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PRELIMINARY ANALYSIS OF INNOVATION INDICATORS FOR BIOECONOMY DEVELOPMENT

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Introduction

The bioeconomy requires a cross-disciplinary approach, focusing more on a patrimonial approach and then on economic gain, while stressing the limited assimilative capacity of ecosystems and highlighting the constraints of substitution between different types of capital. At the European level, the bioeconomy is a dynamic sector, which has been highlighted by the release of specific national development strategies. In Romania, bioeconomy is mentioned in various strategic and position papers.

At this moment, research, development and innovation are key policy components of the Europe 2020 strategy. Innovative products and services can contribute not only to the smart growth objective of the strategy but also to its inclusion in the sustainability objectives. This paper presents preliminary analysis of innovation indicators for bioeconomy development in Romania, in the European context.

Materials and methods

Beyond the inclusion of the bioeconomy in the various position papers, the development of this sector is structured in practice according to the territorial specificities of each country, and Romania is no exception. Thus, indicators may be analyzed that refer to the structure of available bioresources and the way bioresources are processed and transformed, the existence of industrial players, agricultural and industrial history, research and innovation capacity.

Bibliometric analysis

Aiming to analyze the innovation ecosystem related to bioeconomy, we first started with a bibliometric analysis on papers related to this sector. The study was conducted in July 2022, using SCOPUS platform, with the keywords "bioeconomy", "bio-economy", "bio-based economy" set with the activated time interval "every year". The period analyzed was from 1970 to 2021.

Innovation indicators

Eco-innovation is the process of developing new products, processes or services that add value to both the end consumers and the generating organization, but significantly decrease the environmental impact. The eco-innovation index is used to

estimate the level of this process. This indicator is calculated on the basis of 16 sub-indicators grouped into five thematic areas: eco-innovation inputs, eco-innovation activities, eco-innovation outputs, resource efficiency outputs and socio-economic outputs. An EU Member State's overall score is calculated as the unweighted average of the 16 sub-indicators. This indicator shows how well each Member State performs in eco-innovation compared to the EU average, which is equivalent to 100 (EU index = 100).

Research and Development expenditure

Data on R&D expenditure was analyzed over a ten-year time horizon. Further, the source of funding of this investment in Romania was analyzed, at the level of available data.

Results and conclusions

First step in investigating the innovation ecosystem related to bioeconomy was by exploring scientific studies related to the concept in academic literature and examining its connections to other terms studied in research. The number of publications on Bioeconomy started to increase exponentially from 2014 - 2015, immediately after the launch of the first European Strategy for Bioeconomy and the inclusion of this field as an area of smart specialization in the Romanian Research and Development Strategy for 2014 - 2020.

On the other hand, overall eco-innovative contributions and activities in our country are about half of the EU average level, which demonstrates the need to implement measures to encourage initiatives in the bioeconomy and design support instruments for the development of this sector.

Unfortunately, the eco-innovation system in Romania underperforms the EU Member States, with Romania ranking one of the last places in Europe in terms of eco-innovation index level, with a score of 57 calculated for 2019. Moreover, a slightly worsened performance compared to previous years is observed.

In Romania, it was found that there is a high rate of private investment in R&D-innovation, almost 60% of total national investment. Thus, it can be stated that there is an increased interest of the business environment in the development of new products and processes. There is a drastic decrease in public financial allocations, both at national level and compared to the global situation.

Although poorly funded, research and innovation capacity exist and is being translated into practice both through the network of public research organizations and through their collaboration with private actors in the joint development of research and technology transfer projects.