

Chapter 17

Towards Sustainable Development: A Multi-Criteria Assessment of the Circular Economy in the European Union

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ABSTRACT

In a sustainable society, which countries strive for, a special place belongs to the circular economy. The circular economy offers certain solutions that tend to make development more sustainable by increasing resource productivity and reducing waste. The European Union is a leader in the world in implementing the principles and practices of regenerative economy and circularity. The chapter aims at a multi-criteria analysis of circular economy performance by ranking the countries of the European Union, taking into account the created composite index. Aggregation was performed using the grey relational analysis method, while the weight coefficients were determined using the entropy method. The results of the research show that the countries of Western Europe are the most successful in achieving the goals of the circular economy on the way to sustainable development, and that the Netherlands ranks first among them.

INTRODUCTION

Limited resources represent a fundamental economic problem. If all resources were unlimited, there would be no economics as a science. The economy strives to enable the achievement of social well-being for future generations through rational management of resources. Forcing economic growth, without respecting responsibility in the management of raw materials and other resources, is unsustainable. Global challenges, such as difficult energy imports, rising prices of production inputs, and unfavorable macro-economic trends, create additional pressure to move from the traditional model of the linear economy to the advanced model of the circular economy. The circular economy is a relatively new model (concept

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or paradigm) of social development. It was established because the linear economy model did not fully answer the questions concerning the sustainable use of resources.

Strong economic, technological and climate changes require transformations in the model on which economic development has been based until now (Androniceanu et al., 2021). We live in a society where environmental challenges are the central issue of every strategy for the sustainable development. In this line, the problem of waste generation and climate change was particularly highlighted. Today, the circular economy realizes its effects on social and economic development, although the importance of this concept is often neglected in these spheres because it has a dominant impact on reducing environmental pollution. In this sense, the circular economy is a regenerative model that promotes environmental protection but also the creation of a responsible society.

The aim of the research within this chapter is multiple. First, the objective is to evaluate and measure the degree of development of the circular economy on the example of the European Union. For that, carefully selected indicators (criteria or attributes) from the relevant database (Eurostat) at the level of the European Union were used. Then, the author will try to determine the relation with the Human Development Index, as one of the more important indicators of sustainable socio-economic development. The author's intention is to find out whether highly developed countries achieve high circular economy performance. We know that in these countries there are high allocations for the practice of the circular economy because developed societies, as a rule, have greater financial opportunities and interest in a regenerative economy both at the macro level (economic policy makers) and at the micro level (population, business entities). Additionally, the author's intention is to show the importance of incorporating the circular economy as an element of sustainable socio-economic development. This paper should open a discussion on the possible inclusion of the circular economy in the consideration of sustainable human development. By connecting environmental and socio-economic issues, it is possible to debate the overall sustainable development and thereby eliminate the deficiency of the Human Development Index in covering the ecological dimension of human development.

Therefore, the subject of the research is the evaluation of the circular economy at the level of the European Union from a macro aspect. In doing so, indicators of the circular economy from an ecological, economic and social point of view were used (Productivity of resources, Municipal waste recycling rate, Circular material utilization rate, Investments in sectors related to the circular economy, Gross added value of sectors in the area of circular economy, Share of renewable energy sources in total consumption and Consumption of raw materials). A ranking of countries will be carried out and it will be established which countries are the most successful and which are lagging behind in the application of the circular economy principles. Countries with the highest composite index will be identified as those with the best potential to preserve the economic ecosystem.

The importance, justification and originality of the research on this topic stems from several reasons: *i*) the application of a relatively recent method of multi-criteria analysis, *ii*) the use of that method in the field of social sciences in order to assess the performance of the circular economy based on the newly formed composite index, *iii*) the topicality and popularity of the research problem, primarily in the countries of the European Union.

The chapter consists of several sections. The first section talks about the innovative concept of the circular economy. The purpose of this part is to show the link with sustainable economic, social and environmental development. The second section describes the research methodology and identifies the variables for evaluating the circular economy in the European Union. The third section describes the results after applying the constructed circular economy composite index. Next, the author referred

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