IMPLEMENTING THE SMART SPECIALISATION CONCEPT IN THE REPUBLIC OF MOLDOVA: CHALLENGES AND INITIATIVES

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Abstract

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 implementing the European strategy for smart, sustainable and inclusive growth. Smart specialisation strategies have been successfully implemented for several years in the EU member states.

Development 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 of economic relevance, which, for a country with still a low level of investments (both public and private) in these areas, is quite relevant.

The paper analyses the actions taken and the results obtained at the current stage in this area in the Republic of Moldova, including mapping of the economic, innovative and scientific potential, identification of the preliminary priority areas for smart specialisation with potential for economic development, identification of the main niches of smart specialisation for these areas through the first application of entrepreneurial discovery process, as well as the actions to be followed for the successful development and implementation of S3 in our country.

Keywords: smart specialisation strategy, innovation, economic transformation, regional development

1. Introduction

Sustainable economic development and sustainable growth are increasingly dependent on the innovation and transformation capability of the economies, including the regional ones, in order to adapt to an ever-changing and increasingly competitive environment. In such conditions, much greater efforts are required to create systems able to stimulate innovation, research and development, as well as the spirit of innovative entrepreneurial development. The European Union has taken many steps to achieve this goal, with particular emphasis on smart specialisation (S3). This concept has been embedded and has become a key element of the European Union's Cohesion Policy, being an effective instrument for implementing the European strategy for smart and sustainable growth favourable to inclusion. The concept of smart specialisation has become the key-element of the European Union's Cohesion Policy and an ex-ante condition for accessing the structural funds.

Development and implementation of the smart specialisation strategy (S3) are particularly important for the Republic of Moldova, in the context of its aspirations for European integration, and because the concept of smart specialisation supports the reorientation of the RDI policies towards those research activities that offer results with economic impact.

In this context, the process of developing S3 has started in our country in the last years. This is a complex process, which involves different actors and requires their joint efforts. This process, on the one hand, is catalyzed by the challenges of the contemporary period - transforming research into a key factor of economic growth, and, on the other hand, it faces certain barriers to implementation.

The present paper analyses the results obtained in developing the smart specialisation strategy of the Republic of Moldova at the first stages of this process and the actions to be taken to redesign the research-development-innovation policies.

2.   The degree of current investigation of the problem, the purpose of research

The smart specialisation concept was originally developed by the „Knowledge For Growth" high-level Expert Group [5], convened in 2005 at the initiative of European Commissioner for Research, Janez Potočnik, to get advised on the contribution that knowledge can make to sustainable growth and prosperity, the policies for promoting the creation, dissemination and use of knowledge, and the role that various actors can play in stimulating a knowledge society.

This concept was subsequently developed in a study by Foray, D. & Goenega, X. [4], who emphasized that the main purpose of smart specialisation is the prioritization process, and that resources should be concentrated in specially selected areas associated with certain types of technology, disciplines and subsystems within a certain sector or within the intersections of different sectors.

In 2012 the Joint Research Center of the European Commission has developed the Guide to Research and Innovation Strategies for Smart Specialisation [6], which contains the steps and methodology for developing these strategic planning documents.

The analysis of research and innovation systems, and policies in transition countries is contained in the works of Kleibrink, A., Larédo, P. & Philipp, S. [8], Kroll, H. [9], etc.

The Joint Research Center of the EC has launched a pilot project addressing the needs of Serbia, the Republic of Moldova and Ukraine in developing RIS3 [15]. For this purpose, the following activities were carried out with the support of international experts, who have been assisted by the local experts (one of whom is the author of the present paper): mapping of the economic, innovative and scientific potential of Moldova (Hugo Hollanders [10]), and characterisation of preliminary priority areas for smart specialisation in Moldova by SIRIS Academic [1]. Nevertheless, the entrepreneurial discovery process, the identification of the most promising areas of smart specialisation, the development of the policy mix and the creation of an efficient system for evaluating and monitoring the implementation of these policies is yet to be finalized.

Development of the smart specialisation strategy is being carried out in the Republic of Moldova for the first time. This is a new process, therefore, it requires considerable efforts to study all aspects related to this complex process and to identify the best solutions.

The purpose of this study is to debate discuss the opportunity of implementing the smart specialisation concept of the Republic of Moldova, to evaluate the actions taken in this field,

to analyse the results of the first stages of S3 development process and to identify the next steps for the successful completion of this process.

3. Methods and materials applied

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

To conduct the study, the author has examined the EU policy documents in the field of research, development and innovation, smart development, as well as the national policy framework of this field, the publications of scientists from the country and abroad related to the topic of research. The Smart Specialisation Platform (S3 Platform) [21] and its Knowledge Repository, hosted by the Joint Research Centre (JRC) of the European Commission, were a rather helpful source to carry out this research.

4. Results and discussions
4.1 The opportunity of implementing the smart specialisation concept
in the Republic of Moldova

Developing and implementing the smart specialisation strategy (S3) has become especially important for the Republic of Moldova, in the context of its aspirations for European integration, and because the *smart specialisation* concept supports the reorientation of RDI policies towards those research activities that contribute to economic transformation.

The opportunity to develop such a strategy for our country was mentioned in the Report of the team of foreign experts who evaluated the research and innovation system of the Republic of Moldova in 2015-2016 [13]. One of the recommendations of this report calls for better integration of research and innovation policy in the overall economic policy strategy; improvement of the interaction between research and innovation strategies, but also enhancement of priorities through increased stakeholder involvement. At the same time, the experts have recommended urgent reviewing of the framework conditions for innovation by implementing a coherent set of measures aimed at creating and stimulating a favorable environment for the involvement of companies in research and innovation activities.

An eloquent argument, in favor of the need to implement this concept in our country, is the position of the Republic of Moldova in international rankings. In conformity with the data of the World Intellectual Property Organization, according to the Global Innovation Index [19], our country ranked 48th among 126 countries monitored in 2018. At the same time, according to other studies, to the Global Competitiveness Report [18], the Republic of Moldova ranked 88 among 140 countries in the world ranking 2018, according to the Global Competitiveness Index. In recent years, our country has been classified as an economy based on the exploitation of production factors, being at the first stage of development of an economy based on innovation. In 2018, according to the World Bank data [20], in the ranking of countries according to their innovation capacity, Moldova positioned on the last place and ranked last in the Central and Eastern Europe.

The development level of R&D and the performance of the sector have a direct impact on the economic growth. Countries investing in research, innovation and development and pursuing consistent policies in this area have recorded significant economic and social changes, and progress in the development of the entire ecosystem. If we report on investments in R&D, the innovations registered in the economic development, then this relationship is obvious.

According to the policy documents, the target objective of the Republic of Moldova was to achieve 1% of GDP allocated to research and development, in fact this indicator has varied around 0.3% in recent years, while in some countries it attested major values (Austria – 3.16%, Germany – 3.02%, Finland – 2.76%, Poland – 1.03%, Lithuania – 0.88%, Bulgaria – 0.75%, Romania – 0.5% of GDP, the average in the EU member states was 2.07% of GDP in 2017 [17]). At the same time, according to the World Bank data, in the Republic of Moldova GDP per capita amounted to 3189 USD in 2018, this index being almost four times lower than in Romania (12301 USD per capita), 4.8 times lower than in Poland, 6 times smaller than in Lithuania, and 15.7 times lower than in Finland. The average for the countries of the European Union was 36531.7 USD per capita in 2018.

It is worth mentioning that the largest share of research expenditures in the EU countries is accounted for by companies - 66% of total research and development expenditures, followed by universities (22%), public sector (11%) and NGOs (1%). According to The Global Competitiveness Report 2017-2018 [17], pursuant to the index of companies' expenditures for research and development, the Republic of Moldova ranked 135 (among 137 countries included in the ranking). Although some regulatory documents and national policies provide certain conditions and tools to facilitate the creation, development and support of innovative enterprises (government support programs for „start-ups", introduction of innovation „vouchers", investment schemes for innovation, etc.), however, the existing system does not encourage investments of the business environment sector in research and development, and these tools have not yet been widely used.

A significant problem concerns the efficiency of research and development activity, the implementation of the research results in the real sector of the economy. The level of application of innovations in the economy of the Republic of Moldova is reduced, which is largely due to the low level of cooperation between research and business environment. According to the index of cooperation between universities and industry in the field of research and development [17], the Republic of Moldova holds a lower position in the ranking, occupying position 121 (among 137 countries evaluated), and according to the index, the level of technology absorption by companies, our country ranked 106th in the ranking 2017-2018 [17]. The economic effects of research, development and innovation are very small, according to the Global Innovation Index high technologies exports made up only 0.5% of the product exports in 2018 [3].

Thus, based on the above, it can be concluded that research is not yet included in an efficient innovation system and, rather, operates separately from the economy and education, while innovation and the relationship between research and the entrepreneurship sector are considered an element of critical importance for the Republic of Moldova. In this context, new approaches and policies are needed to ensure an effective communication and cooperation between the R&D sector, business environment, authorities and civil society, with the support of an adequate local governance system in the field.

European experience confirms that in the context of globalization and reconfiguration of value chains, smart specialisation certainly offers an opportunity to promote a dynamic economic process that accelerates structural changes, thereby mitigating the negative effects of technological changes and globalization on some countries, on work force employment and traditional industries, creating new ways of renewal and growth [7]. The existence of several strategic documents in the Republic of Moldova, with non-convergent priorities and limited to their own sectors of action, can lead to the diffusion of resources that are already limited, and given the absence of a critical mass in areas important to the modern economy, this limits the impact of public interventions and investments.

4.2. Approaches regarding the implementation of the smart specialisation concept in the Republic of Moldova

Although the existence of a smart specialisation strategy is not a conditionality for countries outside the European Union, as in the case of the Member States, the Joint Research Center (JRC) of the European Commission has launched a pilot project, through S3 Platform, to support Serbia, the Republic of Moldova and Ukraine in the process of their preparing for the development of RIS3 [15].

In the case of the Republic of Moldova, at the level of macro-regions of which our country is a part, smart specialisation is becoming an increasingly recognised priority. For example, the EU Strategy for the Danube Region explicitly mentions smart specialisation as a step towards achieving the goals of Priority Area 7 (Knowledge Society). The Eastern Partnership countries and the EU have set a target objective for at least one of the six participating countries to develop a RIS3 strategy by 2020 [2].

Since 2016, a series of actions have been initiated and carried out in the Republic of Moldova to raise public awareness of the concept and importance of smart specialisation, the impact of smart specialisation strategies on economic growth and the efficient use of resources, regional development. Thanks to the support of the Joint Research Center, several workshops have been organized [16], and a group of local experts (part of which is the author of the present paper) was set up. This expert group was involved in the evaluation of the state-of-the-art in the field of research, development and innovation policies and economic development, as well as their implications on economic development. The local expert group together with foreign experts participated in mapping the economic, innovation and research potential of the Republic of Moldova, and took part in the first exercises of entrepreneurial discovery.

According to the Guide to Research and Innovation Strategy for Smart Specialisation [6], the first step in developing the smart specialisation strategy is to analyse the national/regional context and the potential for innovation. In this regard, international experts and the local expert group, with the support of JRC, carried out *mapping of the economic, innovative and scientific potential of the Republic of Moldova* [10] in order to identify the smart specialisation priorities.

As part of *mapping of the economic potential* (which was based on the analysis of employment, turnover and wages), there were identified the areas with major economic potential and priority for smart specialisation, among them: agriculture and food processing;

textiles; renewable energy; ICT. At the same time, differences have been ascertained between Chisinau region and other development regions. The following priority sectors have been identified for Chisinau development region: ICT, paper and chemical products, equipment, glass products, furniture. Cluster analysis confirmed the importance of ICT. Clusters that could be developed relate to the services offered to the business environment, in marketing, design and publishing, while emerging industries focus on the development of packaging, creative, digital, and experimental industries.

In other regions, in the foreground, agriculture and food processing are priority economic areas, but there are some differences in certain industries. Textiles, clothing, footwear and renewable energy are priority economic areas for smart specialisation in some of these four regions. Cluster analysis identified several of these areas, for example, clothing manufacturing and food processing in the Northern region, processing of animal products and textile manufacturing in the Central region, environmental services, and food processing and production in the Southern and Gagauzian regions.

The evaluation of *the innovation potential* was carried out by the experts based on patent data. It should be mentioned that data on innovation activity in the Republic of Moldova were extremely limited, since official statistics did not contain such information. The National Bureau of Statistics introduced the statistical report on this aspect of activity only in 2018. The analysis revealed that food chemistry is among the technological areas with the largest number of patent applications, which would contribute to the development of agriculture and food processing industry.

To assess *the scientific potential*, the results of international publications in the identified areas of economy were analyzed, and it was found that most of the publications are devoted to agricultural and biological sciences, energy and environmental sciences.

Mapping of the economic, innovative and scientific potential of the Republic of Moldova allowed identification of potential priority areas for smart specialisation [10]. Briefly, these are shown in Figure 1.

Following these studies, subsequently, SIRIS Academic (consulting company developing and implementing strategies and policy solutions for higher education, research and innovation), with the support of JRC, carried out the characterisation of priority areas for smart specialisation in Moldova in terms of priorities' importance and their orientation (on research or technology), as part of the project „Network analysis for the identification of key stakeholders for preliminary priority areas for smart specialisation in Moldova" [1], which aimed at mapping the research and innovation ecosystem of the country.

Thus, the following *top priorities* were highlighted: chemical industries, materials and nanotechnology (the preliminary priority is slightly science-oriented); health, biomedicine and pharmaceuticals (balanced preliminary priority); agriculture and food processing (the priority is focused on technology and innovation), the following were outlined as *intermediate* priorities: electric and electronic technologies (this priority is focused on science); production technology and heavy machinery (technological and innovative priority); ICT (slightly science-oriented priority); environmental industries, services and sciences (the priority is focused on technology and innovation); energy (balanced preliminary priority), and the following were assigned to the category of *low priorities*: vulcanized and fired materials; textiles, apparel, footwear and leather goods; paper industry; furniture.
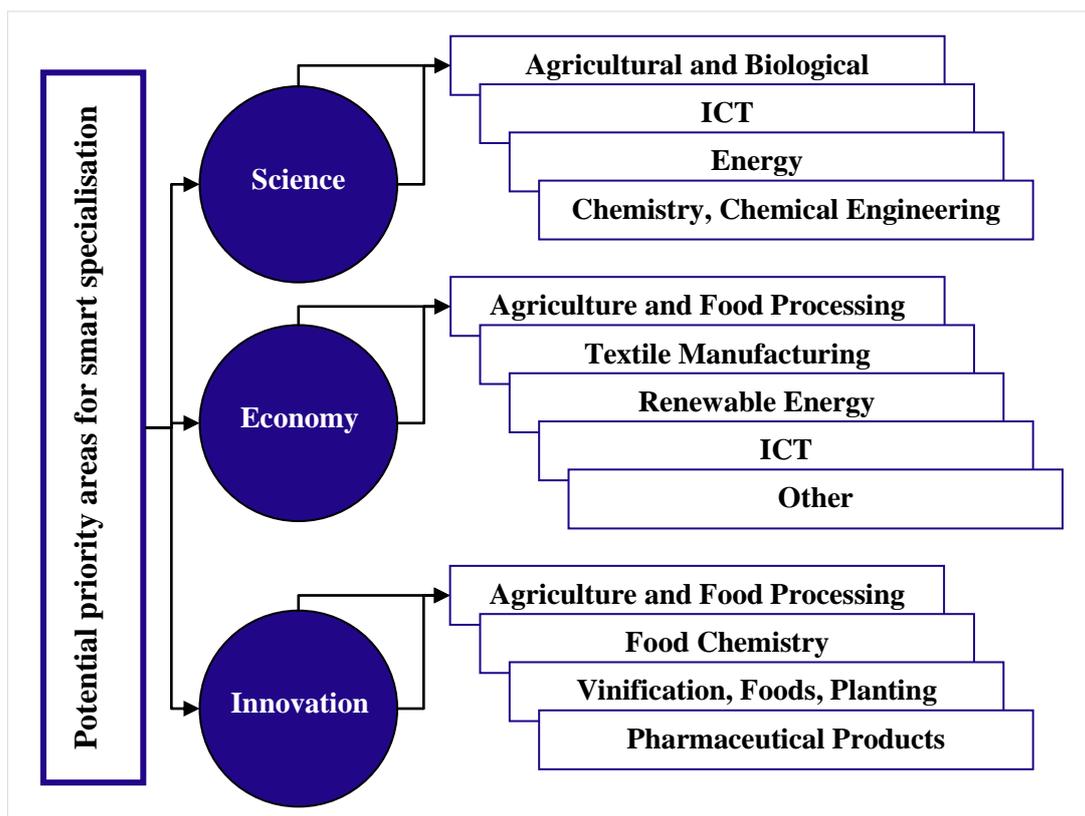
Figure 1. Potential priority areas for smart specialisation in the Republic of Moldova
Source: [10]

The SIRIS Academic study [1] has proposed the potential areas for entrepreneurial discovery process (Figure 2). The upper part of the figure reflects the sectors with the potential for innovation in predominantly commercial sectors, the lower part represens the areas of knowledge with relevant activities, which form the basis of potential knowledge.

Figure 2. Potential areas to focus on the entrepreneurial discovery process
Source: [1]

The next step in developing a smart specialoisation strategy is the *entrepreneurial discovery process (EDP)*, in which the niches of smart specialisation, specific to each region, will be identified. This is a very important exercise for our country in order to move from fragmented priorities and objectives to the priorities of economic transformation, based on the efficient use of innovation potential and investments.

Identification of stakeholders relevant to the involvement in this process is significant for the successful achievement of the entrepreneurial discovery process. In May 2018, the Chamber of Commerce and Industry of Moldova, with the support of TAIEX Expert Mission, organized the Workshop „Network analysis for the identification of key stakeholders for preliminary priority areas for smart specialisation in Moldova". As a result, a list of organizations and individuals connected to S3 priorities at the national level in each development region was prepared.

Afterwards, following the recent structural reforms in the field of research in the Republic of Moldova, the Ministry of Education, Culture and Research, being endowed with attributions and responsibilities in the field of research policy, has assumed the coordination of actions in implementing the concept of smart specialisation. To this end, in November 2018, a national team was created to promote the concept of smart specialisation in our country and to carry out EDP exercises.

Following the actions taken in the context of S3 development in the Republic of Moldova (mapping of the economic, innovative and scientific potential, identifying the preliminary priorities for smart specialisation), from June 18 to June 28, 2019, the Ministry of Education, Culture and Research jointly with the national team, with the support of JRC, organized the first workshops on entrepreneurial dicovery process at the national level to identify the areas of smart specialisation in our country. These covered the following areas:

- Energy
- Information and Communication Technologies
- Agriculture and Food Processing
- Biomedicine and Biopharmaceuticals.

In order to identify the main niches of smart specialisation in the respective areas, these workshops brought together about 180 participants - representatives of the research environment, universities, central, regional and local public authorities, business environment, and civil society. The objectives pursued during the first EDP exercises were aimed at analysing the situation in certain areas, highlighting the current trends in each of the mentioned areas, SWOT analysis, formulating the vision and goals for area development, including sub-areas.

Following EDP exercises, the visions and ***potential areas of smart specialisation*** were identified (Table 1).

The process of entrepreneurial discovery will continue. It is necessary to involve actors relevant to the respective fields, who, through their knowledge, vision and experience, can contribute to the identification of the most promising areas of smart specialisation. The results of entrepreneurial discovery process play a decisive role in the design of smart specialisation strategy, as it allows the verification and specification of the priority areas of smart specialisation based on the consensus between all interested stakeholders.

Table 1. Potential areas of smart specialisation in the Republic of Moldova identified within the EDP and visions for development

Area	Vision	Potential areas of smart specialisation
Energy	By 2029, intelligent heating solutions will be based on the latest technologies, developed and adapted in close collaboration with the R&D sector, characterized by the existence of feasible energy storage systems, hybrid energy production systems, smart grids for energy production, distribution and consumption, benefiting of capacity building and continuous training of sector professionals.	▪ Energy efficient technologies ▪ Alternative energy sources ▪ Heating solutions
ICT	By 2029, the ICT sector will be based on a legal framework developed and harmonized with European and international standards, providing an adequate investment climate for ICT business development and stimulating the public-private partnership aimed to capitalize on e-transformation opportunities in health, agriculture, energy, education, new materials and technologies, public administration.	▪ Micro/nanomaterials and electronic engineering ▪ Interoperability, open data and e-Infrastructures ▪ Software engineering, mobile apps, cloud computing
Agriculture and food processing	The agri-food sector will be sustainable, precision-based, ecological, integrated into the circular economy, with a complex value chain based on modern technologies and the efficient use of natural resources.	▪ Advanced biotechnologies for agriculture ▪ Sustainable agriculture ▪ Value-added food products
Biomedicine & Biopharma-ceuticals	By 2029, the healthcare system in the Republic of Moldova will be based on the principles of 4P medicine (Preventive, Participatory, Personalized, Predictive), transitioning to the 6P vision (+ Public & Psycho-cognitive) in order to guarantee the universal access of the population to qualitative healthcare services and high-tech.	▪ Biomedicine ▪ Biopharmaceuticals ▪ Bioinformatics&health

Source: EDP results, Ministry of Education, Culture and Research

The next stage of implementing the S3 concept in Moldova will focus *on the policy mix*, development of smart specialisation strategy (at national or regional levels), provision of sectoral and regional policies with S3 priorities, and selection of an appropriate set of instruments to achieve the set goals.

Thus, the development/updating of the national policies in the field of research and innovation should ensure their synchronization with the country's national development program, with the sectoral strategies and EU framework programs for research and innovation.

In this context, recent changes in some national policy documents should be mentioned as useful. Thus, the National Development Strategy "Moldova 2030" sets as one of the goals of country's sustainable development the increase of internal and external competitiveness, including through smart specialisation. *The National Research and Innovation Program for 2020-2023 (NRIP)* and the *Action Plan for its implementation* [14], approved in August 2019, sets the strategic priorities and directions of development in the field of research and

innovation for the next four years, including: health; sustainable agriculture, food security and food safety; environment and climate change; societal challenges; economic competitiveness and innovative technologies. The National Program, mentioned hereby for the first time, is aimed at *adopting and transposing the principles of smart specialisation*, noting the importance of this concept "to create a competitive advantage by developing specific strengths for research and innovation and matching them with the needs of the business environment in order to coherently address the emerging opportunities and market development, avoiding duplication and fragmentation of efforts".

According to the provisions of NRIP 2020-2023, it is expected to launch a program of joint projects based on smart specialisation niches.

5. Conclusions

Establishing a knowledge-based economy and the transition from a resource-based to an innovation-based economy, which the Republic of Moldova opts for, require changing the approaches of the regional economic development and reconsidering the research-development and innovation system to turn it into an important progress factor. A key solution for an innovation-based economic development of the Republic of Moldova is the implementation of smart specialisation concept based on the European experience, which has been widely applied in the community countries and has proved its viability and necessity.

Starting from this point of view, a series of actions have been carried out in our country to raise public awareness of the smart specialisation concept by all the interested parties (academia and business environment, authorities, civil society), the first stages of the methodological cycle of smart specialisation strategy development have been carried out - mapping of the economic, innovative and scientific potential, identification of preliminary priority areas for smart specialisation with potential for economic development, identification of the main niches of smart specialisation for these domains through the first entrepreneurial discovery processes.

Successful completion of the process of smart specialisation strategy development in the Republic of Moldova and its implementation will contribute to the development of the policy framework in the field of research-development-innovation, synchronization of their priorities, efficient use of resources for research-innovation, strengthening of the academic - business environment partnerships, and innovative development of the national and regional economy.

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Rezumat

Conceptul de specializare inteligentă a fost încorporat și a devenit un element cheie al politicii de coeziune a Uniunii Europene, fiind considerat un instrument eficient în implementarea strategiei Europene de creștere inteligentă, durabilă și favorabilă incluziunii. Strategiile de specializare inteligentă au fost implementate cu succes de mai mulți ani în statele membre ale UE.

Dezvoltarea și implementarea strategiei de specializare inteligentă (S3) în Republica Moldova este deosebit de importantă, datorită faptului că conceptul de specializare inteligentă susține reorientarea politicilor de CDI către acele activități de cercetare care oferă rezultate cu relevanță economică, care, pentru o țară cu un nivel încă scăzut de investiții (atât publice cât și private) în aceste domenii, este destul de relevantă.

În lucrare se analizează acțiunile întreprinse și rezultatele obținute la etapa actuală în acest domeniu în Republica Moldova, inclusiv cartografierea potențialului economic, inovational și științific, identificarea zonelor

prioritare preliminare pentru specializarea inteligentă cu potenţial de dezvoltare economică, identificarea principalelor nişe de specializare inteligentă pentru aceste domenii prin prima aplicare a procesului de descoperire antreprenorială, precum şi acţiunile care trebuie urmate pentru dezvoltarea şi implementarea cu succes a S3 în ţara noastră.

Cuvinte-cheie: strategie de specializare inteligentă, inovare, transformare economică, dezvoltare regională

Аннотация

Концепция умной специализации была включена и стала ключевым элементом политики сплочения Европейского союза, считаясь эффективным инструментом в реализации европейской стратегии умного, устойчивого и инклюзивного роста. Стратегии умной специализации успешно внедряются в течение нескольких лет в странах-членах ЕС.

Разработка и внедрение стратегии умной специализации (S3) в Республике Молдова имеют особо важное значение в связи с тем, что концепция умной специализации способствует переориентации политики в области НИИ на те исследования, которые обеспечивают экономически значимые результаты, а это для страны с низким уровнем инвестиций (как государственных, так и частных) в этой области является весьма актуальным.

В статье анализируются предпринятые действия и результаты, полученные на современном этапе в этой области в Республике Молдова, включая картографирование экономического, инновационного и научного потенциала, определение предварительных приоритетных областей для умной специализации с потенциалом экономического развития, выявление основных ниш умной специализации для этих областей посредством первого процесса предпринимательского открытия, а также выявление действий, которые необходимо предпринять для успешного развития и внедрения S3 в нашей стране.

Ключевые слова: стратегия умной специализации, инновации, экономические преобразования, региональное развитие