

KNOWLEDGE VALORIZATION IN E.U. A CRITICAL ASSESSMENT FOR ROMANIA

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Abstract: In this paper we propose a critical assessment of the activities in the knowledge valorisation chain in Romania, exploring data from 2021 European Innovation Scoreboard (EIS). Using a set of relevant indicators, we analyse the main dimensions of capturing the value creation from knowledge. Knowledge valorisation lies at the heart of the knowledge economy and is critical for the economic and social progress. Despite of the political efforts of the European Commission regarding this issue, the “European Paradox” continues to exist and the failure of most European countries to convert the investment carried out in R&D into economic results and social benefits remains a debated topic. Universities, as one of the main actors of the knowledge valorisation process acknowledge this as a component of the university mission and play multiple roles along the valorisation channels. In this context, the entrepreneurial transformation of the university is determined and determines support and intensification of knowledge transfer. The research shows the need to reduce barriers for transferring knowledge into economy and necessity for policy intervention in order to uptake of research results in society and the economy, especially for Romanian environment.

Keywords: knowledge valorisation, entrepreneurial university, innovation

JEL Classification: *I32, O32, O38*

Introduction

European Union is dedicated to achieving sustainable development principles. In 2015, the UN 2030 Agenda for Sustainable Development set out 17 goals in a global effort to address the world challenges. European Union adopted the principles of the sustainable development since 2001, when the first European Union Strategy for Sustainable Development was adopted at the E.U. Summit. Later, in 2016, the European Commission developed the European Action for Sustainability, in compliance with which the E.U. SDG Multi-stakeholder Platform was established in 2017.

In this context, mission-oriented Research and Innovation is one of the transformations for EU achieving the UN Sustainable Development Goals (The 2019 European Sustainable Development Report. Paris and Brussels: SDSN & IEEP 2019). On another side, innovation policy is crucial for EU becoming a world innovation leader and outperforming its main competitors, USA and Japan. Investing in R&D as a major driver of innovation is critical. Still there are discrepancies between E.U. countries regarding R%D intensity. For example, in 2020 Belgium and Sweden recorded the highest intensity at 3.5% and at the opposite scale six member states recorded a R&D intensity below 1% of GDP: Romania, Malta, Latvia, Cyprus, Bulgaria and Slovakia (Eurostat, 2021). Despite of the efforts for investing in R&D, there is a failure in the capacity to convert research output into successful innovations in the market. This is encapsulated in the concept of

“European Paradox”, coined by European Commission in Green Paper of Innovation, in 1995 (Green Paper on Innovation, 1995). The document emphasizes the need of utilization of top level European research by industry.

However, there are researchers questioning the theory regarding this paradox (Dosi, Llerena and Labini, 2006), (Rodríguez-Navarro and Narin, 2010). Their main argument could be resumed at the fact that the quality of research publications count more than the high volume of scientific research. The concern for the European paradox was maintained in the policy documents of E.U. which are recently emphasizing that “even if the Union continues to be a global leader in terms of scientific output producing, for example, 22.7 % of all high-quality scientific publication, still lags behind in translating this advantage to the market“ (Eurostat, 2020).

Research and Innovation systems are performing based on top-level science producing relevant output, business involved in innovation activities and also on supporting policies conducive to thriving science-industry knowledge transfer relationship. Universities play an important role in research and innovation systems. The process of knowledge valorisation is starting with universities (Hladchenko, 2016). The traditional functions related to education and research are enriched and complemented with a third mission, for commercialization activities, patenting licensing and company formation. (Rasmussen, Moen and Gulbrandsen, 2006). The model of Triple Helix (Etzkowitz and Leydesdorf, 1995) consider universities together with industry and government as „helices” generating the innovation system. Due to the impacts on society the entrepreneurial profile of universities become a factor for stimulating innovation and for promoting the uptake of research and innovation results.

In this paper, data for Romania and “emergent countries” extracted from the European Innovation Scoreboard (EIS) 2021 are used to illustrate the main dimensions of capturing the value creation from knowledge. Also, we analyse the role of universities in knowledge valorisation chain and the need for policies to enhance the activities stimulating the transfer of knowledge into goods and services.

Conceptualization

The process of transfer the knowledge to society, through transformation of knowledge to valuable products and services is subject of numerous studies. Knowledge valorisation is a broad concept with multiple manifestations such as: ”licensing of a patent to a firm, university-business collaboration to elaborate an invention to bring it to market, graduates working in research departments in the business sector, and spin-off firms engaged in developing an invention” (Van Geenhuizen, 2010), knowledge exploitation, knowledge or technology transfer, knowledge exploitation and academic entrepreneurship (van de Burgwal, van der Waal and Claassen, 2018), the transfer of knowledge from one party to another for economic benefit (Andriessen, 2005). There are three major paths of exploration regarding the concept of transforming knowledge in universities to economic value: knowledge valorisation, knowledge commercialization and knowledge capitalization (Baycan and Stough, 2013). The transformation stages can be considered as constituent elements of a value chain. Porter sought to define competitive of a firm using the concept of value chain. The goal of the activities within a value chain is to create value

that exceeds the cost of performing that activity, therefore generating a higher profit (Porter, 1985).

Similar to Porter's value chain approach, a knowledge value chain is consisting of knowledge management infrastructure, knowledge management activities and knowledge performances (Lee and Yang, 2000). The impact of research valorisation and innovation for economy and social life determined the scholars to design conceptual models for a clear representations of knowledge valorisation. The process of university knowledge valorisation is not linear and homogenous. The diversity in models show that knowledge valorisation, and specifically university-based innovation, is hard to define, comprising multiple heterogeneous subprocesses and associated activities with potential contribution role in the process of achieving societal impact (van de Burgwal, van der Waal and Claassen, 2018).

Among the participants in the valorisation process are university faculty members, university technology officers, firms and entrepreneurs, consumers and policymakers (Siegel and Wright, 2015). In addition to their traditional roles of education and research, universities are engaged in establishing links with industry, which made them to evolve „into fully fledged managerial organizations preoccupied with generating profits and creating an economic impact on local, regional and national scales” (Budyldina, 2018). Preoccupation for valorisation of research is one of the phases of becoming an entrepreneurial university, when the universities are taking an active role in commercializing the intellectual property arising from their activities (Etzkowitz, 2017). One conclusion is there are two necessary conditions for knowledge valorisation: the transfer of knowledge and economic benefit. (Baycan and Stough, 2013)

The concern for “European paradox” meaning “inferiority in terms of transforming the results of technological research and skills into innovations and competitive advantages” (EU Commission, 1995) is reflected in policy instruments adopted by E.C., for instance:

-the EU Knowledge Valorisation Platform launched in 2021, as one of the actions under the new European Research Area (ERA) Communication. The platform is a digital space aiming to stimulate cooperation across the borders and improve the transfer of the research results to economic and social life.

-the policy review ‘Knowledge valorisation channels and tools’ as the first milestone in setting out a European knowledge valorisation strategy published in July 2020. It describes the different means for:

- improving the transformation of research results into new sustainable solutions;
- identifying and analysing the main channels for the uptake of research and innovation results;
- get better at spreading excellent national practices;
- highlight best practices from Europe and beyond.

-the Communication on ‘A new ERA for Research and Innovation’ (COM 2020 628 final) calls on the Commission in consultation with Member States and stakeholders to update and develop guiding principles for knowledge valorisation and a code of practice for the smart use of intellectual property (IP).

Since the first edition in 2001, European Innovation Scoreboard is intended to be a measurement framework for research and innovation performance of the EU Member

States. EIS is integrating indicators are assessing the position of individual countries in terms of innovation, which can reflect knowledge valorisation process.

Data

The Summary Innovation Index measures the performance of EU national innovation systems and is quantified by a composite indicator aggregating 32 indicators which illustrate four main types of activities: Framework conditions, Investments, Innovation activities and Impacts. According to the EIS (Hollanders, 2021) there are four performance groups:

- Innovation Leaders includes four Member States where performance is above 125% of the EU average. The Innovation Leaders are: Belgium, Denmark, Finland and Sweden.
- Strong Innovators includes seven Member States with a performance between 100% and 125% of the EU average. Austria, Estonia, France, Germany, Ireland, Luxembourg and the Netherlands are Strong Innovators.
- Moderate Innovators include nine Member States where performance is between 70% and 100% of the EU average. Cyprus, Czechia, Greece, Italy, Lithuania, Malta, Portugal, Slovenia and Spain belong to this group.
- Emerging Innovators include seven Member States that show a performance level below 70% of the EU average. This group includes: Bulgaria, Croatia, Hungary, Latvia, Poland, Romania, and Slovakia.

Analysis and discussion

The analysis considered benchmarking Romania against the countries from the “Emerging Innovators” (Hollanders, 2021) using specific indicators for each dimension, as illustrated in Table 1.

The dimensions and associated indicators related to the activities in the value chain are illustrated as follows: in Table 2 for “Framework conditions”, in Table 3 for “Investments” and “Innovation activities” and in Table 4 for “Impacts”.

Table 1. EIS selected indicators

Type of activity	Dimension	Indicators	Activity in the KV chain
Framework conditions	Human resources	1.1.1 New doctorate graduates (in STEM) 1.1.2 Population aged 25-34 with tertiary education	Knowledge acquisition
	Attractive research systems	1.2.1 International scientific co-publications 1.2.2 Top 10% most cited publications 1.2.3 Foreign doctorate students as a % of all doctorate students	
Investments	Finance and support	2.1.1 R&D expenditure in the public sector	Knowledge processing
		2.1.3 Direct government funding and government tax support for business R&D	
Innovation activities	Linkages	3.2.2 Public-private co-publications	Knowledge dissemination

Type of activity	Dimension	Indicators	Activity in the KV chain
Impacts	Employment impacts	4.1.1 Employment in knowledge-intensive activities	
	Sales impacts	4.2.1 Medium and high-tech product exports 4.2.2 Knowledge-intensive services exports 4.2.3 Sales of product innovations	

Source: European Innovation Scoreboard 2021 and own elaboration

Table 2. Selected indicators for “Framework conditions”, Emerging Innovators

Country	1.1.1 New doctorate graduates	1.1.2 Population with tertiary education (Regional)	1.2.1 International scientific co-publications (Regional)	1.2.2 Scientific publications among the top 10% most cited (Regional)	1.2.3 Foreign doctorate students as a % of all doctorate students
Slovakia	77,02	127,27	101,07	41,83	61,32
Bulgaria	42,56	73,55	47,61	15,78	46,26
Croatia	42,56	96,69	107,43	32,08	57,90
Hungary	31,07	56,20	85,94	48,74	123,03
Latvia	19,58	165,29	90,39	39,37	63,20
Poland	19,58	162,81	69,72	43,58	13,47
Romania	19,58	14,05	47,41	39,84	28,45

Source: European Innovation Scoreboard 2021

Table 3. Selected indicators for “Investments” and “Innovation activities”, Emerging Innovators

Country	2.1.1 R&D expenditure in the public sector	2.1.3 Direct government funding and government tax support for business R&D	3.2.2 Public-private co-publications
Slovakia	35,09	27,83	84,82
Bulgaria	15,79	6,84	51,81
Croatia	68,42	4,22	126,94
Hungary	31,58	174,72	111,35
Latvia	50,88	5,77	88,45
Poland	54,39	86,92	71,15
Romania	3,51	14,47	51,81

Source: European Innovation Scoreboard 2021

Table 4. Selected indicators for “Impacts”, Emerging Innovators

Country	4.1.1 Employment in knowledge-intensive activities (Regional)	4.2.1 Exports of medium and high technology products	4.2.2 Knowledge-intensive services exports	4.2.3 Sales of new-to-market and new-to-firm innovations (Regional)
Slovakia	70,67	142,19	44,14	83,6
Bulgaria	65,33	50,91	57,93	42,05
Croatia	81,33	64,34	7,95	85,83
Hungary	86,67	143,53	72,02	63,35
Latvia	70,67	45,33	74,84	59,4

Poland	65,33	88,49	57,05	42,8
Romania	25,33	110,44	64,88	62,97

Source: e European Innovation Scoreboard 2021

Analyzing the data for Romania these are indicating the weakest position for the most part of dimensions from the “Framework condition”: “New doctorate graduates (in STEM)”, “Population aged 25-34 with tertiary education” “Population aged 25-34 with tertiary education”, “International scientific co-publications”. Better ranking inside the Emerging Innovators group are for “Scientific publications among the top 10% most cited” and “Foreign doctorate students as a % of all doctorate students”. For “Investment dimension” Romania is ranked before Latvia and Croatia regarding “Direct government funding and government tax support for business R&D”. Despite of the low results in the „input” chain, Romania’s strengths are in “Exports of medium and high technology products”, “Knowledge-intensive services exports” and “Sales impacts”.

Conclusions

There is widely recognized the importance of knowledge as a driver of innovation, economic and societal progress. In order to measure the turn of innovation inputs into innovative outputs, a large set of indicators aiming at measuring the output from innovative processes was created. European Innovation Scoreboard is a framework using specific indicators for assessment of the position of individual countries, in terms of innovation. Performance of the EU innovation system, measured as the weighted average of the performance of the innovation systems of all 27 Member States, has improved by 12.5 percentage points over the last eight years between 2014 and 2021 (Hollanders, 2021).

Within the Emerging Countries group, for 2021, Romania has the lowest value of the innovation index from EU countries, 35.09. Comparative with Sweden which has 156.45, Romania is an emerging Innovator. Based on the assessing indicators and the dimensions related to the activities in the value chain, Romania has the following weaknesses: on both stages of knowledge acquisition and processing the performance is poor, has one of the less attractive research systems from Europe and one of the lowest levels for R&D expenditures in the public sector (3.51 comparing with 156.14 score for Denmark). Despite of the low results in the „input” chain, Romania’s strengths are in “Exports of medium and high technology products”, “Knowledge-intensive services exports”, and “Sales impacts”.

The European Paradox acknowledge the fact that effectiveness of public subsidies for research investments is not translated into successful innovations in the market. The inconsistency between Europe's leadership in scientific production and limited innovation outcomes that is described by this paradox is generally considered to be best addressed by improvements in knowledge transfer and knowledge valorisation processes (Van Vught, 2009). Some of the barriers to knowledge valorisation identified in relevant literature are concerning the following aspects:

- Lack of initiatives for facilitate and foster knowledge commercialization;
- Constraining university-industry collaboration because of cognitive-distance, differences in value systems between university and industry, shortcomings in financial planning and market conditions (Baycan, 2013);

- Bureaucracy and lack of flexibility in University-Industry relationship, insufficient rewards for researchers (Siegel et al., 2004).

In this context it is necessary to improve policies stimulating the knowledge valorisation process. Among recently undertaken measures by the European Commission are supporting: the development of a Code of Practice for researchers on standardisation in the course of research projects funded by Horizon 2020 (European Commission, 2022), the elaboration of the Recommendations on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations (European Commission, 2008) and defining the European knowledge valorisation strategy (European Commission, 2020).

Future research will address the relation between process and outcomes within the knowledge valorization process of university.

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