

Smart specialisation - an innovative approach to the economic transformation of the Republic of Moldova and the role of the universities in this process

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Abstract: Establishing a knowledge-based economy and the transition from a resource-based to an innovation-based economy, which the Republic of Moldova opts for, requires changing the approaches of the regional economic development and reconsidering the research-development and innovation system to turn it into an important progress factor.

While the elaboration and implementation of the National/Regional innovation strategy for smart specialisation (RIS 3) has become an important component of the cohesion policy for 2014-2020 programming period and an ex-ante condition for the EU countries in accessing structural funds, in our country concerns in this area are only at an early stage of conceiving this concept and raising awareness of its importance. A particularly important role in speeding up and successfully implementing this process lies with universities.

This paper analyses the importance of smart specialization for sustainable economic development, its concept and content, and argues the need of a strategic approach for economic development through the support of research and innovation. The paper characterizes the current situation in research-innovation-development in the country, Moldova’s position in the international rankings, the challenges it faces and the actions to be followed in order to develop the smart specialisation strategy in Moldova. A particular attention is paid to the evaluation of the role of the universities in smart specialization strategy design and implementation.

A comprehensive research methodology has been applied in the study, including methods of analysis, synthesis, induction, deduction, benchmarking, observation, economical-statistical methods and others.

The study concludes that a key solution for an innovation-based economic development of the Republic of Moldova is the implementation of the smart specialization concept based on the European experience, which has been widely applied in the community countries and has proved its viability and necessity. One of the main stakeholders should become universities, which have a distinct mission in this process.

Keywords: smart specialisation strategy, innovation, research, economic transformation, role of universities.

Introduction

The concept of smart specialisation has been embedded and has become a key element of the European Union's cohesion policy, being considered an effective tool in delivering a European strategy for smart, sustainable and inclusive growth. The smart specialisation strategies are successfully implemented for several years already in the EU member states (moreover, countries from the EU neighbourhood are currently considering S3 as a strategic framework for regional innovation ecosystems). The impact of their implementation is significant, contributing to an efficient access and use of European structural and investment funds, enhancing the synergy between different (national and regional) policies and boosting public and private sector investments.

The elaboration and implementation of the smart specialisation strategy (S3) in the Republic of Moldova are particularly important, due to the fact that the concept of *smart specialisation* supports the reorientation of RDI policies towards those research activities that provide results with economic relevance, which, for a country with still a low level of investments (both public and private) in these areas, is quite relevant.

The concept of smart specialisation

In the Regulation no.1303/2013, Article 2, paragraph 3 (Regulation, 2013) is defined that smart specialisation represents the national or regional innovation strategies that set priorities in order to ensure competitive advantage by developing and matching the strengths of research and innovation with business needs for addressing emerging opportunities and market developments in a coherent manner, avoiding duplication and fragmentation of efforts; a smart specialisation strategy may take the form or be included in the national or regional research and innovation policy framework. The Organization for Economic Cooperation and Development (OECD) uses the same notion to describe an industrial and innovation framework for regional economies that aims to illustrate how public policies, framework conditions, but especially R-D-I investment policies, can influence the economic, scientific and technological specialisation of a region and, consequently, productivity, competitiveness and economic growth (OECD, 2013).

The concept was originally developed by the „Knowledge For Growth” high level Expert Group (Foray, Paul, & Hall, 2009), convened in 2005 at the initiative of European Commissioner for Research, Janez Potočnik, to get advised on: the contribution that knowledge can have on sustainable growth and prosperity, policies for promoting the creation, dissemination and use of knowledge, and the role that various actors can play in stimulating a knowledge society. Instead of top-down approaches to policy making, the members of the Expert group suggest an "entrepreneurial discovery" process that can reveal where a country or region is achieving the best results in terms of science and technology. In this learning process, entrepreneurs are most likely to have the main roles in discovering promising areas of specialisation. Later on, one of the authors of the concept, Dominique Foray, explained the difference between smart specialisation and smart specialisation strategy (RIS3) - the first notion expresses a diversification process through the local concentration of resources and competencies on a number of new areas that represent the possible ways of transforming productive structures, while the second concept means the implementation of a political process designed to facilitate this dynamic when it is not taking place spontaneously. An essential condition for the smart specialisation process is the existence of a long-term vision among decision-makers, as well as the various actors involved, including business and academia.

In the context of these considerations, but also based "on-the-ground" evidence from the European member states/regions that have demonstrated sustainable economic growth following investments in research and innovation activities (mainly innovation leaders according to the Innovation Union Scoreboard), the concept was incorporated into the European Cohesion Policy (2014-2020 budget cycle) in order to stimulate regional economic transformation.

As a result, in 2010 the European Commission adopted the Communication to the European Parliament and Council "*Regional Policy contributing to smart growth in Europe 2020*", calling on Member States to develop Smart Specialisation Strategies. Being included as an ex-ante conditionality under the 2014-2020 Cohesion Policy, RIS3 became the foundation for investment in research and innovation through the European Regional Development Fund. More recently, the importance of further development of the concept is mentioned in the Commission Communication to the European Parliament and Council "*Strengthening Innovation in Europe's Regions: Strategies for resilient, inclusive and sustainable growth*" from 18.07.2017, where the S3 role is emphasized and the next reforms in the field are pointed out.

Resuming various definitions and contexts in which the term is used, it could be said that the S3 concept focuses on: identifying the unique features and strengths of each country/region; identifying the competitive advantages of each country/region; identifying cognitive specialisations,

most appropriate for their innovation potential; involving enterprises, research centres and universities, which collaborate to identify the most promising areas of specialisation; co-opting stakeholders and resources around a vision centered on excellence in the developing the respective field.

The European Commission's Joint Research Center has developed, in 2012, the Guidelines for Research and Innovation Strategies for Smart Specialisation (Guide to Research, 2012), which contains the steps and methodology for developing these strategic planning documents. According to the guidelines, the main steps for RIS 3 design are the following (Figure 1):

- analysis of the regional context and potential for innovation;
- ensuring participation and ownership;
- elaboration of an overall vision for the future of the region;
- identification of priorities;
- definition of coherent policy mix, roadmaps and action plan;
- integration of monitoring and evaluation mechanisms.



Figure 1. The main steps for RIS 3 design

However, beyond the horizontal programs needed to improve framework conditions and general capabilities, the central purpose of smart specialisation is the prioritization process. The resources are to be concentrated in specially selected areas related to certain types of technology, disciplines, subsystems within a sector or intersections of different sectors (Foray & Goenega, 2013).

Smart specialisation implies an improvement in the allocation of public funds to research, development and innovation activities in order to increase competitiveness, productivity and growth mainly through entrepreneurial activities. These strategies can be seen at the national or regional levels as a combination of innovation and industrial policy elements based on a bottom-up approach (entrepreneurial discovery process), flexibility in implementation and transparency. RIS3 aims to foster experimentation in existing and new business areas and niches and to adapt the policy mix according to the results of these experiments (flexibility). At the same time, the continuous process of smart specialisation involves making difficult choices, as for example the decisions to stop the funding for some projects and activities or to allocate resources to stimulate emerging technologies.

The role of the universities in designing and implementing a smart specialization strategy

The key element that characterizes the process of developing a smart specialization strategy is the implementation of the “Entrepreneurial Discovery Process”, involving Quadruple Helix stakeholders (business, government, research and educational institutions, civil society - Figure 2).

Thus, instead of a top-down strategy, the design of a smart specialization strategy involves representatives of the business sector, research centers and universities, that are working together in order to identify the most promising areas of specialisation at the national or regional level, as well as weaknesses which prevents innovation in that areas. In particular, it is considered that the kind of knowledge existing among entrepreneurs implies much more than just scientific knowledge. Rather, they combine and connect together different streams of knowledge, such as science, technology and engineering with the knowledge in the area of market growth potential, possible competitors, and the whole set of conditions and services needed to launch a new activity.

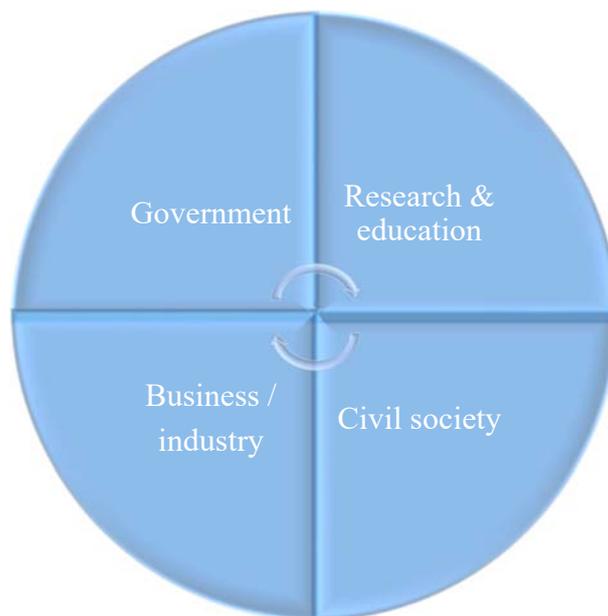


Figure 2. Quadruple Helix model of interaction

Although it is traditionally considered that the mission of higher education institutions includes the generation and accumulation of academic knowledge and its dissemination through the educational process, more recently attention has been paid to the role of university's activities in the context of regional development: *the third mission of universities*¹. These discussions focus on the possible economic and social impact of universities on neighbouring regional area, which implies that universities should have the duty and the mission to engage explicitly within the regional development processes. Increased complementarity between the emphasis of universities on certain research areas and vocational training fields/specialties and clusters, and regional economic specializations could indicate greater potential for regional university engagement and activities related to the third mission (Gunasekara, 2006). We note that the successful achievement of this societal mission is considered extremely important in the less developed countries/regions, which

¹ The concept of "The Third Mission of Universities" refers to their additional function in the context of the knowledge-based society. The University is not only responsible for human capital formation (education - the first mission) and for producing new knowledge (research - second mission), but also for identifying solutions to the needs of society and market requirements by linking the university's work to the local socio-economic context.

could otherwise suffer from the "exodus" of research results from the respective universities to regions with a higher absorption capacity.

Farnam Jahanian, President of the American University Carnegie Mello, argues that universities play an increasingly important role in the development of the economy in general via several key ways:

- stimulating entrepreneurship;
- encouraging collaboration with the private sector (new partnerships with companies, foundations and other institutions with intense research activity);
- promoting diversity and inclusion.

Alpaydin, Atta-Owusu, & Moghadam-Saman (2018) made an analysis of existing theories on the role of universities in promoting innovation and regional development, demonstrating the growing importance of universities in these processes. In particular, the concepts proposed by Gunasekara (2006) - the generative-developmental model, the model of Tripp, Sinozic & Lawton (2015) of economic and societal development and the transformative-industrial model proposed by Lester (2005) were analyzed.

In addition to the indirect impact on the innovation ecosystem, universities can provide public and private authorities with both, strategic advice and experts to directly contribute to the process of identifying regional development priorities. The role of universities as an indispensable "asset" of the region can be even higher in less developed regions, where the private sector may be underdeveloped or relatively small, involving reduced R&D activities (Connecting Universities to Regional Growth, 2011).

Among the mechanisms through which universities can contribute to the development of regional innovation systems can be mentioned:

- stimulating the entrepreneurial spirit of staff and students;
- provision of advice and services to SMEs;
- participation within the programs that promote the training and employment of graduates in innovative enterprises;
- hosting incubators for the spin-off within science and technology parks;
- providing input to cluster activity and to the innovation networks.

Also, universities with an interest in the fields of economy, public policy, administration, but also in specific fields (ex. industry, health, agriculture, environment and culture) can play a key role in the development of innovation strategies.

In 2013, once the number of smart specialization strategies under implementation is growing, Goddard, Kempton & Vallance (2013), based on the three capacities which universities contribute to, previously proposed by Goddard (of absorption, collaborative, and leadership), identified seven areas where universities can be actively involved in the process of developing and implementing a smart specialization strategy:

- involvement in defining the national / regional strategy by contributing to a rigorous assessment of the assets, skills and capabilities of the country / region in the field of knowledge;
- contributing to the entrepreneurial discovery process by promoting cross-border partnerships;
- providing specialized research expertise and links to national and international knowledge networks;
- improving the supply of human capital in the region through teaching programs (including lifelong learning and postgraduate courses);
- building absorption capacity on the knowledge and skills demand side by stimulating new business, student entrepreneurship, and encouraging staff to actively collaborate with local businesses;

- by supporting the development of the social relations underpinning the regional innovation system, universities can contribute to the institutional leadership and the governance of the smart specialization process;

- through its researches, which often have both global and local dimensions, universities can contribute to the creation of knowledge with local relevance and to their transposition into innovative products, public and private services.

Concluding, we could mention some important roles of universities with a direct impact on the innovation ecosystem:

- knowledge producer, promoter of knowledge circulation at local level,
- source of highly qualified workforce,
- knowledge source in relation to the business environment,
- incubator for spin-off and start-up companies.

Moldova within international rankings and actions towards smart specialization

Analyzing the positioning within international rankings, it should be mentioned that according to the World Intellectual Property Organization, within the Global Innovation Index (GII, 2017), Moldova was on the 44th position out of the 141 monitored countries in 2015 (in 2012 it ranked 50th among the 140 countries in the ranking, this year being the index of innovation efficiency over one unit). The Republic of Moldova managed to be the first in the category of countries with gross national income below the average in terms of the number of inhabitants.

At the same time, based on other studies, the Global Competitiveness Report (GCR, 2016) shows that the Republic of Moldova, according to the Global Competitiveness Index, was on the position 100 out of 138 countries in the world ranking for 2016 (decreasing by 16 positions compared to 2015), Moldova being attributed to the category of economies based on the exploitation of the production factors, being at the first (out three) stage towards an innovation-based economy. In the ranking of countries according to their innovation capacity, Moldova ranked 124th position (with a score of only 2.5 out of 7).

Undoubtedly, innovation capacity depends on the performance and resources of the R&D field and on the ability of the business sector to absorb innovations.

Looking to the resource input to the Republic of Moldova's R&D system, first of all in terms of human resources, shows a regrettably decreasing trend. Thus, in 2016 in the research and development activity were involved 4734 persons (out of which 3210 researchers - or 67.8%) compared to 5114 in 2010 (researchers - 63.4%) and 5315 persons in 2008 (National Bureau of Statistics, n.d.).

During the last two decades, in parallel with pronounced trend of internal researchers migration (to other fields of activity), as well as external one, the trend of human potential "aging" is noticed. In 2016, the share of researchers aged over 65 was 20.6%, while in 2010 it was 16.6%. Young researchers between the ages of 25-34 and up to 25 were 24.2% (2016) and 26.0% (2010) respectively. It is estimated that this trend will increase in the future due to the emigration of talented young people abroad, diminished attractiveness of the researcher's career and financial constraints.

R&D investments are another important factor for a research-based economic development that needs to be sustained by joint efforts of the public and private sectors. Expenditures on R&D have been unevenly developed since the 1990s, being constantly in times of crisis. Thus, in 1990, the percentage of GDP allocated to this area was about 0.73%; in 2004 it was around 0.22%, increasing in 2008 up to 0.7% of GDP. In the following years, this index had a decreasing trend, accounting around 0.37% in 2014 and 0.27% in 2016, although according to national policy documents the target was to reach 1% of GDP allocations from the state budget for the research and development sphere in 2020.

The development of R&D has a direct impact on economic growth. If we report investments in R&D, innovations to economic development then this relationship is obvious. In the Republic of

Moldova GDP per capita in 2016 amounted 1900 USD, this index being almost five times lower than in Romania (9474 USD per capita), 6.5 times lower than in Poland, 9.2 times lower than in Estonia and 23.3 times lower than in Finland. The average in EU countries was at the value of \$ 32058.8 per capita in 2016 (WB. GDP per capita, n.d.).

On the one hand, the national economy has the potential to produce innovative results and, on the other hand, that R&D products have a low degree of applicability in the real economy of the country and lack the impact on the economic growth.

The causes of such a situation are multiple. One of these are the deficiencies of the R&D development policies, economic development policies at national and sectoral level, as well as the interactions between them and their interaction with the mechanisms and factors of economic growth based on innovation. Another key issue is the efficiency of the R&D activity, the implementation of research results in the real sector of economy. The rate of innovations application within the Moldovan economy is reduced, largely due to the low level of collaboration between the research, education and the business environment. According to the Global Competitiveness Report 2016-2017 (GCR, 2016), as to the index of collaboration between universities and industry in the field of research and development, the Republic of Moldova held a lower ranking position - 133 out of 138 evaluated countries.

At the same time, there is an insufficient connection between the fields of education and research, as well as imbalances between the training of specialists in the higher education institutions and the needs of the real economy. Under such conditions, it is very difficult to provide businesses with staff that have an adequate level of knowledge and skills capable of promoting and implementing innovations and, above all, of generating innovations, especially in high-tech sectors. This is one of the main reasons for the low innovation capacity of domestic companies, which ultimately has a bad impact on the competitiveness of the national economy. According to the index of absorption of technologies by companies, Moldova is on 112 position in the ranking of 2016-2017 years (GCR, 2016).

In view of the above, researchers, as well stakeholders from the business sector, conclude that research is not yet embedded in an efficient innovation system, and rather exists separately from economy and education. For these reasons, innovation and the link between R&D and the entrepreneurial sector is considered a critical element for the Republic of Moldova. In such a context, it is imperative to reconsider the research-development-innovation system, to identify the opportunities for economic transformation based on innovation and to change the paradigm of economic development. An effective solution in this respect is the implementation of the smart specialisation concept.

Although the existence of a smart specialisation strategy is not a conditionality for non-EU countries, as in the case of Member States, the Joint Research Center of the EC, via the S3 Platform, has launched a pilot project to assist Serbia, the Republic of Moldova and Ukraine in preparation for RIS3 (S3 beyond EU, 2017).

A series of actions have been initiated and carried out in the Republic of Moldova since 2016, in order to raise awareness about the concept and importance of smart specialisation, the impact of smart specialisation strategies on economic growth and resource efficiency, regional development. Thanks to the support of the EC Joint Research Center several seminars were organized (S3 Design Learning Workshop, 2016): a group of local experts was set up and involved in the evaluation activities of the stat (us-quo in the area of research-development-innovation and economic development policies; the mapping of the economic, innovation and research potential of the Republic of Moldova was done by foreign experts.

The first step in developing a smart specialisation strategy is the analysis of the national/regional context and the potential for innovation. In this respect, with the support of the JRC S3 Platform, involving international experts and with the support of the local S3 task force, in order to identify the strong points and the potential of the business, innovation and research areas, the mapping and identification of the regional potential of the Republic of Moldova was carried out. The

results were presented at the national conference "Smart Specialisation - the Engine of Republic of Moldova's Economic Growth", organized within Moldova Business Week (October 6, 2017).

The next step in the process of developing an intelligent development strategy is the entrepreneurial discovery process in which smart niches of specialisation specific to each region will be identified. It is an important exercise for our country in order to move from fragmented priorities and objectives to economic transformation priorities, based on the effective use of innovation potential and investments.

A certain set of reforms, including the structural ones, have been already implemented: the creation of the National Agency for Research and Development, subordinated to the Government, which will implement the state policies in the areas of research, innovation and development (the Agency was set up by the merger of the Public Institution Agency for Research and Development, the Agency for Innovation and Technology Transfer and the Center for International Projects subordinated to the Academy of Sciences of Moldova); transfer of the research institutions subordinated to the Academy of Sciences of Moldova to the Ministry of Education, Culture and Research; the delimitation of the competences and responsibilities of the central public authorities in the field of research and development; establishment of the Council for Research, Development, Innovation and Technology Transfer under the aegis of the Prime Minister; introducing minimum performance criteria for accessing budgetary financial resources, opening access to these funds for actors from business and civil society a.a.

These reforms will undoubtedly increase the efficiency of the R&D activity, but, there is a need for a political will in order to elaborate a vision concerning the design and implementation of a smart specialization strategy with the involvement of all concerned stakeholders.

Conclusion

Smart specialisation represents an innovative approach that aims to boost economic growth by enabling each country/region to identify and develop its own competitive advantages. By involving in a bottom-up manner a wide variety of stakeholders - authorities, academia, business spheres and the civil society, smart specialisation process stimulates the creation of a shared vision about own strengths and potential growth opportunities, is building trust and collaborative networks among them.

Smart specialisation will contribute to the science-business dialog, and, hopefully, to the synchronization of the business needs with scientific offer, by concentrating the potential of both sectors in exploring the specialisation niches. In our case, the process is as important as the result – the traditions of elaborating strategic documents in a top-down manner, or by a small group of experts are still common in the Republic of Moldova, thus having a S3 strategy elaborated in a participative manner, with evidence-based priorities identified during an entrepreneurial discovery process would be already an achievement.

The implementation of the smart specialisation concept and strategy at the national and/or regional level in the Republic of Moldova would facilitate the process of economic transformation based on the valorization of the existing innovative potential of the country and of each region, stimulating the trans-regional cooperation on this dimension. An enormous effort is needed from all the stakeholders around Quadruple Helix (business, academia and HEIs, authorities, civil society) to raise awareness of the S3 importance and to make smart specialisation strategy a part of innovative economic development policies in the Republic of Moldova.

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