030. At the Western Balkans Summit, the region adopted the Green Agenda Declaration (European Commission, 2020). With this, the region undertakes to follow a process of transition from a linear to a circular economy, fully aware of the need for a research and innovation system to support this transition, as part of the common regional market.<sup>6</sup> An Action Plan has been prepared with roadmaps for the implementation of this Declaration on the Green Agenda and the establishment of an effective and efficient monitoring system" (Ministry of economy, 2020).

The competent authorities for inspection supervision and sanctioning are the State Environment Inspectorate (SEI) and the authorized environmental inspectors, as well as the local communal inspectors. Inspection control of

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<sup>6</sup> With the Green Agenda Action Plan, the way is opened for the realization of the Economic and Investment Plan for the Western Balkans, worth 30 billion euros. With this plan, it is foreseen that the countries of the region will receive nine billion euros in non-refundable aid and 20 billion euros

products that have been put on the market is the responsibility of the State Market Inspectorate (within the ME).

Significant stakeholders are also the Association of Local Self-Government Units (ALSGU), Chambers of Commerce, and Unions of public services, Unions of waste handlers, Associations of public service providers, NGOs and Scientific institutions at universities. The weakest feature is institutional practice and the lack of systematic communication and provisions related to training and guidance. More regular meetings and dialogue between the Ministry of Education and Culture and municipalities, industry and other stakeholders are needed.

#### **4. Research results**

The research was carried out within the framework of the "Youth Green Agenda" project supported by the Agency for Youth and Sports, Government of the Republic of North Macedonia, regarding recycling, rational use of resources and utilization of waste in the Republic of North Macedonia. The aim of the research was to obtain data on young people's knowledge of the EU's Green Agenda for the Western Balkans. The questionnaire that we conducted within the framework of this study contains 33 questions about the concept of the circular economy and green entrepreneurship. 299 young people participated in the research, 73.9% of them were female and 26.1% were male.

From the analysis of the answers we received, it can be concluded that the majority of respondents have not heard about the concept of circular economy (54.7%) and the EU Green Agenda for the Western Balkans (80.8%), which means that there is a need of trainings/workshops in relation to the benefits of the previously mentioned concept. In relation to the question to choosing the right materials to package the products, the largest number of participants answered that they sometimes pay attention (49.5%), which means that there is still interest among them.

From the analysis of the issue of waste sorting at home, 45% of respondents said that they mostly sort plastic, despite the fact that 53.3% of them believe that there are no conditions for sorting.

In a large part of the answers among the respondents, it is stated that there is a positive attitude towards environmental protection (45.7%) despite the fact that not enough activities are undertaken, mostly by the citizens (31.7%), then by local self-government (25.3%), central government (17.7%), educational institutions (15%), families (14%), non-governmental organizations (9.7%) and business entities (6.3%).

Interesting opinions were received on the issue of innovative ideas for reuse of materials and utilization of waste. Namely, some of the responders propose to make functional objects from old furniture; to make organizers from cardboard, to create electricity through fuel obtained from plastic, to create natural fertilizer by burying vegetable and fruit peels, to sew bags from old jeans etc.

The questions indicate the fact that among the responders there is an awareness of recycling, rational use of resources and utilization of waste in RNM. Also, a significant part of the responders show interest in starting their own



business, participating in recycling and waste processing activities with the aim of a cleaner environment in our country.

Education and training must respond to the challenges of the 21st century, including the green transition. To accelerate circular solutions, businesses and governments must unlock the passion and creativity of young people by centering their voices in circularity decision-making in boardrooms, waste plants, and communities. Such intergenerational partnerships are key to scaling up ambition from recycling towards strategies higher on the waste hierarchy such as redesigning, repairing, and remanufacturing. Oftentimes, youth are engaged in the circular transition as volunteers but lack the resources to have a positive impact on a bigger scale. By funding youth-led circular economy research and entrepreneurial projects, creating circular economy jobs and training programs, and providing learning and networking opportunities, the old economy can make way for the new economy with young people at the helm.

### **5. Conclusion and recommendations**

The circular economy affects the reduction of the load and the use of natural resources, while at the same time it stimulates economic growth and employment. In order for the concept of a circular economy to come to life, it is first necessary to make a drastic change in the production process and the life cycle of the products, from the very design, the type of raw materials and the energy that will be used, to the consumption. At the same time, everyone should strive to generate as little waste as possible, and even if there is, it should be used as a resource in some other production. Therefore, in order to achieve the circular economy, a long way to go is to use as many raw and recyclable materials as possible, to create circular industrial sites, new and sustainable business models, and when the product will eventually become waste, to ensure efficient recycling, the result of which will be a high-quality secondary raw material. The consistent and timely application of the principles of the circular economy at the moment is from being exceptionally important for our country to being the most serious problem of the whole country. This is precisely the destruction of the environment due to improper treatment of the fallout. North Macedonia needs to fully align its legislation with EU legislation on waste, including recycling and landfill reduction. In other words, it is necessary to make great efforts to develop a sustainable way of life, not only production, but also to direct all factors in society, from consumers to the government, to sustainable solutions in all areas, and not only when it comes to production. It is necessary to ensure efficient collection and management of waste, as well as to build recycling facilities, so that countries can in the future use the resources that currently end up in landfills.

Institutional cooperation is needed, and even more education and information of all stakeholders, who will implement all measures and activities towards the establishment of stem for the selection of the waste. And finally, it will be more necessary to change the way in which we function and that all of us, as end consumers, have the power to attribute to socio-economic changes and to protect our health. Partnerships between businesses, governments, and international organizations are the foundation for the success. Similarly,

partnership and collaboration are necessary for changing the game to drive the circular transformation of our socio-economic systems.

Nobody can achieve a circular economy alone, and taking action together can foster hope and joy needed to build resilience to overcome the social and environmental crises we face today. With so many already taking action at the grass-roots level, policymakers, business leaders, and decision-makers need to listen to communities to learn from their progress, pursue culturally-appropriate solutions, and scale up local efforts for a wider impact. Our main conclusions are the following:

- Uplift indigenous leadership to promote indigenous participation in the circular economy on their own terms, including through traditional, land-based circularity practices;
- Provide capital, safe jobs, training, and leadership opportunities for youth, rural and remote communities, and others already contributing to the circular transition;
- Implement circular procurement, taxation, investment, and trade policies to support circular innovation at all levels, from SMEs to international partnerships;
- Integrate circular, low-carbon, and naturebased solutions through policy-making, business operations, and across society to help tackle the triple planetary crises of pollution and waste, climate, and biodiversity; and
- Build symbiotic partnerships and networks to share circularity stories, lessons learned, and resources across borders, sectors, and generations.

With more and more businesses, policymakers, decision-makers, and civil society leaders recognizing the social, economic, and environmental benefits of a circular future, now is the time for bold leadership and global solidarity to achieve it.

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