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Smart specialization: origin and state of the art

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Abstract

Purpose: is to identify state of the art, key aspects and distinctive characteristics of the smart specialization concept based on a study of the current state and the initial prerequisites for its formation, including linkages with other theoretical approaches.

Methods: theoretical provisions of regional and spatial economics, innovative development, and economic geography by Russian and foreign scientists were used for conducting the research. The methods of bibliometric, statistical and content analysis of literary sources constituted a methodological framework for the study. A systematization of publications for 2012–2021 was grounded on thematic samples from eLIBRARY.ru, Scopus and Web of Science databases. An analysis of text array content was conducted with the aim of further critical interpretation of the revealed patterns and identification of promising research directions.

Results: it was found, that despite the fact that the concept of the smart specialization was based on many previous theoretical approaches, it made a significant contribution to the new political vision of regional development. It is shown how the initially sectoral approach, through the use of the postulates of economic geography, was transformed into the territorial concept. The conducted bibliometric and content analyses of literary sources made it possible to identify the inherent characteristics of the concept, principles and tools for its implementation, as well as formulate the author's definition of the smart specialization approach.

Conclusions and Relevance: the importance of smart specialization consists of the following aspects. Firstly, substantiating the need for differentiated regional policy for various types of regional innovation systems. Secondly, scientific and practical substantiating the importance of the related diversification approach to regional development to stimulate structural changes that are significant for economic dynamics. Thirdly, focusing on interregional interaction to ensure complementarity of scientific and technological regional development.

Keywords: regional economic policy, "smart specialization", interregional interaction, strategic priorities, innovative and technological development, structural transformation

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Научная статья

Умная специализация: происхождение и современное состояние

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Аннотация

Цель настоящей работы состоит в выявлении ключевых аспектов и отличительных характеристик концепции «умной специализации» на основе исследования современного состояния и исходных предпосылок ее становления, а также связи с другими теоретическими направлениями.

Методы. При проведении исследования использовались теоретические положения региональной и пространственной экономики, инновационного развития и экономической географии известных российских и зарубежных ученых. В работе применены методы библиометрического, статистического и контент-анализа литературы. На основе выборки из наукометрических баз данных, Scopus, Web of Science и eLIBRARY.ru, систематизированы публикации, изданные за период с 2012 по 2021 гг., проведен анализ содержания текстовых массивов с целью последующей содержательной интерпретации выявленных закономерностей и определения перспективных направлений дальнейших исследований.

Результаты работы. Установлено, что концепция «умной специализации» внесла существенный вклад в новое политическое видение сбалансированного регионального развития, несмотря на то, что она основана на предшествующих научных направлениях. Показано как изначально отраслевой подход, посредством использования постулатов экономической географии, трансформировался в территориальную концепцию. Проведенный библиометрический и контент-анализ литературных источников позволили выявить неотъемлемые характеристики концепции, принципы и инструменты ее реализации, а также сформулировать авторское определение подхода умной специализации.

Выводы. Центральная идея «умной специализации» как исследовательского направления содержится в следующих аспектах: во-первых, в обосновании необходимости применения дифференцированной региональной политики для различных типов региональных систем; во-вторых, в научно-практическом обосновании целесообразности подхода «связанной» диверсификации к развитию регионов для стимулирования структурных сдвигов, значимых для формирования экономической динамики; в-третьих, в фокусировке на межрегиональном взаимодействии для обеспечения комплементарности научно-технологического регионального развития.

Ключевые слова: региональная экономическая политика, «умная специализация», межрегиональное сотрудничество, стратегические приоритеты, инновационно-технологическое развитие, структурная трансформация

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Конфликт интересов. Автор заявляет об отсутствии конфликта интересов, в том числе, связанного с финансовой поддержкой гранта Президента Российской Федерации для государственной поддержки молодых российских ученых – докторов наук, № МД-1823.2022.2.

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Introduction

The Russian economy is characterized by substantial heterogeneity of the economic space due to highly specific and diverse regional (natural resource, environmental, socio-cultural, historical, financial, economic, institutional, etc.) peculiar to the development of the constituent entities of the Russian Federation. A holistic approach to the development of the economic space presupposes some balance in the advancement of regions and industries, in

particular, in the allocation of productive forces. It is the socio-economic outcomes of such a balance that evidence sustainable innovative development of the country's economy.

Spatial development of Russian regions is characterized by the imbalance leading to major inter-regional disparities regarding the gross regional product (GRP) level, innovation activity, volume of fixed capital investments, industrial and sectoral structure, and other indicators of socio-economic

development. This is due to the reduced government role in managing regional spatial development in the post-Soviet period, which led to the current systemic crisis in the economy.

Thus, it is crucial to search for optimal spatial organization models of economic development, taking into account «the relationship between territorial systems, numerous factors affecting the development dynamics of socio-economic processes therein, and spatial clustering of territories to address the issue of high differentiation in regional development» [1].

The «smart specialization» strategies, originally proposed to increase the investment attractiveness and competitiveness of European regions in the global space and enhance innovation in lagging regions, are powerful instruments for global economic policy. The concept of smart specialization has rapidly acquired a central position in European and worldwide policy and academic circles [2], thanks in part to the efforts and support of the Organization for Economic Cooperation and Development (OECD) and the World Bank [3]. It is assumed that this approach should form the ground for the ongoing advancement of spatial strategies at the federal and regional levels based on methodological recommendations for determining the innovative development priorities for industries having prospective economic specializations¹.

The significance of the smart specialization approach in our country is indicated at the federal level in the adopted Spatial Development Strategy of the Russian Federation in 2019². However, in our opinion, there are serious obstacles to implement smart specialization strategies in Russia. Firstly, some important strategic documents provide inaccurate definition of prospective specialization areas for a particular territory due to the vagueness of the term «economic specialization concept». Secondly, it is theoretical and methodological weakness of

the approach used to implement regional “smart specialization” strategies.

Therefore, it is important to analyze the theoretical background and prerequisites for the emergence of this concept, to determine its distinguishing features, to establish its relationship with other theories of spatial development of territories, to identify opportunities for the mutual application thereof in order to establish an effective economic policy for the development of Russian regions.

Literature Review

The smart specialization concept originated in the literature analyzing the productivity gap between the United States and Europe, which has become evident since 1995. The new concept was formulated by the economists D. Foray, P. David, and B. Hall [4] and was further developed by numerous Western and Russian scientists. Guide to Research and Innovation Strategies for Smart Specializations and Regulation of the European Parliament and of the Council³ were supposed to set common provisions on this concept. In June 2011, the European Commission launched Smart Specialization Platform, containing over 180 developed strategies nowadays to provide information, methodological, and expert and analytical support to the authorities⁴.

Each region had to prepare its own smart specialization strategies in order to make better use of the European Regional Development Fund during the period of financing and increasing synergies both between supranational, national and regional EU policies, as well as public and private investments. The term «smart» implies economic growth based on knowledge and innovation, aimed at creating a resource-efficient economy and maintaining a high level of employment by searching for unique economic activities in order to develop the region's competitive advantages that provide «positive structural changes» [5].

¹ Author's note: The prospective economic specialization of a constituent entity of the Russian Federation is a set of enlarged types of economic activity (industries) due to a favorable combination of competitive advantages (spatial factors for the location of types of economic activity). See: Ivanov O.B., Bukhvald E.M. "Prospective economic specialization" as an innovation in regional development policy // STAGE: economic theory, analysis, practice. 2019; (6):49-65. EDN: <https://elibrary.ru/jmxdry>. <https://doi.org/10.24411/2071-6435-2019-10122> (In Russ.)

² Spatial Development Strategy of the Russian Federation until 2025, approved by the Decree of the Government of the Russian Federation of February 13, 2019 No. 207-r. URL: <http://static.government.ru/media/files/UVAIqUfT08o60RktoOXI22JjAe7irNxc.pdf> (accessed: 09.06.2023)

³ Guide to Research and Innovation Strategies for Smart Specialisations. Brussels: European Commission. European Commission, 2012. URL: <https://s3platform.jrc.ec.europa.eu/en/w/guide-on-research-and-innovation-strategies-for-smart-specialisation-ris3-guide-> (accessed: 05.06.2023)

⁴ European Parliament. The Regulation (EU) 1303/2013 of the European Parliament and of the Council of 17 December 2013. Official Journal of the European Union. 2019; 347:320–469. URL: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0320:0469:EN:PDF> (accessed: 05.06.2023)

The concept suggests each member state and region to focus their efforts and resources on a limited number of ambitious but realistic priorities, consistent with the need for smart, sustainable and inclusive growth. The policy aims to strengthen the innovation systems of EU member states and regions; to maximize, acquire and use knowledge flows; to spread the advantages of innovation through the market, networks and knowledge dissemination effects at local and regional levels.

Notably, the original smart specialization concept emerged from a spatial industrial approach, but it increasingly changed towards obtaining regional growth issues. Hassink and Gong [6] highlights that the originality of the smart specialization concept is in providing a policy-prioritization approach which was rather different to most of the policy recommendations [7].

It is worth noting the "region-centricity" of the "smart specialization" approach, which demonstrates the role of the state in stimulating innovative development, increasing productivity and competitiveness [8]. This approach involves the rejection of the politics of leveling the regions [9]. The basis for "smart growth" should be the collaboration of local authorities, the scientific and educational sector, business structures and civil society in accordance with the Quadruple Helix model [10] according to the "bottom-up" principle.

Researchers also explore the main differences between traditional and "smart" approaches to regional specialization. The "smart" approach is focused on the profiling of the regional economy [11]. It involves the identification of local competitive advantages in order to determine the priorities of economic development. Additionally, it is characterized by the high validity of recommendatory measures provided on the basis of quantitative analysis of regional socio-economic parameters [12].

The interdisciplinary of "smart specialization" involves the search for cross-industrial interactions, their linkages with new rapidly growing technological areas, in which the region has a chance to achieve leadership [13]. This requires the development of priorities that integrate innovation-technological, industrial, and social competencies.

In general, the concept of "smart specialization" is aimed at developing the interaction of regions through the consolidation of their resources, as well as the joint development of innovative products, which leads to the creation of synergy and complementarity, building capacity to work at the intersectoral, interregional levels and, ultimately, to a long-term economic growth [14].

Materials and Methods

Theoretical provisions of regional and spatial economics, innovative development and economic geography by famous Russian and foreign scientists were used for conducting the research. The methods of bibliometric, statistical and content analysis of literary sources constituted a methodological framework for the study. RStudio Open-Source Packages being applied for computer data analysis were used for conducting bibliometric analysis (Fig. 1).

The author conducted systematic quantitative literature reviewing and qualitative content analysis using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) proposed by D. Moher et al. [15].

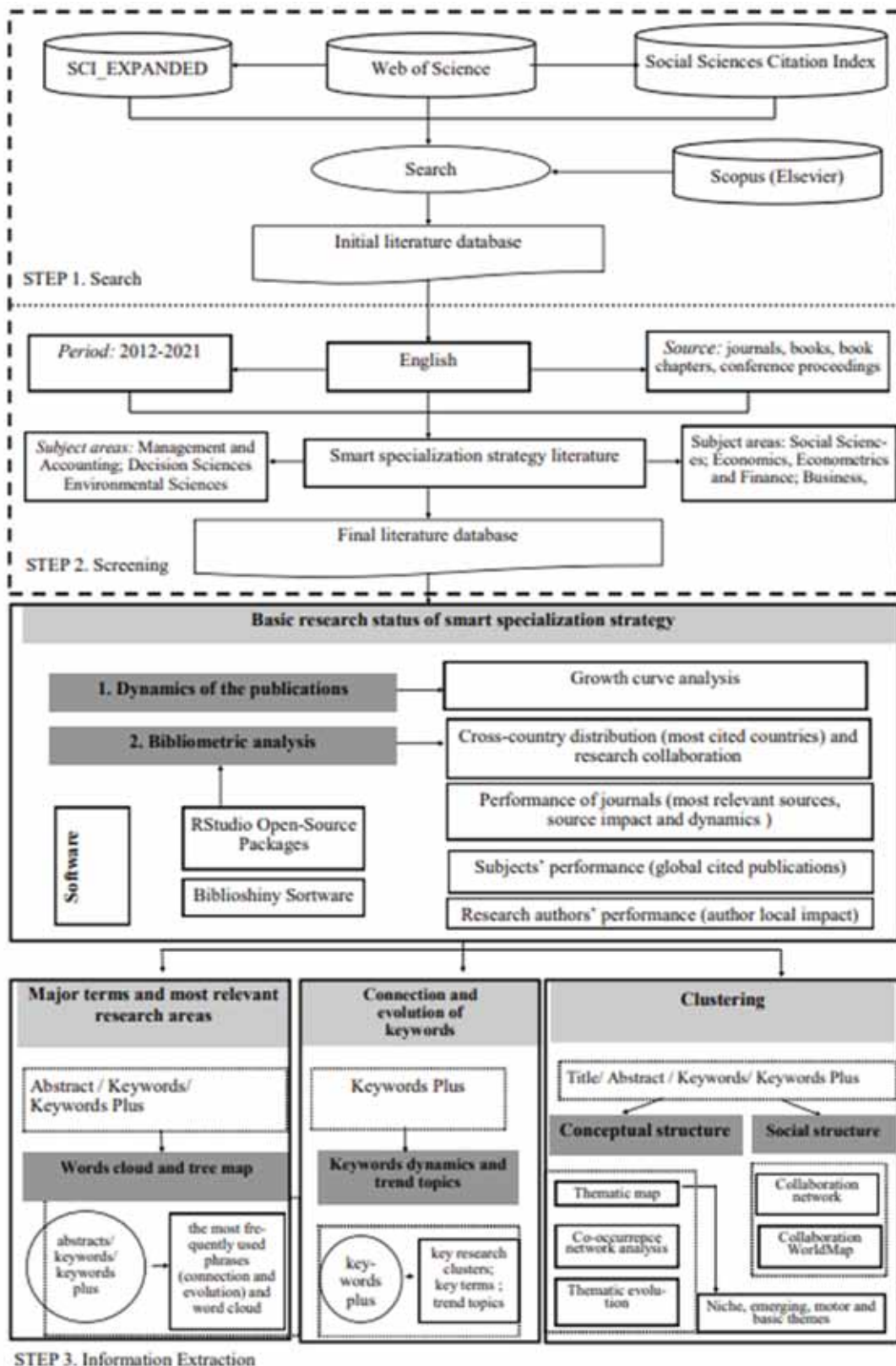
Bibliometric analysis was carried out in December 2021 for quantitative and qualitative research into the subject area. The conclusive data collection on the indexed publications was performed as of December 28, 2021. Some thematic publication samples from Scopus, Web of Science and eLIBRARY.ru databases were used as the research subject. Multi-criteria clustering publications based on citation relations contributes to a profound insight into the current research space on specific subject area to designate the most promising areas for further work [16]. Quantitative methods are used to visualize bibliometric information [17]. In particular, document clustering [18] was applied to structurally map the research areas on smart specialization.

Results

To achieve the research goal, I analyzed Russian and English sources on smart specialization from the relevant Scopus (Elsevier) and Web of Science Core Collection (Clarivate Analytics) international databases, and eLIBRARY.ru (Russian Science Citation Index). The designated international databases are supported by special packages for comprehensive bibliometric analysis [15]. It is feasible to pursue a comprehensive science mapping analysis using bibliometrix R-package [18]. Working with eLIBRARY.ru project is far more challenging, since this Internet portal actually requires manual techniques to form collections of publications based on metadata [15].

Thus, I have analyzed publications over the past ten years (from 2012 to 2021). The database search was premised on the following queries (Table 1) in reference to the previous research on the concept of smart specialization using bibliometric analysis [2, 16].

Having created the initial arrays of publications, I manually analyzed the articles for relevance by examining the title, abstract, and keywords. To enhance the perception of the material, numerous formal data obtained during the study are absent.



Developed by the author

Fig. 1. Framework of bibliometric analysis (literature search, analysis and interpretation)

Разработано автором

Рис. 1. Структура проведения библиометрического анализа (поиск, анализ и интерпретация литературы)

Table 1

Characteristics of database search queries

Таблица 1

Характеристики поисковых запросов к базе данных

Database	Query text	Preferences	Period
Scopus	Smart specialization strategy	Search fields: Title, Abstract, Keywords. Subject areas: Social Sciences; Economics, Econometrics and Finance; Business, Management and Accounting; Decision Sciences; Environmental Sciences	2012–2021
Web of Science	Smart specialization strategy	Search fields: Title, Abstract, Keywords. Subject areas: Economics; Regional & Urban Planning; Geography; Environmental Studies; Business; Urban Studies; Social Sciences; Interdisciplinary	2012–2021

Compiled by the author

Составлено автором

The key indicators of the performed analysis are shown in Table 2.

Fig. 2 shows the dynamics of the number of publications for the related search query.

Table 2

Key bibliometric indicators for Scopus and Web of Science databases

Таблица 2

Ключевые библиометрические показатели для баз данных Scopus и Web of Science

Indicators	Scopus	Web of Science
Sources (journals, books, book chapters, conference proceedings, etc.)	161	106
Documents	305	172
Average citations per document	11,6	7,07
Average citations per document per year	2,727	2,024
Authors	634	591
Collaboration index	2,42	4,02

Compiled by the author

Составлено автором



Developed by the author based on the analysis of Scopus and Web of Science databases.

Fig. 2. Dynamics of the number of publications for «smart specialization strategy» search query

Разработано автором на основе анализа баз данных Scopus и Web of Science.

Рис. 2. Динамика количества публикаций по поисковому запросу «стратегия умной специализации»

Thus, we have found few works among international academic publications related to the research subject. Since 2012, about 30 and 18 publications have been published annually in Scopus and Web of Science databases, respectively. However, the growth rate in the number of publications is quite high, which confirms the growing interest in the concept of

smart specialization. Since 2012, the largest number of papers has been published in Regional Studies (23 papers); European Planning Studies (22 papers); Journal of the Knowledge Economy (12 papers); Regional Studies, Regional Science (7 papers); Smart Innovation, Systems and Technologies (7 papers); Sustainability (7 papers) (Table 3).

Table 3
Periodicals (journals) with the largest number of published papers for «smart specialization strategy» search query in Scopus and Web of Science databases

Таблица 3
Периодические издания (журналы) с наибольшим количеством опубликованных статей по поисковому запросу «стратегия умной специализации» в базах данных Scopus и Web of Science

Scopus		Web of Science	
Source	Number of papers	Source	Number of articles
Regional Studies	23	Regional Studies	17
European Planning Studies	22	European Planning Studies	12
Journal of the Knowledge Economy	12	Regional Studies, Regional Science	7
Regional Studies, Regional Science	7	Innovation-the European Journal of Social Science Research	6
Smart Innovation, Systems and Technologies	7	Sustainability	6
Sustainability	7	Journal of the Knowledge Economy	5
Regional Science	6	The 8th International Scientific Conference Rural Development 2017: Bioeconomy Challenges	3
European Journal of Innovation Management	5	Foresight and STI Governance	3
Innovation: the European Journal of Social Science Research	5	Regional Science Policy and Practice	3
Local Economy	5	Cambridge Journal of Regions, Economy and Society	2

Compiled by the author based on the sample generated from Scopus and Web of Science databases using bibliometrix package
Составлено автором на основе выборки, сгенерированной из баз данных Scopus и Web of Science с использованием пакета bibliometrix

The lists of the most highly cited works in Scopus and Web of Science databases differ considerably (Table 4).

The paper entitled as Regional Innovation Patterns and the EU Regional Policy Reform: Toward Smart Innovation Policies [19] is the most cited article in the Scopus database (219 citations). The authors call for reconsidering the possibilities for translating sectoral and innovation economic policies into a regional setting. The paper suggests a new taxonomy of European innovative regions based on their innovation patterns.

The authors of The Quadruple/Quintuple Innovation Helixes and Smart Specialization Strategies for Sustainable and Inclusive Growth in Europe and Beyond [10] attempted to explore the conceptual and practical linkages between theory, policy and practice. These linkages are seen as components of sustainable growth based on smart specialization

strategies and viewed via the ‘multi-focal lens’ of the Quadruple/Quintuple Helix perspective.

The authors detail the interaction between different social systems for regional development through the innovation system.

P.-A. Balland et al. [20] propose a policy framework around the concepts of relatedness and knowledge complexity in Smart Specialization Policy in the European Union. The authors show that diversifying into more complex technologies is attractive but difficult for the European Union regions to accomplish. The authors use these findings to construct a policy framework for smart specialization that highlights the potential risks and rewards for regions of adopting competing diversification strategies.

The paper entitled as What is Smart Rural Development? [21] focuses on smart growth and the

Table 4

Highly cited works in Scopus and Web of Science databases

Таблица 4

Высокоцитируемые работы в базах данных Scopus и Web of Science

Scopus		Web of Science	
Article	Total Citations	Article	Total Citations
Camagni R., 2013, Growth Change	219	Naldi L., 2015, J Rural Stud	120
Carayannis E.G., 2014, J Knowl Econ	175	Capello R., 2016, Eur Plan Stud	105
Balland P.A., 2019, Reg Stud	153	Carayannis E., 2016, Foresight STI Gov	55
Naldi L., 2015, J Rural Stud	134	Bailey D., 2018, Cambr J Econ	42
Foray D., 2015, Smart Specialisation: Opportunities and Challenges for Regional Innovation Policy	109	Asheim B.T., 2019, Innovation	34
Foray D., 2014, Eur J Innov Manage	100	Magro E., 2019, Res Policy	30
Secundo G., 2017, Technol Forecast Soc Change	70	Iacobucci D., 2016, Eur Plan Stud	30

Compiled by the author

Составлено автором

associated smart specialization approach from the perspective of rural regions.

The authors of Smart Specialization, Regional Growth and Applications to European Union Cohesion Policy [7] postulate that smart specialization, as the logic of policy prioritization within the framework of the EU cohesion policy implementation, draws on the existing literature on regional innovation systems, and represents only one element of this policy.

The book Smart Specialization: Opportunities and Challenges for Regional Innovation Policy by D. Foray [22] is original in that it provides the first full analysis of smart specialization strategies both at theoretical and practical levels.

The paper entitled as From Theory to Practice in Smart Specialization Strategy: Emerging Limits and Possible Future Trajectories by R. Capello and H. Kroll [12] highlights emerging bottlenecks (e.g. the lack of local pre-conditions in the local economy and limits of governance) as well as possible future trajectories to overcome such bottlenecks.

158 publications were found by using the search query «smart specialization» in the Russian Science Citation Index (RSCI) database on the platform eLIBRARY.ru (search field: title, keywords, abstract; type of publication: journal articles; search parameters: morphological search). The first publications appeared only in 2016.

The most cited article (126 citations) is The Paradigm Changing of Regional Innovation Policy in Russia: From Equalization to Smart Specialization [23] published in the Russian journal Voprosy Ekonomiki. The article substantiates the need for regionally

differentiated innovation policy based on the principles of smart specialization.

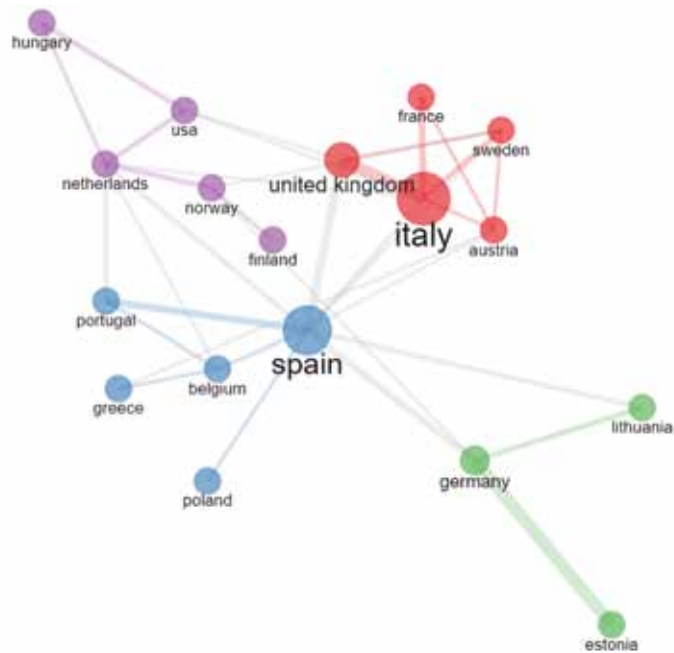
The second most cited article (119 citations) is Quadruple Innovation Helix and Smart Specialization: Knowledge Production and National Competitiveness [10] published in Foresight and STI Governance proposes an algorithm for the development of smart specialization strategy with a rationale for the role of a quadruple model of innovation therein is proposed.

The article entitled as Dispersed Model of Production and Smart Agenda of National Economic Strategies (48 citations) published in Economic Policy [24] ranks fourth. The paper highlights a number of smart principles to form the basis of national economic and foreign economic strategies. The advantages of a non-linear diversification model for production and exports, and the creation of innovative clusters with smart specialization are described.

The compliance of sectorial specialization of Russian regions and the priorities of regional development presented in the form of cluster initiatives is verified in Focusing Regional Industrial Policy via Sectorial Specialization by E. Kutsenko, V. Abashkin, and E. Islankina [25] published in Voprosy Ekonomiki. It was revealed that sectorial specialization of Russian regions is often ignored when applying public support measures.

In my opinion, the listed publications make a crucial contribution to understanding the key issues of implementing the smart specialization approach in the economic policy.

Now, I analyze the cross-country distribution of publication activity and research collaboration on the investigated subject (Fig. 3).



Compiled by the author using bibliometrix R-package

Fig. 3. Bibliometric analysis results on the links between countries according to Scopus database

Составлено автором с использованием R-пакета bibliometrix

Рис. 3. Результаты библиометрического анализа связей между странами по базе данных Scopus

The bibliometric analysis of international relations has evidenced 10 out of 22 participating countries with the exceeding threshold value (at least, three documents) for the total number of publications. Italy, Spain, Germany and Poland demonstrate the largest number of annual publications, which is typical for the EU countries.

The content analysis results for the selected scientific publications to identify the existing definitions of the term «smart specialization» are presented in Table 5.

Among the definitions presented above, the description of the approach of “smart” specialization as a tool for developing interregional connections [26–28] and obtaining a synergy effect from building a single economic space of the country stands out [29–31]. This important aspect is studied in detail by many authors [32, 33, etc.], which is quite justified. Thus, since 2021, the EU has introduced an additional tool for implementing smart specialization strategies – interregional innovations investment. This tool was developed in response to breaks in production and supply value chains due to the pandemic crisis and the recognition of the need to strengthen inter-territorial connections, especially in the high-tech sector.

Thus, there is a clear regionally-oriented approach to indicate the role of the state in stimulating innovative

development, creating scientific, technological and economic specialization, increasing productivity and competitiveness [34]. This approach involves abandoning the policy of equalizing regions [6] and moving to a differentiated policy.

It is important to note that original practical tools and methods have been developed to implement “smart specialization” strategies. These include tools designed to develop maps of unique regional competencies and identify potential for growth in innovation, for example, based on data on research and development costs by type of economic activity. Different European countries use different approaches to identifying promising industries [30]. For example, in the Baltic countries this is an analysis of the correspondence of scientific and technological specializations, in Turkey – an analysis of university and industrial patents, and in England – an analysis of global market trends and technological forecasting.

An important tool is also the analysis of the “technological proximity” of industries through the analysis of data on the patent reserves of regions, which ultimately makes it possible to identify industry complementarity when entering interregional industry clusters. And in this context, it should be emphasized that clusters are the main horizontal tool of the “smart” specialization strategy, since it makes it possible

Table 5

Definitions of «smart specialization»

Таблица 5

Определения «умной специализации»

Author(s)	Meaning of the term
Foray D., David P.A., Hall B.H., 2011 [4]	"Smart specialization is a process addressing the missing or weak relations between R&D and innovation resources and activities on the one hand and the sectoral structure of the economy on the other".
Barca F., McCann Ph., Rodríguez-Pose A., 2012 [11]	The smart specialization strategy reveals a place-based political approach (integrated regional policies) to the regional economic development.
Foray D., 2015 [24]	Smart specialization is to expedite agglomeration processes and to encourage regional players to particularize themselves by generating and stimulating the growth of new exploration and research activities, which are related to existing productive structures and show the potential to transform those structures.
Woolford et al., 2020 [26]	Smart specialization ... promote interregional and international perspectives and synergies.
Correa P.G., Guceri I., 2016 [27]	Smart specialization strategies are development strategies that allow a region to build on its existing comparative advantage and promote a greater contribution of the knowledge factor to economic growth.
Asheim B., Grillitsch M., Trippel M., 2017 [28]	Smart specialization is the greatest attempt to create a supranational innovation strategy to accelerate economic growth through economic diversification and the development of new paths, such as diversifying the economy into more technologically advanced activities that require a higher level of knowledge sophistication.
Marques P., Morgan K.J., 2018 [29]	Smart specialization emphasizes the place-based approach and the central role of the relational infrastructure of public institutions, as well as public-private cooperation as a source of promoting regional growth.
Kotov A.V., 2021 [30]	"Smart specialization is a specific composition of sectors (types of economic activity) of the regional economy and projects that ensures the implementation of the regional scientific and technical potential and stimulates the innovative economic growth of the region".
Neto P., Serrano M., Santos A. 2018 [31]	"Smart specialization is opening up new opportunities for interregional cooperation around shared priorities, thereby complementing the strengths of all parties..."

Compiled by the author based on materials in: [4, 11, 24, 26–31]

Составлено автором по материалам: [4, 11, 24, 26–31]

to support research, development and innovation activities within the identified sectors of promising specialization.

At the same time, in my opinion, the competencies, innovative activity and technological capabilities of neighboring regions should be analyzed in order to reveal areas for potential interregional cooperation and building linkages between regional clusters, which should contribute to increasing the efficiency of the structural and at the same time technological policy of the regions. It is interaction at the level of regional clusters that makes it possible to synchronize disparate regional policies and develop a common vision of sectoral, innovative and territorial (spatial) development of the country.

The unique tools of the "smart specialization" approach also include diverse digital platforms (Smart Specialization Strategy-Platform), which support the processes of building an optimal regional economic policy. These include, for example, the formation of a visualized map of priorities for positioning the region in the global economic space Eye@RIS3, integration of monitoring and evaluation mechanisms using

S3P Energy (clean, resource-efficient energy), S3P Agri-Food (agri-food specialization), visualization of planned investments with using a digital card ESIF-viewer.

The above analysis allows the following conclusion: "smart" specialization is a strategic approach to the development of regional structural and innovation-technological policies by leveraging the potential of individual territories, using their competitive advantages and constructing sustainable inter-territorial interactions that allow obtaining synergy from cooperation between groups of regions and within regions, to form a single interregional innovation and technological space in order to maximize the overall economic effect throughout the entire economic space of the country.

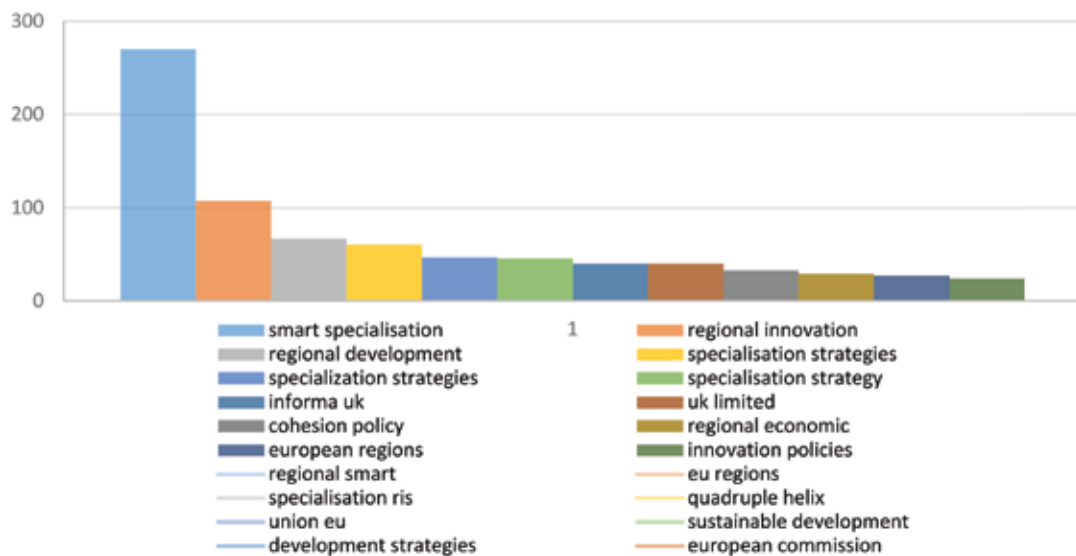
Theoretical background of the smart specialization concept and its relationship with other theories: a literature review

I reveal the relationship of this concept with other theoretical approaches using a quantitative bibliometric analysis of the literature.

The most frequently used phrases in the abstracts of articles presented in Scopus database on the investigated subject are shown in Fig. 4.

Fig. 4 shows the thematic map based on the publications retrieved from Web of Science database to determine the key research clusters on the investigated topic, and to analyze the major terms

and most relevant areas within the cluster. Web of Science or Scopus document search has allowed mapping the frequency of use and co-occurrence of the basic terms extracted from the document keywords. Keywords Plus and Author Keywords are commonly selected as units of analysis, despite the limited research evidence demonstrating the effectiveness of Keywords Plus.



Compiled by the author using bibliometrix R-package

Fig. 4. The most frequently used phrases (abstract search)

Составлено автором с использованием R-пакета bibliometrix

Рис. 4. Наиболее часто используемые фразы (поиск по аннотациям)

Bibliometrix R-package uses methods to cluster and match a set of related terms according to their similarity based on the use of its own algorithm. Here, distance-based imaging technique is applied, that is, the smaller the distance between two terms, the greater the co-occurrence frequency thereof. Each term is represented by a circle on the map, and its size correlating with the related term significance.

There are several research clusters shown in Fig. 5. Regional Development and Regional Planning are the economic geography clusters formed by the following key terms: specialization, competition, smart specialization, entrepreneurial discovery, investments, economic growth, planning and etc.

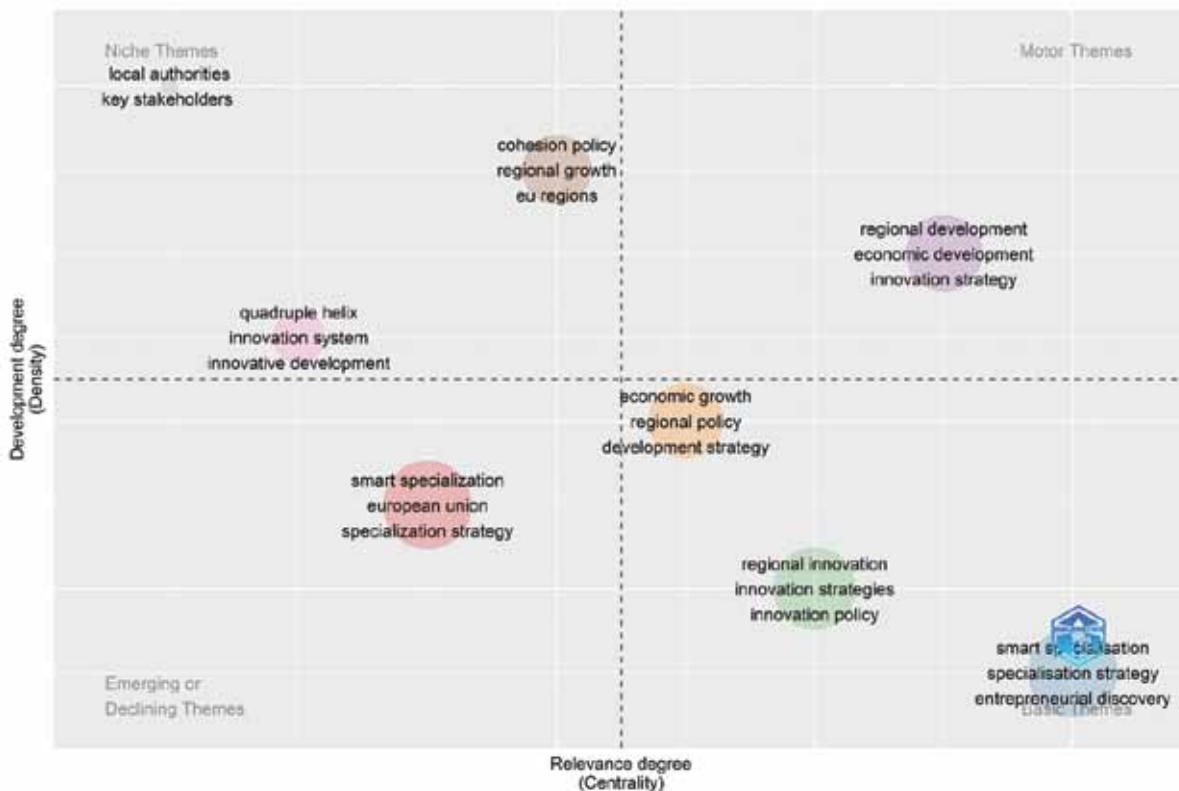
Innovation and Regional Policy cluster contains such terms as innovation, technological development, Europe, European Union, strategic approach, regional policy, industrial policy, policy implementation, institutional framework, knowledge, stakeholders, capacity building, competitiveness and etc. The term «entrepreneur» in the center of

the cluster can be viewed as a cross-cutting one as it effects and connects the other clusters.

I analyze the results on the conducted cluster research in terms of the economic geography approach.

The major city-regions tend to be the most industrially developed and structurally diversified. On the contrary, small urban centers are more narrowly specialized in terms of industry. This combination of scale and diversity tends to mean that the larger centers of the core region consistently demonstrate greater learning-related knowledge and human capital benefits. It is the environment in which entrepreneurial business-processes operate [7]. In addition, for the smart specialization strategy to be effectively applied in a regional context, the attention of decision makers must be focused on methods and tools to maximize knowledge dissemination and develop intra- and inter-regional connections.

The connection between the revealed clusters (Fig. 4) is supported by some generalized facts. First, the level of development of entrepreneurship and innovation



Compiled by the author using bibliometrix R-package

Fig. 6. The thematic map based on the publications retrieved from Web of Science database

Составлено автором с использованием R-пакета bibliometrix

Рис. 6. Тематическая карта на основе публикаций, извлеченных из базы данных Web of Science

specialization is part of a wider and much older set of regional innovation policy tools. This set includes such horizontal measures as science and technology parks, technopolises, technology financing, innovation support agencies [25], as well as vertical measures in the form of cluster policy [24]. In this context, there is a linkage between the investigated concept and cluster policy.

The conducted analysis has evidenced the need for further investigation to identify the research strategy for the smart specialization concept as an emerging research front.

The main question behind the policymaking is the choice of smart specialization sectors and the impact of economic specialization on regional economic development [35]. Some researchers focus on approaches to choosing priorities in favor of certain regional specializations and, accordingly, areas of political interference. In this regard, the paper by A.V. Kotov [30] on the differences between traditional and smart specializations is of particular interest. The author shows that in the case of smart specialization, it is not the selection of individual sectors as «points» that takes place, but determination of the set of types

of economic activity in conjunction with regional competencies. That is, in fact, it is a case of diversifying the structure of regional economy, being constantly adjusted pursuant to changing internal and external conditions, rather than absolutely static and stable.

The concept of territorial division of labor formulated by I.G. Aleksandrov constituted the methodological framework for the implementation of sectoral specialization in the Soviet regional economy. The division of labor «suggested, on the one hand, the specialization of economic regions, and on the other hand, a well-established exchange between regions, since otherwise the study of specialization would be meaningless» [30, P. 379].

In the Soviet Union, specialization was determined by technological processes based on the commonality of the natural resource and energy base, and the basis for the definition of «smart specialization» was knowledge, competencies and the type of regional innovation system. Cyclic-based territorial production complexes formed the ground for spatial organization. As for smart specialization, it was a territorial cluster with the broad range of assets, participants and production processes.

Some researchers consider related diversification to form a backbone for the smart specialization concept. Some authors suggest pointing at «diversified» specialization [20], when regions identify areas of existing or potential competitive advantages and distinguish themselves from the others. Balland et al. [20] propose to create new complex technologies that allow for related diversification.

Thus, I can conclude that the concept of smart specialization is based on the assumption of technological diversification within a particular industry. In the context of regional policy, this means that a workforce development program should be designed advanced technological diversification strategies for the main sectors of the regional economy. Such a strategy is beneficial for the regional long-term economic growth. It is assumed that the emergence of new industrial sectors of the economy is based on the presence in the region of such basic industrial factors as capital (investment in fixed capital), production, labor force and infrastructure. The competitiveness of new economic sectors depends on the already existing and historically determined economic activities that are being developed in the region. And in this case, there are favorable prerequisites for the development of industries related to it. In the case of related diversification, specialized labor markets are created, specialized skills and competencies are disseminated, improved innovations, new products and services are created. Unfortunately, this approach fails to denote neither the reason nor the cause of previous diversification, and therefore it remains unclear whether specialization should have been increased in the past in order to subsequently cover a wider range of economic activities.

Summing it up, I can assume that the term «smart specialization concept» somewhat misleads the researcher, since actually we are concerned with a scientific and methodological approach to diversifying the regional economy structure in order to optimize it. Diversification, oriented on the value-added maximization, makes it possible to change the specialization of regions depending on market conditions and current demand.

Conclusions and Relevance

The concept of “smart specialization” incorporates numerous commonly known assumptions in the literature on regional innovation systems and innovation policy, economic geography and entrepreneurship. However, an integral feature of the concept is that it offers practical tools and ways to provide a clear logic to the prioritization of political interference. Such approach is appropriated for encouraging innovation in a variety of regional contexts.

In essence, “smart” specialization is a harmonious unification and synchronization of the goals and priorities of scientific and technological development at the national level with the unique and specific advantages and opportunities of internal territories (cities and regions). That is, it is assumed that the basic principle will be observed – from a vision of general priorities for the development of the national economy to priorities at the level of individual regions. The smart specialization strategies include an integral planning phase, despite the fact that it was initially conceived as a ‘bottom-up’ framework. That is, this approach is two-pronged, combining the stage of strategic planning to determine the priorities of scientific and technological development of the country as a whole and stimulating progressive structural changes in the regions (top-down approach) with bottom-up logic, revealing the internal territorial potential, taking into account the local businesses’ needs through entrepreneurial discovery process. These logics complement each other harmoniously.

Accordingly, from a managerial point of view, it can be argued that “smart” specialization makes it possible to implement the strategy of “echeloning” – a scientifically based dispersion of resources between directions of economic policy to ensure its balance and high efficiency by supporting the sectors of the economy that are most significant for the economic dynamics at national level. From these positions, investment, financial and institutional mechanisms of state support for cooperative interregional projects are becoming significant. In turn, cooperation can occur on a different basis, from integration and sharing of limited resources to ensuring technological complementarity at the industry level. That is, “smart” specialization offers practical mechanisms that allow us to develop and implement effective structural and technological regional economic policies.

Thus, smart specialization has made a significant contribution to the political vision of balanced territorial development based on the principles for diversification, strategic prioritization, interregional cooperation and connected development. The transition of the original sectoral concept into a placed-based one was shown to be subject to the postulates of economic geography.

Concurrently, a vague definition of a smart specialization approach in the literature creates challenges to its proper explanation and practical use. This is evidenced by some European reports on the results of policy implementation. In particular, serious problems may arise in old mono-structural industrial regions if the emphasis is placed on their further specialization within the framework of a related industry portfolio. This makes the region vulnerable to various economic crises and external

shocks, and hinders long-term economic growth. Ignoring differences between specialization and diversification will only lead to further confusion. In this regard, it is urgent to perceive that smart specialization involves regional formation of a reasonable image of the future and finding ways to diversify the economy based on the development of its competitive advantages.

The conducted bibliometric and content analyses of literary sources have evidenced the need for further investigation to specify the research approach on the smart specialization theory. It seems appropriate to use special approaches to assessing research areas, and the methodology of scientific research programs by I. Lakatos being the one. From the standpoint of this approach, the central idea of smart specialization or the «hard core» of the research program, according to Lakatos, is as follows: firstly, the rationale for a differentiated regional policy for various types of regional innovation systems; secondly, the scientific and practical substantiation of the feasibility of the «related» diversification approach to the development of regions. This methodology presupposes further analysis of the so-called «protective belt» of the considered concept, recognition of critical remarks, and evaluation of future directions for further development and the criterion of the scientific content of the program. However, it seems premature to assess the scientific content of smart specialization as an emerging concept due to its little existence.

An important aspect of the considered concept is its alliance with cluster policy. The European practice confirm that, when interpreting smart specialization strategies, inevitably link them to «industry cluster» priorities, «industry strategic plans» and «cluster strategy». The problem of establishing common features and differences between the cluster development concept and smart specialization in order to bring them to a common theoretical and methodological basis needs further investigation.

Thus, the smart specialization strategy should be considered as an extension of the cluster policy, since it is a tool for implementing a vertical approach to regional innovation policy and identifying ways to successfully diversify the region's economy. In this regard, profound theoretical and analytical research is relevant to identify the similarities and differences between these approaches to regional policy in order to determine the possibilities of their complementary use in practice, which will contribute to further conceptualization and operationalization of balanced territorial development. The obtained research results would make it possible to develop specific recommendations for optimizing limited budget allocation in order to improve the structure of the regional economy with the focus on evidence-based development priorities, focusing on regional priorities, namely, new industries, associated with the current industry portfolios.

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