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Review article

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SMART SPECIALISATION CONCEPT AS A TOOL FOR IMPROVING INNOVATION PERFORMANCE OF THE EUROPEAN UNION MEMBER STATES

Abstract

Globalisation brings significant challenges to economies worldwide. Smart specialisation is one of the tools that helps countries improve their innovation potential, thus improving their economic performance and competitiveness. Smart specialisation involves identifying a country's competitive advantages in order to develop targeted strategies aimed at enhancing its competitiveness. The main objective of the paper is to identify innovation and smart specialisation challenges the European Union economies are facing. The paper aims to provide an overview of current innovation performance of the European Union Member States, as well as their smart specialisation strategies, focusing on their chosen thematic priority areas. In doing so, the contribution of the paper is twofold. First, it gives an overview of the main features of smart specialisation concept. Second, it provides an overview of innovation performance of the European Union Member States and their smart specialisation strategies.

Keywords: Smart specialisation, strategy, innovation, European Union

1. *Introduction*

Innovations are considered to be a source of comparative and competitive advantages of both countries and companies (Bilas et al., 2016). Many regional governments invest in certain areas of science, technology and innovation without taking into consideration the particular features of their region (Arranguren, Wilson, 2013). Smart specialisation involves fostering innovative and entrepreneurial initiatives which are well tailored to the local context (McCann et al., 2017).

Smart specialisation strategy is defined by the EU Regulation (2013)[1] as "national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts". The idea or concept of smart specialisation is based on classical economic theories of growth and trade specialisation. It was proposed in 2008, and quickly became a very important policy factor, especially in the place of its origin, the European Union.

It is important to stress that the smart specialisation process, as one of the main features, includes entrepreneurial discovery process that identifies

priority areas or what a country or region does best in terms of research, development and innovation (Foray et al., 2011).

The smart specialisation approach was developed as an answer to the deepening research and development (R&D) gap between the European Union and its trading partners (Camagni and Capello, 2013). The main issues identified in the European Union countries were smaller share of high-tech R&D-intensive sectors and spatial dispersion of the R&D activities. Camagni and Capello (2013) stressed that this spatial dispersion resulted in insufficient critical mass, investment duplications, inefficient resource allocation, weak learning processes, etc.

Smart specialisation has a strong regional dimension because regions are increasingly important as sources of innovation activities, especially when the impacts of agglomerations are taken into account (Foray and Goenaga, 2013). Hence, regions cannot do everything; they need to focus on developing distinctive and original areas of specialisation (Foray, 2012)[2]. Smart specialisation is a process of identifying and selecting desirable areas for intervention where a cluster of activities should be developed. This implies that opportunities and areas of specialisations should be discovered by entrepreneurs (Foray, 2012). Smart specialisation must not be associated with a strategy of the simple industrial specialisation of a particular region, but rather with R&D and innovation. It focuses on all regions, no matter their strength and performance (Foray et al., 2011).

Recently, the effectiveness of smart specialisation has been globally recognised, which is evident from the fact that many other countries around the world have followed the example of the European Union in terms of implementing smart specialisation (Bilas et al., 2018).

The main objective of the paper is to identify innovation and smart specialisation challenges the EU economies are facing. The paper aims to provide an overview of current innovation performance of the European Union Member States, as well as their smart specialisation strategies, focusing on their chosen thematic priority areas.

The paper has been divided into five parts. It begins with the introduction, which is followed by the review of literature on smart specialisation concepts and strategies. The third section is concerned with the methodology used for this study, while the fourth gives an overview of the innovation performance and smart specialisation strategies of EU countries. Finally, the fifth section is the conclusion.

2. Smart specialisation concept - literature review

Given that smart specialisation is a rather new concept, the literature on the specific features of this approach is fairly scarce. The evaluation of the concept, i.e. of ongoing smart specialisation strategies is still not possible.

According to Foray et al. (2018)[3] "innovation-related policies seek to enhance knowledge generation, absorption and diffusion in the economy (and society) so as to support an innovation-driven economy and to solve major societal problems". Radosevic and Stancova (2018) characterise smart specialisation as the largest innovation policy experiment. According to Gianelle et al. (2019)[4], smart specialisation is a place-based and experimentalist policy.

The rationale of smart specialisation is shown in Table 1.

Table 1 The rationale of smart specialisation

What?	Concentrating knowledge resources for economic specialisation and linking them to a limited number of priority economic activities - competitiveness in the global economy
Why?	Regional innovation policies have often demonstrated a lack of efficiency in identifying priorities and forms of practical cooperation
Who?	Entrepreneurs discover what a country or region does best in terms of research, development and innovation
How?	Regional change through modernisation, diversification and/or transition from an existing sector to a correlated field
Where?	Smart specialisation concept can be used in all regions, even though some are more advanced in terms of knowledge production

Source: Foray et al. (2012), pp. 11-16[5]

Smart specialisation requires setting vertical priorities and is distinctively selective. The main feature of smart specialisation is the definition of the limited set of priority areas for public investment which can best provide opportunities for growth and respond to social and economic challenges (Gianelle et al., 2019). According to Haegeman et al. (2019)[6], a key feature of smart specialisation is a clear thematic focus on research and innovation, through the selection of a limited number of priorities.

At a minimum, smart specialisation strategies should transform less advanced regions into good followers (Foray, 2012). Foray and Goenaga (2013) defined the main principles of smart specialisation as follows: granularity, entrepreneurial discovery, continuous possibility of change of thematic priorities, inclusiveness and experimental nature of the policy, and the need for evaluation. The principle of granularity means that the level on which thematic priorities are identified should not be too high, because otherwise smart specialisation would become a process of sectoral prioritisation. As for the second principle, i.e. the principle of entrepreneurial discovery, priorities are identified where and when opportunities are discovered by entrepreneurs. These choices are not so difficult since activities not currently selected still retain a chance of being supported in the future, which is covered by the third principle. Inclusiveness means that every sector is considered and it implies that policy is implemented at different speeds in different sectors. Finally, because of its nature, this policy is experimental and not all investments in new activities will pay off. Therefore, Foray and Goenaga (2013) claim that evaluation is a central policy task.

Cooperation for smart specialisation involves a wide variety of stakeholders. The involvement of the so-called quadruple helix of the academic world, public authorities, the business community, but also a range of innovation users and civil society is very important for the successful implementation of smart specialisation.

The engagement of universities in smart specialisation strategy (S3) is of high importance (Arregui-Pabollet et al., 2018)[7]. This is especially the case in countries or regions with underdeveloped innovation systems. The role of universities, which encompasses education, research and innovation, makes these institutions one of the key stakeholders in any innovation system. Their role and commitment to S3 directly influence the functioning of the innovation system as well as the successful achievement of S3 objectives. Reforms of the higher education system in the EU countries seek to strengthen the collaboration between the business and academic sectors. Arregui-Pabollet et al. (2018) analysed 74 university governance systems across the European Union. The main reason for performing this study was an assumption that effective governance of these institutions would facilitate their involvement in the S3 process implementation. One of their main conclusions is that embedding S3 coordination aspects into HEI governance system could contribute to the successful implementation of S3 and facilitate access to EU funding.

Smart specialisation aims to boost regional and national innovation, contributing to growth and prosperity and enabling territories to focus on their competitive advantages (Gómez Prieto et al., 2019[8]; Tolias, 2019[9]). The identification of thematic priority areas and vertical measures are characteristics which represent the main difference between the smart specialisation concept and prior innovation strategies (Foray and Goenaga, 2013).

The concept of smart specialisation was conceived in the European Union as part of the European cohesion policy (Gómez Prieto et al., 2019). This "made in Europe" concept is slowly spreading beyond EU borders to the rest of the world. Gómez Prieto et al. (2019) see no obstacles to the successful implementation of S3 around the world. Their main argument is that this concept proved to be effective in the territorial diversity of the EU and different socio-economic contexts. Smart specialisation can contribute to building regional innovation ecosystems around the world.

Smart specialisation is an innovative policy approach. It combines industry and innovation policy. The key characteristics of this approach are (Gómez Prieto et al., 2019): territorial dimension, bottom-up approach fostered via quadruple helix, entrepreneurial discovery process and flexibility which allows modifications and improvements throughout the intervention process. Smart specialisation aims to develop competitive advantages by the conjugation of the economic, innovative and scientific potential of a territory, and to address societal challenges (Gómez Prieto et al., 2019).

Smart specialisation methodology consists of six steps (Sörvik, 2012[10]; Gómez Prieto et al., 2019): (1) the analysis of the potential for innovation through

an entrepreneurial discovery process, (2) the establishment of the governance system, (3) the design of a strategic territorial vision, (4) the identification of selected priorities, (5) the definition of a policy mix and implementation mechanisms, and (6) the establishment of monitoring and evaluation system.

There are strong theoretical arguments that the quality of institutions has a key role in explaining the innovative performance at the regional level (Marinelli et al., 2019)[11]. Marinelli et al. (2019) maintain that regions and Member States should identify competent institutions for the governance of the smart specialisation strategy.

Tolias (2019) points out the big differences between smart specialisation strategy evaluations in the programming periods 2014-2020 and 2021-2027. In the first programming period there was no need for regulatory compliance and S3 evaluation (and monitoring), while these represent one of the explicit criteria for the 2021-2027 period. No regulatory compliance resulted in different reactions from territories. Some of them complemented S3 monitoring and evaluation, some of them did nothing. However, for the new programming period, there is a regulatory need for S3 evaluation, but territories can decide by themselves how to plan, execute and use S3 evaluation results, especially in relation to the Operational Programmes.

Larrea et al. (2019)[12] identified four pillars for the construction of multilevel governance of S3: (1) complexity, (2) emergence, (3) context specificity and (4) reciprocity. Complexity is not related only to the number of actors. Multilevel governance is complex because different government levels have different perspectives on S3 issues. Emergence relates to the fact that it is impossible for policy makers to know what the expected outcome of their S3 would be, as a result of the learning and negotiation processes. The third pillar, context specificity, means that S3 strategies as well as their multilevel governance arrangements have to be tailored to the specific context of each territory. The fourth pillar stresses that mutual recognition among different governments, according to attributed roles, is a significant factor in the successful S3 processes.

Gianelle et al. (2019) analysed to what extent the principles of smart specialisation are actually translated into policy implementation. The main conclusion of this study is that regions and countries use the selective approach of smart specialisation and that only partial transition occurred from prior industrial policy to the smart specialisation approach. Main divergences are broadly defined priority areas, loose alignment of policy instruments with priorities, and scarce customisation of policy measures to the specific innovation needs. Ganielle et al. (2019) believe that one of the possible reasons is that incentive structure at the European Union level does not fully support the intervention logic of smart specialisation, and advise that this structure should be revised for the next programming period. Other possible reasons are lobbying activities, higher political return from widespread public support measures, etc.

It is considered that smart specialisation partnerships will foster a strategic approach to innovation and encourage cooperation between authorities, companies and industry at the regional level (European Commission, 2019).

3. Methodology

Many tenets of smart specialisation have not yet been confirmed by empirical work and there is a gap between policy practice and theory. The paper gives an overview of existing data and literature in the field of smart specialisation. Although it is a rather new concept, it has already been implemented in the current European Union programming period (2014-2020). Due to data scarcity and implementation time period, it is still not possible to conduct quantitative analysis or ex post evaluations. The paper aims to contribute to existing knowledge through descriptive research and systematic collection, interpretation and evaluation of existing data, studies, processes, trends and developments.

4. Overview and discussion

The Global Innovation Index[13] ranks the innovation performance of nearly 130 economies around the world (Cornell University et al., 2019)[14]. According to the rankings for 2019, the top five global innovation leaders were: (1) Switzerland, (2) Sweden, (3) the United States of America, (4) the Netherlands and (5) the United Kingdom. This means that four European countries, of which three were members of the European Union, positioned among the five best-ranked innovation economies. Three more EU countries ranked among the top ten (Finland, Denmark and Germany), and another three (France,

Ireland and Luxembourg) ranked between the 10th and 20th place. Seven more EU countries (Austria, Belgium, Cyprus, Czech Republic, Estonia, Malta and Spain) positioned between the 20th and the 30th place. Between the 30th and 40th place, there were eight EU members (Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Slovakia and Slovenia), while three more (Bulgaria, Croatia and Greece) positioned between the 40th and 50th place. Romania was the lowest-ranking EU country, occupying the 50th place. In conclusion, the European Union countries were rather heterogeneous in terms of their innovation performance. The average ranking of the European Union as a whole did not change from 2013 to 2019, positioning around the 25th place. Table 2 shows the Global Innovation Index rankings of the EU countries for the period 2013-2019.

Table 2 Global Innovation Index rankings of the European Union countries 2013-2019

Country	2013	2014	2015	2016	2017	2018	2019
Austria	23	20	18	20	20	21	21
Belgium	21	23	25	23	27	25	23
Bulgaria	41	44	39	38	36	37	40
Croatia	37	42	40	47	41	41	44
Cyprus	27	30	34	31	30	29	28
Czech Republic	28	26	24	27	24	27	26
Denmark	9	8	10	8	6	8	7
Estonia	25	24	23	24	25	28	24
Finland	6	4	6	5	8	7	6
France	20	22	21	18	15	16	16
Germany	15	13	12	10	9	9	9
Greece	55	50	45	40	44	42	41
Hungary	31	35	35	33	39	33	33
Ireland	10	11	8	7	10	10	12
Italy	29	31	31	29	29	31	30
Latvia	33	34	33	34	33	34	34
Lithuania	40	39	38	36	40	40	38
Luxembourg	12	9	9	12	12	15	18
Malta	24	25	26	26	26	26	27
Netherlands	4	5	4	9	3	2	4
Poland	49	45	46	39	38	39	39
Portugal	34	32	30	30	31	32	32
Romania	48	55	54	48	42	49	50
Slovakia	36	37	36	37	34	36	37
Slovenia	30	28	28	32	32	30	31
Spain	26	27	27	28	28	28	29
Sweden	2	3	3	2	2	3	2
United Kingdom	3	2	2	3	5	4	5

Source: Global Innovation Index (2019); author's compilation

It is of note that in the group of upper-middle income countries, the top five global innovation leaders were: (1) China, (2) Malaysia, (3) Bulgaria, (4) Thailand, and (5) Montenegro (Cornell University et al., 2019). Of the two European countries in this group, one is a member of the European Union (Bulgaria), and the other is a candidate for future membership (Montenegro).

China improved its ranking in the Global Innovation Index considerably, moving up from the 35th place it occupied in 2013 to the 14th place in 2019.

According to the European Innovation Scoreboard for 2019, in terms of innovation performance, the European Union continues to lag behind South Korea, Canada, Australia and Japan, but it has overtaken the United States. The EU countries are divided into four groups based on their performance. Innovation leaders' performance is well above the European Union average, while the performance of strong innovators is above or close to the EU average. Moderate innovators' performance is below the EU average, and modest innovators' performance is well below the EU average (Table 3).

Table 3 Performance of the European Union Member States' innovation systems according to the European Innovation Scoreboard 2019

Performance group	Country
Innovation leaders	Denmark, Finland, the Netherlands, Sweden
Strong innovators	Austria, Belgium, Estonia, France, Germany, Ireland, Luxembourg, the United Kingdom
Moderate innovators	Croatia, Cyprus, the Czech Republic, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, Slovenia, Spain
Modest innovators	Bulgaria and Romania

Source: European Commission (2019)[15]

Compared to 2018, Estonia is the only country that improved its performance and moved from the group of moderate innovators to the group of strong innovators. A few countries dropped in their rankings. Specifically, Luxembourg and the United Kingdom dropped from the group of innovation leaders to the group of strong innovators, while Slovenia dropped from the group of strong innovators to the group of moderate innovators.

According to the Global Competitiveness Index 4.0, Germany is the best-positioned European Union country, ranking third in the world (Bilas et al., 2018).

There are obvious disparities among the European Union Member States, and the gap has not been narrowing (European Commission, 2018d)[16]. It is likely that today's increasing inequality is the result of insufficient uptake of technological innovations and their wide diffusion (European Commission, 2018d).

There are 19 European Union countries and 180 regions registered on the Smart Specialisation Platform (Smart Specialisation Platform, 2019)[17]. According to the available data from the Platform, there are around 120 smart specialisation strategies developed in the European Union by Member States and regions (Gómez Prieto et al., 2019). Since many regions already have experience with innovation strategies, it was a good basis for the development of smart specialisation strategies (Foray et al., 2012). According to the level of adoption of these strategies, the EU countries can be divided into three groups: (1) countries which have adopted only national smart specialisation strategies, (2) countries which have adopted only regional smart specialisation strategies and (3) countries which have adopted both national and regional smart specialisation strategies (Polverari, 2016).

The most frequent S3 priority areas identified in the European Union countries are agri-food, key enabling technologies (KETs), health, energy and digital growth (Table 4).

Table 4 S3 priority areas in the European Union countries included in the Smart Specialisation Platform on national and regional levels

Priority area	Total	%
Agri-food related	272	22
KETs related	267	21
Health related	192	15
Energy related	178	14
Digital agenda related	144	11
Environment related	59	5
Creative /cultural related	48	4
Transport and logistics	38	3
Social innovation, organisational models, others	25	2

Source: Gnamus (2017: 15)[18]

Gnamus (2017) identified the overlaps in S3 related priority areas. The most common ones were found in KETs and energy; KETs and agri-food; agri-food and health; digital agenda and energy, and digital agenda and health. In total, in the five most frequent thematic priority areas, Gnamus (2017) identified 128 overlaps.

Haegeman et al. (2019) analysed collaboration between joint undertakings and national and regional European Structural and Investment Funds managing authorities. They define joint undertakings (JU) as a form of public-private partnership set up in strategic European Union research and innovation areas. It is of note that in their report the authors stressed the possibility of synergies between Structural and Investment Funds and other EU funding programmes. The synergies are clearly encouraged in the proposal of the European Commission for the next Multi-annual Financial Framework 2021-2027, which is yet to be approved by the European Parliament and the Council. For instance, should they choose to do so, EU Member States would be able to transfer 5% of ESI funds to any other EU instrument to fund a project. This opens the possibility for some countries and regions to benefit from closer collaboration with JU, as well as for other types of partnerships, and for the integration of industry in the S3 process (Haegeman et al., 2019).

Recent industrial policies assume active government role in facilitating innovations (Benner, 2019). For the past three decades, the EU has experimented with some new approaches to industrial policy, of which Horizon 2020 and smart specialisation represent two major policy frameworks (Benner, 2019).

It can be stated that research and innovation strategies for smart specialisation have been a useful tool in developing innovation ecosystems in the European Union countries (European University Association, 2018). According to the European University Association (2018)[19], key success factors of these strategies are: investing in human talent and skills, enhancing the strategic involvement of universities, promoting the engagement of all EU regions, strengthening collaboration, and reinforcing multilevel governance.

There is a consensus about the main reasons why innovators find it hard to start up and scale up their businesses in the European Union. Most of these reasons include: universities that lack expertise, adverse attitudes to entrepreneurship, underdeveloped venture capital markets, the incomplete single market, access to adequate human capital, and regulatory barriers (European Commission, 2018a)[20].

The promotion of innovation should play a key role in delivering on all the European Union policy priorities. The European Union countries and regions focus on their strengths in research and innovation by establishing a strategy for smart specialisation, which is a condition to receive Structural Funds support via the European Regional Development Fund (European Commission, 2017)[21].

The EU countries should invest smartly and sustainably in R&D and innovation at national level, focusing investments on building human capital and infrastructures for R&D and innovation and prioritising those areas where they are strongest (European Commission, 2017).

European Commission (2018b)[22] announced that the next long-term European Union budget 2021-2027 will be focused on key investment priorities: innovation, support to small businesses, digital technologies and industrial modernisation, low-carbon, circular economy, and the fight against climate change. For this period, the European Commission is proposing a budget of €100 billion for research and innovation (European Commission, 2018c)[23].

5. Conclusion

Smart specialisation concept, although rather new, has become an integral part of research & development and innovation policies in all countries of the European Union, where it originated. However, this concept is becoming increasingly important outside the borders of the EU. Innovations are recognised in this regional economic integration as one of the main sources of economic growth and development, i.e., a source of competitive advantage which European Union seeks to maintain in an increasingly competitive world.

Innovation performance strongly varies between European Union Member States as does the speed of implementation of the concept of smart specialisation into relevant policies. Consequently, the speed of implementation of smart specialisation strategies varies too. Due to data scarcity, it is still not possible to compare the results of policy actions taken thus far or still ongoing in the EU countries.

However, so far, it can be concluded that most of the regions/countries of the European Union have identified similar S3 priority areas to focus on (agri-food, key enabling technologies, health, energy, digital agenda, etc.). One of the key factors which will contribute largely to the achievement of the desired results of the implementation of smart specialisation strategies is the ability of key stakeholders (quadruple helix) to collaborate in all phases of smart specialisation, from identifying the priority areas to implementing policy actions.

The limitations of this paper lie in the fact that it does not present concrete data and analysis, as it is too early to conduct any evaluation of ongoing policy actions. In terms of future research, it would be interesting to gather data and compare policy actions and performance of the EU Member States in order to identify best practices and thus contribute to smart development policies.

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Koncept pametne specijalizacije kao alat za unapređenje inovacijske izvedbe zemalja članica Europske unije

Sažetak

Globalizacija predstavlja znatne izazove za sve zemlje, a pametna specijalizacija jedan od alata za unapređenje inovacijskog potencijala zemalja što vodi poboljšanju ekonomske izvedbe i konkurentnosti. Pametna specijalizacija obuhvaća identificiranje i ciljano jačanje konkurentskih prednosti zemlje s ciljem poduzimanja ciljanih strateških napora u svrhu poboljšanja konkurentnosti. Cilj rada je utvrditi izazove inoviranja i pametne specijalizacije s kojima se suočavaju zemlje članice Europske unije. Rad pruža pregled trenutne inovacijske izvedbe zemalja članica Europske unije, kao i njihovih strategija pametne specijalizacije, s posebnim naglaskom na odabrana tematska prioritetna područja. Slijedom navedenoga, doprinos rada ogleda se u dva ključna pravca. Prvo, u radu se daje pregled glavnih značajki koncepta pametne specijalizacije. Drugo, pruža se pregled inovacijske izvedbe zemalja članica Europske unije i njihovih strategija pametne specijalizacije.

Ključne riječi: pametna specijalizacija, strategija, inovacije, Europska unija