

THE CURRENT STATE OF INNOVATION IN ROMANIA IN THE EUROPEAN CONTEXT

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ABSTRACT: *In the actual approach, the innovation is a process by which a domain, product or service is renewed and updated by applying new processes, introducing new techniques or establishing successful ideas to create new value. Innovation does not represent just the new ideas or methods introduction or implementation, but can be defined as a process involving multiple activities to discover new ways of doing things.*

In the present paper, we analysed the place occupied by Romania in the European context, through the European Innovation Scoreboard. The purpose of the European Innovation Scoreboard is not to rank economies in terms of innovation, but aim to improve innovation by measuring it as accurately as possible and by identifying policies, best practices and other levers that encourage innovation. The European Innovation Scoreboard supports the EU's commitment to research-development and innovation and to policy development to improve innovation in Europe. According to the latest report of European Innovation Scoreboard Romania is only in the fourth group of innovators in the EU, the emerging ones, which present an innovation performance level below 70% of the European average, our country being in last place in the EU in 2021.

Keywords: *research, development, innovation, Romania, European context*

JEL Classification: O30, O31.

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1. INTRODUCTION

The European Innovation Scoreboard (EIS) provides a comparative analysis of innovation performance in the European Union and supports the EU's commitment to research and innovation and policy development to improve innovation in Europe. [5] The European Innovation Scoreboard helps decision-makers to assess the strengths and weaknesses of national research and innovation systems, track progress and identify priority areas to enhance innovation performance. [7]

The new European Innovation Scoreboard measurement framework distinguishes between four main groups of activities, comprising 12 dimensions of innovation and a total of 32 different indicators. Each main group includes a number of indicators and has an equal weight in the EIS. Within each group, each indicator has the same weight.

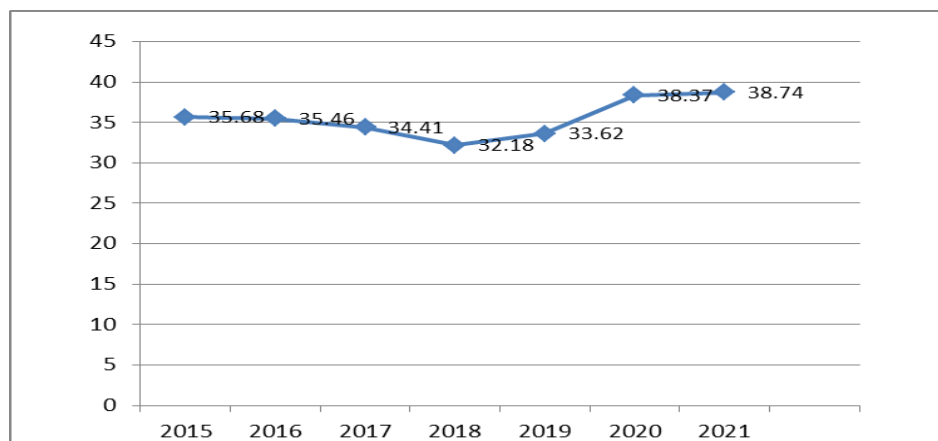
According to the European Innovation Scoreboard 2021, compared to 2014, innovation performance for all EU Member States increased by 12.5%, mainly due to improved broadband internet penetration, venture capital investments and increasing the number of international scientific co-publications. In previous EIS reports, less innovative countries tended to improve their performance faster than more innovative countries. Between 2014 and 2021, there was a moderate rate of convergence in innovation performance across Member States, the countries with lower economic performance improved their level of innovation performance at a higher rate than countries with higher economic performance.

2. ROMANIA'S POSITION IN THE EUROPEAN INNOVATION SCOREBOARD

According to the European Innovation Scoreboard 2021, Romania is an emerging innovator and in terms of innovation performance occupies the last position in EU. As can be seen in Figure 1, the evolution of the global innovation index for Romania has not changed significantly over time. If in the period 2015-2016 the relative performance compared to the EU recorded the value of approximately 35%, in 2021 it recorded a modest progress reaching the value of 38.74%.

In order to deepen the analysis of Romania's position in the European innovation landscape, we will analyse the sub-indices calculated by groups of indicators for 2021. The analysis of these innovation sub-indices will allow the identification of the weak and strong points of innovation in Romania, which ranks last in 7 of the 12 dimensions of EIS.

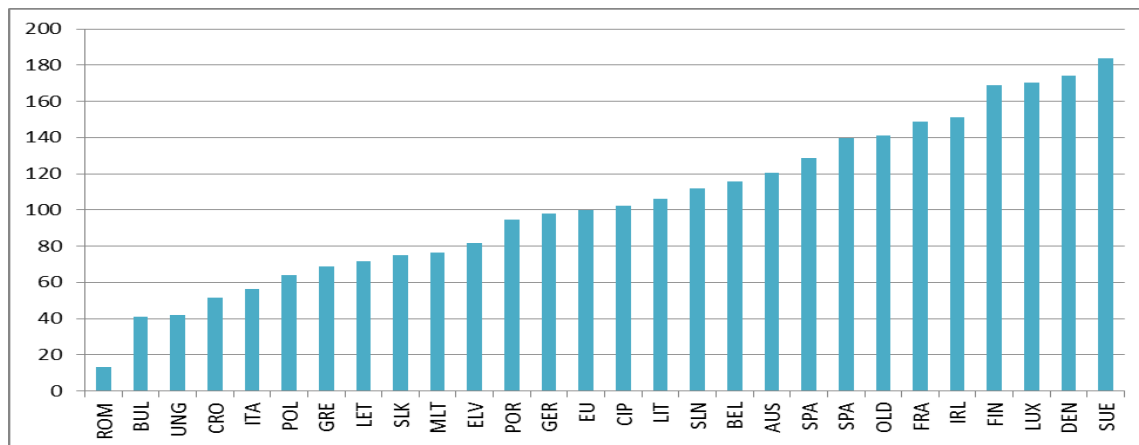
Figure 1. Evolution of the Global Innovation Index for Romania (2015-2021)



Source: Author own processing based on EIS 2021 data, <https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis>

Romania occupies the last position in the EU depending on the value of the human resources dimension synthetic index with a value of 17.37. The value of this index was in 2021 at only 13.2% compared to the EU average.

Figure 2. Synthetic index of the human resources dimension in the EU



Source: Author own processing based on EIS 2021 data, <https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis>

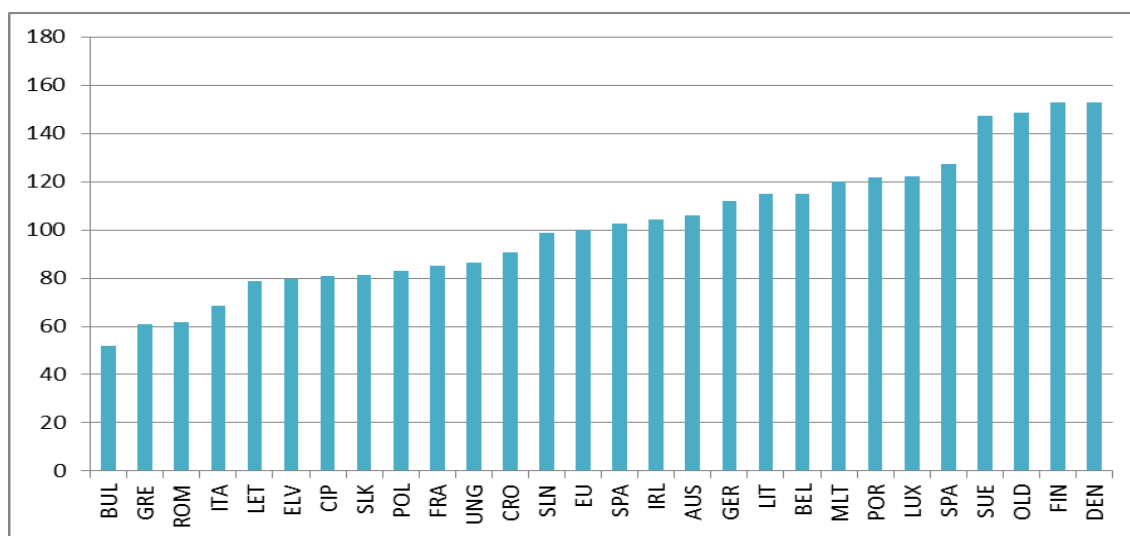
This last position is primarily determined by the decrease compared to 2014 in the number of graduates with a doctorate and in the number of people with lifelong training. At the same time, according to Eurostat, Romania is the European state with the lowest number of people with higher education, about 23% of the country's population aged between 25 and 34 graduating from tertiary education. [6]

Closely related to this dimension, it is important to mention that Romania has the lowest number of researchers in the EU 27. Since 1993 the total research and development personnel has decreased substantially from over 73,611 to 33,892 in 2000. Since then the number of researchers it stabilized around the value of 30,000, reaching in 2020 the value of 33,189. However, the number of R&D personnel in higher education has increased over the past two decades from 3,780 in 2000 to 8,862 in 2020, peaking at 9,000 in 2015.

Regarding the research attractiveness dimension, Romania is in the category of modest innovators, occupying the penultimate place, ahead of Bulgaria and well below the EU average (research attractiveness being in 2021 at 35% compared to the EU average). This position is determined by the poor research and development funding and the low prestige of research organizations (research institutes, public or private universities).

Regarding the digitization dimension Romania ranks 25th out of the 27 EU member states, the synthetic index of the digitization dimension registering in 2021 a value of 61.8% of the EU average. One factor that has contributed to this position is the broadband internet coverage increasing. According to DESI 2020, Romania ranks 10th in the EU in terms of connectivity, it has improved its results in terms of coverage, with broadband coverage increasing up to 87% and reaching the EU average. [1]

Even if in terms of broadband internet penetration Romania has reached the EU average, in terms of the population with digital skills above the basic level the situation is not favourable, Romania occupying the last place in the EU with only 10% of people having these skills (comparatively with 30% European average).

Figure 3. Synthetic index of the digitization dimension in the EU

Source: Author own processing based on EIS 2021 data, <https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis>

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The value of the finance dimension synthetic index in Romania represents 28.7% of the EU average value, which determined Romania's 23rd place among European states. Within this dimension, the most unfavourable situation is recorded in terms of the level of expenditures for research and development in the public sector. Public spending on research and development in recent years was far from the target of 1% of GDP, respectively: 0.13% of GDP in 2020, 0.17% in 2019, 0.15% of GDP in 2018.

In 2020, Romania had the lowest value of the research and development expenditure as a percentage of GDP in the EU (0.47% of GDP, of which business R&D expenditure was 0.28% of GDP) and the 2% target for 2020 was not reached.

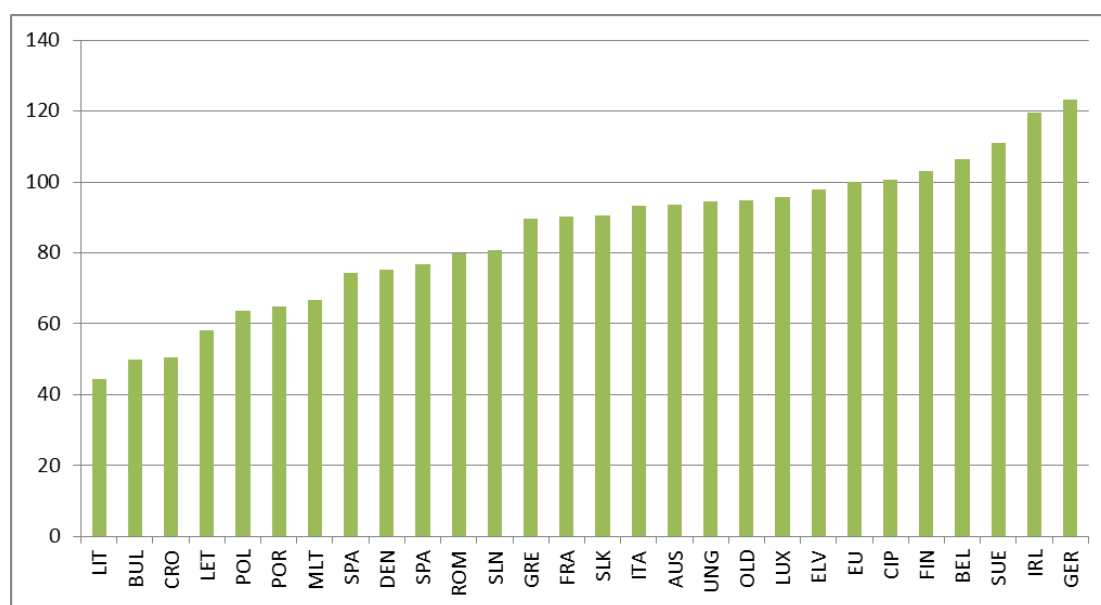
Romania's position in the Finance and support dimension was improved by the value of venture capital investments. In 2021, the Romanian venture capital market broke the 100 million euro barrier of venture transactions for the first time in the post-UiPath era. The amount of capital raised in 2021 by Romanian start-ups more than tripled compared to the previous year, going from 30 million euros in 2020 to over 116 million euros in 2021. [8]

The value of the synthetic index of the Firm Investments dimension places Romania in last place in the EU (representing 7.2% of the European average in 2021). The research and development expenses of the private sector environment in Romania were in 2020 only 0.28% of GDP, Romania occupying the penultimate place in the EU (the EU average being 1.46% of GDP). [10] Through the National Strategy for Research, Innovation and Smart Specialization 2021-2027, Romania aims to reach the level of 1% by 2027 also for the research and development expenses of the business environment. [3]

Romania takes the last place in the EU also in the Use of information technologies dimension. The relative position in relation to the EU in 2020 of Romanian businesses that offer training to develop or improve their staff's ICT skills is 6.7%. A relatively better position within this dimension is occupied by the share of ICT specialists employed, Romania registering in 2021 a share of 2.6% (compared to 4.6% in the EU) increasing compared to 2020 (when it had a value of 2, 4%). However, Romania is far from the European leader Sweden, which recorded a share of ICT specialists in total employees of 8%.

The highest position is occupied by Romania in the case of the Sales Impact dimension (Figure 4). The indicator that contributed to Romania occupying a relatively good position in this dimension is the export of high-tech products. Romania is an important centre for software developers, and IT specialists are recognized in this field. However, the lack of sophistication of the national market, the weak public procurement of innovation, along with other factors, block the development and internationalization and are the cause of the export of innovation-based businesses. [4]

Figure 4. Sales impact synthetic index in EU



Source: Author own processing based on EIS 2021 data, <https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis>

Even in the case of the Innovators dimension, the situation is not favorable for Romania, occupying the 27th place among European states. The provisional results of the statistical research on innovation in business enterprises show that in the period 2018-2020, the share of enterprises that introduced new or improved products or business processes to the market, in the total number of enterprises, was 10.7 %, which represents a decrease of 3.9 percentage points compared to the period 2016-2018. Of the total enterprises, 4.4% were innovative only of new or improved products, 3.1% applied only for business process innovations, and 2.6% implemented only product and business process innovations. The decrease in the share of innovative product enterprises is due to both the decrease in the share of innovative goods and service enterprises. [2]

The value of the Linkages dimension synthetic index places Romania in the last place in the EU. Within this dimension, the indicator that has a positive influence is the number of public-private Co-publications. Romania had 19.1 public-private co-publications per 1 million

inhabitants in 2018 (latest available data), according to the European Commission report. Even so, Romania is in second to last place in the EU for this indicator.

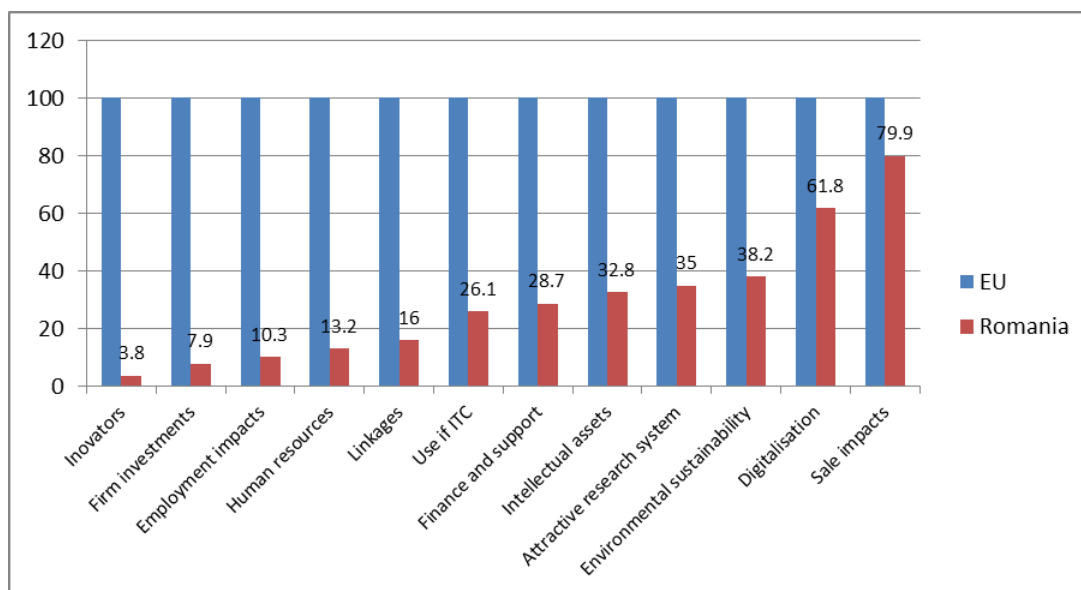
Even in the case of the Intellectual Assets dimension, Romania's situation is not favourable, occupying the last place in the EU according to the value of the index related to this dimension (the value of the Intellectual Assets dimension index representing 32.8% of the EU average). The indicator that has a negative influence on the value of the intellectual asset dimension index is the number of PCT (Patent Cooperation Treaty) patent applications. Romania registered only 40 applications in 2019 at the European Patents Office (EPO), 3 times less than the target for the year 2020.

The last place is occupied by Romania also in the case of the Employment Impact dimension, the mobility of human resources in science and technology (HRST) being the lowest in the EU (2% compared to 7.8% in the EU). [9]

Analysing the relative position of Romania vis-à-vis the EU in 2020 within the 12 dimensions of the EIS, it can be observed that in the case of two dimensions - Sales Impact and Digitization Romania is close to the EU average (recording values of 79.9% and 61.8% respectively of the EU average). At the opposite pole are the dimensions Human resources, Employment Impact, Firm investments and Innovators, for which Romania recorded values far below the EU average (Figure 5)

Romania scores best in the Connectivity dimension and is well positioned in terms of ICT (Human Capital) graduates, but the digitization of the economy lags far behind. Regarding digital public services and the use of internet services, Romania has the worst performance in the EU [1].

Figure 5. Innovation performance in Romania compared to the EU



Source: Author own processing based on EIS 2021 data, <https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis>

3. CONCLUSIONS

According to the European Innovation Scoreboard 2021, the evolution of the global innovation index has not changed significantly over time, Romania occupying the last place in seven of the twelve dimensions of the EIS. However, compared to 2014, Romania's

performance improved in the case of most of the dimensions analysed in the European Innovation Scoreboard (less so in the case of the Human Resources, Business Investments, Innovators and Environmental Sustainability dimensions).

Among the areas in which Romania recorded values of the indicators close to or above the EU average are the export of high-tech goods, broadband internet penetration and venture capital investments. On the other hand, the list of weak points includes a much larger number of indicators, which reflects the poor level of innovation performance in Romania.

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