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Aleksandra Ewa Nowakowska[*]

NEW IDEA OF BUILDING REGIONAL INNOVATIVE CAPACITIES – SMART SPECIALISATIONS

Summary At the beginning of the twenty-first century, low competitiveness of the economy and the deepening gap relative to the world's economic powers was the key problem of the European Community. Also, weak innovativeness of the economy, underdeveloped R&D sector with inefficiency of public policy are seen as leading EU challenges These problems have become the basis for criticism of current innovation policy and the search for new methods, tools, and development trajectories. The answer to these challenges is the concept of smart regional specializations proposed along with a new vision of the development of the EU's, known as Europe 2020 Strategy.

Smart specialization is a new paradigm for building competitive advantage of regions. It is also a new way of regional innovation policy, aiming to eliminate barriers and failures in building innovation capacity of regions.

The purpose of this article is to show the essence of the concept of regional smart specializations. Article identifies the theoretical assumptions and describes the key elements of this new approach. It exposes the novelty of the concept and identifies the challenges of its implementation.

Keywords: smart specialisation, innovation, development of regions, regional policy.

1. FROM LISBON STRATEGY TO EUROPE 2020 – INTRODUCTION

The key problem of the European Community at the brink of the 21st century was low innovativeness of its economy and poor knowledge potential, which translated into poor competitiveness of the economy and deepening gap to global economic powers. It was confirmed by R&D expenditure, which diverged from amounts allocated for that purpose in the United States or Japan. On average, in 2000 United States allocated ca. 2.7% of their GDP for R&D, Japan over 3%, while the European Union only slightly more than 2% of its GDP. The structure of financing R&D activities was also unfavourable. In the EU public funding of R&D accounted for ca. 40% of the total spending compared to its 19% share in Japan and 33% in the United States. At the same time, the structure of employment among R&D staff in integrated Europe maintained low „permeability" of R&D into the economy. In the EU-15 only 50% of research staff worked in private

[*] University of Lodz, Faculty of Economics and Sociology, Department of Regional Economy and Environment.

businesses, 15% in the public sector and as many as 35% at universities while in the States the proportions were as follows: 84% in private businesses, 4% in state-owned companies and 12% in higher education. The structure of R&D expenditure also diverged from trends observed in more developed economies. Compared to the US or Japanese economy, European Union earmarks too much for basic research and too little for applied and development research, which results in low adaptation and permeability of innovation and new technologies into the economy. Low innovativeness of the European economy was also confirmed by the structure of exports and imports of high-tech products. Only 17% of the EU exports were high-tech and technology products while the same category accounted for 25% – 27% in the structure of exports of Japan and of the United States. We also observed an unfavourable internal balance of economic exchange – EU companies imported more highly innovative products than they exported[1].

Deepening gap between the competitiveness and innovation of the EU economy compared to the United States, Japan or China, together with the decreasing dynamics of economic growth, provided grounds for radical decisions and changes designed to improve the position of integrating Europe in the global economy. Answer to these challenges was provided in the Lisbon Strategy adopted in March 2000 at the European Council summit in Lisbon[2]. It became the main instrument of reforms and structural changes and became an overriding instrument of the EU social and economic development. The strategy was an attempt to revive the European economy so that in the assumed time horizon it could become the leading global economic power.

Activities undertaken for more than a decade within the framework of the Lisbon Strategy did not produce expected results. No satisfactory outcomes were recorded, first of all, in the building of a knowledge and innovation-based economy, i.e. the restructuring of education, deep transformations in the R&D sector and improving innovation capacity of the economy. New mechanisms of the implementation of the EU science, technology and industrial policies did not w ork out, either. Not only has the so called "Transatlantic gap" of productivity, innovation and economic growth in many industries and sectors not been reduced but in many cases it deepened. These negative phenomena were clear particularly in R&D activities and in high-tech and high technology sectors.

The answer to these challenges is the concept of smart regional specializations. It is a new paradigm for building competitive advantage of regions. It is also a new way of regional innovation policy, aiming to eliminate barriers and failures in building innovation capacity of regions. The purpose of this article is to show the essence of the concept of regional smart specializations. Article identifies the theoretical assumptions and describes the key elements of this new approach. It exposes the novelty of the concept and identifies the challenges of its implementation.

[1] Science and technology in 2003, Central Statistical Office, Warsaw 2004.
[2] Lisbon Strategy, http://europa.eu/scadplus/glossarv/lisbonstrategyen.htm.

2. ORIGIN OF REGIONAL SMART SPECIALISATIONS

The failure of the implementation of the Lisbon Strategy provided grounds for a deep review and for the development of new operational framework and stimulating the EU development. New challenges and directions have been reflected in a new strategy "Europe 2020", which is to replace the Lisbon Strategy after 2010 and make a new opening in the building up of competitiveness and innovation of the European economy. New development plan is based on the "3-5-7" scheme, i.e. three priorities, five goals (quantitative), seven flagship initiatives, which is consistent with the postulate to concentrate goals. It assumes EU economy should be based on three pillars: development of knowledge and innovation-based economy (smart growth), an economy effectively using available resources (sustainable growth) and helping social inclusion (employment and social cohesion – inclusive growth)[3]. The above priorities are to be achieved in seven key projects, which will focus on initiatives delivered at both European and national levels. Five future quantitative goals of the future strategy have been identified; Member States will adopt national goals adapted to their internal specificity[4].

Major issues identified under smart growth, the first pillar of the new strategy, focus on enhancing innovation through increasing R&D outlays and infrastructure (mainly in the private sector) and improving their economic efficiency (by changing the operating conditions of the private R&D sector). That is supposed to be achieved by one of the leading programmes "Innovation Union", which concentrates on the strengthening of the European research area and on the improvement of conditions for innovation[5]. Improving innovation capacity of the EU, as proposed in the Europe 2020 Strategy, highlights the need for a comprehensive support to innovation, starting from initial research projects up to commercial application of their results. Special attention is paid to the deepening and intensification of activities aimed at the development of the European Research Area. The strategy

[3] Document adopted by the European Commission in March 2010, in June 2010 by the European Parliament, ec.europa.eu/eu2020/pdf/1_PL_ACT_part1_v1.pdf.

[4] These are: increase of employment rate for people aged 20-64 from the present 69% to at least 75% (until now the goal was 70%); achieving 3% of the GDP for R&D, mostly by the improvement of engagement of the private sector in R&D; reduction of CO2 emission by at least 20% compared to the level of 1990 (or, if situation perm its, 30%), increased share of renewable energy sources in the total energy consumption to 20% and to improve energy efficiency by 20% (the so called 20/20/20 indicator); reduction of school drop-outs to 10% from the present 15% and the increase of the portion of people aged 30–34 with higher education from 31% to at least 40%; reduction of the population of Europeans living below national poverty threshold by 25% as a result of helping ca. 20 m persons out of poverty.

[5] Other key initiatives are: "Digital agenda for Europe", "Youth on the Move", "Resource-efficient Europe" (building up a low emission economy), "An Agenda for new skills and jobs" (improving workers' competence, labour market modernisation), "An Integrated Industrial Policy for the Globalisation Era", and "European Platform against Poverty and social exclusion".

points to the need to intensify partnership in the area of knowledge and to reinforce relationships among the world of science, business, research and innovation (with the involvement of the European Institute of Innovation and Technology). Stress is put also on the need to improve framework conditions for innovation activities in companies (by, inter alia, adopting a single European patent and Unified Patent Court, improving legislation in the field of copyright and trademarks, facilitating SMEs' access to the protection of intellectual property rights) and using internal demand (through, e.g., public procurement) for the fostering of innovation in European economy. A vital pillar of building up the innovativeness of the European economy under Europe 2020 strategy is the identification, selection and building of smart specialisations for regions, countries but also for the European economy. The EU policy evolved with respect to the support for the development of innovation capacity: from stressing the development of the R&D sector and increasing the internationalisation of R&D activities through institutional and public management mechanisms up to the building of smart specialisation based on market mechanisms of creating, disseminating and adapting technological changes.

Building smart specialisations is to become a specific remedy for decreasing competitiveness of the European economy. Existing fragmentation of research, national dimension of science, low transfer of technology and commercialisation of research results considerably restrict concentration and consolidation of scientific activities and R&D and hamper the development of globally leading scientific centres in the EU (Licht 2009; O'Sullivan 2009). As a result, resources are dispersed and there is no specialisation in knowledge, technology and economy.

The idea of regional smart specialisations originates directly from the criticism of the previous innovation, science and research and industrial policies. It is deeply rooted in numerous analyses and critical studies concerning the condition of knowledge and innovation-based economy and the implementation of the development policy. New approach to the stimulating of innovation capacity in the regions is attributed to the international expert group *Knowledge for growth* (K4G), and in particular to its two leaders: Bart van Ark and Dominik Foray[6]. The concept was further developed and disseminated mostly by Paul David, Bronwyn Hall, and Jacques Mairesse. The following studies were crucial for the development of the idea of smart specialisations:

- ERA European Research Area and Innovation Union Flagship Programme[7],
- Smart Specialisation: The concept (Foray, David, Hall 2007),
- Measuring Smart Specialisation: The concept and the Need for Indicators (David, Foray, Hall 2009).

[6] Knowledge for Growth Group, www.ec.europa/invest-in-research/monitoringlknowledge_en.htm.
[7] http://ec.europa.eu/research/innovation-union.

The idea of smart specialisations is an attempt to improve the efficiency of innovation, in particular in the context of the expenditure of the public sector. The concept rests on the assumption that regions should not and cannot operate actively in all areas (comprehensively). They should make selective choices of domains, where their resources are the best developed and focus their scientific, research and innovation activities on them (McCann, Ortega-Argiles 2011). The originators of the approach note that "under the previous policy, too many regions have selected the same technology mix – a little bit of ICT, a little bit of nano and a little bit of bio, without making any significant changes in any of them. A more promising seems to instigate activities and develop investment programmes where new R&D and innovation projects will complement the country's other productive assets to create future domestic capability and interregional comparative advantage" (Foray, David, Hall 2011). The previous regional policy is dominated with the approach, where each region was striving to develop similar resources, which caused excessive correlation and duplication of scientific, R&D, and educational effort, which, in turn, reduced the diversity and complementarity of European resources of knowledge and innovation.

3. THE SUBSTANCE OF THE CONCEPT OF REGIONAL SMART SPECIALISATIONS

The novelty in the concept of smart specialisation consists in the integration of two perspectives of developing innovation capacities in regions, which before were considered contradictory or little related. The concept combines sectoral and regional perspectives. Sectoral perspective concerns the selection of the domain of specialisation and the identification of technological advantage of a region while regional perspective specifies the endogeneity, specificity, concentration and complementarity of regional resources needed to develop specialisation (the so called territorial advantage) (Foray, Van Ark 2007). The concept of smart specialisations suggests the need of closer correlation between R&D sector, regional economic structure, science and education. The potential is strongly internally interrelated and, through network relationships, it provides grounds for regional specialisation. It is a new way of formulating an innovation strategy in regions, which joins elements of the analysis of the competitiveness of regions with identification of priorities for scientific, technological and industrial policies.

Sectoral perspective focuses on the identification of the specialisation domain, which results from technological potential in a given area concentrated in a particular region. It formulates three fundamental conditions necessary to identify smart specialisation:

- Entrepreneurial, bottom up identification of specialisation domains. Identification of smart specialisation does not consist in ordering research, implementing

an imposed industrial policy or selecting the areas of cooperation by regional authorities or experts. Entrepreneurial selection of specialisation domain should consist in seeking science and technology fields, in which the region in question is especially successful in economic terms and where scientific and research solutions meet the real needs of companies. The process should be based on a strong involvement of economic partners in the identification of specialisation, activities complementary to it and the analysis of efficiency of previous public interventions. Specialisation should be closely linked to market needs and priority directions of research financed from public resources should be identified in a bottom-up approach and meet the needs of final users.

- Accumulation of existing resources. Specialisation domain should have a well-developed base of technological resources, which create, the so called, critical mass. European regions are often too weak to be highly competitive and achieve excellence in science, technology and innovation. Selective choice and focusing on specific areas of specialisation will help achieve the economies of scale. The previous regional policy has been dominated with general tendency to select some of the most popular technologies (e.g. ICT, nanotechnology, biotechnology). European regions tend to imitate what other regions are successfully developing rather than seeking their own, unique development areas. If all European regions compete for the leadership often in the same fields, most of them will never reach an adequate critical mass and the economies of scale (Kardas 2011). Fundamental pre-condition for smart specialisation is the development of a sufficiently extensive area of research and innovation, which will allow to compete at international level. The power of human resources, infrastructure, experience, and specialisation network should enable to better benefit from the economies of scale and from spillover effects.
- Strong links between specialisation domain, science and R&D. Specialisation should offer a well-developed scientific and research support of economically successful entities renowned on the market, with dense and well-developed links with business sector (technically complementary R&D sector). A well-developed institutional environment is also needed in a given specialisation domain to establish links between R&D and the economy (e.g. science and technology parks, technology transfer centres, innovation incubators), or venture capital.

Regional perspective stresses that regional environment (territory) is not neutral for building innovation capacities of businesses. Technological advantage itself, without a favourable regional environment may be insufficient to develop a highly competitive specialisation (Nowakowska 2011). A region is the source of innovation and territorial development mechanisms based on the endogeneity and specificity of resources are important sources of success. Regional perspective exposes three fundamental conditions for the development of smart specialisation:

- Embeddedness and territorialisation of specialisation domains. Smart specialisation must be linked with endogenous resources (often immaterial) of

a region, built for decades (in evolutionary way), resulting from traditions, experiences, social and economic past of the region, which at present give a unique flavour to the territorial unit in question. It embeds a given specialisation in its specific social, economic and spatial environment.

- Combining diversity and affinity of regional resources. Smart specialisations require regional resources to be complementary, focused around specialisation and supportive for its development (e.g. human resources, infrastructure, social capital, economic traditions, networks, experience, routine and specific social conduct). Such a specific combination of resources sometimes opens up new "space" for the development of a particular specialisation and emergence of a unique economic structure of a region. It enables effective diffusion and permeability of knowledge, innovation and technology in the economy.
- Links and relationships among regional entities. Smart specialisations necessitate dense relationships and interactions among actors operating on a given territory. Lasting links and cooperation networks, both formal and informal, involving various regional groups are needed. Cumulated experience of previous collaboration, complementary knowledge resources of the R&D sector and of economic operators, well-developed communication channels and means (all, that we refer to as cognitive, institutional and organisational affinity) are fundamental conditions for the development of smart specialisation.

The concept of smart specialisations is "smart" in two aspects. On the one hand, it is a "smart development trajectory" based on and relating to regional resources not only when it comes to their concentration but, most of all, their complementary nature and using rare, specific and unique potential of a concrete territory (strong reference to generic concepts and specific resources). On the other hand, it is a "smart regional policy", a sophisticated policy individually tailored to the needs of a given region and sector. It is a concept of a comprehensive policy, interactive and bottom-up (Foray 2009). Smart specialisation is a new concept of developing economic specialisations but also a tool used to define and build the future position of a region in knowledge and innovation-based economy.

4. REORIENTATION OF REGIONAL INNOVATION POLICY

New regional innovation policy has got the logic and operating nature of general purpose technologies (GPT) as its foundations. The substance of developing smart specialisation is centred around this term. GPT are innovations resulting often from principal inventions[8]. They are (Hall, Trajtenberg 2006):

[8] These technologies make industrial revolutions a reality. For the first industrial revolution (18th century) it was, e.g.: steam engine, iron, machines; for the second industrial revolution (19th

- omnipresent technologies applied in many areas of human activities,
- technologies subject to continuous technical advance, which improve their economic performance,
- technologies, which require complementary investment in the using sectors (feedback),
- technologies, representing significant potential of creative derivative solutions and their practical implementations.

GPTs offer unlimited possibilities of new technological solutions, new "co-inventions" emerging in other sectors or their new applications in the economy. The invention of GPTs has largely expanded the borders of inventions for the entire economy and new applications change production function of a given sector. In other words, basic inventions generate new possibilities of developing applications in given sectors. And the reverse, a new application expands the general market of technologies and improves economic performance of invention activities. This is how dynamic loops of feedback emerge, where inventions lead to new applications, which, in turn, enhance the efficiency of further inventions. Between GPTs and their practical applications there is a feedback (Giannitsis 2009). GPTs offer new possibilities in developing new products or services, while the latter extend the scope of application, i.e., the rate of return from their developing. Nevertheless, the heart of the trajectory is not the development of a general purpose technology, which is a radical breakthrough compared to previously applied technological solutions, but the development of new innovation possibilities by expanding the use of a given GPT in other sectors.

Based on the mechanism of general purpose technologies, the concept of regional smart specialisation introduces the idea of regional policy differentiated depending on the development of innovation capacities. Three types of regions and regional policy trajectories can be distinguished (McCann, Ortega-Argilés 2011).

- innovation leaders for a particular area of innovation – regional policy should focus on the support for the development of general purpose research and innovation (GPT),
- moderate innovators, innovation followers – regional policy should focus on the support for the development and implementation of new products and technologies,
- modest innovators (catching-up regions) – regional policy should support absorption and diffusion of technologies and their applications developed in other, better developed regions[9].

century): chemicals, combustion engine, electricity or steel, while for the third industrial revolution (20th century) – ICTs, biotechnology or smart materials.

[9] Innovation Union Scoreboard 2014, ec.europa.eu/enterprise/policies/innovation/policy/innovation-scoreboard/index_en.htm.

If we apply the above typology to 16 Polish regions, none of them belongs to European leaders when it comes to innovation capacity. Only 5 voivodeships: Mazovia, Lower Silesia, Malopolska, Podkarpacie and Silesia were included in the second group of regions capable to develop GPT's applications. The remaining 11 voivodeships meet the criteria for regions with the lowest innovation potential in Europe, where innovation policy should focus on the development of absorption capacity and diffusion of innovation.

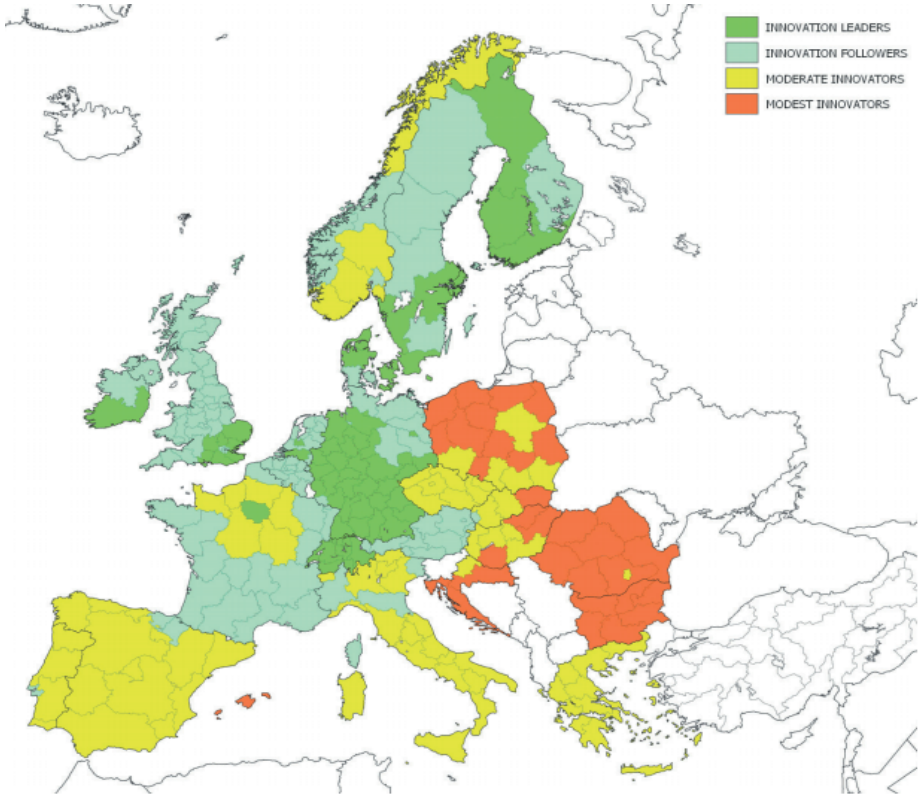

Figure 1. Types of regions

Source: Regional Innovation Scoreboard 2014, www. http://ec.europa.eu/news/pdf/2014_regional_union_scoreboard_en.pdf.

The concept of regional smart specialisations suggests a transparent innovation policy, adapted to various innovation capabilities of regions. As stressed by the authors of the concept, smart specialisation is a strategy addressed to all regions (not only to technological leaders). Smart specialisation should increase differences between the regions of European Union in specialisation in specific areas of science, technology and sectors of the economy.

Important assumption connected with smart specialisation refers to its implementation, especially to the role of public administration. Smart specialisation is not decided top-down by public administration when drafting development plans (e.g. development strategies or programmes). Neither is it identified within *foresight* projects drafted by external experts as it happened before. It is an "entrepreneurial" and bottom-up selective choice of areas of science and technology, in which a region can become a leader at European and global scale. The engagement of public administration consists mainly of ensuring appropriate infrastructure, access to information concerning technological or economic opportunities and threats, safety standards, potential sources of funding, etc. Hence, the role of public administration is diminished and should not consist in arbitrary selection of a specialisation but in seeking effective policy tools, adjusted to the needs of a particular specialisation.

5. CONCLUSION

Regional smart specialisation is both an idea of creating innovation capacity in regions and a tool, which enables the building of a unique competitive position on international market. It is based on simple, even obvious assumptions. In real terms, however, it calls for difficult, complementary actions, starting from the identification of territorial resources and technological advantages, through the identification of functioning cooperation networks up to the selection of specialisation domains and defining a comprehensive and individual regional policy.

The concept of regional smart specialisations results from combining sectoral and regional policies and it is often colloquially named as a specific third generation of innovation systems. It is deeply embedded and makes references to many theoretical approaches to the development of innovation capacities of regions. Particularly strong links can be observed with the idea of innovation communities, sectoral and regional innovation systems or innovation cluster. Despite many elements in common with other concepts, it is a new approach, which puts stress on other elements and puts accents differently across the conditions of innovation development in regions.

Smart specialisation deserves a deeper interest and a debate both at national and at regional levels. Polish regions have significant problems to identify smart specialisations and new regional innovation strategies, although they directly refer to the idea of smart specialisation, in fact they do not respect the principles and mechanisms of their selection and of shaping innovation policy. In Polish reality it is a "dead" idea of building technological and territorial advantage of regions (Dziemianowicz, Peszat 2013).

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