

# INNOVATION IN ROMANIAN ORGANIZATIONS. A GAP ANALYSIS AT REGIONAL LEVEL

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## Abstract

This article presents the results of a gap analysis conducted at the level of Romania's development regions regarding innovation in organizations. The research was focused on determining the gap in Regional Innovation Scoreboard (RIS) between Romania's development regions and the EU average as well as analyzing gap dynamics in 2009-2017. The results obtained from the research seem to indicate that: the gap existing at the beginning of the analyzed period had a downward dynamics and it was accentuated for all the development regions of Romania; the quasimajority of the regions of Romania registers modest values of RIS compared to the EU average, which places them on the last places in the EU; some regions of Romania are very close to the EU average in some RIS-specific indicators such as the Bucharest-Ifov region for trademark applications and for other indicators the gaps are very high; the innovation of Romanian organizations is focused on technical aspects. The existing disparities and the tendency of their accentuation largely explain the relatively small competitiveness of Romanian organizations in the single market and the effort to be made to recover them.

**Keywords:** gap, innovation, organization, regional.

## 1. INTRODUCTION

The application of the results of research-development by organizations from different fields of activity is the essence of the innovative processes within them, manifested as new products, processes and methods or the improvement of the existing ones. Under its many forms, innovation (product, process,

marketing or organizational) is one of the most important sources of competitive advantage for organizations.

In the last decades, most Romanian organizations have based their survival and, more rarely, their development on the advantage of reduced labor costs compared to the European average. With the entry into the European Union and the advantages that human resources have in the single labor market, pressure has been intensified on companies that are forced to innovate in order not to lose their employees. The capacity to innovate the Romanian organizations is the main problem of competitiveness at national and regional level compared to other regions of the European Union, especially in Central and Eastern Europe.

The main aim of the research presented in this article is the study of the gap between the organizations from different regions of Romania regarding the innovative processes and their results. In view of its main purpose, research carried out within this article attempts to answer the following questions:

- Q1. What is the national and regional gap in organizational innovation in relation to the European Union average?
- Q2. How big are the differences between Romania's development regions in terms of innovation within organizations?
- Q3. What are the ways of showing the innovative processes where the gaps are most pronounced?

As these issues have been less researched so far by other studies, in this article, the results obtained with regard to determining the gap existing at regional level in terms of innovation (in its multiple forms) within organizations.

## 2. LITERATURE REVIEW

The topic of the place of innovation within the research-development function of the organizations and of the research-development activity carried out in the whole socio-economic systems has been approached many times in the literature. Schot and Steinmueller (2018) consider that, from a historical perspective, there have been three approaches to innovation policies:

- A post-World War II approach, institutionalized state support for R & D activities;
- An approach that has developed in parallel with globalization processes and which correlates the competitiveness of organizations and nations with the ability of socio-economic systems to produce knowledge and market it;
- The third approach, the most recent one, which considers innovation as the basis for the processes of change / transformation of the economy and society.

Between the first and the second approach is remarkable paradigm shift produced after 1960 treatment of research and innovative processes with a clear link to economic activity to treat it as a support for economic development (Eizagirre, Rodríguez and Ibarra, 2017). Europe's policies on innovation support reflect this transition from one approach to another (Owen, Macnaghten and Stilgoe, 2012). For these reasons, a series of studies have been launched in recent years to analyze the efficiency of public funding allocations dedicated to research, development and innovation. Scholleova and Hajek (2014) analyzed the effectiveness of innovation support offered by the European Union through programs for this area. Moreover, innovation is a constant concern of the European Commission, which uses the concept of open innovation with different roles held by five key players: academia, the financial sector, public sector innovators (business innovation) and citizens.

The analysis of research-development and particularly innovation activity in Romania in a comparative perspective with other European countries has been the subject of countless studies mainly conducted by Romanian authors. Diaconu and Vilcu (2018), analyzing in a comparative approach to national innovation activity, concluded that Romanian companies are in the last places in Europe in terms of innovation in its many situations. Also, on the basis of the analysis of the existing statistical data, the two authors came to the conclusion that the big Romanian companies innovate more than the small firms and that the low share of the small innovative firms is one of the weaknesses of the innovation activity in Romania. Sandu et al. (2015), analyzing the research, development and innovation activity in Romania and Bulgaria in relation to the EU level, considered Romania to be superior to those in Bulgaria in terms of most of the R & D activity specific indicators. Drumea and Baba (2015) analyzed the relationship between competitiveness and innovation in the case of Romania by studying the relationship between financial allocations and the results obtained (in particular, for patents).

Caramihai, Tănase and Purcărea (2017) proposed a series of measures to improve innovation and technology transfer policies in Romania: simplifying the legal framework for technology transfer, supporting structures that can play a facilitating role in technology transfer and improving patents activities of Romanian organizations (especially public ones in the field of research and development).

As we can see, no gap analysis has been carried out at the regional level regarding the innovation activity carried out by the Romanian organizations. Previous studies have been limited to comparative approaches at national level, either between Romania and neighboring countries (compared to Bulgaria) or between the situation in Romania and the European Union. The exception is made by the Regional Innovation Scoreboard (2017) carried out under the aegis of the European Commission, the database which was also used in the research presented in this article.

### 3. RESEARCH METHODOLOGY

Research under this article attempts to compensate for gap analysis at the regional level for innovation at the level of Romanian organizations. Considering the purpose of the research and the fundamental questions that this research attempts to respond to, the research methodology used includes the following steps:

- Establish the purpose and objectives of the research (including the key questions to which the research should provide answers);
- Analysis of the stage of approach of the issue in the literature so as to observe whether there have been previous studies and relevant results;
- Establishing the aspects to be analyzed regarding the regional innovation in Romania (the gap with the EU average, the gap with developed EU regions, the evolution of the gaps, the gaps specific to the main areas analyzed);
- Selection of the most relevant data sources for the analyzes to be performed. The database used by the European Commission for the Regional Innovation Scoreboard (2017) was selected;
- Carry out gap analyzes based on specific indices and formulation of research findings.

The approach used to carry out the research was quantitative and the choice of the European Commission's database for the Regional Innovation Scoreboard (2017) was achieved for the following reasons: it is strictly focused on innovation activity at regional level and the most recent of all existing databases at European level.

### 4. RESEARCH RESULTS

The gap analysis performed resulted in the following research results: indexes on RIS evolution in the period 2009-2017 (based on 2009 calculation); determining the RIS gap between the development regions of Romania and the EU average as well as between the development regions of Romania and other regions of Central and Eastern Europe. Also, a series of indices concerning the gap between Romania's development regions and the EU average for the following key components of the RIS were determined:

- R&D expenditure public sector;
- R&D expenditure business sector;
- Non-R&D innovation expenditures;
- Product or process innovators;

- Marketing or organizational innovators;
- SMEs innovating in-house;
- Innovative SMEs collaborating with others;
- EPO patent applications.

The indices were determined for the eight development regions of Romania: RO11- North-West, RO12 – Center; RO21 - North-East; RO22- South-East; RO31- South-Muntenia; RO32- Bucharest -Ilfov; RO41 - South-West Oltenia; RO42 – West.

Indices of RIS evolution between 2009 and 2017 were determined on a 2009 basis. The evolution of these indices in the period 2009-2017 is presented in the following table.

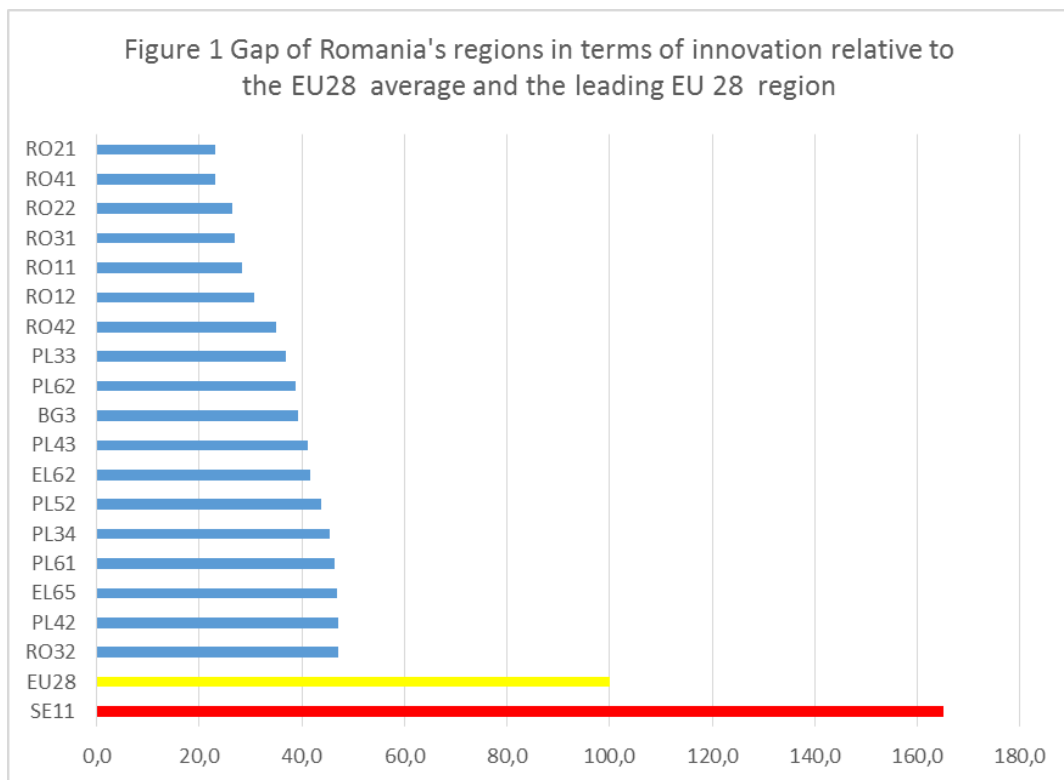
**TABLE 1 INDEX ON RIS EVOLUTION BETWEEN 2009 AND 2017**

Region	Index 2011/2009	Index 2013/2009	Index 2015/2009	Index 2017/2009	Average index
North-West	1.03	0.95	0.68	0.68	0.84
Center	1.06	1.01	0.80	0.86	0.93
North-East	1.01	0.95	0.71	0.54	0.80
South-East	0.85	0.72	0.59	0.51	0.67
South-Muntenia	1.09	1.13	0.82	0.78	0.95
Bucharest -Ilfov	0.99	0.97	0.77	0.77	0.88
South-West	1.00	1.00	0.67	0.70	0.84
West	1.14	0.97	0.76	0.88	0.94

Source: authors calculation based on Regional Innovation Scoreboard 2017 (European commission, 2017)

In all development regions of Romania there is a downward trend of RIS as compared to 2009, and this trend has become more and more pronounced in recent years. The most distances from the EU average in 2009-2017 on RIS are recorded in the North-East and South-East. The lowest gap in RIS is recorded in the West region, followed by the Centru and South-Muntenia regions. The most pronounced trend of increasing gaps compared to the European Union average is registered in the organizations in the South-East region and the most pronounced trend of recovery of the gap with the European Union average is registered in the South-Muntenia region, followed by the West Development Region.

The gap in RIS between Romania's development regions and the EU average as well as between the development regions of Romania and other regions of Central and Eastern Europe is much more visible in Figure 1.



Source: authors calculation based on Regional Innovation Scoreboard 2017 (European commission, 2017)

Figure 1 presents a selection of RIS determined for Romania regions, RIS regions (in the modest category of innovators), RIS for the EU28 and for the first region of the leaders of innovation (SE 11 Stockholm). From Figure 1 it can be seen that seven of the eight regions of Romania they are placed on the last places in the last category (modest) in terms of the innovation made by the organizations. Only one region Bucharest - Ilfov is not in this situation, it has a better RIS than some regions in Poland (PL33, PL62, PL43, PL52, PL34, PL 61), Bulgaria (BG3) or Greece (EL62, EL65).

However, all regions of Romania are very far behind RIS both in terms of the European Union average and of innovation leaders at European level. In fact, Romania is the only country in Europe that has all eight development regions (modest) in terms of innovation in organizations.

Indices of R & D and innovation at regional level were determined by reference to the European Union average and are presented in Table 2. In terms of R & D expenditure in the public sector, the biggest gap with the European Union average is in the region South -Muntenia, followed very narrowly by the South-East region. The two development regions have R & D spending of less than one third of the EU average. The Bucharest - Ilfov region is closest to the European Union level in terms of spending allocated for research and development in the public domain.

TABLE 2 INDICES OF R &amp; D AND INNOVATION EXPENDITURE AT REGIONAL LEVEL

Region	Index of R&D expenditure public sector	Index of R&D expenditure business sector	Index of Non-R&D innovation expenditures
North-West	0.57	0.27	0.17
Center	0.35	0.53	0.52
North-East	0.63	0.19	0.33
South-East	0.30	0.00	0.91
South-Muntenia	0.27	0.63	0.50
Bucharest -Ilfov	0.98	0.53	0.47
South-West	0.48	0.06	0.01
West	0.50	0.13	0.72

Source: authors calculation based on Regional Innovation Scoreboard 2017 (European commission, 2017)

As regards the private sector allocations for R & D activity, the South-Muntenia region has the lowest gap compared to the European Union average. A relatively small gap in this index is also recorded in the Bucharest-Ilfov development region and in the Center region. The biggest gap compared to the EU average for private sector allocations for R & D activity is registered in the South-East region.

Organizations in the South East region allocate the most funds for innovation activity compared to the other seven regions of Romania. This region has the slightest gap compared to the European Union average for this index. The largest gap to the European Union average for expenditure on innovation is registered in the South-West Oltenia region.

Another element analyzed in the research was the orientation of organizations from different regions of Romania towards a certain type of innovation: exclusively technical (product or process) innovation and managerial or marketing innovation. For the two types of innovation, specific indices were determined (see Table 3).

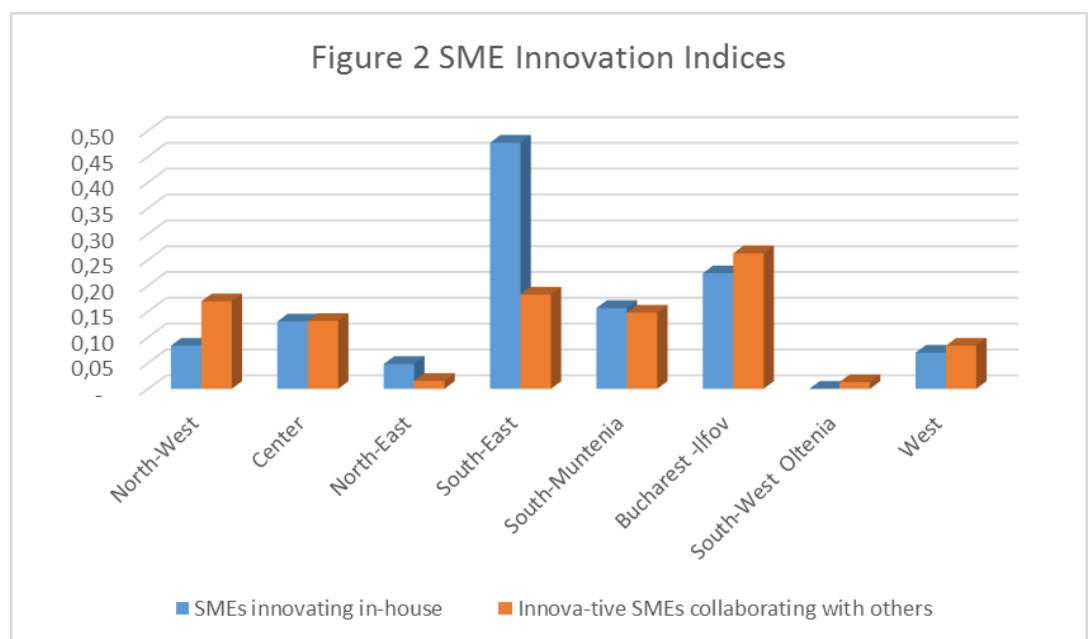
TABLE 3 INDICES SPECIFIC TO THE TYPES OF INNOVATION APPROACHED

Region	Product or process innovators (index)	Marketing or organisational innovators (index)
North-West	0.08	0.09
Center	0.14	0.16
North-East	0.05	0.27
South-East	0.44	0.12
South-Muntenia	0.15	0.15
Bucharest -Ilfov	0.21	0.23
South-West	0.00	0.00
West	0.06	0.03

Source: authors calculation based on Regional Innovation Scoreboard 2017 (European commission, 2017)

Innovation of a technical nature is much better compared to the economic innovation in the South-East region where the lowest gap with the European Union is recorded, although the determined index shows that it is very high (the value of the indicator in the South-East region is 56% lower than the EU average). A much bigger gap is recorded in marketing or organisational innovators in almost all development regions. The biggest gap, with regard to both types of innovation, is recorded in the South-Oltenia region.

For gap analysis, very relevant are the indices of SME innovation. These indices show how they innovate SMEs: alone or in collaboration with other entities. Figure 2 shows that in the Bucharest - Ilfov development region, the index of innovative SMEs in collaboration with others shows the highest values while in the South-East region the lowest gap with the European Union is registered with respect to the SME index which innovate in-house.

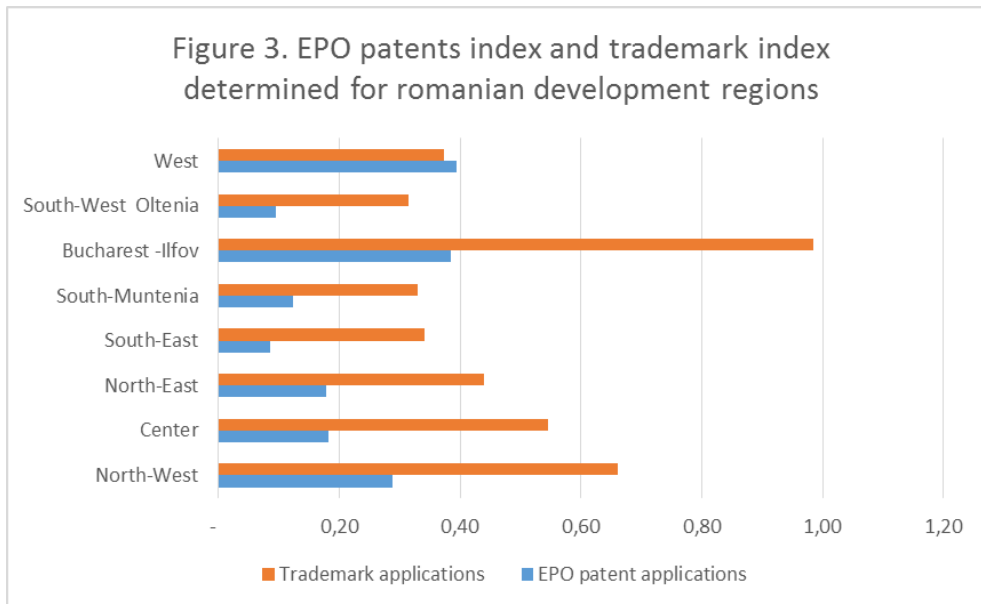


Source: authors calculation based on Regional Innovation Scoreboard 2017 (European commission, 2017)

The North-East and South-West regions are the ones with the largest gaps compared to the European Union both innovating in-house SMEs and innovative SMEs collaborating with others. Nonetheless, SMEs in all the development regions analyzed are very little inclined towards innovation (in-house or in collaboration with others) compared to SMEs in other regions of the European Union. Very few Romanian SMEs fall into the category of start-ups based on innovation or spin-offs, fact visible in their innovative work.



Another dimension of the gap between Romanian organizations and those in the European Union in terms of innovative activities is the analysis of regional indices regarding EPO (European Patent Office) patent applications and trademark applications (Figure 3). As can be seen from Figure 3 in seven of the eight development regions of Romania, the situation in trademark applications is much better than EPO patent applications.



Source: authors calculation based on *Regional Innovation Scoreboard 2017* (European Commission, 2017)

In the field of trademark applications, the Bucharest-Ilfov development region records values almost identical to the European Union average. The gap with the European Union regarding EPO patent applications remains relatively low especially in the South-East and South-West development regions.

## 5. CONCLUSIONS

The research presented in this study aimed to achieve a gap analysis that would reveal the distance between the different development regions of Romania and the European Union media regarding the innovation within the organizations. The main motivation for this research comes from the fact that previously no similar research was carried out at the regional level regarding the innovative activities.

The research was focused primarily on the study of the gap dynamics measured by specific RIS indices for the period 2009-2017. The results seem to indicate an increase in the gap between the innovative activities of the organizations and the European Union average for all regions of Romania.

The fact that seven of the eight regions of Romania are placed on the last places in Europe in terms of innovation activity and all eight regions of Romania are placed in the last category of European regions from the point of view of innovation within the organizations is also significant. A low innovation place Romanian regions on the last places in terms of competitiveness in Europe.

The research shows that between the regions of Romania regarding the main indicators analyzed. There are regions such as Bucharest-Ilfov that are very close to the European Union average for trademark applications and regions with major disparities over the European Union average in terms of indicators such as private spending on innovation activity (South-East region), product process innovators (South-West region). Most Romanian innovators seem to be rather product or process innovators and less Marketing or organizational innovators.

The results seem to confirm and deepen at the regional level some previous results obtained by Diaconu and Vilcu (2018) regarding the existing gap in the field of innovation between the Romanian organizations and those from other European states. That is why they will be pursued by carrying out research to follow the main determinants of this state of affairs.

## REFERENCES

- Banu, G. S. (2018). *Open innovation model: enabling the market uptake of innovation* Procedia Manufacturing, 22, 893–899.
- Caramihai, M., Tănase, N. M., Purcărea A. A. (2017). Proposals for Improving Innovation and Technology Transfer Policies in Romania, *Procedia Engineering*, 181, 984 – 990.
- Diaconu, M., Vilcu, A. (2018). Business innovation activity in Romania: the main trends and weaknesses, *Procedia - Social and Behavioral Sciences*, 238, 157 – 166.
- Drumea, C., Baba, C. M. (2015). Competitiveness through innovation for the Romanian Economy. Allocations correlated with outputs. Patent applications and their effect on competitiveness, *Procedia Economics and Finance*, 32, 1541 – 1549.
- Eizagirre, A., Rodríguez, H., Ibarra, A. (2017). Politicizing Responsible Innovation: Responsibility as Inclusive Governance, *International Journal of Innovation Studies*, 1(1), 20–36.
- European Commission, Directorate-General for Research and Innovation. (2016). *Open Innovation Open Science Open to the World – a vision for Europe*, ISBN: 978-92-79-57346-0.
- European Commission. (2017). *Regional Innovation Scoreboard 2017 – Database*. Retrieved November 01, 2018, from <http://ec.europa.eu/DocsRoom/documents/31644>.
- OECD. (2010). *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*. OECD, Paris, France.
- Owen, R., Macnaghten, P., Stilgoe, J., (2012). Responsible research and innovation: From science in society to science for society, with society. *Science and Public Policy*, 39(6), 751–760.
- Sandu, S., Goschin, Z., Anghel, I., Goschin, G. (2015). The R&D and innovation systems in Romania and Bulgaria in the EU context, *Procedia Economics and Finance*, 32, 1804 – 1826.

- Scholleova, H., Hajek, J., (2014). Effectiveness of innovation support from EU funds program, *Procedia - Social and Behavioral Sciences*, 156, 529 – 532.
- Schot, J., Steinmueller, W. E (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change, *Research Policy*, 47(9), 1554–1567.