Circular Economy: Premise for the Development of SMEs in Romania¹

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Abstract

A circular economy is a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, and repair, reuse, remanufacturing, refurbishing, and recycling. This is contrast to a linear economy which is a 'take, make, dispose' model of production. Some scenarios show that in the near future competition will increase regarding the use of land, water and biological resources as the effects of climate change, population growth, migration, economic and policy trends. For Romania's economy this new approach of economy (circular economy) can be a path to economy development. This paper provides an overview of the circular economy in Europe, and the benefits of it, and, we try to identify how the circular economy can contribute to sustainable development of SMEs in Romania.

Keywords: circular economy; European Union; Romania; SMEs; innovation

JEL Classification: E29; P49.

Introduction

In this paper we have resumed our research in the fields of sustainable economic growth, innovation, by adopting a new research objective: analysing the concepts, principles and implementation issues of the circular economy and the benefits resulting from this for a long time.

The methodological approach will be based on literature review, mostly on some European Commission documents, some recently published theoretical and empirical research findings to be reanalysed and developed from our viewpoint.

If we carry on using resources at the current rate, by 2050 we need, on aggregate, the equivalent of more than two planets to sustain us, and the aspirations for a better quality of life will not be achieved (figure 1). To avoid this unsustainable outlook, resource-efficient economy is strongly required, close to ideal concepts like a green economy or a circular economy (Frone S., Frone D.F., 2015) for promoting a systemic transformation in the way resources flow through the economy and society, as we shall further analyse in detail (Frone, S., 2017).

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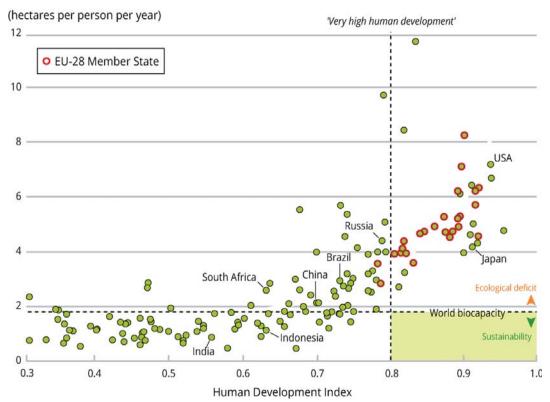


Fig. 1. Ecological human footprint

Source: from Janez Potočnik, 2015

Basic principles of the circular economy: wastes are raw materials - The model of circular economy proposes total waste disposal and rethinking products so that they can be disassembled and reused to obtain other products in a very easy way; diversity is power - Diversity and high degree of product adaptation are a priority for the circular economy. This new model militates for durable products over time and can be transformed into other products, easily, to infinity; energy from renewable sources; systemic thinking - In a circular economy, manufacturers need to have the capacity to understand how raw materials influence each other.

In a circular economy, the substances used remain in a material cycle beyond the life cycle of goods. Waste, emissions, dissipative losses and thus also the extraction of raw materials from the environment should be reduced as much as possible.

The global economy's evolution has been dominated by a linear model of production and consumption, in which goods are manufactured from raw materials, sold, used and then discarded as waste. While great steps have been made in improving resource efficiency, any system based on consumption rather than on the restorative use of resources entails significant losses along the value chain. The rapid acceleration of consumptive and extractive economies since the mid 20th century has resulted in an exponential growth of negative externalities (EMF, 2015).

Global material resource use in 2030, for example, is expected to be twice that of 2010 (SERI, 2013), while the most recent United Nations forecast suggests that the global population is likely to exceed 11 billion by the end of the 21st century (UN DESA, 2015). With 7.2 billion people today, however, the planet is already struggling to meet humanity's demands for land, food and other natural resources, and to absorb its wastes (EEA, 2016).

The transition to a circular economy is a systemic change. In addition to clear-cut actions targeting each phase of the value chain and key sectors, it is necessary to create the conditions in which a circular economy can thrive and resources can be mobilized (European Commission, 2015).

Innovation will play an essential role in this systemic change. In order to rethink our production and consumption patterns and to turn waste into high added-value products, we will need new technologies, processes, services and business models that will shape the future of our economy and society. Supporting research and innovation will therefore be a major factor in encouraging the transition; it will also contribute to the competitiveness and modernization of the EU industry. SMEs play a key role in the European economy. They are a source of entrepreneurial skills, innovation and job creation. The European Union employs about 23 million SMEs (99% of all enterprises) that provide about 75 million jobs. They often face market imperfections or difficulties in obtaining capital or loans, especially in the start-up phase and difficulties in the process of joining new technologies, need constant support, materializes in concerted action by the EU. SMEs need to innovate in order to survive and create benefits in today's competitive environment. Globalization exposes SMEs to competition, making it more difficult to defend their position in the value chain (Robescu, V.O, 2012).

The pace of technological change, particularly in the fields of information, communication, nano- and biotechnologies, is unprecedented. These innovations may help to reduce humanity's impact on the environment and reliance on non-renewable natural resources, but the uptake of new technologies is often associated with uncertainty and risk (EEA, 2015).

The transition to a circular economy will also require a skilled worker experience, with certain skills and sometimes new opportunities and opportunities in terms of employment and social dialogue. To develop all the levels of skills required, they must be supported by education and training systems. A circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times. A concept that distinguishes between technical and biological cycles, the economy is a continuous, positive development cycle. It preserves and enhances natural capital, optimizes resource yields, and minimizes system risks by managing finite stocks and renewable flows. A circular economy works effectively at every scale (European Commission, 2015).

As we see in the figure 2 the circular economy make distinguishes between technical and biological cycles: *the technical cycle* involves the management of stocks of finite materials. Use replaces consumption. Technical materials are recovered and mostly restored in the technical cycle; *the biological cycle* encompasses the flows of renewable materials. Consumption only occurs in the biological cycle. Renewable (biological) nutrients are mostly regenerated in the biological cycle (EMF, 2015).

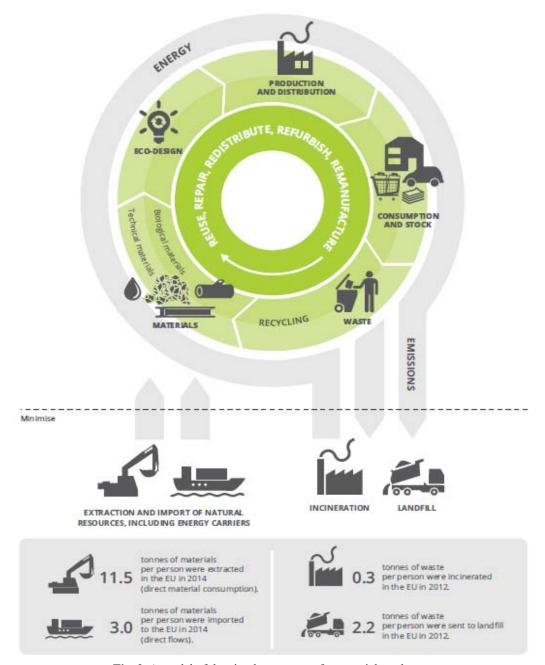


Fig. 2. A model of the circular economy for materials and energy

Source: EEA based on Eurostat, 2015b, 2015c.

The Benefits of Circular Economy in European Union

The linear *take-make-consume-dispose* approach exerts great pressure on the environment and human health, and can also reduce opportunities for increasing the competitiveness of several sectors of European industry. A circular economy, on the other hand, could offer a platform for innovative approaches, such as technologies and business models to create more economic value from fewer natural resources (EEA, 2016).

The European Union's economy is currently losing a significant amount of potential secondary raw materials in waste streams. In 2011, total waste production in the EU has grown to around 2.5 billion tones. Of this, only a limited percentage 40% of municipal waste generated in the Union was recycled, the rest being stored in landfill (37%) or incinerated (23%), of which approximately 500 million tones would be recycled or otherwise reused. The European Union, therefore, has important opportunities to improve the efficient use of resources and create a more cyclical economy generating economic growth and jobs, which, in turn, would reduce greenhouse gas emissions and dependency of imported raw materials.

A recent study of the impacts of a switch to a circular economy in the food, mobility and built environment sectors estimated annual savings of primary resource inputs of EUR 600 million in the EU-27 (without Croatia) by 2030. Achieving this would require systemic changes in these sectors (EEA, 2016).

The sector analysis also found significant waste in sectors that many would consider mature and optimized. For example, the average European car remains parked 92 percent of the time (figure 3), 31 percent of food is wasted along the value chain, and the average European office is used only 35 to 50 percent of the time, even during working hours. In the area of mobility, changes suppose more sharing of cars and better integration of transport modes, light-weight and remanufactured cars, electrification of transport based on renewables and self-driving vehicles (figure 4). And use cycles are short. The average manufactured asset lasts only nine years (excluding buildings).

In total, this way of producing and using products and resources costs Europe \in 7.2 trillion every year for the three sectors analyzed at depth in this report (mobility, food, and the built environment). Out of this total, actual resource costs are \in 1.8 trillion; other related cash costs, which include all other household and government expenditures on the three sectors, are \in 3.4 trillion; and externalities, such as traffic congestion, carbon, pollution, and noise, are \in 2.0 trillion (exhibit).

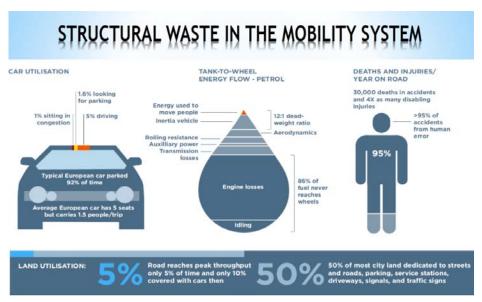


Fig. 3. Structural waste in the mobility system – linear economy

Source: from Janez Potočnik, 2015

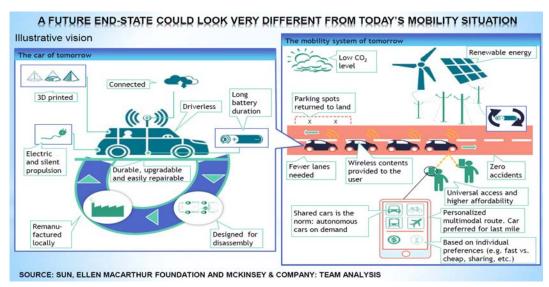


Fig. 4. Structural waste in the mobility system – circular economy

Source: form Janez Potočnik, 2015

For the food system, the study mentions more resource-efficient and regenerative farming practices such as organic or no-till farming, closing nutrient loops (for example, phosphorus recovery from meat and bone meal) and reducing food waste. Key resources for producing food are also wasted. Only 5 percent of fertilizer actually goes into nutrients absorbed by humans, not all of which improve health and well-being.

Only 40% of irrigation water actually reaches the plants, and soil degradation affects 30–85 % of European agricultural land (Figure 5). Finally, the average European consumes 40 % more calories than recommended, and more than 50 % of the European population is overweight or obese. Again, these numbers represent significant waste – and opportunity (EMF and McKinsey Center for Business and Environment, 2015).

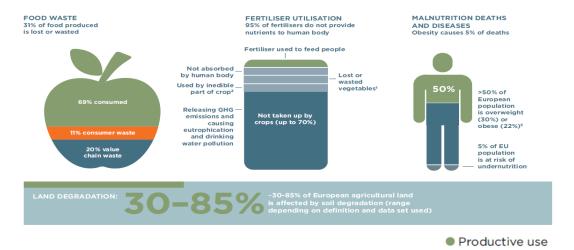


Fig. 5. Structural waste in the food system

Source: EMF and McKinsey Center for Business and Environment, 2015

¹In Europe ~46% of edible mass of fruit and vegetables is lost or wasted (FAO, Global food losses and food waste, 2011); ² On average 23% of vegetable crops are not edible (peels, leaves, etc.); ³ BMI >25 (overweight) or >30 (obese).

Moreover, in the built environment, systemic changes would include factory-based industrial processes in construction, smart urban planning, sharing of residential and office space, and energy-efficient buildings (figure 6) (EMF and McKinsey Center for Business and Environment, 2015).

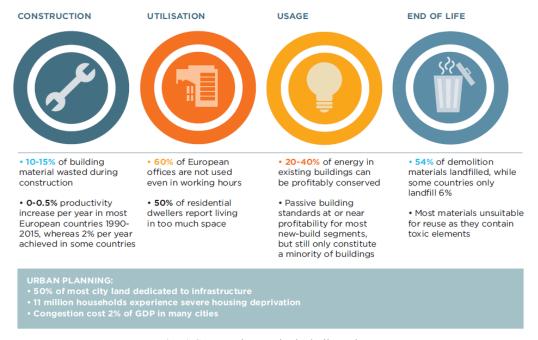


Fig. 6. Structural waste in the built environment

Source: EMF and McKinsey Center for Business and Environment, 2015

Resource benefits: improving resource security and decreasing import dependency

A circular economy could increase the efficiency of primary resource consumption in Europe and the world. By conserving materials embodied in high-value products, or returning wastes to the economy as high-quality secondary raw materials, a circular economy would reduce demand for primary raw materials. This would help to reduce Europe's dependence on imports, making the procurement chains for many industrial sectors less subject to the price volatility of international commodity markets and supply uncertainty due to scarcity and/or geopolitical factors.

An estimated 6–12 % of all material consumption, including fossil fuels, is currently being avoided as a result of recycling, waste prevention and eco-design policies (EEA, 2016); the maximum potential using the existing technology is estimated to be 10–17 % (EC, 2011a). Using innovative technologies, resource efficiency improvements along all value chains could reduce material inputs in the EU by up to 24 % by 2030 (Meyer, 2011).

Economic benefits: opportunities for economic growth and innovation

A circular economy could provide significant cost savings for various industries. For example, implementation of circular economy approaches in the manufacture of complex durable goods with medium lifespans is estimated to result in net material cost savings of USD 340–630 billion per year in the EU alone, roughly 12–23 % of current material input costs in these sectors (EMF, 2012). For certain consumer goods — food, beverages, textiles and packaging — a

global potential of USD 700 billion per year in material savings is estimated, that is, about 20 % of the material input costs in these sectors (EMF, 2013).

Another study estimates the annual net benefits for EU-27 businesses of implementing resource-efficiency/ circular economy measures such as waste prevention, the recovery of materials, changing procurement practices and the re-design of products. Remanufacturing is a comprehensive and rigorous industrial process by which a previously sold, worn, or non-functional product or component is returned to a "likenew" or "better-than-new" condition (figure 7). These range from EUR 245 billion to EUR 604 billion, representing an average of 3–8 % of annual turnover (AMEC Environment & Infrastructure and Bio Intelligence Service, 2014).

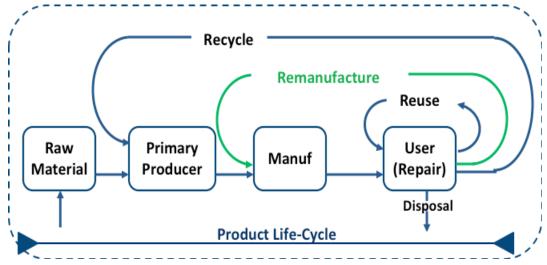


Fig. 7. Remanufacturing and the circular economy

Source: Janez Potočnik, 2015

According to the European Commission, the efficient use of resources leads to new opportunities for economic growth and brings net profits to businesses in Europe of over 600 billion euros. On a circular economy development path, European GDP could increase as much as 11% by 2030 and 27% by 2050, compared with 4% and 15% in the current development scenario (EMF, SUN, McKinsey & Co., 2015).

Employment opportunities would not be limited to remanufacturing and growth within large corporations; the employment story in the circular economy is rich and diverse. Jobs will be created across industrial sectors, through the development of local reverse logistics, within small and medium enterprises, through increased innovation and entrepreneurship, and a new service-based economy. In analysis conducted on Denmark, modelling suggested that ten circular economy opportunities could unlock, by 2035, 7,300–13,300 job equivalents, or 0.4–0.6% relative to a 'business as usual' scenario. In the longer term, employment often correlates with innovation and competitiveness, which should strengthen in the circular scenario (EMF, 2015).

Circular Economy Opportunity for Romanian SMEs

At the beginning of this year, the European Commission (EC) report shows that the resource efficiency in Romania is low, the underdeveloped circular economy, while the recycling and composting levels are well below the European average. According to the report, Romania has

very low recycling and composting levels, respectively 16% compared to the European average of 44%, as well as the high rate of landfilling.

Regarding the conservation status of protected species, the European Commission document states that this is inadequate in 67,19% of cases, favorably in 19%, unknown 8,42%, and last but not least unfavorably in 5 %.

As a member state of the European Union, Romania has to meet, according to European directives, the following objectives by 2020: 50% minimum recycling rate of the total mass of waste (paper, metal, plastic and glass), at least 70% level of preparedness for re-use, recycling and other material recovery operations of at least 70% of the mass of non-hazardous waste resulting from construction and demolition activities, 60% recycling of packaging waste from the total packaging placed on the national market. Also, the country will have to reach an annual amount of electronic waste of 4 kilos per inhabitant and collect bio-waste separately for composting and fermenting it.

Starting from the overview of the environmental practices of Romanian companies that is provided by The Green Business Index 2015, we notice that in Romania most of the companies show weak environmental awareness and weak levels of transparency and communication on environmental issues.

However, they increasingly make use of ecological product design, in spite of low uptake of environmental labelling. In terms of cost assessment, companies don't measure or do not want to declare the costs and benefits obtained through their environmental management practices. The companies do not monitor their resource use systematically, which is why they are not able to take measures to improve their environmental performance.

A notable change is the increase in companies' use of renewable energy sources 9.3% of the surveyed companies predominantly use renewable energy sources, while for 18.5% of the companies, less than 50% of their energy use comes from renewables. This positive change could be due to the surplus of energy production in the Romanian energy market in 2014, as renewable energy production capacity has increased in recent years.

The majority of the surveyed companies (57%) do not use recycled resources as production materials at all, while for another 16.3%, recycled resources make up less than 2.5% of their production materials. This shows there are large opportunities for development of the circular economy in Romania.

A rising number of companies have started implementing waste management policies: 83% in 2014, which is an increase of 15% compared to 2013. Almost all of them also have a policy for minimising their waste production, but only 60% took actual measures. However, this is a very promising trend, as it shows the trend towards more sustainable use of resources.

The use of waste as raw materials in Romania

Turning waste into resources or secondary raw materials is the loop closure in systems that promote the circular economy. That is why the European Union has embarked on a major process of change in its environmental and economic policy, which has begun with the adoption of regulations promoting improved waste management by stimulating innovation programs in recycling and reuse technologies, reducing resource losses and promoting financial incentives to change behaviors both at the level of the waste generators and in the business environment.

The recyclable waste market in Romania is worth about 1 billion euros. Of all recyclable waste most economically attractive are paper, plastic, metal and glass. In Romania, about 2-3% of the total municipal waste is currently recycled. We basically waste by wasting amounts of raw materials and energy in waste dumps.

In order to recycle as much waste as possible, to recover efficiently the raw materials found in them, it is primarily necessary to change the waste management system. This involves establishing a separate collection system at the source and not mixing the separately collected waste during transport. In this way waste treatment plants will have access to high-quality raw materials and will not have to import waste to keep their production lines at their optimum operating capabilities.

Another important aspect of the recycling industry is the social one, linked to the jobs it offers. There are studies showing that the storage of 10,000 tons of waste creates 6 jobs, while recycling the same amount creates 36 jobs. Studies carried out at European Commission level to substantiate circular economy decisions show that successful implementation of this economy model would create over 180 000 jobs by 2030 and would reduce consumption of natural resources between 10-40%.

In order to increase the economic, social and environmental benefits of better municipal waste management, the Commission proposes a series of measures to be implemented at local community level, which could represent major development opportunities for the business environment, such as:

- to increase the municipal waste reutilization and recycling rate to a minimum of 70% by 2030;
- o to increase the recycling rate of the packaging waste to 80% by 2030, with a 60% target by 2020 and 70% by 2025, including targets for certain materials;
- prohibiting the storage of recyclable materials such as plastics, metals, glass, paper and cardboard as well as the biodegradable waste by 2025 and Member States should strive to eliminate waste disposal by 2030;
- o further, to promote the development of high-quality secondary raw materials markets, including by assessing the added value of the criteria for establishing the end-of-waste status of certain materials.

New demand for business services

A circular economy would create demand for new business services, such as: collection and reverse logistics companies that support end of life products being reintroduced into the system; product remarketers and sales platforms that facilitate longer lives or higher utilization of products; parts and component remanufacturing and product refurbishment offering specialized knowledge.

Collection, disassembly, refurbishment of products, integration into the remanufacturing process, and getting products out to users all require specialized skills and process know-how. Most of the case examples at scale are subsidiaries of existing manufacturers, which result in new business model opportunities for incumbents.

The transition would involve considerable costs, such as R&D and asset investments, stranded investments, subsidy payments to promote market penetration of new products, and public expenditure for digital infrastructure. While it is hard to find an appropriate cost comparable for such an economy-wide project, some examples could shed light on parts of the needed transition (EMF, McKinsey, 2015).

Concrete steps for the circular economy, such as:

- o creating the framework to transform and accelerate the Romanian economy's transition to towards a green economy;
- o promoting environmentally friendly technological innovations and supporting the development of green business and green entrepreneurship;
- o creating the framework to implement the principles of the circular economy in alignment with EU policies;
- o implementing cross-sectoral campaigns and programmes for environmental protection;

o founding the Action Partnership for the Green Economy.

Financial Instrument to Support the Development of Circular Economy in Romania

EU funds are an important source of public investment in Romania.

Romania can receive up to €31 billion from EU Structural and Investment Funds in 2014-2020. Out of that sum, up to €5.4 billion can be investment on Environmental Protection and Resource Efficiency, and €3.9 billion for Low-Carbon Economy (DG Regio, 2016).

However, the new Operational Programme (OPs) for European Structural Funds started with long delays in Romania, which means that there has been very little investment to date from the 2014-2020 programmed funds.

Climate change, circular economy and eco-innovation-related interventions can be done through several OPs:

- o Large Infrastructure OP, under the European Regional Development Fund (ERDF) and Cohesion Fund, which funds water, transport, energy, waste, etc.;
- o Regional OP (ERDF), which funds urban and regional development projects on local transport, energy efficiency, etc.;
- o Rural Development OP (EAFRD), which funds public infrastructure in agriculture and rural areas;
- o Competitiveness OP (ERDF), which funds investments in research, development and innovation and business development in smart specialisation domains.

Conclusions

The global dimension of the circular economy and supply chains is particularly important in areas such as sustainable supply, marine litter, food waste and an increasingly globalized market for secondary raw materials. In implementing this Action Plan, the Commission have to cooperate with international organizations and other stakeholders in the global efforts to meet the sustainable development targets set for the 2030 horizon.

In a single market without internal borders it is essential that measures to encourage SMEs are based on a common attitude in order to improve their consistency and effectiveness and to limit the distortions and effects of competition.

Adoption of solutions to reduce the environmental impact and generation of waste in the manufacturing process and during the use of products has to be encouraged since the product design phase.

Encouraging the production and commercialization of multi-purpose products, technically sustainable products that, once they become waste, can be properly exploited and whose disposal is compatible with environmental protection principles;

Acceptance of returned products and waste resulting after the products are no longer used, and the ensure their subsequent management without harming the environment or the health of the population

Making available to the public the information on the reusable and recyclable nature of the products.

The opportunities of a circular economy highlighted in this section span across economies, the environment, businesses, and citizens. These benefits come together to offer a promising vision for a regenerative and restorative economy in the future.

Important elements for the implementation of a circular economy are the re-use of goods, the recycling of materials as well as a design of the goods, which enables a circulation without loss of quality. At the same time, the accumulation of substances that make circulation more difficult and the accumulation of pollutants must be avoided. The service life of goods should be as long as possible and their return to the circulation at the end of the useful life possible to be fast.

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