
ANALYSIS OF SUSTAINABLE DEVELOPMENT OBJECTIVE 9 - INDUSTRY, INNOVATION AND INFRASTRUCTURE

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Abstract

This paper will analyze the progress of implementing the Sustainable Development Objective 9 - Industry, innovation and infrastructure at the national level. In this contexts, a set of indicators will be taken into account, such as the share of modernized county and communal roads in the total road network, the percentage of GDP allocated for investments by institutional sectors, the labor force involved in high and medium technology production, revenues obtained from innovation as a percentage of total revenues and total expenditure with research and development activities as percentage of GDP.

Keywords: sustainable development, sustainable development goal 9, bidimensional analysis

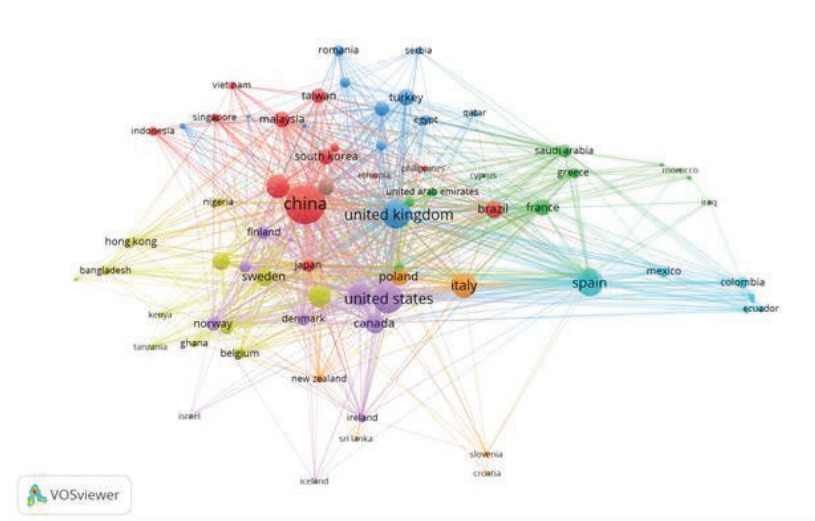
1. Review of scientific literature

Quantitative analysis of scientific documents found in the Scopus database - Bibliometric analysis performed in VOSviewer

In this chapter, a bibliometric analysis was performed on an inventory of publishing activity in the field of sustainable development. The figure below shows the analysis of the collaboration relations between the states.

Analysis of collaboration relations between states

Fig.1

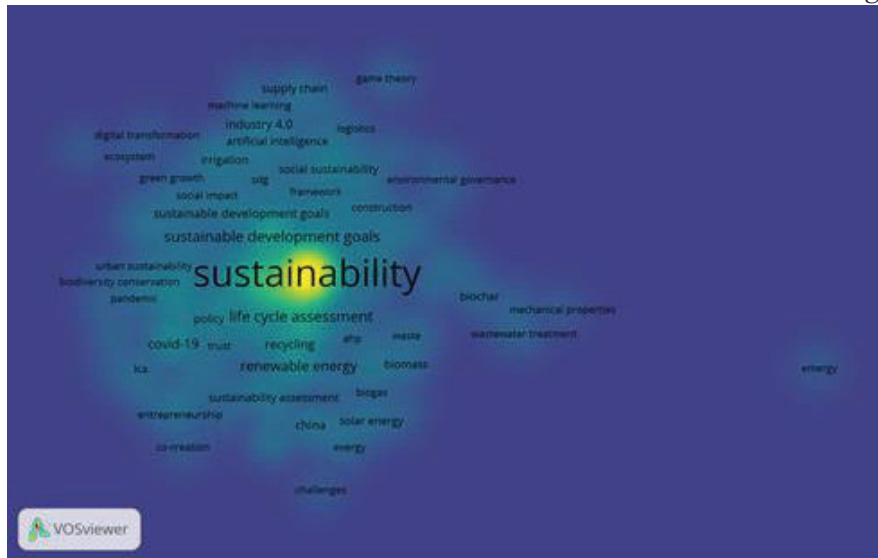


Source: own conceptualization based on Scopus database

The analysis was performed for 74 states. On first place in terms of the number of collaborative relations between states, is China with 51 links and 374 documents published in the field of sustainable development. On the second place is the United Kingdom with 60 links and 188 published documents. In the analysis, Romania can also be identified with 13 links and 30 documents published in the field of sustainability. The figure below shows the analysis of the keywords used by the authors in the research papers.

Authors' keywords analysis

Fig.2



Source: own conceptualization based on Scopus database

The most commonly used word is “sustainability” with 999 appearances, followed by “sustainable development goals” with 62 appearances, “life cycle analysis” with 54 appearances and others.

II. Research methodology

In the first part of the paper, a bibliometric analysis was performed to determine the scientific interest in the field of sustainable development. An inventory of the publishing activity in this field was made, found in the Scopus database. Approximately 2000 documents were analyzed using VOSViewer software. Next, a set of indicators was characterized from a statistical point of view in order to create an image of the Objective 9 of Sustainable Development.

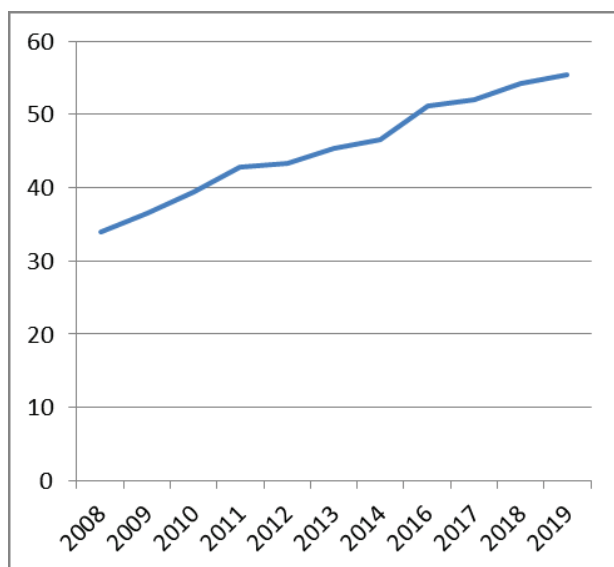
III. Results and discussions

3.1 Statistical analysis of the indicators corresponding to Objective 9 of Sustainable Development - Industry, Innovation and Infrastructure

In this chapter it will be analyzed a set of indicators that can characterize the degree of implementation of Objective 9.

The analysis of authors' keywords

Fig.3



Source: own conceptualization based on Scopus database

According to the National Institute of Statistics, the length of public roads represents the totality of roads open to public traffic throughout the country; it is administratively grouped in the network of national, county and communal roads, including each one, the respective road categories.

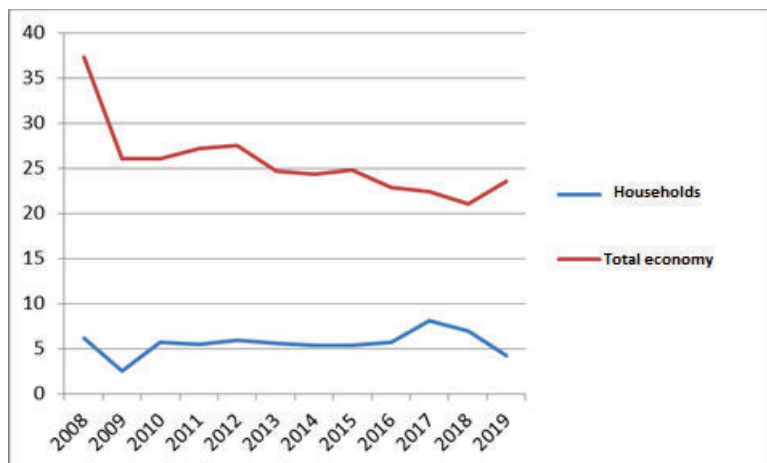
They are recorded on a certain date (usually at the end of the year) and are grouped as follows:

- modernized roads;
- roads with light road clothing;
- cobbled roads;
- dirt roads.

The indicator registered an upward trend in the analyzed period, respectively an increase of approximately 63%, which means that improvements have been made in this regard. The evolution of the Percentage of GDP allocated to investments is presented below.

The evolution of the percentage of GDP allocated to investments

Fig. 4

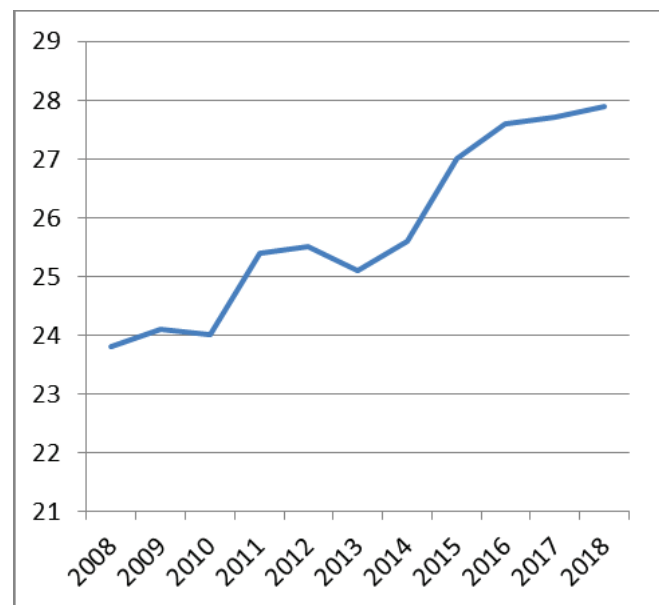


Source: Tempo Online

According to the National Institute of Statistics, the indicator is defined as gross fixed capital formation (GFCF) expressed as a percentage of GDP. The GFCF consists of acquisitions by resident producers, less disposals of fixed assets over a period of time plus certain additions to the value of non-produced assets realized as a result of the productive activity of producers or institutional units. Fixed assets are active products used in production for more than one year. It can be seen that the indicator has shown a downward trend both in the case of GDP allocated for investment by households and in the national economy. The indicator decreased by 30% in the case of households and by 36% in the case of the national economy, which is not a beneficial situation for the phenomenon analyzed in the paper. The figure below shows the dynamics of the workforce involved in the production of high and medium technology.

The evolution of the labor force involved in the production of high and medium technology

Fig. 5

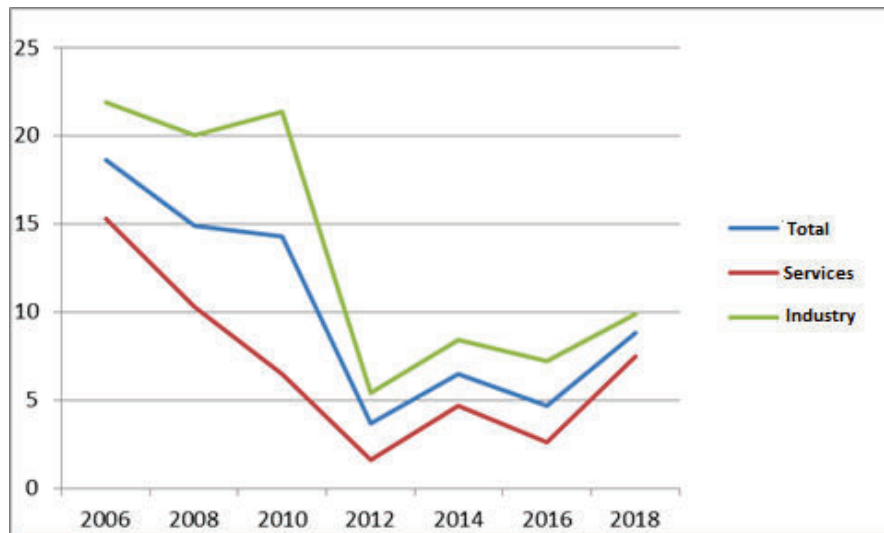


Source: Tempo Online

According to INS, the Indicator is calculated based on data from several statistical domains and provides aggregate information on both human resources employed in high-tech and their mobility from one service to another (job-to-job). The labor force involved in high and medium technology production registered an upward trend in the period 2008-2019, namely an increase of 17.2%, which has a positive impact on the achievement of the sustainable development objective 9. Further, the evolution of the turnover from innovation is presented as a percentage of the total turnover.

Evolution of turnover from innovation as a percentage of total turnover

Fig. 6



Source: Tempo Online

This indicator is defined as the ratio between the turnover resulting from new products for the enterprise and new for the market and the total turnover of the enterprises. The indicator decreased by 52.6 pp in the economy and by 50.9 pp in the case of services. Regarding the turnover from innovation for industry, in the period 2006-2018, there was a decrease of 54.7 p.p. Last but not least, the dynamics of total expenditures with research and development activities as a percentage of GDP will be analyzed.

**Evolution of total expenditures on research and development activities
as a percentage of GDP**

Fig. 7



Source: *Tempo Online*

The indicator fluctuated in the period 2008-2018, and there was a decrease of 11 p.p. The highest value of total expenditure on research and development as a percentage of GDP was recorded in 2008.

Conclusions

In conclusion, the share of modernized county and communal roads in the total road network registered an upward trend in the analyzed period, respectively an increase of approximately 63%, which means that improvements have been made in this regard. Also, the percentage of GDP allocated for investments registered a downward trend both in the case of GDP allocated for investments by households and at the level of the national economy. The indicator decreased by 30% in the case of households and by 36% in the case of the national economy. According to the Department for Sustainable Development, the modern age has brought an accelerated way of life. Only countries that encourage innovation in addition to resilient infrastructure and a sustainable industry can be competitive in this era. These

three aspects are, of course, interconnected. Modern infrastructure is vital for economic growth, and sustainable infrastructure is the basis of a sustainable industry. Moreover, innovation is essential for an efficient and sustainable industry. Therefore, innovation is indispensable from the perspective of competitiveness in the 21st century. In this context, we want to develop quality, reliable, sustainable and strong infrastructure, including regional and cross-border infrastructure, to support economic development and people's well-being, with a focus on broad and equitable access for all, promoting inclusive and sustainable industrialization and, until 2030, significant increase in employment rate and Gross Domestic Product in industry, Modernization of infrastructure and rehabilitation of industries to become sustainable, more efficient use of resources and increased adoption of clean and environmentally friendly technologies and industrial processes and Strengthening scientific research. Thus, Romania, although it has registered positive trends in some indicators, still has to make an effort to be able to meet European standards and to make the transition to a green economy.

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