

FROM LINEAR ECONOMY TO CIRCULAR ECONOMY IN THE ERA OF SUSTAINABILITY

Ph.D. Associate Professor, Alina VOICULET

"Constantin Brâncoveanu" University of Pitești, Romania

E-mail: alinav06@yahoo.com

Abstract: *Sustainability is based on the idea that human activities are dependent on the environment and resources. The economic model of the last decades is linear, with resource consumption being extremely high to meet the unlimited needs of a global population of over 8 billion inhabitants. In this context, it is obvious that strategies must be changed so as to respect the ecological limitations in the exploitation of the environment and the planet's resources. Therefore, the current economy is intended to be a circular one, in which the emphasis is placed on extending the useful life of products, through reuse, repair, remanufacturing and modernization. The circular economy emphasizes the efficient use of resources, on preserving the value and utility of products for longer periods of time, so that the speed of rotation of production factors also increases. Increasing the useful life of products will generate a decrease in waste. The new vision that is emerging regarding the future development of humanity starts from the need to ensure a sustainable economy, in which the pressure on the planet's resources is increasingly reduced, and meeting the needs of current generations does not affect the possibilities of future generations to meet their own needs. The circular economy supports sustainability by reducing the pressure on resources, by increasing the life cycle of products, by minimizing waste, offering new opportunities for both companies and consumers. The future economic model is therefore based on the reuse of resources already in circulation, instead of eliminating them.*

Key words: *sustainability, responsibility, reuse, linear economy, circular economy.*

JEL Classification: *E20, Q01.*

1. Introduction

After the Second World War, as a result of how the outcomes of production factor development were used, the premises for a severe ecological imbalance accumulated at an extremely rapid pace. From the moment the natural environment could no longer absorb the shocks caused by human intervention, the ecological crisis erupted. It was the first time in history that humankind faced such a broad and deep phenomenon, generated by its own activity.

The ecological crisis is the expression of the contradiction between the man-made environment and the natural environment, between humans and nature. Humans have treated the planet's resources as an unlimited gift from nature, exploiting them excessively without considering the disturbances that could occur in the ecosphere. It is certain that the degree of exploitation of the natural environment and resources depends on technological progress. Environmental degradation was not inevitably caused by this progress, but rather by the way technology was used.

The resource crisis was caused by the irrational exploitation of resources.

Pollution, in its various forms, is a result of uncontrolled economic development. It consists of disturbing the natural ecological balance of an ecosystem under the pressure of harmful substances, mostly produced by human activity. Once it exceeds a certain threshold, pollution harms human well-being and health, causes damage to the economy, and can become a disaster for entire regions.

Several factors contribute to environmental degradation: improper agrotechnical methods, energy-intensive industries, transportation, urbanization, tourism, and the arms race.

2. From Linear Economy to Circular Economy

It is considered that the deterioration of the environment through pollution is caused by the way industry has developed over the last few hundred years—namely, a polluting industry and chaotic urbanization.

That is precisely why the concept of the circular economy emerged as a reaction to the traditional "linear" economic model—i.e., "extract, produce, consume, discard"—which proved unsustainable in the long term due to the depletion of natural resources and excessive pollution. The 1970s and 1980s were years when industrialization, pollution, and population growth reached alarming rates, negatively impacting the environment and generating reactions from scientists and the international community.

Thus, in 1972, the first report to the Club of Rome, titled "The Limits to Growth," presented the concept of zero economic growth—a situation in which absolute macroeconomic results and total population increase at the same rate, keeping per capita outcomes constant. The 1972 report includes a model of the world designed to formulate various growth scenarios up to the year 2100. According to the report's authors (who considered parameters such as global population, natural resources, per capita industrial production, per capita food, and pollution), both economic and demographic expansion will halt during the 21st century due to the depletion of natural resources. This led them to propose zero growth to enable the establishment of a state of equilibrium. The report sounded the alarm about the waste of natural resources, which are limited and exhaustible. The main criticism of the report was that it did not account for technological progress, which creates new possibilities for substituting raw materials.

At the same time, the 1972 Stockholm Conference on the Human Environment marked the recognition that human activities contribute to environmental degradation, which threatens the future of humanity. A few years later, in 1983, the World Commission on Environment and Development (WCED), led by Brundtland, began its work and introduced the concept of sustainable development—a concept still highly relevant in the 21st century.

The oil crises and environmental movements of the 1970s emphasized the need for more sustainable alternatives.

Amid all these environmental crises, in the 2000s, the term circular economy began to be used more frequently in scientific research and public policy. The Ellen MacArthur Foundation (founded in 2010 in the UK) played a key role in popularizing and structuring the concept globally. The European Union also integrated the circular economy into its policies through the Circular Economy Package (2015), which became a landmark for the green transition.

The main difference between the linear economy and the circular economy lies in how resources are used and waste is managed:

The linear economy is a traditional production and consumption model based on:
Extract → Produce → Consume → Discard

In the linear economy:

- Natural resources are extracted to produce goods;
- Products are used for a time, then discarded as waste;
- It creates a significant environmental impact: pollution, waste, depletion of resources.

The circular economy is a sustainable model that aims to keep resource value in the economy for as long as possible, through: Reduce → Reuse → Repair → Recycle

In the circular economy:

- Products are designed to be durable, easy to repair, and recyclable;
- Waste becomes a resource for other processes or industries;
- Raw material consumption and environmental impact are minimized.

Given the environmental issues we face, the circular economy is a key solution for sustainability and combating climate change. It is clear that the linear economy consumes and discards, while the circular economy reclaims and reduces waste.

Differences between the linear economy and the circular economy

Criterion	Linear Economy	Circular Economy
Principle	Extract → Produce → Consume → Discard	Reduce → Reuse → Repair → Recycle
Resource Use	Extensive	Intensive
Product Lifespan	Short	Long
Waste	Is discarded	Is reused
Environmental Impact	High (pollution, resource depletion)	Low (reduced emissions, less waste)
Consumer Behavior	Buys → Uses → Discards	Buys → Uses → Repairs/Recycles

Table 1

Source: Based on information from the following websites:

<https://conquestcreatives.com/linear-economy-vs-circular-economy/>;

<https://www.reconomy.com/2025/05/12/linear-economy-vs-circular-economy/>

Against the backdrop of the alarming growth of the global population, it is clear that the pressure humanity places on resources is immense, starting from the basic principle of economics: unlimited needs and limited resources. Even those resources that are renewable regenerate at a much slower pace than the rate at which human needs multiply and diversify.

According to the United Nations, the circular economy contributes to a stable system by minimizing the risks associated with resource depletion.

3. The Transnational Corporation – A Key Player in the Circular Economy

The key players in the circular economy are transnational corporations—those giant companies with financial assets that often exceed the GDP of some small developed countries. These firms have expanded to such an extent that, in a certain sense, they have lost their national character. Precisely because we are dealing with such powerful economic agents, whose sole goal is profit maximization, the managers of transnational corporations are sometimes reluctant toward the interventionist tendencies of local and national communities, which seek to impose rules to prevent the excessive consumption of the resources in the countries they invest in.

Transnational corporations have a huge environmental impact, but also an enormous potential to positively influence the transition to a circular economy. They play a key role through: *Promoting sustainable innovation*, namely: investments in research and development for renewable or biodegradable materials, products designed for durability and recycling; *responsible supply chain management*, namely: involving suppliers in ecological standards,

optimizing logistics to reduce the carbon footprint; *material recovery* through: “take-back” programs, factories that reuse secondary materials instead of raw ones; *global influencer* through: setting new sustainability standards in the industry, public-private collaborations for regulations favorable to the circular economy.

Thus, in order to make the transition from the linear economy to the circular economy, corporations must adopt a series of strategies that reduce waste, extend the product life cycle, and harness resources in a sustainable way, such as:

1. Product Redesign: - design for durability and recycling - products should be easy to disassemble, repair, and recycle; - sustainable materials - choosing renewable, recycled, or recyclable materials.

2. Circular Business Models: - product-as-a-service (PaaS) - instead of selling products, companies offer services (e.g., leasing, renting, subscriptions); - recovery and refurbishment - collecting used products for repair, refurbishing, or recycling; - collaborative economy - encouraging resource sharing among consumers (e.g., rental platforms).

3. Circular Supply Chains: - reverse logistics - systems in which products and materials are returned to the production chain; - partnerships with sustainable suppliers - integrating circularity across the entire value chain.

4. Digitization and Technology: - traceability technologies (blockchain, IoT) - monitoring resources and products throughout their life cycle; - digital platforms - optimizing reuse and redistribution of materials.

5. Internal Education and Organizational Culture: - employee training - understanding circular economy principles at all levels; - culture of innovation - encouraging regenerative thinking and experimentation.

6. Collaboration and Regulation: - cooperation with authorities and other companies - developing common policies and standards; - ESG transparency and reporting - clearly communicating progress to stakeholders.

The circular economy can generate new challenges for these companies, such as high initial costs for the circular transition, inadequate infrastructure in some regions, resistance to change within organizational structures, and the need for collaboration among multiple stakeholders. At the same time, it also brings opportunities such as market differentiation through sustainability leadership, long-term cost reduction, improved consumer loyalty, and access to new markets and business models.

Transnational corporations represent key sources of capital, technology, and market access for nearly every country. Their activities have a significant impact on the global distribution of wealth and economic activity among national economies. They provide benefits to both consumers and economies worldwide, and can therefore become primary promoters of the circular economy.

4. Conclusions

Today, the circular economy and sustainability can be seen as two sides of the same coin. Fundamental changes in economic models are needed if we want an inclusive green recovery and to accelerate progress toward achieving the Sustainable Development Goals. Alongside climate change, biodiversity loss, and pollution, humanity is also facing challenges related to rising inequality and poverty, economic stagnation, conflict, political polarization, and fragility. The COVID-19 pandemic has led to a decline in global human development for the first time in 30 years. Extreme poverty is on the rise, and we have witnessed one of the

largest drops in global GDP per capita in the last 100 years. It is no longer possible to have a separate development agenda and a parallel environmental agenda. Concerns related to nature and climate must be at the core of all economic planning and investment decisions.

Transnational corporations are in constant pursuit of advantages: low costs, new markets, cheap labor, and so on. Therefore, changing the strategies and production systems of these transnationals opens up new opportunities for the world's economies, which seek to meet the unlimited needs of their populations while promoting responsibility and respect for the environment.

For too long, recent decades' economies have been built on the relentless extraction, use, and waste of resources—practices that destroy nature, drive climate warming, pollute ecosystems, sustain inequalities, and squander materials that still hold immense value for society.

The model of the future is the circular economy, which offers a viable alternative to the 20th-century linear economy built on waste and extensive production.

References:

1. Conquest Creatives, 2025. *Linear Economy vs Circular Economy: Understanding the Paradigm Shift*. [online] Available at: <<https://conquestcreatives.com/linear-economy-vs-circular-economy/>> [Accessed on May 13, 2025].
2. Iuga (Butnaru), A., 2018. *Management industrial în economia circulară. Concepte teoretice* (vol. I). Bucharest: Matrix Rom.
3. Puiu, O., Voiculeț, A., Voicu, I., Răcășan, M., 2013. *Economie și organizații mondiale - curs aplicativ*. Pitești: Independența Economică.
4. Reconomy, 2025. *Linear Economy vs. Circular Economy: why businesses must shift to circularity*. [online] Available at: <<https://www.reconomy.com/2025/05/12/linear-economy-vs-circular-economy/>> [Accessed on May 13, 2025].
5. Stahel, R.W., 2020. *Adevărul despre economia circulară* (eBook). Otopeni: Letras.
6. UN, 2025. *Economics for Sustainable Development. Circular Economy*. [pdf] Available at: <https://www.un.org/sites/un2.un.org/files/circular_economy_14_march.pdf> [Accessed on May 13, 2025]
7. UNDP, 2025. *Circular Economy*. [online] Available at: <<https://www.undp.org/chemicals-waste/our-work/circular-economy>> [Accessed on May 13, 2025]