

THE IMPLICATIONS OF CIRCULAR ECONOMY DEVELOPMENT AT EUROPEAN LEVEL

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Abstract

In the context of the production of more than 2,5 billion tons of waste every year in the European Union, the circular economy is a matter of significant importance, debated in the European area and beyond.

The transition to the circular economy involves reducing waste to the lowest level and replacing the traditional linear purchase-use-disposal economy.

Thus, given the World Bank's 2050 estimates (2018), which support an increase in annual waste production by 70% and the premise that the United Nations' Sustainable Development goals made, that the population will require the resources of three planets, moving toward a circular economy is a necessity for both the environment and society.

Keywords

Circular economy, linear economy, pollution, sustainable development, sustainability

JEL Classification

G30, G41, M14, Q50, Q53

Introduction

According to the definition issued by the European Parliament (2022), the circular economy is a production and consumption mechanism that involves the use, reuse, repair, renovation and the recycling of goods in order to extend the life cycle of products.

This mechanism is intended to bring long-lasting benefits, such as reducing environmental pressure, developing of the raw material supply chain, facilitating market competition and economic growth, and encouraging innovation.

Also, a study by Cambridge Econometrics, Trinomics and ICF (2018) estimates that the implementation of the circular economy at EU level would have the potential to increase GDP by 0.5% by 2030, creating around 700,000 new jobs.

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The European Commission argues that the circular economy can strengthen European industry by stimulating the emergence of businesses and encouraging the entrepreneurial spirit of SMEs.

The activities undertaken which are classified as part of a circular economy are an issue that is currently under discussion. Moreover, the way of quantifying the implementation of the circular economy among countries in the European space is a current topic.

Thus, the present paper is a research aimed at the indicators used in measuring the circular economy and their connection with how developed a country is at the European Union level.

1. Literature review

The EU Taxonomy defines the circular economy as an economic system in which the value of resources, materials and products is maintained as much as possible, their efficiency in production and consumption is increased, and the resulting negative environmental effects, waste and hazardous substances are minimized. At the same time, the transition to a circular economy is one of the six environmental objectives set out in the European Union legislative framework, namely Taxonomy (EU Regulation 2020/852), which mentions the characteristics of an economic activity to be classified as an activity facilitating the transition to the circular economy.

From a practical point of view, Korhonen, J. et al. (2018) mentions that the term circular economy brings superficiality and non-organization, being a collection of vague and separate ideas, gathered from several fields.

Corvellec, H. et al. (2021) points out that the circular economy contains unclear theoretical aspects and its implementation involves obstacles in terms of legislation, business model and consumer perception.

Also, Ritzén, S. et al. (2017) specifies the barriers that arise in the circular economy, namely: financial barriers (quantification of financial benefits of the circular economy, financial profitability), structural barriers (lack of information exchange, unclear distribution of responsibilities), operational barriers (infrastructure), social barriers (perception of sustainability, risk aversion), technological barriers (product design, integration into production processes).

Moreover, Neves, S.A. et al. (2022) mentions that the age distribution and the income are significant factors in the circular economy, older people being more reluctant to changes, like the ones implied by the transition from linear economy to circular economy. Furthermore, if per capita income increases, the level of accepting recycled materials products decreases.

2. Research methodology

Heshmati, A. (2017) argues that the circular economy provides a strategic alternative to mitigate the negative environmental implications resulting from the expected economic development at national level.

Also, Velenturf, A. P. M. et al. (2021) considers that the circular economy can contribute positively to the achievement of the sustainable development goals, provided that economic and social prosperity is aligned with the technological solutions needed in the circular economy.

In order to quantify a country's progress in the circular economy, the European Commission has developed a number of indicators, classified into four thematic areas: production and consumption, waste management, secondary raw materials, competitiveness and innovation. These indicators are available in Eurostat databases.

Starting from the two points of view mentioned above and also considering the indicators created by the European Commission, we aim to carry out a four-year research (2016-2019), in which to check whether the progress of the implementation of the circular economy is correlated with the level of development of a country from the European Union.

Research on the development of the circular economy at European Union level

The working methodology used in the research on the development of the circular economy at EU level was based on the indicators proposed by the European Commission, grouped into four categories, as follows:

Table no. 1. Circular economy indicators

<i>Category</i>	<i>Indicator</i>
<i>Production and consumption</i>	Material footprint Resource productivity Municipal waste Packaging waste Plastic packaging waste
<i>Waste management</i>	Recycling municipal waste Recycling packaging waste Recycling biowaste
<i>Secondary raw materials</i>	Circular material Imports intra-EU Imports extra-EU Exports
<i>Competitiveness and innovation</i>	Patents

Source: Own elaboration

To carry out the above analysis, we have extracted for each indicator shown in the table (*Table 1*) the data presented in the Eurostat database for the period 2016-2019, and for each country in the European Union we have rated from 0 to 26 points each indicator, where 0 points represent the country with the lowest score in terms of application of the circular economy, and 26 points represent the highest possible score for implementation of the circular economy.

Thus, for each indicator, the following ratings were issued (the first places represent a favorable rating, while the last places represent an unfavorable rating):

- *Circular material*: the first places are occupied by the Netherlands, France, Italy, Belgium, and the last places are represented by Portugal, Romania, Ireland;
- *Exports*: in the top of the ranking there are countries such as: the Netherlands, Germany, Belgium, and in the last places are ranked Cyprus, Slovakia, Luxembourg, Malta, Czech Republic;
- *Imports extra-EU*: the first positions are held by the Netherlands, Spain, Germany, France, and the last positions are represented by countries such as: Estonia, Luxembourg, Malta;
- *Imports intra-EU*: in the top of the ranking are Germany, Belgium, the Netherlands, and in the last places are Estonia, Cyprus, Malta;
- *Material footprint*: the first countries in the ranking are the Netherlands, Malta, Spain, Italy, while the last are Austria, Luxembourg, Finland, Estonia, Romania;
- *Municipal waste*: the first places are occupied by Denmark, Luxembourg, Malta, and the last places are represented by the Czech Republic, Poland, Romania, Slovakia, Hungary, Estonia;
- *Packaging waste*: in the top of the ranking are Croatia, Bulgaria, Romania, Greece, and in the last places were Italy, Germany, Luxembourg, Ireland;
- *Patents*: the first positions are occupied by countries such as: Germany, Poland, France, the Netherlands, Italy, and the last positions are represented by the countries Cyprus, Slovakia, Slovenia, Lithuania, Malta, Croatia, Estonia, Greece, Latvia, Bulgaria;
- *Plastic packaging waste*: in the top of the ranking are the countries Croatia, Bulgaria, Greece, Cyprus, and in the last places are the countries Luxembourg, Estonia, Ireland, Denmark;

- *Recycling biowaste*: the first countries in the ranking are Austria, Luxembourg, Denmark, the Netherlands, while the last are Estonia, Croatia, Malta, Cyprus, Romania, Bulgaria;
- *Recycling municipal waste*: the first places are occupied by Germany, Austria, Slovenia, and the last places are represented by Cyprus, Romania, Malta;
- *Recycling packaging waste*: in the top of the ranking are Belgium, Denmark, Czech Republic, the Netherlands, Luxembourg, and Croatia, Hungary, Malta, Latvia, Romania are ranked last;
- *Resource productivity*: the first positions are occupied by the Netherlands, Luxembourg, Italy, and the last positions are represented by countries such as Estonia, Romania, Bulgaria.

Table 2 shows the centralization of countries in terms of the application of the circular economy. The results show the Netherlands as the country with the most developed circular economy in the European Union, while Estonia has the lowest level of implementation of the circular economy.

Table no. 2. Ranking - circular economy

Country	Rating	Rating	Rating	Rating	Rank	Rank	Rank	Rank
	2016	2017	2018	2019	2016	2017	2018	2019
Netherlands	266	271	274	269	1	1	1	1
Belgium	234	237	238	234	3	3	3	2
Italy	224	225	228	231	4	5	4	3
Germany	237	239	239	228	2	2	2	4
France	223	227	223	224	5	4	5	5
Spain	218	214	209	210	6	6	6	6
Denmark	204	198	197	199	7	7	7	7
Slovenia	183	185	183	189	8	8	9	8
Austria	182	184	186	182	9	9	8	9
Sweden	180	183	173	173	10	10	10	10
Finland	148	146	159	159	13	14	12	11
Luxembourg	152	158	160	155	12	12	11	12
Czech Republic	135	157	152	152	16	13	13	13
Greece	155	163	160	150	11	11	11	14
Slovakia	117	129	139	145	22	18	16	15
Lithuania	143	138	143	134	15	17	15	16
Croatia	127	120	132	132	18	20	18	17
Poland	152	145	151	130	12	15	14	18
Ireland	145	141	138	130	14	16	17	18
Latvia	130	116	101	120	17	22	24	19
Portugal	126	115	120	118	19	23	20	20
Cyprus	117	107	124	118	22	24	19	20
Bulgaria	120	125	105	115	21	19	23	21
Hungary	122	116	113	107	20	22	21	22
Malta	93	103	93	94	24	25	25	23
Romania	111	117	106	88	23	21	22	24
Estonia	62	64	73	77	25	26	26	25

Source: Own elaboration

3. Results and conclusions

According to the table presented above (Table 2), the analysis performed resulted in the classification of countries in descending order of the level of application of the circular economy.

Thus, in the period 2016-2018 the first three countries applying the circular economy the most are the Netherlands, Germany and Belgium, and the last three countries are

Romania, Malta and Estonia (2016), Cyprus, Malta, Estonia (2017) and Latvia, Malta, Estonia (2018).

In 2019, the ranking is slightly modified, the first three positions being occupied by countries such as: the Netherlands, Belgium, Italy, and the countries with the lowest score are Malta, Romania, Estonia, similar to 2016.

It is noted that countries with higher GDP are among the top developed countries in terms of circular economy, and countries with lower GDP are among the last in terms of implementation of the circular economy. Therefore, according to the study, there is a direct link between the degree of development of a country and the degree of application of the circular economy. The research can be expanded by taking into account other Eurostat indicators that include a future period of analysis, starting with 2020.

According to this, developing countries should follow the example of more developed countries by participating in conferences and activities on the circular economy subject, thus facilitating the sharing of views and the exchange of experiences and best practices. In this way, companies can move toward a circular economy, in line with new requirements regulated by the EU taxonomy, thus encouraging the transition to a sustainable economy.

The circular economy has the potential to create new jobs for accomplishing this transition, reduce carbon emissions and used resources, improve air quality, but it can also imply future costs (payroll costs, recycling costs etc.), so the countries need to find the right balance between the opportunities and the emerging challenges.

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