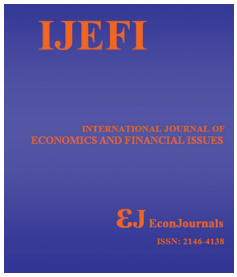

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Conceptual Model of Differentiated Social and Economic Policy of Smart Specialization of Regions

Daria Serogina[1], Hanna Bazetska[2]*

[1]Department of Economics of Municipal Enterprises, O.M. Beketov National University of Urban Economy in Kharkiv, Ukraine, [2]Department of Economics of Municipal Enterprises, O.M. Beketov National University of Urban Economy in Kharkiv, Ukraine. *Email: bazana1721@gmail.com

ABSTRACT

In this article the methodical foundations for the construction of a regional innovation strategy and the vectors for the formation of a new policy are presented. The necessity of conducting a regionally differentiated innovation policy based on the principles of Smart Specialization is substantiated; the assessment of Ukraine's preparedness for the practical implementation of the Smart Specialization concept is given. The authors consider the prerequisites for the application of the Smart Specialization concept in the European Union and Ukraine; they also evaluate and formulate the advantages of applying the Smart Specialization strategy. When using the concept of Smart Specialization, the strategic directions are: Creation and development of creative regions; development of a network of technologically advanced public services; assistance in the development of the infrastructure of the innovation ecosystem; encouraging small and medium-sized enterprises to participate in the global structure of value creation. We think that the application of the policy of the Smart Specialization of the regions will allow us to launch the process of improvement and transformation of national and regional innovative strategies that provide a strategic framework for innovative transformation of the regional economy and determine the main investment priorities.

Keywords: Smart Specialization, Regional Development, Innovation Policy, Economic Growth, Cluster Policy
JEL Classifications: O33, O38, R11, R58

1. INTRODUCTION

In developing countries, the policy of social and economic development is based on the existing sectoral structure, without taking into account the competitive advantages that are newly formed. Regional development programs in such countries, including Ukraine, consider innovation in its traditional embodiment, while in the European Union (EU) countries clusters in the field of nanoindustry are gaining popularity.

The reason for the inertial policy of this kind is the lack of an instrument for detecting protoclusters, as well as the lack of an integrated system that allows us to assess the prospects for the development of industries and regions. In addition, existing mechanisms for economic development, such as special economic zones, are not able to provide for resource, geographic and environmental characteristics of regions, and they do not take into account existing productions and territorial infrastructure.

In the context of modern challenges, the key challenge for socio-economic regional development is the identification of new benefits that include the use of knowledge, intellectual capital and the ability of state structures to create an innovative development model. At the same time, the basic condition for intensive development is technological and sectoral specialization.

Taking into account international competition, the second condition for accelerated development is the availability of territorial and other infrastructures that facilitate the tasks of cooperation for solving the set tasks. Examples of successful application of this approach include promotion of the brand of Italy as a world design center, cooperation of Japanese firms for scientific research, centers for implementing educational programs, functioning in a number of clusters in the US and Europe.

Qualitative legislation is also significant, as well as a territorial attraction for people with leadership abilities and investors who have the opportunity to support their ideas.

The strategy of the European social market economy of the EU "Europe 2020" (European Commission, 2013) encourages the development of Smart Specialization strategies. This strategy is aimed at solving structural problems through achieving smart economic growth based on knowledge and innovation, sustainable economic growth based on a resource-efficient, environmentally and competitive economy, as well as inclusive economic growth through increased employment of socio-economic and territorial integration.

Intellectual specialization strategies can use numerous new growth opportunities for all regions. Taking into consideration the already existing level of development of globalization and technology, this approach to regional development is more of a necessity than something new and progressive.

In order to achieve the goal set in the study, the authors considered the prerequisites for the transition of the EU countries and Ukraine to the implementation of the smart specialization strategy, the diagnosis of the preparedness of the regions of Ukraine for the implementation of this strategy is performed, as well as theoretical studies on the adaptation possibilities of the Smart Specialization strategy and prospects for its application in the national economic system; advantages of applying the Smart Specialization strategy in the light of the critical necessity of Ukraine's transition to an innovative development path are set up.

According to the results of the conducted research, it is established that the application of the conceptual model of differentiated social and economic policy of Smart Specialization of regions will increase the efficiency of the economy, set the vector of interregional and international interaction in order to increase the investment attractiveness of the regions.

The reliability of the results of the research carried out in the work is ensured by the use of tools for the generalization and processing of official statistics, expert reports, author's observations and calculations. The validity of the results obtained is due to the correctness of the use of the research and analytical apparatus, which has been tested in scientific practice, and also by comparing the results of the work and the data of international experience. Evidence of analytical conclusions served as the basis for the proposed recommendations.

The theoretical significance of the work lies in the development of theoretical approaches and provisions for the improvement and transformation of regional innovation strategies of Smart Specialization.

2. DIRECTIONS OF THE REGIONAL INNOVATION POLICY OF THE EU

The state, like any political community, strives to pursue a policy of supporting weak regions to ensure social order, legitimacy and integrity, and to preserve and ensure a single political, social and economic space (Barnes and Barnes, 1995).

In practice, two main mechanisms for implementing regional development policies can be identified: regulation and redistribution (Braun and Giraud, 2003).

European integration, within the framework of which the process of socio-economic and territorial cooperation of the countries of the EU is taking place, is provided through the use of instruments for implementing the EU's regional policy, which involves the use of structural mechanisms and the formation of goals for reforming their economic structures.

Achieving the growth of the world economy at present is possible mainly due to the innovative development. The introduction of innovative technologies contributes to the formation of competitive economies of countries in different regions and the overall world economic progress. Until 2020, the EU must solve the task of implementing an innovative strategy for the development and transformation of the economy. The introduction and implementation of EU innovation policy at the local, regional and supranational levels is carried out in a comprehensive manner, integrating the principles of innovation development in all its member countries. The tasks set for 2020 can be achieved through the effective implementation of the eighth "Horizon 2020" program which was launched in 2014 (European Commission, 2014). Based on the results of this program, the EU will be able to enter a new level of managing the innovative development of national economies.

The most effective mechanism for intensifying the creation and introduction of innovative technologies is the formation of so-called innovation ecosystems (Crescenzi and Rodriguez-Pose, 2011), the existence of which implies the formation of territorial innovation systems, the operation of which is governed by regional policies aimed at identifying and supporting the most promising, in terms of their potential, territories.

The study of the issues of increasing the potential of the territories is based on the concepts of implicit knowledge and "knowledge spillover" that is identified with positive external effects from the innovative activity for any agent (Romer, 1986)

Among modern researchers of problems of innovative development of regions there is a lively discussion about the level of studying innovative processes. Consideration is given to problems at the national, regional or enterprise levels (Boschma, 2005; Brenner and Broekel, 2011).

However, today's realities show that the process of creating, implementing and disseminating innovative technologies is localized at the regional and local levels. In addition, venture investments, the implementation of which is not limited to a certain territory, are mainly accumulated at the regional level. Agglomeration and localization effects that ensure the achievement of positive effects in innovation activity also operate at the regional and local levels (Asheim and Isaksen, 1997). And agglomeration

effects provide savings as a result of differentiation of economic activity and its concentration in large cities, and localization effects are associated with the specialization of the economy of the regions. However, both of these effects are inextricably linked with the creation, exchange and knowledge spillover.

Since the end of the twentieth century (Buyst, 2012), the traditional regional development policy based on growth theories has been criticized on the basis of emerging issues when using the old paradigm regarding the basic goals of its development. In fact, not only encouraging increased investment for developing lagging regions (Bachtler and Yuill, 2001), but also creating an infrastructure for economic development and the subsequent creation of jobs have a great impact on potential investors. In addition, the lack of coherence between regional and sectoral policies, as well as the standardization of traditional territorial policies (Tödtling and Trippl, 2005) adversely affected the effectiveness of the applied regional innovation policy. Particularly decision-making from the top down, which means, as a rule, ignoring mixed, integrated or upward approaches, was criticized (Barca et al., 2012).

The development strategies of the EU regions have traditionally consisted mainly of policies neutral with regard to sectors of the economy and sectors, using horizontal measures, and have been aimed at improving the overall framework opportunities and conditions, especially for innovative development (developed institutions, human capital, protection intellectual property rights, relevant research and IT infrastructure, ensuring competition and publicity, etc.). But in recent years, a key strategy in the area of territorial development, taking into account the targets for rallying the EU countries, is a new strategy that, while keeping emphasis on horizontal events, adds vertical logic to the so-called Smart Specialization (Foray et al., 2009).

At the present stage, the policy of innovation development in the EU countries is based on the delegation of differentiated powers to the regions (McCann and Ortega-Argiles, 2013, Uyarra and Flanagan, 2010) by applying the concept of smart specialization (Camagni and Capello, 2013, McCann and Ortega-Argiles, 2013). This approach is based on the development and implementation of regional innovation development strategies that determine the priorities of regional growth based on competitive advantages and the business expectations of its strengths in science and technology.

The support measures and the set of competencies are territorially differentiated, which makes it possible to respond quickly to market development trends while avoiding duplication of efforts (European Commission, 2014). Austria, Belgium, Germany, Britain, Spain and Italy (Cooke and Memedovic, 2003) have experience in the development of regional innovation strategies.

3. SMART SPECIALIZATION AT REGIONAL LEVEL

A fundamental aspect of the concept of smart specialization is that by concentrating knowledge resources and linking them with a limited number of priority economic activities, countries and regions can become more competitive in the world economy (Jucevicius and Galbuogiene, 2014).

The development process of Smart Specialization includes the identification and selection of targeted areas of economic activity and technologies that will in future contribute to innovative regional development (Foray and Goenaga, 2013). At the same time, great importance is attached to involving regional and local government bodies, as well as non-governmental organizations, in the process of selecting target support facilities, as well as providing private-state coordination of the implementation of the developed strategy, monitoring and evaluation of its effectiveness (Martinez and Palazuelos-martinez, 2014).

Different territories face different problems, while possessing unique opportunities that are taken into account when implementing the Smart Specialization strategy (Midtkandal and Sorvik, 2012). The main idea is to formulate a regional development strategy taking into account the advantages and potential of a particular territory. Existing strategies can become basic, however, only if they are developed specifically for the selected region, and it is possible to prove empirically their adequacy (Foray et al., 2012).

The main component of the Smart Specialization concept, distinguishing it from traditional innovations and sectoral policies, focusing of this concept on the self-discovery of the entrepreneurial process through which the entrepreneur is able to implement local innovations that do not yet exist in other regions and can be produced on more favorable terms (Rodrik, 2004).

Targeted events should be the result of the process of entrepreneurial self-knowledge (Foray et al., 2009; Hausmann and Rodrik, 2003), a decision-making process where entrepreneurs open new target-oriented modern sectors for themselves. The adoption of Smart Specialization implies the rejection of an old-fashioned industrial policy based on a top-down approach - imposing development strategies for economic development regions applicable to the regions that are leaders. This approach also differs from the concept of innovative regional development, the lack of which is the lack of a single conceptual framework and empirical validation (Doloreux and Parto, 2004).

Smart Specialization is rather a mechanism for creating new opportunities with ancillary state support for real entrepreneurial initiatives, taking into account their needs for establishing links and achieving synergies in the interaction of all stakeholders. These links include, in addition to standard business networks, links to the scientific community and universities that are characteristic of the triple-helix model between university, industry and government (Etzkowitz, 2002).

The concept of smart specialization does not mean exclusively supporting the existing strengths of the region, but it is rather based on the search for new opportunities for their development. Each region can find new areas of development based on local knowledge, by diversifying existing specialization and finding synergies and links between them (Gulc, 2015).

Regions react differently to investments in innovations - investments in innovative regions are more effective. Thus, regions should have a smart specialization - to identify sectors, technological areas or their main competitive advantages, and then focus their regional policies on promoting innovations in these areas (Naldi et al., 2015).

At the same time, state intervention plays an important role. However, political intervention is of a subsidiary nature, since it is not necessary to select areas or activities for investing public resources (Foray et al., 2009), but only to facilitate and support this discovery (for example, by providing incentives and eliminating regulatory restrictions). Governments should create an information environment and appropriate conditions for its operation, through which entrepreneurs and the government can effectively interact, learn about costs and opportunities, and participate in strategic coordination (Rodrik, 2004).

Advances in information and communication technologies, development of human capital, improvement of state institutions, effective interaction of industry and government stimulate the process of disclosing the information underlying the rationale for strategic policy. The Smart Specialization concept provides opportunities in this respect for national, regional and local administrations, including the use of information previously inaccessible to them (OECD, 2013; OECD, 2014).

Possible specialization strategies contain a lot of models and approaches with inherent risks, since the problem of selectivity remains unsolved, as well as the lack of an unambiguous answer to the questions what risks must be taken and how an effective policy of economic development can be developed and implemented. The success of specialization depends on how selected technologies and industrial areas interact with a variety of local labor, capital or other resources. Decisions at the state level should be taken in cooperation with research and scientific and technical firms and research organizations, so such mechanisms are much more applicable for developed countries with established co-evolutionary processes between different entities (Giannitsis, 2009).

The spread of understanding and practical implementation of the concept of Smart Specialization as a strategic approach is also carried out by independent institutions and international organizations, such as the United Nations Industrial Development Organization, the World Bank and OECD, in addition to the European Commission. However, the practice of its use indicates that the most effective is the combination of the Smart Specialization strategy with the policy of clustering the economies of the EU member states (Foray et al., 2012). Clusters create significant potential for the implementation of the Smart Specialization strategy through the provision and mobilization of local resources necessary to achieve the stated goals of regional development, and the use of which allows the territories to create greater value, while achieving a higher level of functioning and success in the global economy (European Commission, 2013).

In order to support the development of the Smart Specialization strategy, the European Commission has set up the S3Platform (European Commission, 2011), which aims to help the registered regions and states in the development, implementation and evaluation of regional smart specialization strategies and help regional representatives identify activities with high added cost, which provide the best chance of strengthening their competitiveness.

4. METHODOLOGY

Paying tribute to scientific and practical value to the work of scientists, the question of the methodology of regional specialization, solving the problems of fragmentation of funds and duplication of competencies by defining the framework for selecting priorities for the development of regions based on their comparative advantages, while reducing the risks of choosing the wrong priorities by delegating authority to the regions, acquires paramount importance. The study of the issues highlighted and the practical implementation of the results of their decisions will have a positive impact on the socio-economic development of the territories.

The purpose of the study is to develop a conceptual model of differentiated social and economic policies for smart specialization of the regions, which will help to improve and transform the national and regional innovation strategies of smart specialization, taking into account the realities of emerging economies, providing a strategic framework for innovative transformation of the regional economy and determining the main priorities for investment.

In the course of achieving the goal of the article, general scientific and special methods of cognition were used. The methods of economic-statistical analysis and data processing, system analysis, comparative, logical, analysis and synthesis, observations, analogies, methods of classification of information in various combinations were used in the work.

Within the framework of this article, a methodology for assessing the preparedness of the regions of Ukraine for the practical implementation of the Smart Specialization concept was developed. The proposed method consists of the following steps:

1. It is advisable to assess the preparedness of the regions of Ukraine for the practical implementation of the Smart Specialization concept according to the indices listed in Table 1, which is explained by the need to diagnose the scientific and innovative potential of the regions; availability of proposed indicators in statistical reporting; unidirectional indicators, that is, the higher is the value of the indicator, the higher the expected performance from the introduction of the Smart Specialization concept is. The latter will allow aggregating all indicators and determining the possibilities for practical implementation of the smart specialization concept at the regional level.
2. Analysis of the structure and dynamics of indicators of the scientific and innovation potential across the regions of Ukraine consists of several stages (Figure 1).
3. Determining the feasibility of practical implementation of the Smart Specialization concept at the regional level.

Primary data were normalized by the method of linear scaling, by means of which the indicators heterogeneous by their nature are reduced to a single scale (0, 1). At the next stage, the normalized indicators were aggregated into indices of scientific and innovative development, after which they were aggregated to calculation of the integral index of the regional potential. For the aggregation, the arithmetic mean was used.

The theoretical and methodological basis of the article includes fundamental and applied research of specialists in the field of formation and development of the innovative strategy of Smart Specialization, decisions and program documents on this subject.

5. ASSESSMENT OF UKRAINE'S PREPAREDNESS FOR THE PRACTICAL IMPLEMENTATION OF THE SMART SPECIALIZATION CONCEPT

Current trends in territorial development in the world are characterized by global synchronization, the convergence of various fields of science and technology, the transnationalization of the economy, the transition from individual to network type of development, the change of types of regional and urban development, the emergence of compact smart cities.

Table 1: Scorecard for assessing the feasibility of practical implementation of the smart specialization concept at the regional level

Indicator	Contents of the indicator
K_1	Number of innovatively active enterprises in the region
K_2	Specific weight of the number of innovatively active enterprises in the total number of industrial enterprises in the region
K_3	The volume of realized innovative products, which is new to the market
K_4	The volume of realized innovative products, which is new for the enterprise
K_5	Share of innovative products in the total volume of sold industrial products
K_6	The ratio of the volume of innovative products to the total volume of financing innovative activity
K_7	R & D costs
K_8	Share of R & D costs in total GRP
K_9	Number of innovative industrial processes implemented in industry
K_{10}	The ratio of the volume of innovative products to the number of innovative technological processes introduced in industry
K_{11}	Number of innovative products introduced in industry
K_{12}	The ratio of the volume of innovative products to the number of innovative products introduced in industry
K_{13}	Number of staff engaged in research and development
K_{14}	Proportion of personnel engaged in research and development in the number of employed in the economy
K_{15}	Number of researchers under 30-year old
K_{16}	The share of researchers under 30-year old in the total number of researchers
K_{17}	Number of patents
K_{18}	Number of patents for 100 employees in the scientific and technical sphere

SOURCE: Authors`own elaboration

The key conditions for the formation of the differentiated regional policy of Smart Specialization for its application in global and regional markets are the following: The transformation of the global value creation system, the ability to update the existing players in the world and national markets, the change in the configuration of such systems as energy, transport, information and communication. The most important task of implementing smart specialization is to modernize the education system and introduce new technologies and principles of training, which will allow changing the type of regional development.

The purpose of the strategy of regional specialization is to transform the sectoral structure of the region. The policy of Smart Specialization is aimed at the development of existing industries, modernization, diversification and the emergence of new industries, as well as the emergence of new forms of innovation, thanks to the positioning of the region in relation to key enabling Technologies, the definition of unique competencies.

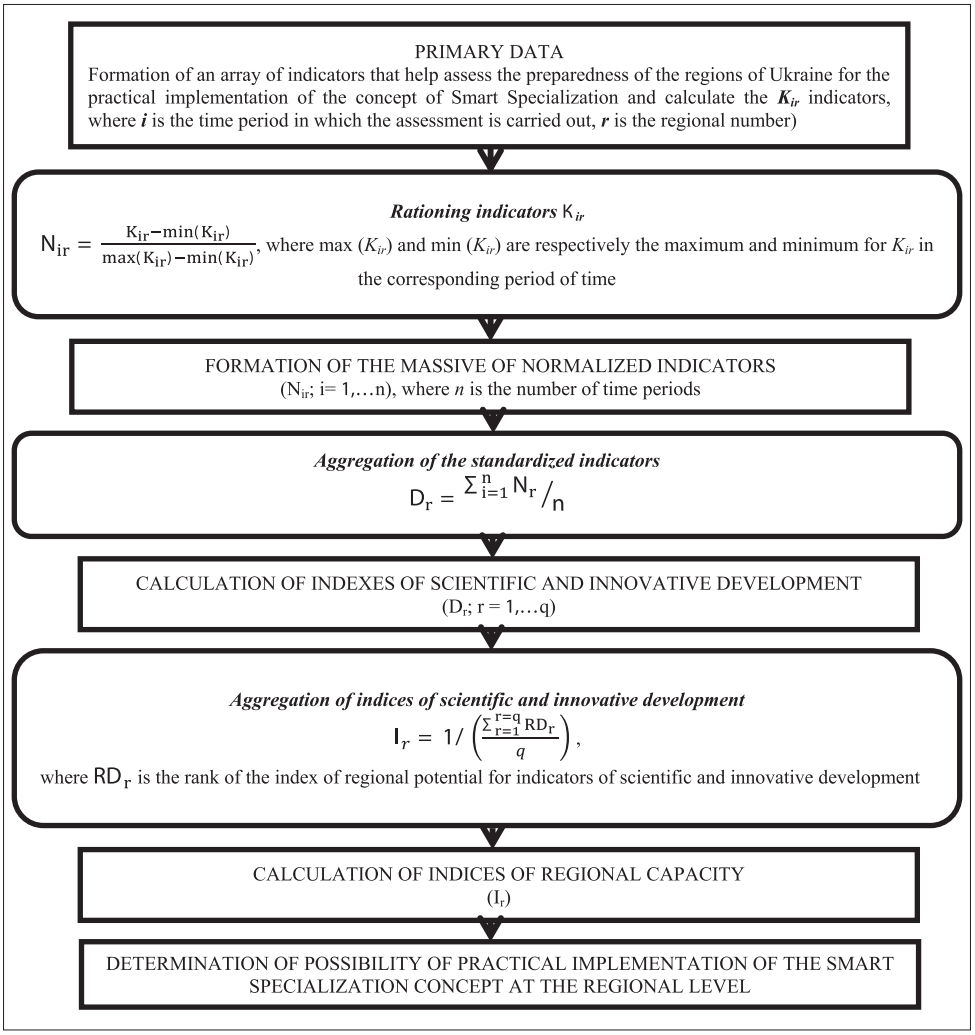
The speed of mastering new technologies is a fundamental factor for the implementation of the innovative smart specialization strategy. To change the trajectory of regional development, high resource costs are required, which is explained by the need to change the paradigm of an innovative-oriented territorial development policy, regardless of the opportunities and priorities of development, to the policy of differentiated Smart Specialization (Tödtling and Trippl, 2005), and, therefore, the implementation of targeted support regions with high innovative potential. The most effective is the use of the already available potential of regional development leaders.

Based on the production function of knowledge, the development of technology is directly influenced by the amount of R & D costs (Fritsch, 2002). According to the World Bank (The World Bank, 2014–2016), the share of total expenditure on R & D in GDP in Ukraine is much lower than in economically developed countries (Table 2).

The analysis of patent activity suggests that Ukraine has a significant potential for innovative development. At the same time, from the point of view of creating new knowledge, the effectiveness of human capital in the country is much lower than in advanced economies, which can be attributed to insufficient funding of the science and technology sector, as well as to a low level of competition in it.

The trend of recent years indicates a reduction in the proportion of employed in R & D in Ukraine, which is associated with the emergence of crisis phenomena in the economy. Reproduction of human capital requires the creation of jobs in knowledge-based and high-tech industries, supporting private initiatives at the global and regional levels. At the same time, priority is given to the increase in the innovative potential of the territories, both the recording of the

Figure 1: Algorithm for assessing the feasibility of implementing the concept of Smart Specialization



Source: Authors' own elaboration

Table 2: Countries technology base: Research and development expenditure, patent applications, scientific and technical journal articles

Country	Research and development expenditure (% of GDP) 2014	Patent applications, residents 2015	Patent applications, nonresidents 2015	Scientific and technical journal articles 2013
Korea, Rep.	4.29	167.275	46.419	58.844
Israel	4.11	1.285	5.623	11.300
Japan	3.58	258.839	59.882	103.377
Finland	3.17	1.289	127	10.157
Sweden	3.16	2.038	390	19.362
Denmark	3.08	1.462	270	12.482
Austria	2.99	2.205	236	12.031
Germany	2.87	47.384	19.509	101.074
Belgium	2.46	949	148	16.511
France	2.26	14.306	1.994	72.555
Singapore	2.19	1.469	9.345	10.659
China	2.05	968.252	133.612	401.435
Russian Federation	1.19	29.269	16.248	35.542
Poland	0.94	4.676	139	28.753
Ukraine	0.66	2.271	2.226	7.218

Source: According to the World Bank

achieved level of volumetric parameters and the dynamics of the economic and social development of the corresponding territory. This approach provides an opportunity to comprehensively assess not only the potential innovative opportunities of the region, but also the level of its economic development, estimated using static indicators such as gross regional product.

It should also be taken into account that the presence and proximity of research centers, fundamental and applied directions, allows using the regional pool of knowledge and human capital, and accelerates the exchange of knowledge between higher education institutions and companies, and thus has a positive impact on the efficiency of spending financial resources (Feldman and Florida, 1994; Jaffe, 1989).

Support for basic and applied research without a corresponding increase in corporate R & D, and vice versa, is not an effective measure. Regions, increasing the funding of scientific developments, R & D, receive significant advantages in the process of generating ideas for the definition of innovative regional policies.

It is necessary to take into account the positive experience of economically developed countries, where there is effective cooperation of the state, universities, scientific organizations, business and venture funds. To this end, the priority task for developing countries is the leveling of a number of negative factors, in the first place, such as the asymmetry of the economic sectors in terms of the level of technological development and innovation activity.

The development of an innovation policy is becoming fundamental, taking into account regional features, increasing interregional interaction as a result of technology transfer, expansion of activities of local companies and their inclusion in global value chains. Strengthening regional initiatives directly affects the process of accumulation of institutional changes, which will contribute to strengthening the links between regional innovation processes, cooperation of the subjects of production, innovation and scientific systems. Innovative development and introduction of innovative goods and services into the economies of countries and regions is determined, however, not so much by the availability of innovations themselves as by the willingness of the territories to introduce these goods and services.

In order to determine the possibilities of practical implementation of the smart specialization concept in Ukraine at the regional level, the method proposed in the work was applied. The final values of the indices of scientific and innovative development, the regional potential index, and also their rank values are presented in Table 3.

The data of the table indicate that the leading places in the ratings for the indicators under consideration are such regions as: c. Kyiv, Kharkiv, Dnipro, Zaporizhzhia, Lviv, Poltava, Sumy, Donetsk, Luhansk, Ivano-Frankivsk, Kherson, Mykolaiv, Kropyvnytskyi, Cherkasy, Ternopil, Khmelnytskyi, Odesa, Volhynia, Zhytomyr. These regions represent the first five places among all the regions of Ukraine according to the presented eighteen indicators, however their grouping and consistency differ.

So, c. Kyiv is the leader in the volume of realized innovative products, which is new for the market, but not for the enterprises of this region. This region is also ahead of others in terms of the number of personnel engaged in research and development, and the share of such personnel in the total number of employed in the economy in c. Kyiv is the highest in Ukraine. The c. Kyiv is also leading in terms of the number of innovative technological processes in industry, as well as in the number of patents and the number of researchers up to 30-year old. This situation proves that having the highest volumes of innovative products, technologies, patents and young researchers that have been implemented, which ensure the greatest volume of realization of innovative products, c. Kyiv does not develop R & D through financing, nor does it seek leadership in ensuring a high share of innovative products in the total volume of industrial sales.

Next on the number of occupied first places in the ranking are Kharkiv, Poltava and Zaporizhzhia. These regions are actively developing innovative activities, since they have a significant number of innovative active enterprises, a high share of innovative products in the total volume of sales of industrial products and a high volume of innovative products that are new to enterprises. However, for such important indicators as the number of patents and the number of researchers up to 30-year-old, characterizing the innovative potential of the region, only Kharkiv ranks in the top five.

An important aspect of regional innovation management is the level of investment in R & D. The data of the table indicate that only Kharkiv is in the top five and, consequently, effectively uses the material means available to the region. However, the analysis of the rating for the indicator. "The share of R & D costs in the total GRP" (D_8) indicates that this item of expenditure is far from dominating the budgetary expenditures for the science in this region. The same applies to the other four leading regions in terms of "R & D expenditures" (D_7).

Thus, the situation that has developed in the regions of Ukraine can be characterized as follows. Regions that have high innovative potential do not have a high level of funding for scientific and innovative activities, they pay little attention to the education and stimulation of young scientists and do not provide the appropriate number of personnel engaged in research and development. The rest of the regions do not even seek to increase innovation activity, not being able to produce products that can compete in world markets.

Figure 2 shows a diagram of the distribution of calculated regional capacity indices.

The paper proposed a methodology for determining the feasibility of implementing the concept of Smart Specialization at the regional level based on calculation of regional capacity indices. As the visual data in Figure 2 show, the regions with the most opportunities for the implementation of the Smart Specialization concept are Kharkiv, Dnipro, Sumy, c. Kyiv, Zaporizhzhia, Donetsk, Ivano-Frankovsk, Odesa, Poltava, Lviv. That is, these figures confirm the trends we identified in the development of innovation in these regions. Therefore, despite some difficulties in organizing and managing scientific research, training young specialists and financing R & D, the leader regions identified by us earlier have the opportunity to implement the concept of Smart Specialization at their own level.

Table 3 Calculation of indices of scientific and innovative development and regional capacity index

Regions	Vinnytsia	Volhynia	Dnipro	Donetsk	Zhytomyr	Zakarpattia	Zaporizhzhia	Ivano-Frankivsk	Kyiv	Kirovograd	Luhansk
$D_1^{2010-2016}$	0.18	0.04	0.43	0.17	0.21	0.02	0.47	0.39	0.26	0.15	0.05
$RD_1^{2010-2016}$	12	24	5	15	11	25	4	6	9	16	23
$D_2^{2010-2016}$	0.58	0.24	0.30	0.21	0.47	0.06	0.60	0.64	0.20	0.46	0.23
$RD_2^{2010-2016}$	6	20	19	22	10	25	4	3	23	11	21
$D_3^{2010-2016}$	0.03	0.03	0.13	0.23	0.02	0.14	0.33	0.23	0.16	0.05	0.25
$RD_3^{2010-2016}$	17	18	13	8	22	12	5	7	10	16	6
$D_4^{2010-2016}$	0.05	0.04	0.32	0.47	0.09	0.13	0.29	0.06	0.07	0.07	0.13
$RD_4^{2010-2016}$	17	20	3	2	12	9	4	15	13	14	10
$D_5^{2010-2016}$	0.10	0.22	0.03	0.17	0.22	0.85	0.20	0.28	0.10	0.23	0.25
$RD_5^{2010-2016}$	20	12	24	16	11	1	13	6	21	10	8
$D_6^{2010-2016}$	0.02	0.06	0.02	0.08	0.15	0.66	0.13	0.08	0.10	0.06	0.20
$RD_6^{2010-2016}$	21	18	24	14	6	1	8	13	12	16	5
$D_7^{2010-2016}$	0.20	0.06	0.70	0.35	0.11	0.01	0.19	0.22	0.06	0.07	0.04
$RD_7^{2010-2016}$	8	17	1	3	12	25	10	6	16	15	18
$D_8^{2010-2016}$	0.44	0.20	0.33	0.23	0.19	0.02	0.19	0.36	0.04	0.21	0.10
$RD_8^{2010-2016}$	2	11	6	8	12	24	13	4	22	10	16
$D_9^{2010-2016}$	0.05	0.02	0.14	0.04	0.05	0.001	0.39	0.06	0.06	0.04	0.03
$RD_9^{2010-2016}$	11	22	6	16	13	25	3	10	9	17	21
$D_{10}^{2010-2016}$	0.03	0.06	0.09	0.37	0.05	0.59	0.04	0.10	0.08	0.07	0.23
$RD_{10}^{2010-2016}$	19	12	6	3	15	2	17	5	8	10	4
$D_{11}^{2010-2016}$	0.12	0.03	0.26	0.16	0.02	0.00	0.82	0.24	0.18	0.08	0.01
$RD_{11}^{2010-2016}$	16	21	7	12	22	25	2	8	10	18	23
$D_{12}^{2010-2016}$	0.04	0.21	0.11	0.25	0.21	0.72	0.05	0.04	0.06	0.08	0.43
$RD_{12}^{2010-2016}$	21	6	7	4	5	2	17	20	16	11	3
$D_{13}^{2010-2016}$	0.01	0.003	0.21	0.06	0.00	0.01	0.06	0.01	0.05	0.01	0.01
$RD_{13}^{2010-2016}$	15	22	3	6	21	17	7	16	8	20	19
$D_{14}^{2010-2016}$	0.02	0.01	0.19	0.08	0.01	0.03	0.10	0.03	0.08	0.03	0.03
$RD_{14}^{2010-2016}$	20	21	3	9	23	18	6	16	8	17	19
$D_{15}^{2010-2016}$	0.01	0.005	0.27	0.09	0.003	0.01	0.05	0.01	0.05	0.02	0.01
$RD_{15}^{2010-2016}$	18	21	3	5	24	16	8	17	7	14	19
$D_{16}^{2010-2016}$	0.21	0.57	0.60	0.44	0.19	0.35	0.24	0.39	0.28	0.90	0.39
$RD_{16}^{2010-2016}$	20	4	3	9	23	12	17	11	16	1	10
$D_{17}^{2010-2016}$	0.04	0.01	0.36	0.12	0.03	0.06	0.07	0.04	0.08	0.01	0.03
$RD_{17}^{2010-2016}$	12	22	3	6	14	9	8	11	7	24	13
$D_{18}^{2010-2016}$	0.42	0.22	0.21	0.33	0.71	0.65	0.11	0.51	0.20	0.11	0.50
$RD_{18}^{2010-2016}$	7	12	13	8	1	2	18	4	14	19	5
$I^{2010-2016}$	0.07	0.06	0.12	0.11	0.07	0.07	0.11	0.10	0.08	0.07	0.07

The concept of Smart Specialization assumes (Foray et al., 2009) that the developing regions and the countries in which they are located should initially adhere to an industrial policy that uses direct government intervention. Increasing the efficiency of these regions in a certain period of time is achieved through the use of administrative tools such as clusters, networks, technology platforms and Smart Specialization, which allows to achieve synergies due to the interaction of enterprises that innovate or introduce innovative development programs. However, the use of such tools is advisable if the country's economy is in the stage of post-industrial development, and the sectors that make it up have positive development tendencies, but at the moment their management is not efficient enough, which directly constrains the pace of development. In this case, it is necessary to create entrepreneurial universities in the regions (Etzkowitz, 2004), which will allow forming the core of regional innovation systems by intensifying the implementation of applied research projects that stimulate the activation of the entrepreneurial environment.

A key place in the system of achieving the goals of territorial development in Ukraine belongs to sectoral policy, whose goal is to increase the competitiveness of the regions, to ensure effective specialization of regions with priority use of their own resource potential.

In Ukraine, development institutions, innovative infrastructure, venture funds - engineering centers, technology transfer centers, etc. are actively created (Figure 3).

Taking into account the current conditions and priorities of territorial development in Ukraine, the concept of Smart Specialization in regional structural policy can be implemented by scaling and internal integration of regional innovation potential and creating markets for smart technologies of the future.

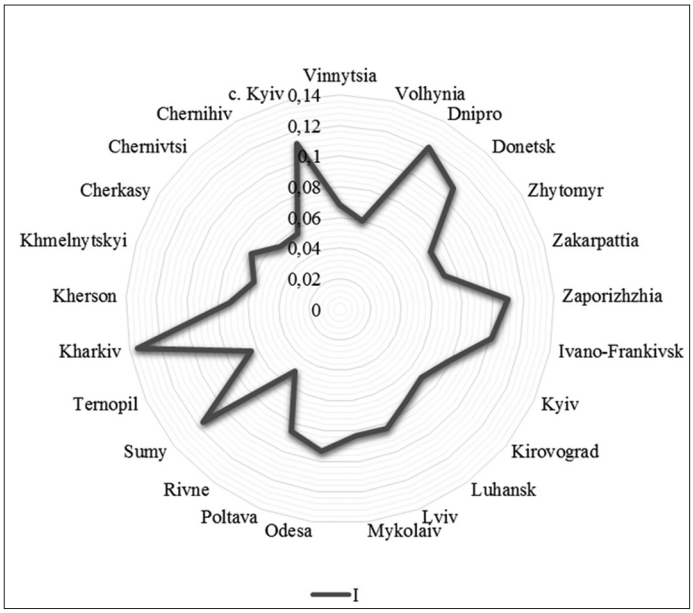
The first priority is connected with the establishment of interaction between representatives of science, economics and business services to obtain new high-tech products, by improving the infrastructure, strengthening endogenous links within the economic system of the region. The second priority is to change the business model and management of companies, which will enable them to participate in the chains of added value created on an interregional scale. An important component of this priority is the transformation towards the

Table 3 ***(Continued)***

Regions	Lviv	Mykolaiv	Odesa	Poltava	Rivne	Sumy	Ternopil	Kharkiv	Kherson	Khmelnytskyi	Cherkasy	Chernivtsi	Chernihiv	c. Kyiv
$D_1^{2010-2016}$	0.58	0.36	0.34	0.12	0.10	0.14	0.14	1.00	0.18	0.24	0.18	0.08	0.12	0.78
$RD_1^{2010-2016}$	3	7	8	19	21	18	17	1	14	10	13	22	20	2
$D_2^{2010-2016}$	0.42	0.46	0.45	0.17	0.37	0.56	0.57	0.90	0.46	0.58	0.52	0.32	0.31	0.86
$RD_2^{2010-2016}$	15	12	14	24	16	8	7	1	13	5	9	17	18	2
$D_3^{2010-2016}$	0.12	0.15	0.16	0.55	0.01	0.59	0.03	0.58	0.07	0.00	0.03	0.001	0.02	0.59
$RD_3^{2010-2016}$	14	11	9	4	23	2	20	3	15	25	19	24	21	1.00
$D_4^{2010-2016}$	0.10	0.03	0.06	0.91	0.01	0.15	0.03	0.24	0.05	0.03	0.14	0.01	0.05	0.22
$RD_4^{2010-2016}$	11	21	16	1	25	7	22	5	19	23	8	24	18	6
$D_5^{2010-2016}$	0.16	0.18	0.16	0.70	0.02	0.77	0.30	0.27	0.33	0.07	0.18	0.23	0.15	0.07
$RD_5^{2010-2016}$	17	15	18	3	25	2	5	7	4	23	14	9	19	22
$D_6^{2010-2016}$	0.06	0.01	0.11	0.61	0.12	0.14	0.21	0.06	0.07	0.02	0.39	0.06	0.11	0.02
$RD_6^{2010-2016}$	19	25	10	2	9	7	4	17	15	23	3	20	11	22
$D_7^{2010-2016}$	0.10	0.24	0.21	0.09	0.01	0.17	0.02	0.35	0.04	0.20	0.01	0.02	0.02	0.63
$RD_7^{2010-2016}$	13	5	7	14	24	11	21	4	19	9	23	22	20	2
$D_8^{2010-2016}$	0.10	0.52	0.22	0.09	0.02	0.42	0.06	0.25	0.16	0.35	0.02	0.10	0.08	0.13
$RD_8^{2010-2016}$	18	1	9	19	25	3	21	7	14	5	23	17	20	15
$D_9^{2010-2016}$	0.10	0.04	0.05	0.05	0.01	0.27	0.12	0.84	0.16	0.03	0.04	0.01	0.04	0.60
$RD_9^{2010-2016}$	8	19	12	14	23	4	7	1	5	20	18	24	15	2
$D_{10}^{2010-2016}$	0.04	0.08	0.07	0.79	0.03	0.06	0.02	0.02	0.03	0.03	0.08	0.04	0.06	0.03
$RD_{10}^{2010-2016}$	16	7	11	1	23	14	24	25	21	22	9	18	13	20
$D_{11}^{2010-2016}$	0.29	0.15	0.13	0.12	0.01	0.46	0.29	0.45	0.18	0.03	0.10	0.05	0.17	0.85
$RD_{11}^{2010-2016}$	5	13	14	15	24	3	6	4	9	20	17	19	11	1
$D_{12}^{2010-2016}$	0.04	0.07	0.07	0.74	0.08	0.09	0.01	0.09	0.03	0.08	0.09	0.02	0.03	0.04
$RD_{12}^{2010-2016}$	19	15	14	1	12	10	25	9	23	13	8	24	22	18
$D_{13}^{2010-2016}$	0.10	0.03	0.07	0.02	0.002	0.04	0.003	0.38	0.01	0.0003	0.02	0.01	0.01	1.00
$RD_{13}^{2010-2016}$	4	10	5	11	24	9	23	2	13	25	12	14	18	1
$D_{14}^{2010-2016}$	0.13	0.07	0.09	0.05	0.01	0.12	0.01	0.42	0.05	0.002	0.04	0.05	0.03	1.00
$RD_{14}^{2010-2016}$	4	10	7	12	24	5	22	2	13	25	14	11	15	1
$D_{15}^{2010-2016}$	0.10	0.02	0.07	0.02	0.00	0.04	0.00	0.35	0.02	0.002	0.01	0.02	0.01	1.00
$RD_{15}^{2010-2016}$	4	10	6	11	23	9	22	2	13	25	15	12	20	1
$D_{16}^{2010-2016}$	0.15	0.29	0.22	0.19	0.45	0.56	0.34	0.13	0.46	0.55	0.32	0.65	0.22	0.19
$RD_{16}^{2010-2016}$	24	15	19	22	8	5	13	25	7	6	14	2	18	21
$D_{17}^{2010-2016}$	0.14	0.05	0.16	0.02	0.01	0.03	0.01	0.48	0.02	0.01	0.01	0.01	0.01	1.00
$RD_{17}^{2010-2016}$	5	10	4	16	25	15	18	2	17	23	19	20	21	1
$D_{18}^{2010-2016}$	0.14	0.25	0.26	0.10	0.28	0.05	0.46	0.12	0.15	0.55	0.05	0.08	0.11	0.08
$RD_{18}^{2010-2016}$	16	11	10	21	9	24	6	17	15	3	25	22	20	23
$I^{2010-2016}$	0.08	0.08	0.09	0.09	0.05	0.12	0.06	0.13	0.07	0.06	0.07	0.06	0.06	0.11

Source: Calculated by authors according to state statistics service of Ukraine

Figure 2: Identification of regions with the highest opportunities for practical implementation of the smart specialization concept



Source: Authors`own elaboration

creation of intellectual markets. Priority is in the preparation of a social platform and institutional capacity and for functioning in the conditions of intellectual markets. Strategic directions are: creation of creative regions, development of a network of technologically advanced public services; promoting the development of the infrastructure of the innovation ecosystem in the region; encouraging small and medium-sized enterprises to participate in the global structure of value creation in terms of implementing innovative solutions.

Among the directions of reforms oriented to accelerated economic growth in Ukraine, a major component is the component of the political and public administration reforms, the search for a model that will restore confidence in political institutions, strengthen the authority of local government and civil society institutions, which, in turn, will allow for a more effective regional structural policy.

The priority task in the development of a new regional policy, taking into account the social and economic development priorities, is the use of a multi-level and multidimensional territorial model, subject to mutual responsibility, ensuring a decent standard of living, the state, business, science and civil society.

6. DEVELOPMENT OF THE MODEL OF DIFFERENTIATED SOCIAL AND ECONOMIC POLICY OF SMART SPECIALIZATION OF REGIONS

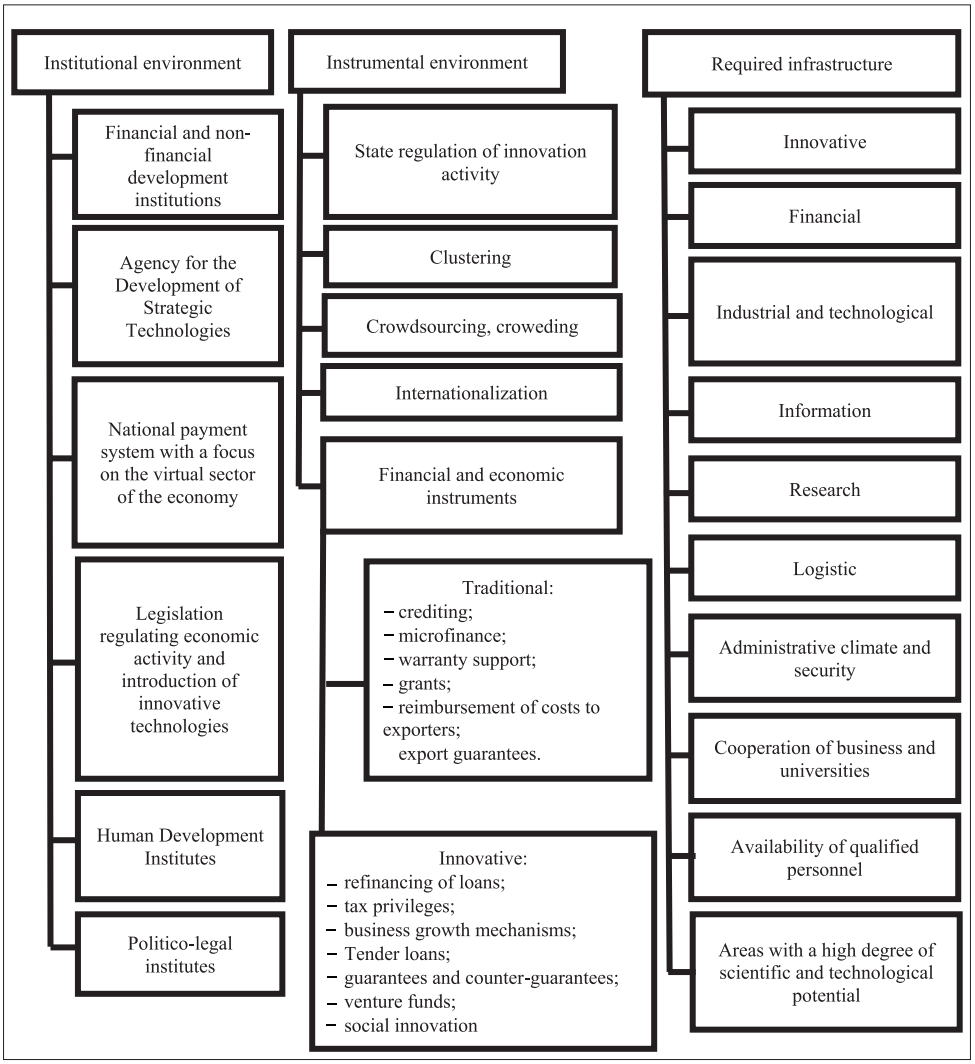
The shortcomings of the current state regional policy in Ukraine are the fragmentation of the planning systems for the social and economic development of the territories, the lack of a unified management system based on the use of a scientific approach, and clear mechanisms for coordinating development programs for administrative and territorial units, desynchronization of regional development strategies, and insufficient decentralization of financial resources, which affects the efficiency of the various areas. These shortcomings have a negative impact on the effectiveness of the functioning of regional authorities and the use of alignment policy instruments, which exacerbates territorial heterogeneity and reduces the effectiveness of the country's economy as a whole.

In order to ensure a comprehensive modernization of the socio-economic development of the regions, it is necessary to develop measures to strengthen the state regulation of the innovation economy, due to which we can expect an increase in the effectiveness of business entities. In addition, there is a positive effect from the introduction of modern methods of influence, both in general on the management system, and on individual socio-economic processes, which increases their quality. However, at the state level in Ukraine such tasks are difficult to solve, therefore, the solution of the problem may be the activation of interregional interaction and the activation of regional management of the implementation of smart specialization in various regions.

The process of improving the policy of territorial specialization involves solving a number of problems:

- Determination of the necessity and expediency of structural reorganization of the region's economy;
- Determination of the feasibility of state or interregional support for the regions of the country that are lagging behind in the development or are subsidized;
- Determination of the forms of mobilization and the principles of distribution of financial, labor, natural and other resources available in the state and regions;

Figure 3: Institutional and instrumental environment for creating territorial innovation systems in Ukraine



Source: Authors` own elaboration

- Ensuring effective regulation of scientific and technological achievements that allow not only to intensify production and provide resource saving, but also to create favorable conditions for the implementation of environmental protection programs;
- Ensuring the integration of production in regions with necessary capacities and resources;
- Ensuring the sustainability of interregional economic interaction;
- Ensuring the effective functioning of industrial, scientific and commercial regional systems, which will increase their financial stability and market maneuverability;
- Ensuring the stability of the single national economic space through the formation of stable inter-regional ties.

The first stage in the modernization of the region's innovation policy should be the development of a model of social and economic policy based on the principles of smart specialization, with a view to eliminating disparities in territorial development. The main elements of the conceptual model of the differentiated social and economic policies of the Smart Specialization of regions are reflected in Figure 4.

The presented model of the differentiated social and economic policy of smart specialization allows the regional government bodies, as well as domestic and foreign investors, to clearly identify the appropriate branches of specialization, basing their choice on the already accumulated competencies and assets available in this or that sphere. Smart Specialization, combining the potential of the industry and existing competencies, relevant technologies for the region, foresight and entrepreneurial activity of economic entities, allows analyzing the available resources for a combination of regions, intensifying interregional interaction in technology trade, and including local firms in global networks.

Currently, the most urgent task of regional management is the activation of structural changes in its economy. This task allows us to solve the use of the smart specialization policy, which is an incentive to introduce innovations in economic processes in all sectors of the economy. The advantage of the policy of smart specialization is that it does not use state intervention, and there is no direct state support for innovations in the sectors of the economy. However, state regulation of such activities provides for increased competition, stimulation of demand, development of science and education, and, as a result, strengthens the country's financial system.

An important direction in modernizing regional policy should be the creation and increase of the effectiveness of network interactions. It is necessary to introduce mechanisms of public-private partnership and implement cluster initiatives. A condition for co-financing innovative projects should be the participation of representatives of small businesses and science in the procurement of goods and services.

International cooperation plays an important role in the implementation of innovative projects. Ukraine has an advantageous innovation-geographical position due to the proximity of its individual economic regions to the European centers for the creation of new technologies. Actual for such regions is the strengthening of the role of international cooperation, attracting foreign investment, import of equipment and technologies, migration of highly qualified specialists through the creation of territories of preferential taxation for high-tech companies.

The main component of the Smart Specialization is internationalization, which involves not only export and foreign direct investment, but also the creation of strategic alliances, joint research and development, outsourcing, relocation and mergers and the acquisition of intellectual property rights. The study of the best practices of applying Smart Specialization is especially important for developing your own innovative strategy. At the same time, the experience of countries closer to socio-economic development and territorial structure will provide a better understanding of effective practices that can form the basis for the development of a regional innovation strategy based on Smart Specialization.

6. CONCLUSION

Taking into account the crisis processes in the world economy, it is advisable to change the paradigm of the territorial development policy, move from the universal creation of innovative infrastructure and allocation of financing to stimulating measures, taking into account the entrepreneurial climate, effective use of human capital and intensification of horizontal ties in the leading regions.

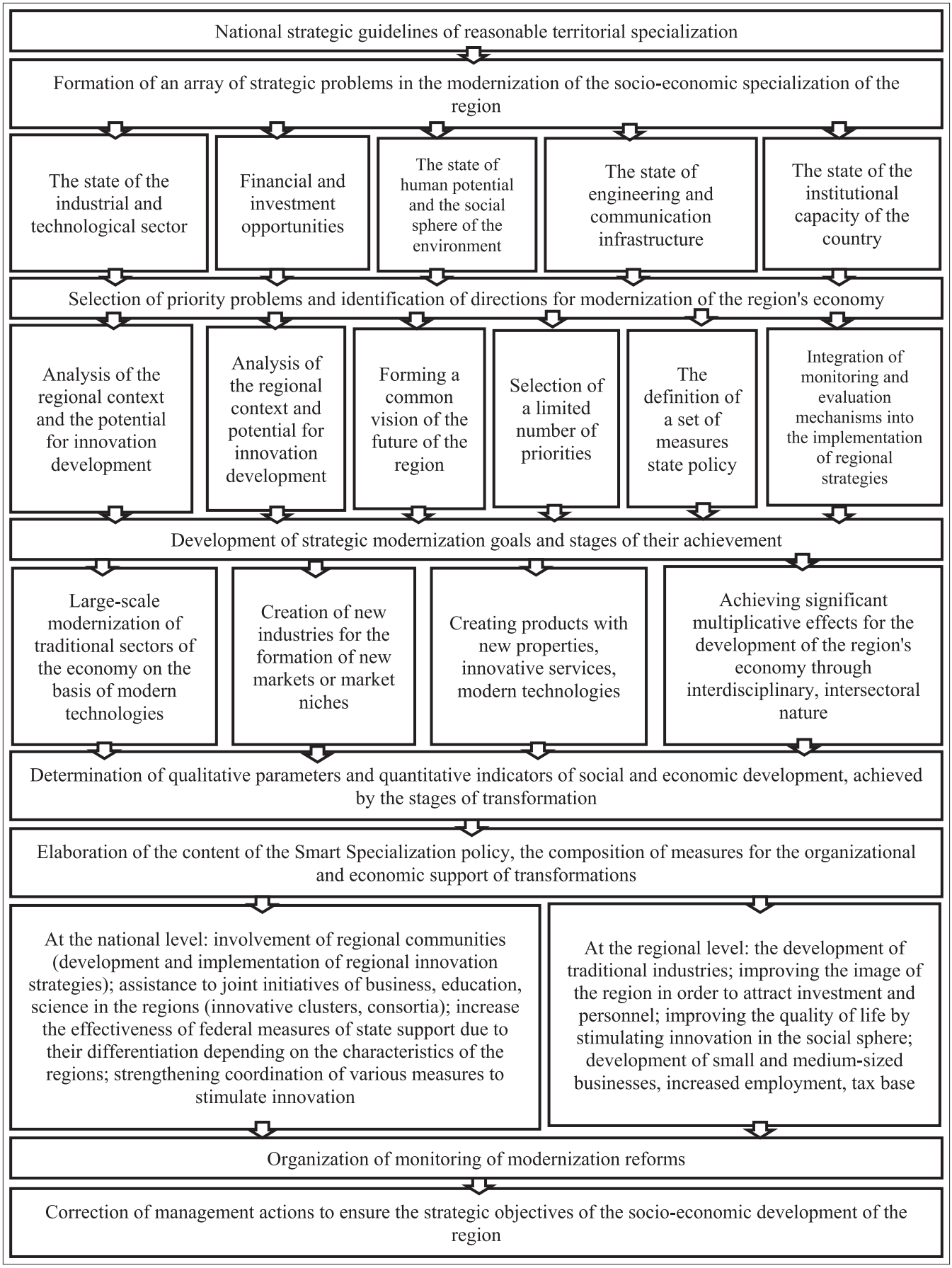
The priority task is to conduct a variable innovation policy of the regions which have different scientific and technological and sectoral specialization. The solution of this task is possible when carrying out targeted research coordinated with territorial administrations. Proceeding from this, the conceptual model of the differentiated social and economic policy of the Smart Specialization of regions proposed in this paper can be useful for the development of specific regions and the elimination of disparities in territorial development.

Using the Smart Specialization model, thanks to the application of unique competences and regional resources, taking into account the diverse paths of territorial development, on a national scale, it leads to differentiation of the strategic priorities of regional development, which in turn will lead to their diversification and, as a result, the emergence of new growth points and directions of stabilization of social and economic development.

Applying the principles of smart specialization is a unique opportunity for countries to improve their territorial development strategies, as well as to strengthen international, intersectoral and public-private partnerships.

The Smart Specialization concept plays an important role in improving Ukraine's regional development, since it helps identify unique assets and turn them into competitive advantages, create additional jobs. This approach also contributes to economic reforms, improves governance and improves the dialogue between

Figure 4: Conceptual model of differentiated social and economic policies smart specialization regions



Source: Authors` own elaboration

the private and public sectors. Cooperation between the EU and Ukraine in the field of research and innovation will promote the establishment of international relations, as well as expand cooperation in European research programs, in particular Horizon 2020.

For Ukraine, which is in the process of gradual decentralization, the use of the Smart Specialization principle in practice is problematic. In these circumstances, state and regional government bodies should act as initiators and active participants in the implementation of scientific and innovation policies based on Smart Specialization.

The use of the concept of Smart Specialization for the modernization of the Ukrainian economy must be correlated with the directions for possible clustering of the region, that is, when processing the relevant strategic priorities, it is necessary to take into account not only the possibilities for upgrading the clusters already existing in the region's economy (metallurgical, machine-building, food, recreational), but also the possibility of creating new ones in the process of implementing the strategy.

In the search for forms and methods of modernizing social and economic policy and accelerating the innovative development of the regions of Ukraine, further research will be aimed at studying the experience of European countries in developing Smart Specialization strategies, the possibilities of implementing this approach in the strategic management of regional development in Ukraine.

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