

Regionalization

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**SMART SPECIALISATIONS
IN REGIONAL INNOVATION ECOSYSTEM**

Abstract

In times of economic crisis creating new kinds of advantages remains a key task which determines a quick recovery from economic difficulties as well as whether the fast socio – economic development of the country is achieved. These advantages should be based on the use of knowledge, intellectual capital and abilities of the state and local self governments' structures to support and establish conditions for the innovative development of the country and its regions. RIS is a public policy instrument whose guidelines are directed at a priority of the innovative development. The paper presents both the methodical foundation for building the regional innovation strategy and vision for the development of an innovation ecosystem in Region.

Key words:

National innovation system, regional innovation strategy, innovation ecosystem.

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The global economic crisis have led to a situation in which Europe in order not to lose its political and economics position in the world has to face up to such challenges as globalization, growing demand for limited resources, aging societies, dynamic development of competitiveness of emerging countries. To cope with them United Europe accepted the Flagship Initiative Innovation Union, which is a part of Europe 2020 strategy. It involves a broad strategy for development of innovations. Thanks to them priorities of intelligent and sustainable development, which were set in Europe 2020 document, will be accomplished. The role of smart innovations, which is included in Europe 2020 strategic framework, was also emphasized in document summing up the Flagship Initiative Innovation Union that was prepared by the Council of the European Union. The Council stresses smart specializations concept and an arising state of affairs when given Regions take an advantage of their strong points. The idea of smart specializations lays foundations of fixing national priorities and regional innovation strategies as well as transnational cooperation in accordance with circumstances (Bondaruk, 2013). As a consequence, smart specializations become a key element determining future economic status of European countries in the world.

Modern and effective innovation policy is of great importance for building of innovation system that is an element of knowledge-based economy. The innovation policy is one of the youngest fields of economic policy. It is a tool of a state that serves to influence processes of socio-economic development in a sphere of broadly defined supporting and developing of innovations. It manifests itself in different kind of innovation strategies and policies that are made and implemented actually in all developed countries in the world. They are being prepared and accomplished at the different levels of management, which is why they have different forms as well as contain a wide range of topics. The term was introduced by Ch. Freeman who defined National Innovation System as «network of cooperating institutions in public and private sector whose activities and interactions initiate import, modification and diffusion of new technologies» (Bendyk, 2010). Both the term «National Innovation system» and approach towards these systems have evolved for 20 years. However, the necessity of analyzing of environment (herein an issue of innovation policy is included) that has an impact on

innovativeness of enterprises was being emphasized all the time. Nowadays Ch. Edquist approach is used to define national innovation system (Brzóska, 2010). He proposes a more open definition. It includes all important economic, social, political, organizational and institutional factors as well as some others that influence development, diffusion and making use of innovations. In this context innovation policy should support and initiate activities that involve innovation management in enterprises by means of different instruments, e. g. consulting or training.

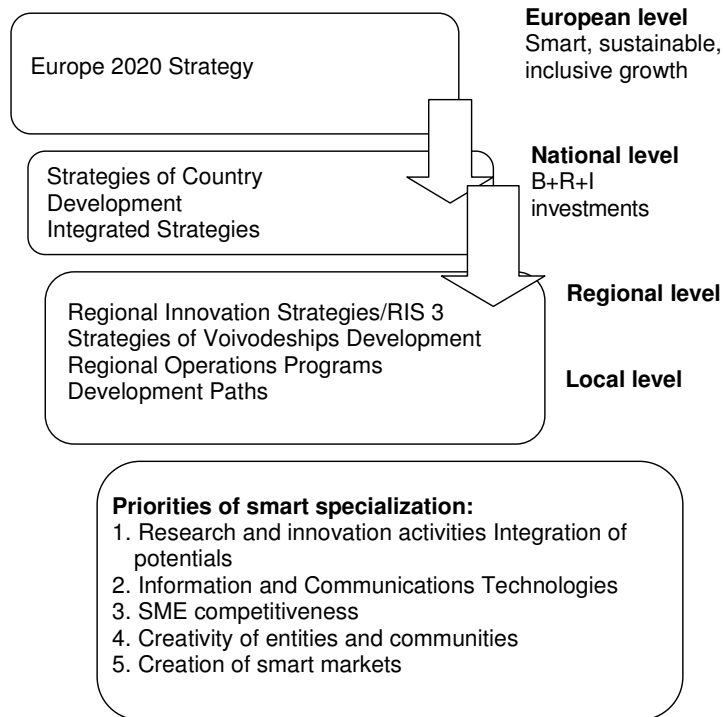
Innovation policy may also be defined as a set of activities which aim at supporting an implementation of results of scientific research, new knowledge achievements, inventions and other improvements into economic practice. In addition to this it comprises governmental programs, tools, mechanisms and measures – all of them are used by a state in order to directly or indirectly influence the level of innovativeness of given entities, sectors as well as they have an impact on shaping innovative economic structure (Brzóska and Pyka, 2012). The tools, which are used while innovation policy is carried out, can be divided on following categories:

- demand categories – they comprise government buying and contracts concerning new products, processes, services and research works;
- supply categories – they comprise technical and financial support for companies that make an effort to innovate, herein such elements like creating of scientific and technical infrastructure, education system, credits system and subsidies;
- environment shaping categories – they comprise such elements having an impact on enterprises as taxes, patents regulations, antitrust law, regulations concerning environment protection;
- institutional categories – they involve setting up as well as supporting institutions of technology and innovation transfer, science parks.

The abovementioned tools of innovation policy are used by a state to influence innovativeness of enterprises. It is justified to say about four levels of conducting research on both innovation policy and pursuing of it in European Union countries. These are policies led on union, national, regional and local level (Figure 1).

Figure 1

Current priorities of scientific, development and innovation policies



Source: Prepared on the basis of (Bondaruk, 2013).

1. European outlook on innovative development

The key document that sets mid-term European Union strategic outlook is «EUROPE 2020. A strategy for smart, sustainable and inclusive growth» (David, 2007). Europe 2020 puts forward three mutually reinforcing priorities:

- smart growth: developing an economy based on knowledge and innovation;
- sustainable growth: promoting a more resource efficient, greener and more competitive economy;

- inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.
- Focus on these priorities should let achieve by 2020 following targets:
- 75 % of the population aged 20–64 should be employed;
- 3% of the EU's GDP should be invested in R&D;
- the «20/20/20» climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right);
- the share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree;
- 20 million less people should be at risk of poverty.

Having analyzed priorities and targets more thoroughly, one can show that they are mutually reinforcing. The development of economy repleted with innovative solutions leads to savings of resources. Consequently, competitiveness and environmental protection are improved. An increase in employment rate causes the improvement in life quality and decrease in poverty rate. In the document it is emphasized that «country-specific recommendations will be addressed to Member States. Policy warnings could be issued in case of inadequate response». In the light of these arrangements, a statement saying that «at national level, Member States will need to reform national (and regional) R&D and innovation systems to foster excellence and smart specialization» proves that European Commission is highly determined to create conditions suitable for innovative development of European Union. The economic crisis makes evident structural weaknesses of Europe. Low growth rate, weak financial conditions of states and economic system, aging society as well as weak inclination to bear costs of crisis can be regarded as sufficient impulses to changes. In order to recover from the crisis Europe needs distinctly outlined development strategy based on innovativeness.

Each country and region is obliged to indicate domains, branches and fields of its specialization in the scope of created development strategies. Their preparation determines access to structural funds in European Union financial framework 2014–2020. European Union expects national and regional authorities to elaborate research and innovation strategies for the benefit of smart specializations and in order to take an advantage of structural funds in a way that will be more effective. Additionally authorities should aim at improving synergies among different union, national and regional policies as well as investment projects with foreign capital and public funds.

2. National innovation system – structure and weaknesses

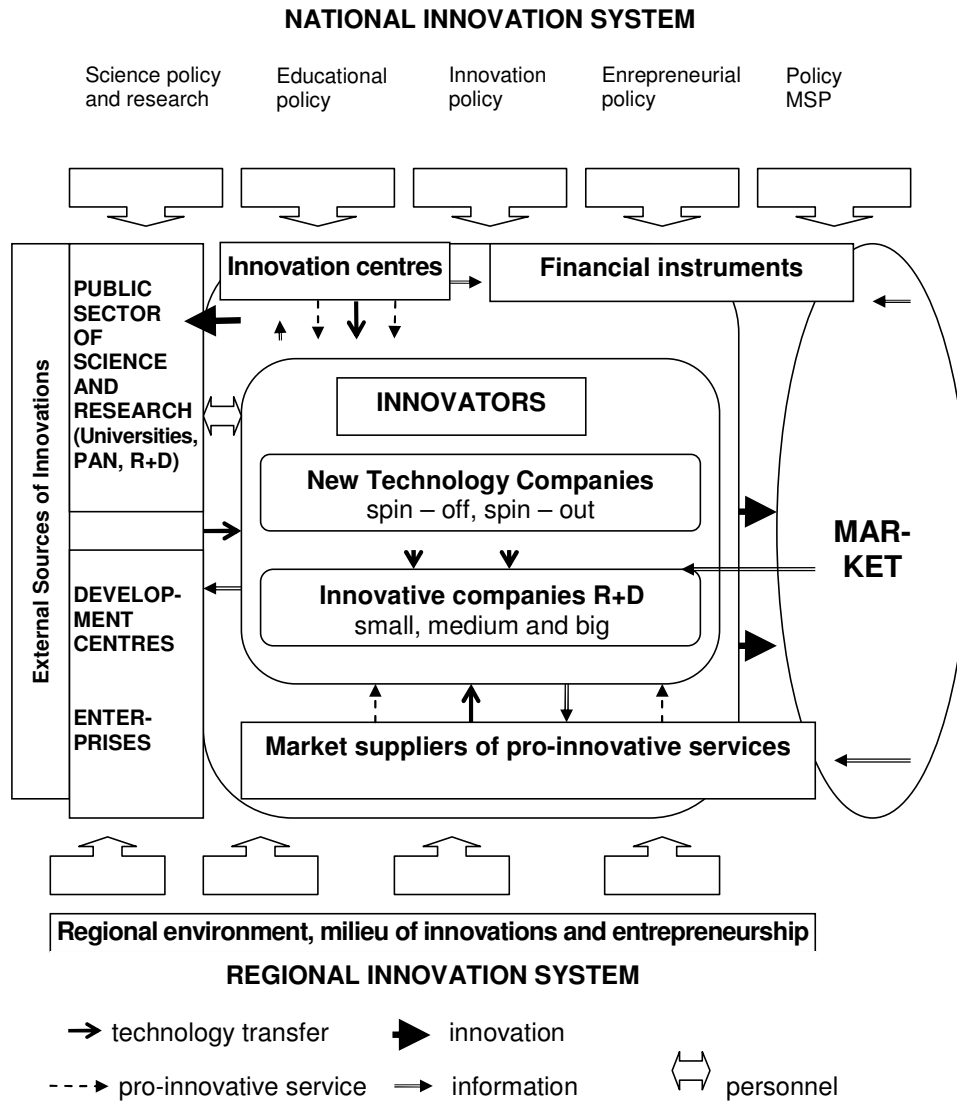
A competition that is becoming more and more intensified and often has global scope leads to increasing importance of knowledge-based economy, the important constituent element of which is innovation system. It comprises broadly defined innovativeness of enterprises, research centers, universities, consultants, other pro-innovative organisations, as well as innovation policy that makes it possible to tap into growing global knowledge resources and next to assimilate them and adapt to local needs. Thanks to it new technologies can be devised. Nobody undermines the importance of the growth (or even of growth imperative) of innovativeness of Polish economy.

«Terminology of innovations» is almost ubiquitous and has become one of these words that are used in many spheres of economic and social life. It seems that much more difficult than accepting a need for growth is to stimulate to search for effective methods and instruments by means of which it will be possible to actuate innovations. A fact that our country falls behind not only European leaders but also European Union average results proves a need for making use of active methods of creating and supporting innovations on the national, regional and local level. An effective and modern innovation policy is of great importance for building innovation system that constitutes a part of knowledge-based economy (Figure 2).

Although an effort is put into building efficient innovation system in the state, Poland still falls behind countries possessing innovative economies that offer high – technology products or services. In European Union ranking Poland is placed on 24th position and is ranked among group of countries that are described as modest innovators. It is presented on Figure 3.

In comparison with 2008 and 2009 results position of Poland deteriorated, because it shift from group of moderate innovators to group of modest innovators that is the one, the position of which is the lowest in the ranking. Table 1 presents collected indicators that are used to assess innovation system in Poland that is compared to European Union leader (Sweden), European leader (Switzerland) and average UE-27 performance.

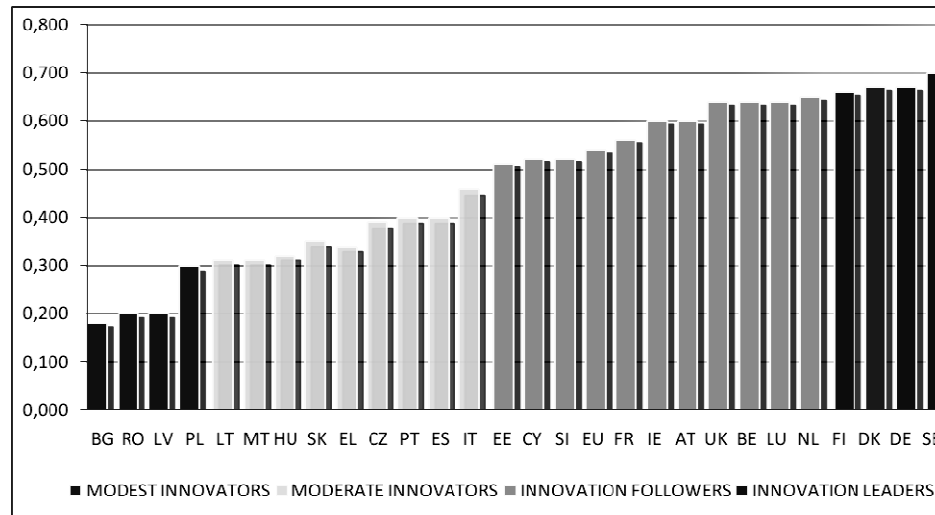
Figure 2
Structure of national innovation system



Source: (Edquist, 2005) cited from: (Europa 2020).

Figure 3

EU Member States' innovation performance



Average performance is measured using a composite indicator building on data for 24 indicators going from a lowest possible performance of 0 to a maximum possible performance of 1. Average performance reflects performance in 2010/2011 due to a lag in data availability. The performance of Innovation leaders is 20% or more above that of the EU27; of Innovation followers it is less than 20% above but more than 10% below that of the EU27; of Moderate innovators it is less than 10% below but more than 50% below that of the EU27; and for Modest innovators it is below 50% that of the EU27

Source: (Freeman, 1987)

Table 1

Indicators and dimensions of assessment of Polish, Swedish, Swiss and UE-27 innovation system

	Innovation Union Scoreboard – indicators and dimensions	Poland	Switzerland	Sweden	EU - 27
ENABLERS					
Human Resources					
1.1.1	New doctorate graduates per 1000 population aged 25–34	0,50	3,10	2,90*	1,50
1.1.2	Percentage population aged 30–34 having completed tertiary education	36,90	44,00	47,50	34,60

	Innovation Union Scoreboard – indicators and dimensions	Poland	Switzerland	Sweden	EU - 27
1.1.3	Percentage youth aged 20–24 having attained at least upper secondary education	90,00	83,00	88,70	79,50
Open, excellent and attractive research systems					
1.2.1	International scientific co-publications per million population	213	1692	1604	300
1.2.2	Scientific publications among the top-10% most cited publications worldwide as % of total scientific publications of the country	3,52	15,84	12,28	10,90
1.2.3	Non-EU doctorate students as a % of all doctorate holders	1,91	31,56	19,99	20,02
Finance and support					
1.3.1	R&D expenditure in the public sector (% of GDP)	0,53	0,79	1,03	0,75
1.3.2	Venture capital (% of GDP)	0,051	0,094	0,156	0,094
FIRM ACTIVITIES					
Firm investments					
2.1.1	R&D expenditure in the business sector (% of GDP)	0,23	2,11	2,34	1,27
2.1.2	Non-R&D innovation expenditures (% of turnover)	1,02	1,16	0,64	0,56
Linkages & entrepreneurship					
2.2.1	SMEs innovating in-house (% of SMEs)	11,34	28,20	37,68	31,83
2.2.2	Innovative SMEs collaborating with others (% of SMEs)	4,15	9,40	17,47	11,69
2.2.3	Public-private co-publications per million population	5,30	179,90	147,00	52,80
Intellectual Assets					
2.3.1	PCT patent applications per billion GDP (in PPP€)	0,45	8,12	8,93	3,90
2.3.2	PCT patent applications in societal challenges per billion GDP (in PPP€)	0,12	2,30	2,01	0,96
2.3.3	Community trademarks per billion GDP (in PPP€)	3,16	12,98	7,81	5,86
2.3.4	Community designs per billion GDP (in PPP€)	4, 51	8,56	5,09	4,8

	Innovation Union Scoreboard – indicators and dimensions	Poland	Switzerland	Sweden	EU - 27
OUTPUTS					
Innovators					
3.1.1	SMEs introducing product or process innovations (% of SMEs)	14,36	57,00	47,38	38,44
3.1.2	SMEs introducing marketing or organizational innovations (% of SMEs)	19,95	–	42,15	40,30
3.1.3	High-growth innovative firms	–	–	–	–
Economic effects					
3.2.1	Employment in knowledge-intensive activities as % of total employment	9,30	20,00	17,40	13,60
3.2.2	Contribution of medium and high-tech products exports to the trade balance **	0,88	8,44	2,02	1,28
3.2.3	Knowledge-intensive services exports as % of total services exports	26,14	26,51	38,7	45,14
3.2.4	Sales of new-to-market and new-to-firm innovations as % of turnover	8,00	19,23	8,37	14,37
3.2.5	License and patent revenues from abroad as % of GDP	0,05	1,80	1,16	0,58

* Data for Sweden captures also non-PhD degrees leading to an award of an advanced research qualification. Source: (Innovation Union Scoreboard, 2013).

**The contribution to the trade balance is calculated as follows:

$$(X_{MHT} - M_{MHT}) - (X - M) \times [(X_{MHT} + M_{MHT}) / (X + M)]$$

where $(X_{MHT} - M_{MHT})$ is the observed trade balance for medium and high-tech products and $(X - M) \times [(X_{MHT} + M_{MHT}) / (X + M)]$ is the theoretical trade balance (where X denotes exports and M denotes imports of resp. MHT products and all products).

Source: (Freeman, 1987)

Not only must one feel anxious about the position of Poland in the ranking but also (and mainly) about the scale of differences between Poland and Sweden or Switzerland. While maintaining on so low level, the indicators should be interpreted as a threat of loss by Poland its international competitiveness. Hence, improvements of systems on national and regional level should be regarded as imperative.

3. Concept of smart specialization

The term «smart specialization» was coined in the period of functioning of European Group «Knowledge for Growth». The Group was called into being by European Commissioner for Science and Research Janez Potočnik in 2005. Smart specialization is a concept (and a tool at the same time) that is used to build new position of European Union countries and regions in knowledge-based economy (Innovation Union Scoreboard). The concept involves identifying of unique characteristics and assets of each country and region that aims at building competitive advantage and concentrating assets under the vision of achieving targets effectively. The concept is not a new one. It is innovative way of thinking about the future of European Union. In the context of dynamic changes in global distribution of economic potentials European Union search for new developmental impulses. In the light of fiasco of Lisbonian Strategy European Union infers from experiences connected with planning and functioning structural funds. In published handbook European Commission formulate recommendations that are a part of Smart Specialization Platform initiative. They relate to creating strategies of innovations in Regions. They should be based on «4 C» concept:

- choices – involves indicating few investments priorities that have entrepreneurial potential and promising fields of specialization,
- competitive advantage – involves building on current economic specializations of Region and mobilizing talents by means of associating of needs as well as potentials of R + D sector and business,
- critical mass – involves directing towards development of world class clusters and creation spaces for diverse inter-sectoral linkages that propels processes of diversification taking place under conditions of participating in supraregional networks on a larger scale,
- collaborative leadership – involves inclusiveness in pro-innovative processes not only science institutions, enterprises, public authorities, but also consumers, users of innovations.

In accordance with European Union guidelines each Region should prepare regional innovation strategy for Smart Specialization. The strategy should be based on SWOT analysis and includes systems of monitoring, self-evaluation, and verification. In recommendations of European Union innovation policy it is assumed that besides making use of scientific achievements it is also recommended that practical innovations (others than those technological) are supported and the advantage of global sources of knowledge and innovations is taken (Korenik, 2000).

4. Regional innovation ecosystem

4.1 Methodical foundations for creating regional innovation strategies-RIS 3 in Europe 2020 strategy

Smart specialization is expected to play a key role in creating and pursuing policies of innovative development of countries and regions. National and regional strategies of research and innovations, which are created with intent to implement the concept of smart specialization, should fulfill following criterions:

- they let concentrate support stemming from carried out policy and investments on key national/regional priorities, challenges and needs concerning development based on knowledge (including activities connected with ICT);
- they take an advantage of strong points and competitive advantages of given country/region as well as its potential to achieving excellence;
- they support technological and practical innovations, stimulate private investments;
- they encourage stakeholders in complete commitment and to innovate and experiment as well;
- they are evidence-based and include solid systems of monitoring and assessment (Matusiak and Guliński, 2010).

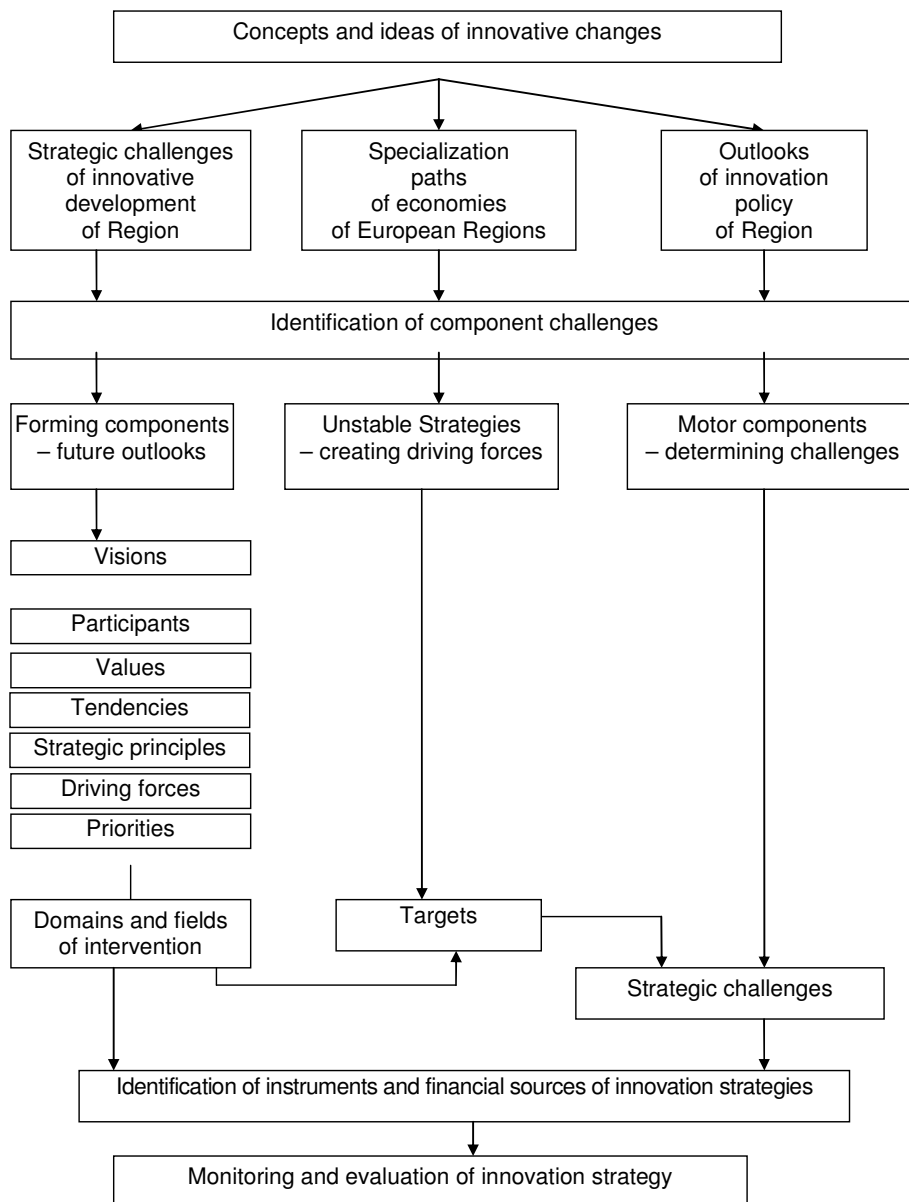
Recommendations that concern regional innovation strategies refer to all priorities included in Europe 2020 strategy. They also directly correspond with targets and instruments of European Union Cohesion Policy that is aimed at growth and creation of new work places in European Union countries and regions. There is a proposition in New Cohesion Policy that smart specialization could be a condition «ex ante». This means that making a strategy determines obtaining European Union financial support in the field of interest. It is also emphasized the importance of process of defining and choosing leading, smart specializations in innovation strategies. A quality and effectiveness of implementing of regional innovation strategies are determined by main actors and stakeholders.

4.2 Methods of building Regional Innovation Strategies

Methodical assumptions of projects of building regional innovation strategy are presented on Diagram 1 and Figure 4.

Diagram 1

Methods of building regional innovation strategy



Source: (Own).

As a result of study works components of identified strategic challenges became defined in a following way (Table 2).

Table 2

Strategic challenges of development of Region

Strategic Challenges	Component challenges
Risk management in financing of innovative activity	Financing of innovative activity
	Diversification, transfer and limitation of risk of financing innovative activity
	Absorption of financial instrument strengthening innovative capacity of enterprises
Stimulation of innovative potential of capital groups and industrial corporations	Innovative potential of big enterprises
	Scope and scale of innovative activities of big enterprises
	Scope and scale of cooperation of SME in networks of big enterprises and capital groups
	Participation in a network as a source of increasing innovative capacity of SME
Elimination of information asymmetries in regional innovation system – knowledge management in system of public support of innovation	Learning and flows of applicative knowledge in networks
	Development of competences of creation and implementation of innovation in enterprises and institutions
	Integration of knowledge and information about development of innovations in Region
Diffusion of innovations in sector of public services	Acceleration of technological change of rendering public services
	Acceptance of technologically advanced standards of public services
	Creation of demonstrative effects
	Networking of participants of process of innovative rendering public services
Development of infrastructure of knowledge-based economy	Creation of new infrastructural investments of knowledge-based economy
	Restructuring of using of existing infrastructure of knowledge-based economy
	Competences and cooperation of research groups
	System of pro – innovative education

Strategic Challenges	Component challenges
Creation smart markets for technology of the future	Innovative partnerships in milieu of entrepreneurship
	Smart distributive networks
	Digitalization of innovative networks and single digital market
	Gospodarka niskoemisyjna Low-emission economy
Shaping of innovative culture	Innovative strategies of enterprises
	New business models
	New management models

Source: (Unia Europejska, 2012).

A detailed analysis of abovementioned strategic challenges of innovative development of Region was based on crossing methodology that involves analyzing influences among components of strategic challenges. It became a foundation on which identification of functions (these are functions of given components in formulating strategic challenges of development of innovative Region) was made as well as for a reduction of a number of components (in order to recognize ones that are the most important and have the most powerfully impact on dynamics of innovative changes in Region).

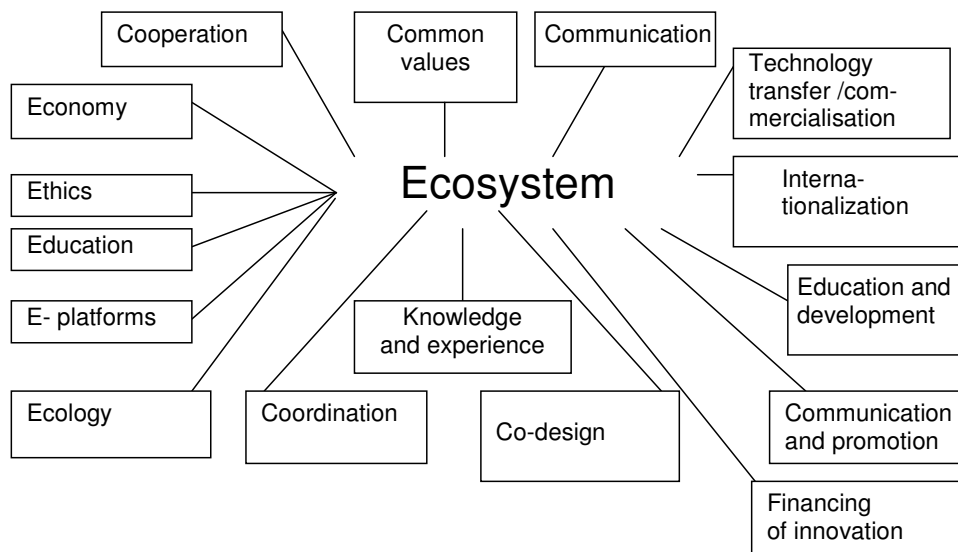
Revealing of dynamics of innovative changes that take place or could happen in the future was a basis for formulating the vision of innovative development of Region. An awareness of accessibility of global resources, limitation of the importance of possessing resources as well as their localization – all of them influence a perception of the role of actors in innovative development of business milieu as well as science and economic environment.

As a decisive factor determining development of economic entities or Regions can be considered an ability of achieving resources (and not necessarily their possession). Hence, it seems justified to transform regional innovation system in innovation ecosystem that is characterized by mutual processes shaping, generation of solutions naturally permeating themselves in thematic structures. In addition to this climate and conditions for creation of innovations are other characteristics of ecosystem. Foundation of ecosystem is built on relations and endogenous elements of Region, whereas external orientation of actors of innovative development tends to gain exogenously resources and as a result of this advantage in supraregional scale is built. Consequently, the vision of innovation ecosystem as a driving force based on dynamically changing innovative milieus (additionally the force should be able to ensure synergistic effects of market operating and innovation policy of Region) was created.

The innovation ecosystem category enters in European Union concept of creation so called strategies of innovation of third generation aimed at implementing of the idea of smart specialization.

Figure 4

Innovation ecosystem

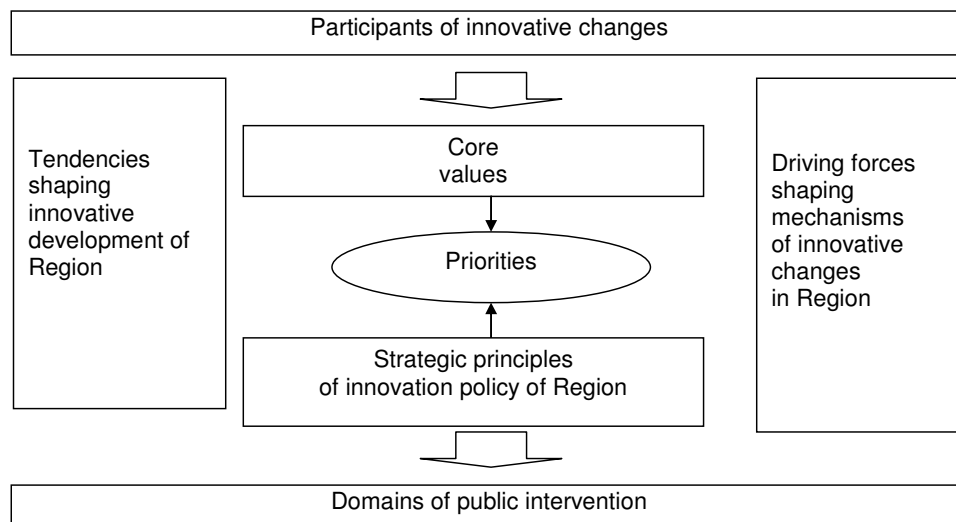


Source: (Own).

Establishing priorities for development of innovation ecosystem in Region was a core for a formulation of vision in a complete way. Two kinds of approaches were combined then – subjective approach (connected with identification of core values of main entities of innovative changes in Region) and objective approach (connected with tendencies and driving forces that shape innovative development of Region). While creating the vision, decisions concerning concepts of innovation policy of local authorities were made. Both strategic principles of policy and a choice of domains of public intervention for shaping innovative challenges are components of this policy (Figure 5).

Figure 5

Structure of the process of formulating the vision of ecosystem



Source: (Unia Europejska, 2012).

As a result of outlined above procedure leading to formulation the vision of innovative development of Region, a reference structure for setting targets of strategies was developed.

The identification and description of targets were made a next stage. For each of targets, by means of methods of workshops and as a result of consultancies with actors of innovative development, desirable strategic challenge was ascribed to. Given strategic challenges were aggregated because of strategy requirements to meta challenges that have horizontal character. This means that mutual linkages in processes of achieving strategic targets were taken into consideration. A final stage assumptions relating to monitoring and evaluation were formulated for all strategic structure. Needless to say, these assumptions are in accordance with national and regional system of monitoring of processes of regional development as well as assumptions that relate to financing of innovations.

Conclusions

A strategy for smart, sustainable and inclusive growth accepted by European Commission Union in 2010 defines frames for activities that when undertaken by EU members should shorten the time needed to recover from the crisis. In order to do it European Union needs smart and sustainable development based on effects caused by implementing of innovative solutions and entrepreneurship (Regionalne Strategie Innowacji Województwa Śląskiego na lata 2013–2020).

Method of creation of strategy of innovation ecosystem development that is presented in this paper is a trial to cope with requirements of building regional innovation strategies of third generation/ RIS3 as part of «Smart Specialisation Platform» initiatives that is recommended by European Commission (Regionalne Strategie Innowacji Województwa Śląskiego na lata 2013–2020).

Being capable of meet these requirements is acknowledged to be of special importance. This is because the requirements are point of departure to build strategy of regional development in the field of innovations. A number of outlined priorities are very limited due to experiences of ineffectiveness of agreeing on too many strategic targets and priorities. Transforming regional innovation system into ecosystem is the foundation of strategic thinking. Ecosystem is multilevel, multimodal and multilinked system that comprises elements and internal relations, simultaneously being open on new actors and new resources, searching for new solutions and domains that distinct Region building its competitive potential (Regionalne Strategie Innowacji Województwa Śląskiego na lata 2013–2020).

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