The Paradigm of Innovation: From the Entrepreneur to the System

Maria-Alexandra Sârbu[1], Elena Radu[2], Andra-Maria Ionescu[3] and Cosmin Nicolae Mirea[4]

[1) 2) 4)] *The Bucharest University of Economic Studies, Bucharest, Romania.*
[3)] *Unilever South Central Europe.*
E-mail: alexandramariasarbu@gmail.com; E-mail: elena.radu2012@gmail.com;
E-mail: andramaria.ionescu@yahoo.com; E-mail: cosminnicolaemirea@gmail.com

Please cite this paper as:
Sârbu, M.A., Rădulescu, C.V., Radu, E. and Mirea, C.N., 2021. The Paradigm of Innovation: From the Entrepreneur to the System. In: R. Pamfilie, V. Dinu, L. Tăchiciu, D. Pleșea, C. Vasiliu eds. 2021. *7th BASIQ International Conference on New Trends in Sustainable Business and Consumption.* Foggia, Italy, 3-5 June 2021. Bucharest: ASE, pp. 112-118
DOI: 10.24818/BASIQ/2021/07/014

Abstract

Innovation makes an essential contribution to the economic and social progress of all countries, regardless their level of development. The aim of this research is to analyze Romania's national innovation system, and its objective is to identify the evolution of the innovation concept, from its emergence to the treatment of innovation at national / regional level, as a system (through the decisive contribution of OECD and EU). The paper analyzes and synthesizes the main bibliographic sources in the field of innovation, the research being quantitative, from secondary sources - analysis of statistical data provided by Eurostat and by the Romanian National Institute of Statistics, to identify the level of innovation performance in the EU and also Romania's position within the Union, based on the composite innovation index. Following the research, it can be seen that innovation, in terms of defining the term and the conceptual approach, has seen a continuous evolution, from Schumpeter's theory, which regards innovation as a source of business cycles (1939), to innovation, seen as a result of processes within a system (Miettinen, 2002). The research highlights the negative evolution of the performance of the Romanian innovative system within the EU (2019: 22.46% of Sweden's performance and 34.4% of the EU average performance), given that the horizon of the last relevant strategy (2020) has been exceeded and no other strategy has been developed yet.

Keywords

Innovation, national innovation system, innovation performance index, innovation scoreboard.

DOI: 10.24818/BASIQ/2021/07/014

Introduction

From a historical point of view, it is not possible to specify exactly when the term innovation was introduced, there are several examples that could be taken into account (at Falce, 2014). For some authors, innovation has emerged in the Middle Ages (the 13th century), when it was more associated with change, with the *creative* dimension of innovation only appearing in the 20th century (GGoa, 2008), others give Schumpeter the primacy in dealing with the concept of innovation, while other authors consider Adam Smith the first author who, even if he did not use the word innovation specifically in relation to free trade, it was the one who introduced the concept. In the contemporary period, the significance of the concept has evolved greatly, the vision of innovation becoming a systemic one, being regarded as a long-term process that, by virtue of its nature, changes the working methods and

perceptions that each individual has about their own role and interests. Globalization of research activities, collaborative networks, clusters and the role of users are just some of the new terms added to the approach that emerged in the 1990s (Goudin, 2007).

Review of the scientific literature: innovation and national innovation system

Innovation is common in all fields and is a subject of analysis and research in scientific and technical literature, social sciences (history, sociology), management and economics, humanities and arts, becoming an emblem of modern society and a phenomenon that needs to be studied (Gedin, 2008). Fagerberg, Fosaas and Sapprasert (2012) consider that innovation began to show interest during World War II, when policy makers, first in the US and then in other parts of the world, became interested in research, development and innovation, as a driver of military progress and, to a lesser extent, of the civilian sector. Analyzing an impressive number of specialized works, according to the above authors, many of the central ideas of the literature in which innovation is treated can already be found in Schumpeter's two reference works, namely: "*Theory of Economic Development*" (1912) and "*Capitalism, Socialism and Democracy"* (1942), in which innovation is described as a dynamic force that drives the continuous transformation of social, institutional and economic structures. J. A. Schumpeter (1883-1950) is one of the first great economists in the world to analyze the role of innovation in economic change in the twentieth century, which is why McCraw (2005) calls him "*the prophet of innovation*". For Schumpeter, "*innovation is possible without anything that should be identified as an invention, and invention does not necessarily induce innovation*" (1939, p. 84) because while invention is an act of intellectual creativity and "*does not matter for analysis economic*"(p. 85), innovation is an economic decision taken by a firm in the application or adoption of an invention. Schumpeter regards innovation as a historical process of structural change and classifies it into five types: the launch of a new product; a new quality or product mix; the application of new methods of production or sale of a product; the opening of a new one; New sources of supply of raw or semi-finished materials; a new industrial structure such as the creation or destruction of a monopoly position (Śledzik, 2013, p. 90). After approx. 40 years, Barnet (1953, p. 7) defines innovation from a much broader perspective, that of cultural change: "*any new thought, behavior or thing, qualitatively different from existing forms*". By the 1960s, innovation was already the watchword in the economic environment, being recognized at its true value. Thus, Robertson (1967) begins his study with the slogan "*Innovate or you will perish*" (p. 14), which had become a true leitmotif of the market and defines innovation as „*a process through which a new idea, a new behavior or material object appears and is transposed into reality*"(p. 19) that can be programmed, classified according to effects and influenced by opinion leaders. Innovation is also of interest to Drucker (1985) who, like Schumpeter, treats innovation in close connection with entrepreneurship: "*the specific tool for entrepreneurs, the means by which they exploit change as an opportunity for another business or a different service"* (p. 20), considering it an economic or social term, rather than a technical one, expressed more correctly in terms of demand than in terms of supply, while Porter (1990, p. 83) looks at innovation in its direct relationship with competitiveness, considering that the companies that create a competitive advantage, compared to those that cannot perceive the new way to compete, carry out, in the last resort, an act of innovation. But above all, innovation means novelty: "*an idea, practice or object that is perceived as new by an individual or other adoption unit*" (Rogers, 2002, p. 990) counting less on whether or not an idea is a new "objective", as compared to the time that has elapsed since its first use or discovery, the novelty of the idea perceived by a particular individual also determines his reaction: if the idea seems new, it is an innovation. As a conclusion of the above, technological evolution, economic and social changes take place through innovation, the ability of a society to innovate being its own mechanism for renewal and development.

Since the 70s, there has been a shift in focus, from the characteristics of companies to the systematic properties of innovation, usually characterized at national level (Wixtoe, 2009), thus creating a new concept - an innovation system. The innovation system consists of "*all the important economic, social, political, organizational and other factors influencing the development, dissemination and use of innovations*" (Edquist 1997, p. 14, op. cit. in Edquist, 2001, p. 1). By defining the innovation system, through the determinants of innovation and not through their consequences, the crucial issue becomes the identification of all important determinants, named by Edquist and activities of the innovation

system or its functions. Gradually, the *national innovation system* term became widespread among policy makers and researchers around the world (Godin, 2007; Yoon and Hyun (2009).) Despite the fact that most researchers subscribed to Nelson's definition (op. cit. 1993): "... a set of institutions whose interactions determine the innovative performance of national firms", others describe the national innovation system as *"... elements and relationships that interact in the production, dissemination and use of new knowledge and economically useful ... and which are either located inland or rooted within the borders of a nation-state* "(Lundvall, 1992, op. cit in Yoon and Hyun, 2009, p. 2), focusing on the role of spreading innovation. Analyzing the innovation system, Carlsson (2006, p. 65) finds that there is little evidence of the globalization of innovation systems, as long as most studies focus on national innovation systems and their effects at the regional level are not further analyzed. Lundvall (2007), who considers that the core element of the innovation system - interactive learning - is problematic at regional level, much of the interaction taking place at national / international level, rather than at regional level.

Despite the above statements, in 2007, based on the premise that strong innovation, together with new international partnerships, can help address global issues, OECD ministers acknowledged the need for an intergovernmental policy that harnesses the potential of innovation as a driver mainstay of productivity, generating growth and economic development. As a result, *the Innovation Strategy* was launched in 2010, revised in 2015 (OECD Innovation Strategy 2015). Also the OECD, together with Eurostat and supported by UNESCO, the World Bank and other regional development banks supporting innovation investment, published the fourth edition of the *Oslo Manual* in 2018 (first edition in 1992) where there is a clear gap between the outcome of the innovation process (innovation) and related activities (innovative activities).

Research methodology

The purpose of this research is to study the innovation concept, its evolution during time and to analyse the E.U's and Romania's inovation systems. In order to analyse the innovation systems we have studied the overall performance of innovation in the E.U member states, finding out which countries are strong, moderate and modest innovators using the innovation index of the E.U member states. Romania's innovation system was studied in terms of the number of Innovative enterprises, by activity and size classes. In order to find out the level of innovation performance we have examined the statistical data provided by the Romanian National Institute of Statistics and by Eurostat.

The U.E. innovation system

In 2000, the Council of Europe launched the Lisbon Strategy, as an action and development plan by 2010, with the stated aim of transforming the EU in "*the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth, with more and better jobs and greater social cohesion*" (European Council, 2000). However, Lundvall (2007) highlighted some errors that were made at European level:

- emphasis on reference policies and components of innovation systems, in order to generalize "best practices", without understanding the meaning of the concept of "*system*", in which good practice cannot be copied or translated from a national system to another, with the expectation of producing the same effects, abstracting from performance, characteristics, culture, conjuncture, internal and external environment, etc., a fact reported long ago by Deming (1980);

- innovation policy efforts at national and European level have been based on the narrow definition of the innovation system, where the emphasis has been on innovation based on scientific progress, while "interactive learning" within and between companies operating in low-tech sectors has not been reflected in the development of european innovation policy etc. (pp.6-7).

In full agreement with Lundvall, and Krcek (2013), it shows that perhaps the greatest failure of the Lisbon Strategy is that the EU economy has failed in its goal of becoming *"the most dynamic and*

competitive knowledge-based economy in the world". As a result, in 2010, the European Commission set out a new set of objectives leading to an "Innovation Union" by 2020 (Europe 2020).

The radiography innovation system of the EU at the level of 2019 is presented in the *European Innovation Scoreboard 2020*, which shows that between 2012 and 2019, South Korea (which is in 2019 the EU's innovative performance by 38%), Canada and Australia have a score of performance (calculated as a composite index) higher than the EU, and Japan, which in 2012 was below the EU level, is now in a higher position. However, the EU maintains its superior position compared to the USA, China (despite the most significant increase between 2012 and 2019 compared to all countries), Brazil, Russia, South Africa and India (Figure no. 1).

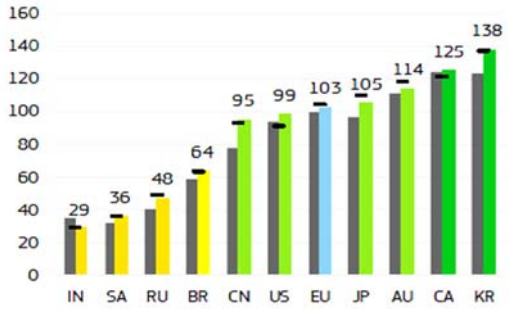

Figure no. 1. The overall performance of innovation in the EU
Source: Hollanders, H., 2020, p. 6.

The legend of the coloured columns: gray – 2012; various – 2019; Horizontal black lines- 2018

Despite the reduction in the level of performance by the UK leaving the EU, between 2012 and 2019, the performance score of the EU increased by 8.9 percentage points (Hollanders, 2020, p. 6, p. 18), with innovation performance increasing in 24 of the 27 EU member states, with the largest increases being recorded in Lithuania (+ 27.8%), Malta (+ 24.7%), Latvia (23.3%), Portugal (21.5%) and Greece (20.7%) and only in three countries decreased: Germany (-0.4%), Romania (-5.7%) and Slovenia (-9.9%) - Figure no. 2.

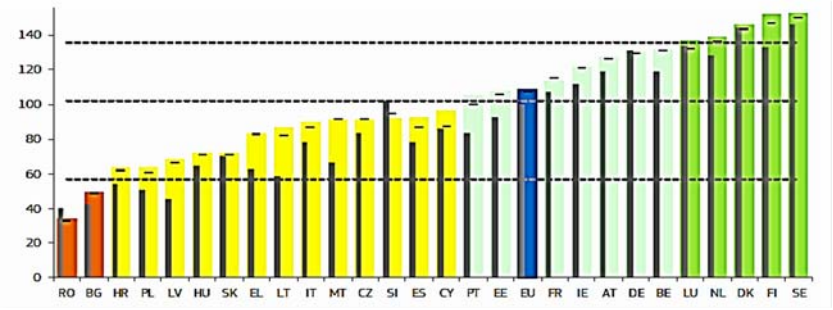

Figure no. 2. The performance of innovation systems in EU Member States
Source: Hollanders, 2020, p. 7.

National innovation performance systems are calculated on the basis of 27 indicators that capture 10 dimensions of innovation, according to which EU countries are classified into four categories: **innovation leaders** - they are above the EU average: Sweden, Finland, Denmark, Netherlands and Luxembourg; **strong innovators** (above or close to the European average): Belgium, Germany, Austria, Ireland, France, Estonia and Portugal; **moderate innovators** (below average): Cyprus, Spain, Slovenia, Czech Republic, Malta, Italy, Lithuania, Greece, Slovakia, Hungary, Latvia, Poland and Croatia and **modest innovators**: Bulgaria and Romania, also below the European average - Figure 2. We can notice that the first two categories include the countries of Western and Northern Europe, and in the last two, the vast majority of the countries belong to the Eastern and Southern Europe. The analysis highlights a fairly high level of concentration on the performance of national innovation systems, without a real convergence of regions within the EU, which imposes the need to develop and

implement an innovation-based growth model for the last two categories of countries. It should be emphasized that the *European Innovation Scoreboard 2020* presents and analyzes not only the individual performance of Member States' national innovation systems, but also of the innovation system across the European Union, based on each indicator. As a result of the Coronavirus pandemic triggered in 2019, only a one-year forecast (2020) could be made, by half-extrapolating the results of the linear regression, respectively continuing the trend of increasing innovation performance for most indicators by 3.2 percentage points (2020/2019) and by 12% compared to 2012 (Hollanders, 2020).

As a conclusion of the above, 13 countries in the European space are included in the category of moderate innovators and two countries - Romania and Bulgaria - in the category of modest innovators, which means that 55.6% of EU countries are in the performance of innovation system, below the European average, the last countries with a big difference compared to the absolute leader: Romania is at 22.46% of Sweden's performance, and Bulgaria at 32.3% - Figure no. 3. As a result, we believe that sustained efforts are needed at both national and European level, by stimulating countries that are below the European average, in order to raise the performance and global competitiveness of the EU and achieving European strategic objectives.

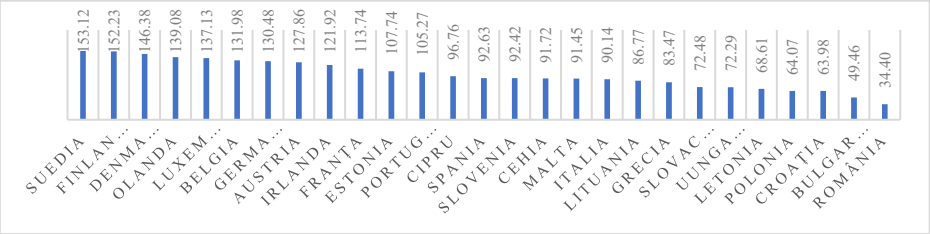

Figure no. 3. Innovation index in EU member states

Souce: statistical data processing of the European Innovation Scoreboar 2020. Available at: https://interactivetool.eu/EIS/EIS_2.html# [Accessed on: 28.01.2020].

Romania's innovation system

After 1989, the research and development activity experienced a chronic underfunding, which generated a permanent decline materialized in the low quality of the infrastructure, the drastic decrease of the number of researchers (reduced salary attractiveness, young researchers leaving the country, etc.), in parallel with the increase of the average age, and reorganizations and privatizations in the economy have led almost to the disappearance of research and development at the organization level (National Strategy for Research, Development and Innovation for 2007-2013). In the perspective of Romania's accession to the EU in 2007, in order to ensure coherence with specific policy documents at community level, the Romanian Government adopted, in 2006, *the National Strategy for Research, Development and Innovation for the period 2007-2013* which, in addition to contributing to the institutional administration of research and development activities, innovation, also provided a number of objectives, including: increasing scientific production, internationalization and development of domestic human capital in research, as a result of a substantial increase in public funding of research and technological development. The evaluation of 2011 and the impact study of 2015 resulted in a number of shortcomings, including: undersizing of the research and development sector, insufficient number of researchers; lack of human capital in the development of areas and for innovation and interdisciplinary research; decrease in the number of researchers in the business environment; the reluctance of multinationals in the development of local research centers; limited intra- and intersectoral mobility, with a negative impact on the spread of innovation and the circulation of technical knowledge and innovation; the weak connection of the research-development activity with the business environment; difficult access of the private environment to public research infrastructure, insufficient funding of research and development (amounts spent per capita are 20 times lower than the European average, etc.), the conclusion being that „*innovation is not a central factor of economic and social development in Romania"* (Romania's National Strategy for Research, Development and Innovation for the period 2014-2020, p. 6).

Despite the above shortcomings, in 2012, the performance of Romania's innovation system stood at the highest level, which continued to decline until 2019 - Figure no. 2. As can be seen from Table no. 1,

the largest number of innovative enterprises was registered in 2008, growing steadily since 2002, after which it started to decrease steadily until 2016, in 2018 there is a return of innovative activity on all enterprises, but without reaching level of 2012, taken as a reference in the latest European Innovation Scoreboard. The same evolution is registered also in the structure, with the mention that the highest number of innovative enterprises is registered in the category of small enterprises (53.65% in 2002 and 71.98% in 2018), at the opposite pole being the large enterprises (16.64 % in 2002 and 8.36% in 2018). If in 2002, the innovative enterprises in Romania represented 17% of the total enterprises, in 2008 their share increased to 33.3%, so that in 2018 to reach below the level of 2002, respectively 14.6%. From 2002 to 2006, the main share in innovative enterprises was held by the innovative product and process, and since 2008, the main share was held by enterprises with marketing and/or organizational innovation (until 2008 there are no statistics available for this type of innovators), a situation that will continue until 2018.

Table no. 1. Innovative enterprises in Romania, by activity and size classes

Activities	Size classes	Number of enterprises								
		2002	2004	2006	2008	2010	2012	2014	2016	2018
Total	Total	3.983	5.171	6.013	9.986	8.116	5.968	3.645	2.925	4.198
-	Small	2.137	2.851	3.523	6.797	5.613	4.089	2.527	2.059	3.022
-	Medium	1.183	1.597	1.836	2.388	1.874	1.400	786	643	825
-	Large	663	723	654	801	629	479	332	223	351

Source: National Institute of Statistics. Innovation. Available at: http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table

In 2014, with the end of the strategy's time horizon, a new strategy was adopted for the next period - 2014-2020 - which, according to the above analysis, began to take effect only in 2018 (latest data statistics available on the website of the National Institute of Statistics of Romania), a fact also confirmed by the *Romania's Country Profile* in the European Innovation Scoreboard, 2020. The new strategy was developed in correlation with cohesion policies, taking into account the European strategy Europe 2020 and its main instrument - Horizon 2020. In the European innovation landscape, Romania ranks last in most dimensions of innovation: the last place at: *Human resources*; *Innovators* (continuously declining since 2012), *Business investments*, *Intellectual assets*, *Impact on employment*; position 26 of the 27 member states in *Attractive Research Systems*; position 25 in *Cooperation*; 23rd place in the *Favorable Innovation Environment*; the 22nd place in the *Financing and Support dimension* and the best position in *the Impact on sales* - the 20th position among European countries, followed by: Malta, Poland, Portugal, Lithuania, Latvia, Bulgaria and Croatia. According to the country profile, Romania's lowest scores are recorded on the indicators: *Lifelong learning, SMEs with product or process innovations, SMEs with marketing or organizational innovations and internally innovative SMEs.*

Conclusions

Although *Romania's National Research, Development and Innovation Strategy for the period 2014-2020* was based on building a "*broad partnership for innovation*" (p. 7) which, through coordination and integration within the research-development-innovation system, to allow long-term commitments on ensuring resources, predictability and credibility of the public-private partnership and which, in the end, will lead to raising Romania's performance and convergence towards the EU average, the results did not live up to expectations. Romania of 2019 has a very small improvement and is, at most indicators analyzed, below their level in 2012. *The innovation-friendly environment* and the *Impact of sales* are the most favorable dimensions of innovation, the weakest are *Innovators*, *Business I*nvestments and Human Resources, and *Broadband Internet penetration* and *Exports of medium and high technology products* are the only indicators that approach the EU performance average. Increasing the performance of Romania's innovation system requires action on two levels: concerted support from both the EU, aimed at countries with national innovation systems that perform below the European

average, but also nationally, through sustained measures to support and stimulate research-development-innovation activity. If from the EU it can be said that the answer was received by allocating 2.5 million Euros, in cooperation with the World Bank, for providing expertise in two cooperation and innovation projects in the regions and cities of Romania, within *Catching up Regions* initiative, Romania's action is still awaited: although the time horizon of the last strategy has been exceeded, a new Romania strategy in the field has not been launched in 2021 either, despite the fact that innovation is a safe investment in Romania's competitive development, in the context of the European and global economy.

References

Carlsson, B., 2006. Internationalization of innovation systems: a survey of the literature. *Research Policy,* 35(1), pp.56-67.

Drucker, P.F., 1985. *Innovation and Entrepreneurship. Practice and Principles.* New York: Harper&Row, Publishers, Inc.

Edquist, C., 2001.*The Systems of Innovation Approach and Innovation Policy: An account of the state of the art.* [pdf] Available at: <https://www.semanticscholar.org/paper/The-Systems-of-Innovation-Approach-and-Innovation-Edquist/a7f9e570864ee75dd3bcca9ca86885190a0d5134> [Accessed 19 January 2021].

Fagerberg, J., Fosaas, M. and Sapprasert, K., 2012. Innovation: Exploring the Knowledge Base. *Research Policy,* 41(7), pp.1132-1153.

Godin, B., 2007. *National Innovation System: The System Approach in Historical Perspective. Project on the History and Sociology of STI Statistics*, Working Paper No. 36. [pdf] Available at: <http://espace.inrs.ca/id/eprint/10307/1/Godin_2007.pdf> [Accessed 08 January 2021].

Hollanders, H., 2020. *European Innovation Scoreboard 2020*. European Commission: Luxembourg: Publications Office of the European Union, 2020.

Lundvall, B-A, 2007. National Innovation Systems—Analytical Concept and Development Tool. *Industry and Innovation* 14(1), pp.95-119.

Porter, M. E. *The Competitive Advantage of Nations.* 1990. New York: The Free Press.

Rogers, M.E., 2002. Diffusion of Preventive Innovations. *Addictive Behaviors* 27, pp.989–993.

Schumpeter, J.A., 1939. *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*. New York: McGraw-Hill.

Śledzik K., 2013. Schumpeter's view on innovation and entrepreneurship. In: *Management Trends in Theory and Practice,* (ed.) Stefan Hittmar, Faculty of Management Science and Informatics, University of Zilina & Institute of Management by University of Zilina.

Wixted, B., 2009. *Innovation System Frontiers. Cluster Networks and Global Value.* Berlin, Heidelberg: Springer-Verlag.

Yoon, W. and Hyun, E., 2009. How Relevant and Useful is the Concept of National Systems of Innovation? *Journal of Technology Management of Innovation*, 4(3), pp.1-13.