

**ГЕОИНФОРМАЦИОННОЕ И КАРТОГРАФИЧЕСКОЕ
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АСПЕКТОВ УСТОЙЧИВОГО РАЗВИТИЯ ТЕРРИТОРИЙ**

**GEOINFORMATICAL AND CARTOGRAPHICAL SUPPORT
OF ECOLOGICAL, ECONOMIC AND SOCIAL
ASPECTS OF SUSTAINABLE DEVELOPMENT OF TERRITORIES**

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Kliment M. Naydenov¹, Dimitar S. Atanasov²

**CIRCULAR ECONOMY AND SUSTAINABLE DEVELOPMENT IN THE EU —
SOME ASPECTS AND TRENDS**

ABSTRACT

The main objective of the present study is to prove that the implementation of the circular economy within sustainable development allows the creation of conditions for future development and helps to make informed decisions for the implementation of the strategic goals for development of the Cohesion policy and the circular economy are not only a matter of infrastructure policy, but also of social cohesion and solidarity. They provide answers to the challenges facing local and regional communities about ways to tackle the most important climate problems. In the article are used primary data and secondary sources and the use of both, which is termed triangulation, or dual methodology. Primary data, which we used, is the data collected by us, i.e. interview, observation, questionnaires. Secondary sources used in the article are data that already exists — previous research, official statistics, mass media products, government reports, web information, historical data and information. The results of the survey will prove that, in the context of circular economy implying the adaptation of sustainable development to the requirements of the

¹ Sofia University “St. Kliment Ohridski”, Tsar Osvoboditel blvd, 15, 1504, Sofia, Bulgaria;
e-mail: naidenov@gea.uni-sofia.bg

² Bulgarian Geographical Society, Tsar Osvoboditel blvd, 15, 1504, Sofia, Bulgaria; *e-mail: mitoatan@abv.bg*

competitive international and EU market, circular economy is the most adequate instrument that can consolidate the efforts of the regional authorities, business structures, public organizations and others in addressing the problems of transformation of traditional economy in new EU economy related to nature safety.

KEYWORDS: circular economy, sustainable development, EU economy

INTRODUCTION

The circular economy is a model of production and consumption that minimizes waste. It has benefits for the environment, the economy and all of us. Resource utilization patterns in the past and now have led to high levels of pollution, degradation of the environment and depletion of natural resources. The circular economy is a model aimed at extending the life cycle of products. In practice, this means sharing, borrowing, reusing, repairing and recycling existing materials and products as long as possible. The cornering is an alternative to the traditional linear lineage (derivative, used, extrinsic). It preserves resources for use, so long as possible. We extract the maximal value of the value at the time of arrival. Following this, the resurrection and re-emergence of events and material in the living world is further developed. Man is the only one on the planet who creates garbage. Until two centuries ago, this was not a major problem: before the industrial and technological revolution, the garbage created by humans was, for the most part, recyclable, like everything else in nature. Today's economy is built on a principle that no reasonable person would take for granted — it throws more and more materials that we extract and extract from nature, but which are increasingly difficult to decompose and have a high residual value if used properly.

MATERIALS AND METHODS OF RESEARCHES

In the article are used primary data and secondary sources and the use of both, which is termed triangulation, or dual methodology. Primary data, which we used, is the data collected by us, i.e. interview, observation, questionnaires. Secondary sources used in the article are data that already exists — previous research, official statistics, mass media products, government reports, web information, historical data and information.

The road to a circular economy goes through several stages and levels that create the conditions for its development. The term “circular economy” can be traced back to the late 1980s with the work of economists David Pearce and Kerry Turner. According to them, the economic order does not have a mechanism for recycling resources and treats the environment as a waste tank. They note that the linear economy follows an unsustainable model: extraction – production – consumption – waste, which is based on the continuous extraction of new raw materials and treats the environment as a waste warehouse. In a circular economy, materials rotate for the longest time, generate minimal amounts of waste, and reduce the need for primary raw materials extraction and dependence on the import of such materials. Today, the concept is expanded to include a number of other ideas such as the endless cycle of resource use, adaptation of natural forms in technology, and more. In all cases, the circular economy extends the life cycle of resources by using as little non-recyclable material as possible. The current meaning builds on Pearce and Turner's work and includes a number of other ideas, such as the “cradle to cradle” concept, which implies an endless cycle of resource use, biomimetic, or the adaptation of naturally occurring forms of technology, natural capital — an environmental assessment approach environment and others. In short, the circular economy aims to extend the life cycle of resources while minimizing the use of non-recyclable waste [Pearce, Turner, 1990]. As early as 1966, Kenneth E. Boulding said in his famous phrase: “Anyone who believes that steady growth in a restricted world can continue forever is either crazy or economist”. Boulding's idea of an economy as a circular system is seen as a prerequisite for maintaining the sustainability of human life on Earth (a closed system with no practical exchange of matter with the external environment).

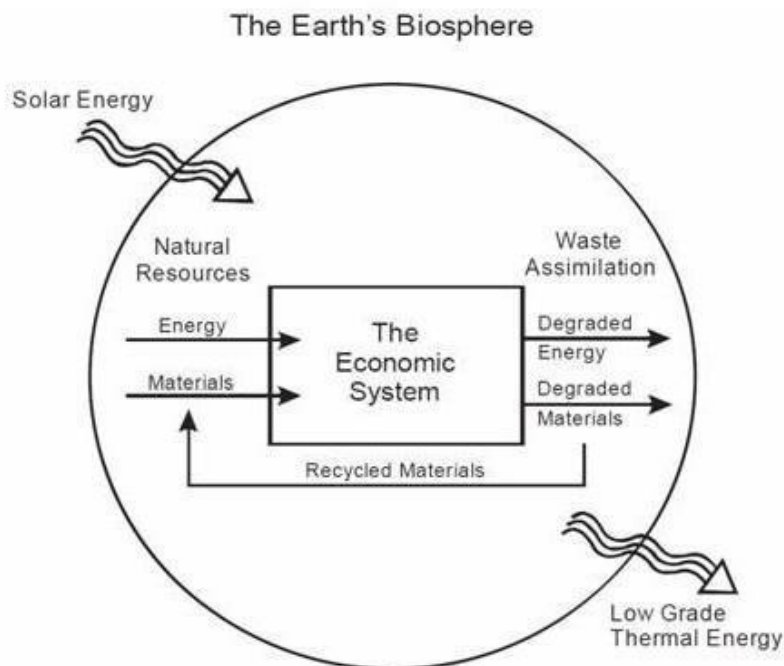


Fig. 1. Humanity's economic system viewed as a subsystem of the global environment

The term “cradle to cradle” was originally coined by Walter R. Stahel in the 1970s and made popular by William McDonough and Michael Braungart in their book *Cradle-to-Cradle, Re-making the Way We Make Things*, published in 2002 [McDonough, Braungart, 2009]. That book gives specific details of how to achieve the model. It is considered to be a manifestation of cradle to cradle design, which provides specific details for its achievement. This design method is being implemented by companies, organizations and governments around the world. “Cradle to cradle” is the basis of several documentaries, the most famous of which is “Garbage Are Equal to Food” by director Rob van Hatum. According to the Cradle to cradle model, all materials used in industrial and commercial processes — such as metals, fibers, dyes — fall into one of two categories: “technical” and “biological” nutrients (raw materials). For the technical there is a strict restriction that they are not toxic, that they are not harmful synthetic materials, that they have no negative effects on the natural environment. They can be used in a continuous cycle of the same product without losing their integrity and quality. In this way, these materials can be used again and again, rather than being “recycled at a lower level” into more minor products, which eventually become waste. Organic nutrients (raw materials) are organic materials that, when used, can be discharged into the environment and decomposed into the soil, providing food for small life forms without affecting the natural environment. This depends on the ecology of the region, because, for example, organic materials from one country or region can be harmful to the ecology of another country or region. Each of the two types of material follows its own cycle in the regenerative economy offered by McDonough and Braungart. A key criterion in the C2C certification process is “material health” (determination of the chemical composition of the product). Particularly dangerous materials (heavy metals, pigments, halogens, etc.) must be observed regardless of their concentration, as well as other materials when their concentration exceeds 100 parts per million. For timber it is obligatory to indicate its origin. The risk of each material is evaluated by criteria and ranked on a special scale. Certification has several levels of basic, silver, gold and platinum, with increasing requirements each time.

RESULTS OF RESEARCHES AND THEIR DISCUSSION

In 2014, EU Member States produced over 2.5 mn tn. of waste, of which only 50 % was recycled. Although recycling capacity is growing, almost half of the materials used are still coming out of the economy. Let's take phones as an example. In the current design and production process, it takes an average of two to three years before mobile devices begin to show signs of slowing down and become morally obsolete. According to the World Economic Forum in 2016, only 20 % of the generated electrical and electronic waste (nearly 45 mn tn.) was recycled, 4 % was dumped in landfills and the remaining 76 % was missing. The European Commission proposes, by 2030, that the increase in household waste recycling should be at least 65 %, for packaging the target is 75 % of waste and for the disposal of household waste to be limited to 10 %. All cities and municipalities in the European Union will be the driving force behind the move towards a circular economy. Local and regional authorities are closest to the citizens and to the local challenges, thus giving them a better idea of the challenges and opportunities at the local level. When a product reaches the end of its life, the materials of which it is composed continue to be used in another way. This is done over and over again to minimize waste disposal. It is therefore essential to ensure adequate functional and financial autonomy for local and regional authorities, especially with regard to their right to develop and implement their own development strategies, led by local development communities and integrated territorial investments, to support local stakeholders to combine funding flows and plan local initiatives to move towards a circular economy.

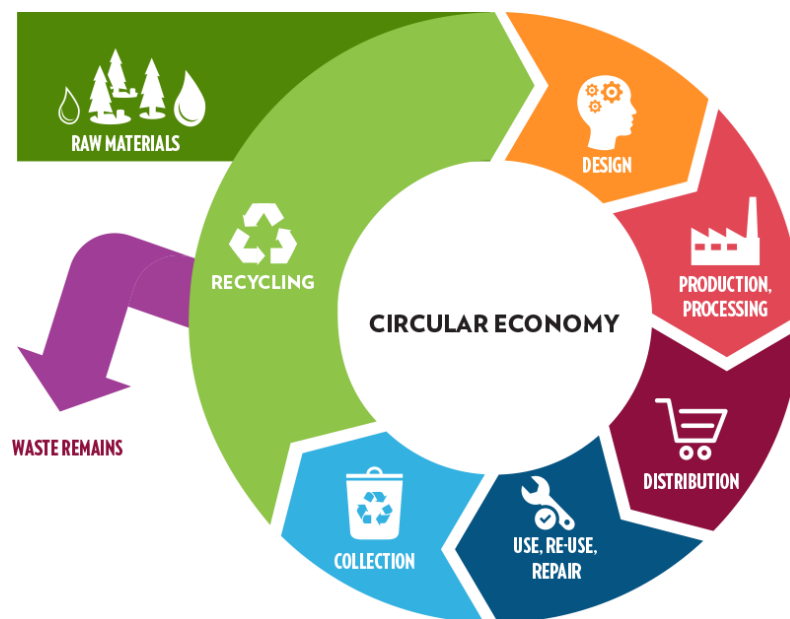


Fig. 2. Circular economy 1

Thinking in systems is one of the basic principles of a circular economy, since the transition from a linear to a circular model of our economy can only be achieved through cooperation and linking of business and production models. The report also highlights the role of small and medium-sized enterprises (SMEs), who are better aware of local markets and can raise awareness of good practices through community cooperation and create value and sustainable jobs at the local level. Through innovation and development, SMEs provide new solutions and circular business models to the market and society. In the process, they rely on cohesion policy, and in particular on smart specialization and synergies with Horizon 2020, the European Structural and Investment Funds, as well as the investments raised through the European Investment Bank and the European

Bank for Reconstruction and Development, etc. We should support these efforts and adapt both policies along these lines, with the aim of making today's innovations tomorrow's reality. Unfortunately, there is still no demand for circular products and services as they are often more expensive than linear ones, while the negative externalities of the latter are not taken into account. Green procurement, combined with circular procurement, is a powerful tool through which public authorities can stimulate circular economy markets. To practitioners, this result suggests that the market performance of firms will increase their visibility, thereby increasing pressure on their firm to pursue green procurement initiatives [Blome et al., 2014].

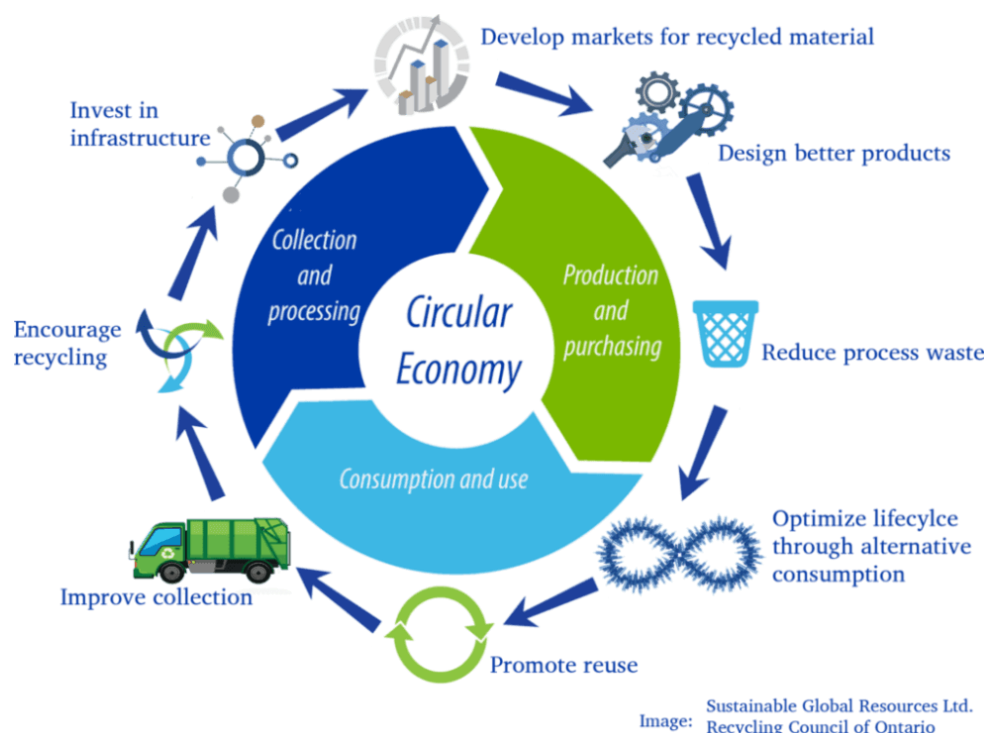


Fig. 3. Circular economy 2

The European Commission has identified priority materials — including agricultural products and waste, wood and paper, plastics and metals — that would be useful in accelerating the transition to a circular economy and where EU policy plays a special role. Packaging, food, electronic and electrical equipment, furniture, buildings and construction were identified as priority sectors. In addition, the macro-regional approach is key to achieving regional cooperation and coordination, as well as the opportunity to create regional markets, in particular for secondary raw materials. We therefore need to speed up the creation of joint capabilities, for example with regard to the recovery of waste oils and other recycling capacity. Cross-border and transnational cooperation programs are crucial to support interregional cooperation in the area of circular economy activities, promote industrial symbiosis, raise awareness and stimulate knowledge sharing and best practices.

All these efforts aim to make our regions and local communities more sustainable and competitive in global markets. The circular economy provides local jobs and business models located in the heart of the European Union, in its regions and local municipalities. One of the main prerequisites for achieving a fully functioning circular economy model is to increase sustainable and local energy production while increasing resource efficiency and the flow of recovered materials. Renewable energy sources are one of the main pillars of the circular economy and thus

represent one of the most important indirect investments in the circular economy and have considerable potential to stimulate the creation of green jobs locally.

The bioeconomy, as an established area of European public policy, consists of crucial political actions that can make a significant contribution to the transition to a circular economy. The bioeconomy is based on the idea of applying biological principles and processes in all sectors of the economy and to increasingly replace fossil-based raw materials in the economy with bio-based resources and principles [Dietz *et al.*, 2018]. The switch to biological raw materials and biological treatment methods could save up to 2.5 bn tn. of CO² equivalent per year by 2030, while reducing fossil fuel dependency, which is a critical long-term challenge for the European Union. Biological, biodegradable and compostable materials, as well as durable materials, are important in order to achieve higher resource efficiency and retention of valuable materials in circular chains. The future potential for innovation lies in the more efficient management of stocks of biological raw materials, as well as the gradual phasing out of toxic substances from all materials.

One of the first legislative steps to implement the circular economy package was the waste package, which sets out many of the necessary provisions for the proper treatment of waste — the main challenge facing local municipalities and regions. Achieving the objectives set out in the waste package will inevitably receive financial support from cohesion policy. Given the recycling rates set at European level and the envisaged implementation deadline, it is necessary to focus investments on higher levels of the waste hierarchy in order to achieve the objectives and avoid long-term technological dependency. Member States should use national circular economy strategies and national waste management plans as long-term policy instruments that can provide clear guidance to all stakeholders and signal to the European Commission that they are on the right path to the circular economy. Waste management plays a central role in the circular economy: it determines how the EU waste hierarchy is put into practice. The waste hierarchy establishes a priority order from prevention, preparation for reuse, recycling and energy recovery through to disposal, such as landfilling. This principle aims to encourage the options that deliver the best overall environmental outcome [Deselnicu *et al.*, 2018].

Food waste is globally recognized as an important economic and ethical issue that needs to be addressed at every stage of the food value chain. The European Union currently consumes about 173 kg of food per capita p.yr., representing 20 % of Europe's annual food production. Local action has proven to be very effective in tackling this major challenge, with successful initiatives and projects implemented across Europe. Therefore, funding opportunities targeted at this important policy area should be increased. Eliminating waste from the industrial chain by reusing materials to the maximum extent possible promises production cost savings and less resource dependence. However, this article argues that the benefits of a circular economy are not merely operational but strategic, not just for industry but also for customers, and serve as sources of both efficiency and innovation [Ellen MacArthur Foundation, 2012].

Unauthorized waste disposal is also among the pressing global challenges, which usually has the greatest impact on local communities and their quality of life. Some estimates show that cleaning up such waste costs each European taxpayer about EUR 25 p.yr., with costs in some Member States as high as EUR 54 p.yr. The management of unregulated waste disposal should be better promoted and funded through European Structural and Investment Funds, as it has both environmental and social benefits. The poorest sections of society are most affected by inaction. In addition, addressing the problem of marine litter must begin with the prevention of unregulated landfill. Moving manufacturing away from wasteful linear material consumption patterns could prove to be a major innovation engine, much as the renewable energy sector is today. Such a transition offers new prospects to economies in search of sources of growth and employment. At the same time, it is a source of resilience and stability in a more volatile world [Ellen MacArthur Foundation, 2012].

In a circular economy, products and the materials they contain are valued highly, unlike in the traditional, linear economic model, based on a “take-make-consume-throw away” pattern. In

practice, a circular economy implies reducing waste to a minimum as well as re-using, repairing, refurbishing and recycling existing materials and products. What used to be considered as “waste” can be turned into a valuable resource. Moving towards a more circular economy could deliver benefits, among which reduced pressures on the environment, enhanced security of supply of raw materials, increased competitiveness, innovation, and growth and jobs. However, it would also face challenges, among which finance, key economic skills, consumer behavior and business models, and multi-level governance (EU Legislation in Progress, January 2016).

CONCLUSIONS

The concept of a circular economy is built in opposition to the traditional linear model, using raw materials, creating things from them, consuming them and throwing away the leftovers. This model relies on large quantities of cheap and affordable materials and energy sources. The circular economy is a new trend that combines economic growth and environmental protection. In fact, the idea of a circular economy has already led to changes in business cycles. The whole “shared economy” is based on this idea. Consumer and business support are needed to get it right. A circular economy is a concept in which growth and prosperity are separated from the consumption of natural resources and the decline of ecosystems. Sustainable development, in turn, is a concept that “meets the needs of the present without compromising the ability of future generations to meet their needs”. In this sense, we can say that the general concept of a circular economy and sustainable development is that “all people on the planet should reach an acceptable level of prosperity without destroying the planet in the process”.

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