

# Influence of small and medium enterprises sector at the change of innovation potential of polish regions

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**Abstract** The article results of the multidimensional comparative analysis of the innovation of Polish regions made on the basis of accessible domestic statistical information. For the comparative analysis were taken into consideration the potential and innovative capacity which were indicated by 24 crucial factors of the innovation, grouped in six problem modules (groups): human resources and creating of the new knowledge; B+R intensity; effects of the innovative activity of the industry and services, information-telecommunications technologies (ICT), modernity, infrastructure of the support and economic infrastructure. In the model of multidimensional analysis of the innovation (WAP<sub>INNOVA</sub>) additionally was accepted the module of small and medium entrepreneurship because of the meaning of this sector for the economy of regions. The aim of research presented in the article was setting the influence of the small and medium enterprises sector for the change of the value of the synthetic indicator of the innovative capacity of Polish regions.

**Keywords** Innovation, region, small and medium enterprises sector, SME

## 1. INTRODUCTION

Leading of the effective regional policy is realized by building of the Regional Innovation Strategies (RSI). Determining of aims of the strategy, its methods and means of action and, further, the evaluation of real achievements requires the monitoring of the innovation of the regions. Using the method of benchmarking does not only come down to the measurement of current conditions of the things in the context of determined purposes, but also concerns identifications of so-called best practices being supposed to serve the achievement of those purposes [13].

Dispersing of the statistical information in the regional presentation constitutes presently the fundamental barrier to leading analyses of the innovation of the regions at using the indicative list of indicators *Innovation Union Scoreboard* (IUS 2013) [6] as well as *Regional Innovation Scoreboard* (RIS 2012) [16]. It should be matched that

IUS 2012 includes 25 indicators but at present data of only twelve indicators is accessible.

In Poland the systematic comparative research (benchmarking) which could enable to make periodic evaluations of innovation of the regions are not led. Spatial diversifying of regional innovation causes, that in present numerous attempts of the evaluation of innovative abilities and potentials of developmental regions are being made [2, 16, 8, 12, 18, 5].

There was suggested an extension of the field of analysis of the innovation of the regions which is matching with the definition of economy innovation (at the regional level) [8] understood as the ability and motivation of entrepreneurs for both constant seeking and using in practise the research and developmental results, new concepts, ideas and inventions but also as improving and the development of existing technologies of production, exploitation and concerning the sphere of services, entering new solutions in the organization and the management, improving and developing of infrastructure, especially concerning the accumulation, processing and the providing access to information.

One of the elements of the document *Europe 2020* is supporting of the economy being characterized with the high level of employment (working in small and medium enterprises of the Polish industry constitute close the 60%) and ensuring the economic cohesion, therefore the European Commission in the new financial perspective for years 2014-2020 offered raising the competitiveness of small and medium enterprises. Mentioned sector in the evaluation of the innovation of the European Union economies is described as far as by four indicators (two in *FIRM ACTIVITIES* and two in output indicators *OUTPUTS*).

The main aim of present article is indicating the influence of the fragmentary evaluation of the module describing the SMEs sector at the change of the value of the innovative capacity of Polish regions pointed by crucial innovation indicators at the example of research led in 2011.

## 2. REGIONAL POLICY AND SMART SPECIALIZATION IN REGIONS

The main element of realized this way regional policy is the ability of strategic thinking what should be understand as the ability of diagnosing current situation from one side, on the other - ability of formulating strategic challenges at this base [9].

Policy of the region can appear with the attribute "strategic" in the event that in the course of planning process, apart from understanding it as the group of related activities undertaken by official authorities to the purpose of assurance the sustainable development of the country and the social-economic and territorial cohesion [20], contains internal structure of purposes and crucial options. This structure is contributing to different detailed documents of the type regional or trade strategies [10].

Leading development policies of the province is a basic function of the provincial (regional) self-government taking, among others, the economic development, development of the social and technical infrastructure about provincial importance, promotion of the science development. This policies should also include technological progress and raising citizens education, using natural resources and forming of the natural environment according to the principle of the sustainable development rule.

The assumptions of the region's strategy are concentrating on the following levels:

- level of mission and vision of the region<sup>1</sup> – planning the most desired (general) direction of transformations with reference to the specificity and the specialization of the planning,
- level of general and field strategies - planning the strategy about general character (developmental and competitive) and in specific field or developmental defined area (the strategy of the health care, the strategy of integration and the social policy),
- operational programmes - planning concrete actions being aimed at realization of the determined bundle of strategic aims [11].
- at the EU policy level smart specialization origins are rooted in the work of the "Knowledge for Growth" Expert Group who defines it as „one simple idea" [3] which should be understood at the outset that the idea of smart specialisation does not call for imposing specialisation through some form of top-down industrial policy that is directed in accordance with a pre-conceived „grand plan" [4].
- enforcement of smart specialization into legal force suggested that entrepreneurial process of discovery what the member state or region does best in terms of science and technology.
- that is a specific learning process to discover the research and innovation domains in which the region can hope to excel.
- the intelligent specialization is indicating identifying of exceptional features of both assets of every member state and the region, underlining the competitive edge of every region and concentrating of regional partners and stores around the vision of their future directed at achievements.
- this also means strengthening regional innovation systems, maximizing flows of knowledge and spreading benefits resulting from the innovation within the regional economy [19].

Creating and implementing of the strategy requires an economic transformation of integrated and local attempt to creating and implementation of a policy.

<sup>1</sup> Expression "vision" is often applied as the synonym of the attribute "mission", at least in reality these are two different notions. A vision is a concept of potential, vision of the desired future. A mission is a role for playing, meaning of the being.

It also seems to be necessary, by regional self-government, to find the answer for many important questions connected to the region. Most important are the practical conclusion for regional government:

- regions should see their comparative advantage not only as an asset in itself to build on but also as an opportunity to cooperate with other regions,
- smart specialization is the challenge to develop initiatives to cross-link technology areas, and last but not least
- smart specialization is the long-term political support and committed multi-level governance [7].

Taking into consideration smart specialization aims in the region it is important to remember who will be responsible for validating the relevance of the smart regional strategy.

## 3. METHODOLOGY OF ASSESMENT OF REGIONS INNOVATION

The complexity of the innovation strategies requires applying multidimensional analysis methods of innovation levels achieved by individual regions as well as monitoring of changes in this area. Considering new concepts of integrated approach of statistics and the practice of supporting for strengthening the economy innovation in connecting with the science and technology and the modern infrastructure [14] there was made the choice of 24 Key Innovation Indicators which are components of of drawn up board of indicators of regions innovation.

In the comparative analysis of the regions innovation in Poland with using the methodology of European Innovation Scoreboard was accepted that main ares of the competitive edge of regions are the abilities to create innovation by human resources, B+R activity and using information-telecommunications technologies. Simultaneously as the stimulants of the innovative activity of regions were pointed: modernizing the technical equipment and improving (climate for investment) of infrastructure economic and supporting the innovative activity.

Present paper is becoming part of the field of endogenous regions development, represented among others by J. Friemana, C. Weaver, W. B. Stöhr [1]. The field is also supported by external conditioning.

Chosen indicators of the assessment of the innovation level regions (for which statistical data were accessible) were grouped together in the following modules:

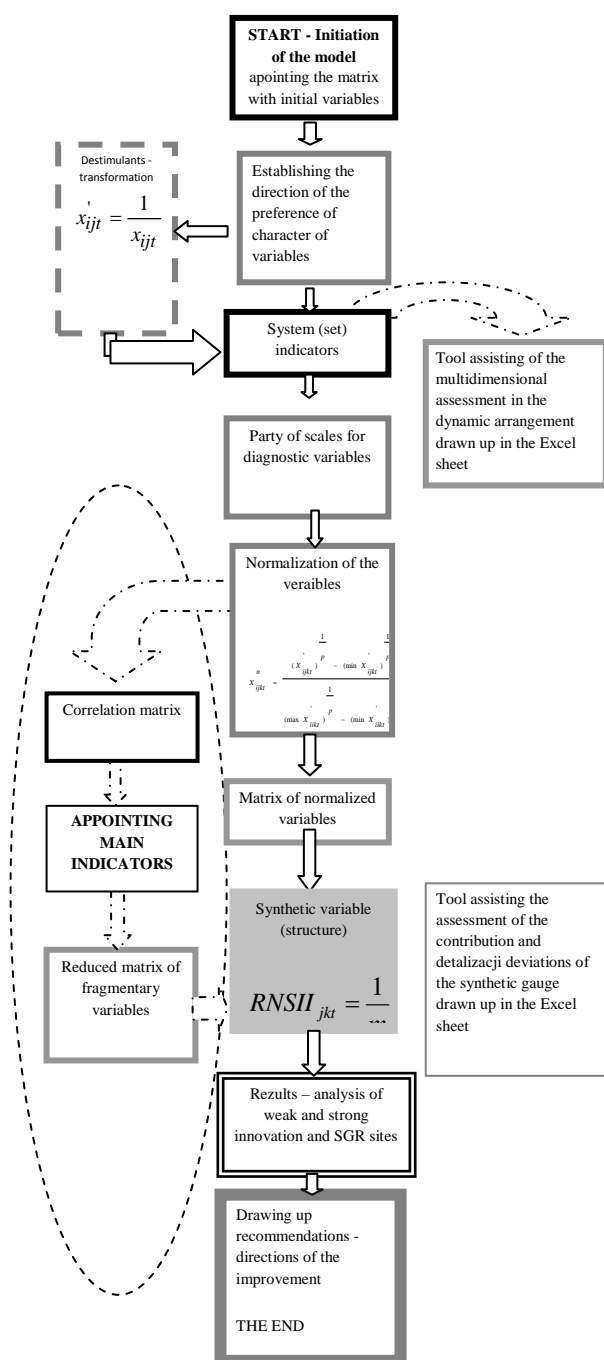
- MI – human resources and creating of the new knowledge,
- MII – B+R intensity,
- MIII – effects of the innovative activity,
- MIV – ICT technologies,
- MV – modernity,
- MVI – infrastructure of the support and economic infrastructure,
- MVII – SMEs entrepreneurship – additional modul including 3 indicators.

Moduls I-IV constitute the widened list of indicators of the entry groups (the driving forces of the innovation; creating of knowledge; innovations and the entrepreneurship) and outcome (implementations; intellectual property) IUS 2013 [2]. Other modules are a new proposal which in the light of carried out operational programmes (including regional) accepting innovative conceptions include creating of: modern infrastructure of regions, new generation of bases of technical equipping of the enterprises functioning as well as institutions supporting coming into existence

of innovative products and services. The production sector – especially the sector of small and medium enterprises – as well as institutions business environment are playing special role in the improvement of the innovation level and the competitiveness of the economy of regions.

For appointing of the synthetic evaluation of the innovative capacity of regions in the domestic system was used indicator recommended by European Commission called Regional National Summary Innovation Index (RNSII) which formula was included in the scheme of the algorithmic model presented by Figure 1.

Figure 1. Schedule of the algorithmic model of the multidimensional comparative analysis of the innovation.



Source: own research.

In detailed ranking based on researched aggregate indicators distinguished groups of indicators and the synthetic indicator so-called RNSII, it is possible to allocate four groups pointing strong and weak areas of regions innovation which can have practical applications for the choice of principal and main areas of supporting of the innovative activity in regions [17].

In research results the main point of interest was the legitimacy of choice of modules to research as well as the grounds of influence the SMEs sector at overall view of Polish regions.

#### 4. RESEARCH DESIGN

Establishing of the gravity of fragmentary indicators stimulating the final (synthetic) evaluation of the regions innovation is presenting by the correlation matrix.

Figure 2. the correlation matrix of the fragmentary indicators of regions innovation in year 2011.

Modules	MI	MII	MIII	MIV	MV	MVI	MVII	RNSII
MI	1,0							0,89
MII	0,6	1,0						0,77
MIII	0,4	0,8	1,0					0,64
MIV	0,7	0,4	0,4	1,0				0,79
MV	0,5	0,4	0,5	0,6	1,0			0,73
MVI	0,9	0,6	0,5	0,7	0,7	1,0		0,92
MVII	0,6	0,3	0,1	0,6	0,3	0,6	1,0	0,68

Source: own research.

The most important fragmentary indicators (about the coefficient of correlation exceeding the value 0.8) showed themselves: infrastructure of the support and economic infrastructure (MVI), human resources and creating of new knowledge (MI), ICT technologies (MIV). B+R intensity, modernity, entrepreneurship of the small and medium-sized entrepreneurship, effects of the innovative activity in the lower degree influences at the final assessment of the innovation of all regions.

The Mazovian province, as the leader of the innovation, got nineteen strong places in the twenty-seven indicators evaluation of the innovation, where in accordance to twelve of them mentioned province was classified at the first locate. However relatively in Warmian-Mazurian province most often appeared middle-weak (16) and weak places (10), in addition in none of considered evaluation criteria of the innovation this region got a strong point. This situation in presented in the Figure 3."

Figure 3. The level of the innovation in regions in the modular and aggregate arrangement in year 2011.

Province, in accordance to the ranking of the synthetic assesment in year 2011	Modules of innovation assesment							Synthetic assesment RNSII
	MI	MII	MIII	MIV	MV	MVI	MVII	
Mazovian (1 locate)	I	I	I	I	I	I	I	I
(...)								
Warmian-Mazurian (16 locate)	IV	III	IV	IV	IV	IV	III	IV

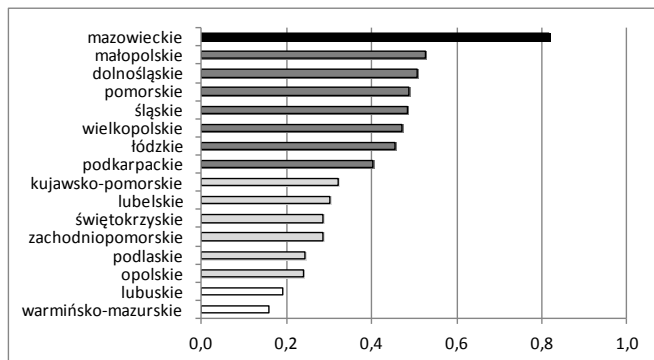
Source: own research.

The legend of the innovation levels:

strong (I)	middle-strong (II)	middle-weak (III)	weak (IV)
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In the evaluation of the VII module the following indicators were accepted: number registered SMEs at 1000 residents; number of active SMEs at 1000 residents, investments in thousands PLN at 1 active enterprise from the small and medium enterprises sector [15]. The innovation level in all regions after entering the VII module into the RNSII evaluation, did not change, what presents Figure 4.

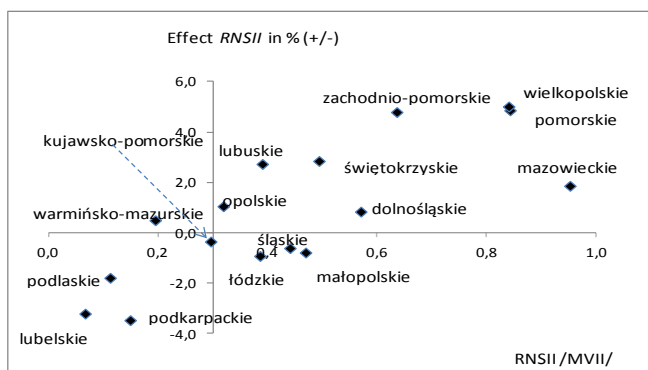
Figure 4. RNSII including the SME sector in Polish regions in year 2011.



Source: own research.

The influence of the small and medium enterprises sector at the overall assessment of the innovation of Polish regions was determined as the difference between the RNSII value counted including the module being characteristic of the SMEs sector but RNSII without the SMEs sector. Figure 5 presents effects of this influence on the value of the innovative capacity of Polish regions and the fragmentary assessment of the entrepreneurship of the SMEs sector (RNSII/MVII/).

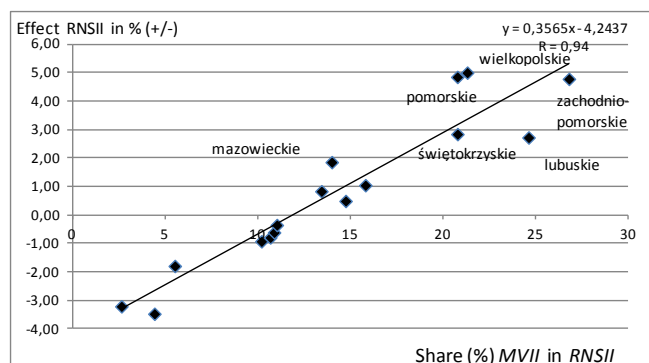
Figure 5. Influence of the small and medium enterprises sector at the height/decline of the regions' innovative capacity value of regions.



Source: own research

From the analysis of the data presented in Figure 5 it is possible to conclude that regions about the high fragmentary evaluation of the SMEs sector have got their effects of the height of the synthetic assessment of the regions innovation.

Figure 6. Relation between the participation of the MVII module and the effected effects of the height/decline of the aggregate assessment of the innovation RNSII in Polish regions (data of year 2011).



Source: own research

The increase of the innovative capacity was firmly correlated with the participation of the SMEs sector in the forming of the aggregate RNSII value. Coefficient of correlation of these relations, described with pattern  $y = 0.3565x - 4.2437$ , risen as many as 0.94.

## 5. CONCLUSIONS

Conducted analysis enabled to draw the following conclusions:

- (1) the biggest effects of the influence of SMEs sector at the value of innovative capacities received following provinces: Greater Poland, Pomeranian, West-Pomeranian, Świętokrzyskie and Lubusz in which over the 20% participation of the VII module in the forming of the aggregate assessment was stated,
- (2) it also was formed with biggest investment of the active enterprises from the SMEs sector,
- (3) this correctness was stated in provinces: Greater Poland, Pomeranian, Mazovian. They were also industrialised provinces what means that there took place the highest participation of sold production in the whole industry (Mazovian - 20.1%, Silesian - 18.2%, Greater Poland - 10.6%).

It is possible to state that small and medium enterprises sector as got influence at the development of the region. Presented values shows that innovation in SMEs sector are possible to see in the change of innovation capacity in regions.

Important is that innovation and its diffusion are becoming the same interactive result and collective network process, personal and institutional connections evolving in the time. They are answering in region at challenges put by "new economy": globalization and acceleration of technological changes, creating, at the same time, chances for economic development in underdeveloped or weak developer regions.

The conclusion seems to be clear - in research context - innovations at the level of small and medium enterprises entrepreneurship will be filling more and more large area in enterprises activity; this activity will also have more and more large impact for the regions and their economy and will be used in more and more for substantial amount of fields.

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