Smart Specialisation Strategy – bibliometric analysis & GoSmart BSR project practices

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Abstract

The aim of the article is to present practical solutions used in the GoSmart BSR project to identify transnational smart specialization strategies in the light of current research directions in the interest of smart specialisation strategies. The article uses descriptive analysis of the results and bibliometric analysis using tools available in VOSviewer and SCOPUS database. The bibliometric review is based on the Scopus database. The searched articles contained keywords 'Smart Specialisation Strategy'. The article presents results of bibliographic research with separately 5 clusters and assumptions of The methodology for Transnational Smart Specialisation Strategy (Trans-S3), which were compared with the research directions in the literature.

Keywords

bibliometric analysis, GoSmart BSR, Smart Specialisation Strategy (S3), Transnational Smart Specialisation Strategy (Trans-S3)

Introduction

Smart specialisation strategies (S3) are considered key in modern innovation-based regional policies [McCann and Ortega-Argilés, 2016, p.1408; Tomaszuk, 2015, p. 681, Ejdys 2016, p. 13]. The European Union and the United States are working to develop specific policies and smart specialisation strategies to improve the competitiveness of countries and regions [Lopes et al. 2019, pp.38-39]. The European Union's cohesion policy is based on different pillars, including research

and innovation strategies for smart specialisation (RIS3) at regional level. This concept is consistent with the aims of the 'Europe 2020' in smart and sustainable growth. The concept enables regions to catch up against other successful regions [Kruse and Wedemeier 2019, p.795-796].

The implementation of smart specialisation in regional development policy processes has positively influenced the transformation of innovation policy in Europe [McCann and Ortega-Argilés 2016, p.1409]. But the question is still relevant: how smart specialisation strategies can be effective for the development of European regions? Research shows that smart specialisation in its current form does not benefit equally central and peripheral regions [Schulz, 2020, p.49]. To overcome the problem of diversification, it is proposed, i.a. to develop new complex technologies based on local opportunities [Balland et al. 2019, p.1252; Urban , Rogowska 2018, p. 339]. Moreover, the development priorities within S3 should be elaborating as an Entrepreneurial Development Process (EDP) of the region with the involvement of Triple Helix stakeholders: industry, university, and government [Corpakis 2020, p. 96; Höglund and Linton 2018, p. 60; Ejdys 2013, p.38].

The project 'Strengthening smart specialisation by fostering transnational cooperation' GoSmart BSR under the European Union Interreg Baltic Sea Region Programme 2014-2020 is fully integrated into the S3 concept. The project aims at supporting effective cooperation in a transnational approach between industry, research and development (R&D) and public power [https://gosmartbsr.eu/]. One of the results of the GoSmart BSR project is the elaborating a methodology for Transnational Smart Specialisation Strategy (Trans-S3) and its application to a common strategy for 7 partner regions.

The aim of the article is to present practical solutions used in the GoSmart BSR project to identify transnational smart specialization strategies in the light of current research directions in the interest of smart specialisation strategies.

The article make use of bibliometric analysis and tools available in VOSviewer and SCOPUS database. The bibliometric review is based on the Scopus database with a selected sample containing all articles containing the key words 'Smart Specialisation Strategy'.

The paper is structured as follows. The first part presented research methodology and the results of bibliographic research with the separation of clusters. The following part presents the assumptions of The methodology for Transnational Smart Specialisation Strategy (Trans-S3), which were compared with the research directions in the literature. The article concludes with a discussion and a summary.

1. Methods

For the purpose of evaluating research in the area of smart specialisation strategy, descriptive analysis of the results and bibliographic analysis were used. According to Fanelli and Glänzel (2013), bibliometry is a technique to evaluate and measure the results of bibliographic research relevant particular research question. The bibliometric analysis is also used to track changes/progress and identify areas of future research [Opejin et al. 2020; Samul 2020]. The search for reviewed publications was conducted on 24 February 2020 in the Elsevier Science Scopus database. The Scopus database offers a comprehensive and high quality catalogue for this analysis. The database includes information from the social and international sciences. According to Elsevier, Scopus is the largest database of abstracts and quotations from the reviewed literature. The category of 'Business, Management, and Accounting' was used in order to contain only research results that are about smart specialization strategy. Between 2011 and 2020, 303 publications were received. These publications were further analysed. The following tools and techniques were used to carry out bibliometric analysis: the analysis of trends in terms of the number of publications, the method of co-occurrence of words, cluster analysis, the mind mapping method. The VOSviewer software and data analysis tools available in the SCOPUS database were also used [Halicka 2017; Gudanowska 2015, 2017; Siderska and Jadaa 2018; Szpilko 2017; Winkowska et al. 2019].

2. Results

2.1. Trends in publications

Year by year, interest in research in the area of smart specialisation strategy (S3) is growing. Figure 1 shows the number of publications that were published in the period 2011-2019. In 2011, only 1 publication on this subject was recorded, then in 2016 there were 50, and in 2019 already 87. Already in 2020, 7 publications were published. The great interest in S3 results from its role in regional development [Sörvik et al. 2019, p.1070; Bosch,Vonortas 2019, p.32].
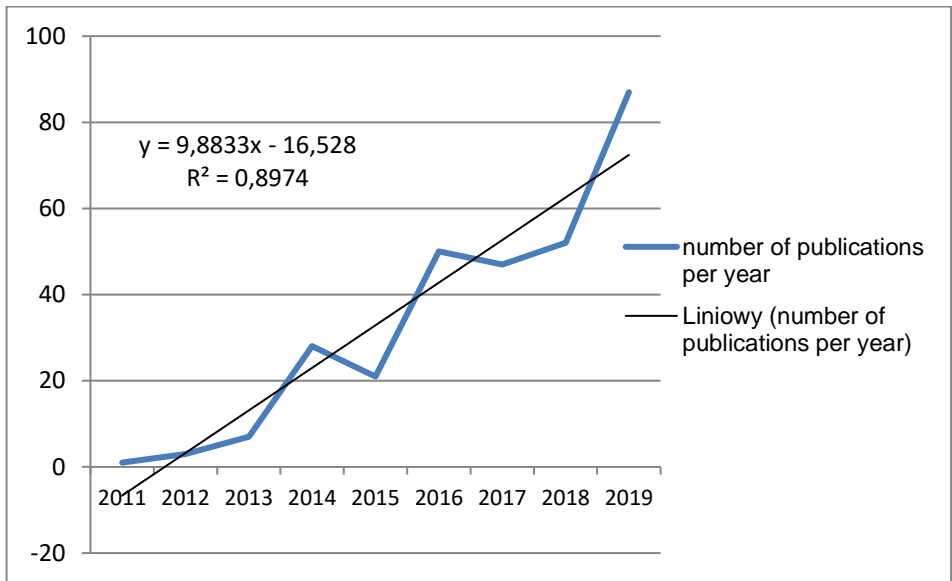
Fig. 1. The number of publications in the years 2011-2019 and fitted linear trend

Source: own elaboration based on the Scopus database.

The interest in the area under examination was different territorially. As shown in Figure 2, the most attention to this topic was paid by researchers from Italy, Spain and United Kingdom. In the United States, 17 articles were published. In the group of countries with more than 10 articles published is dominated by European countries. In Poland, 9 publications on this topic were published in the analysed period.

The top 5 journals with the largest number of publications are as follows:
- European Planning Study (23),
- Journal of the Knowledge Economy (12),
- Regional Studies (10),
- Scienze Regionali (8),
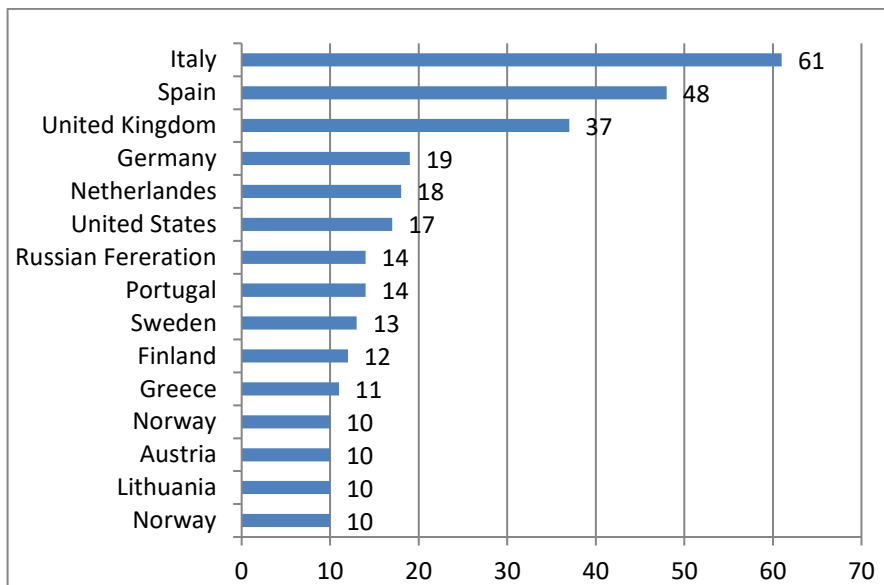- European Journal of Innovation Management (7).

Fig. 2. Number of publications with by country (above 10 items)

Source: own work based on the Scopus database.

Among the 303 publications analysed 70% were peer-reviewed journal articles, 17% conference paper, 8% book chapter, 3% review and 2 % other documents.

2.2. Term Co-Occurrence Network Map

The initial process of text data analysis in tool VOSviewer which included title, keywords and abstract generated 8573 total terms. Then all words that have less than fifteen speeches were excluded. Only 159 terms met this requirement. Using the relevance scores in VOSviewer, the level at which this term is informative was established [Van Eck, Waltman 2013]. Only the terms within the highest 60% of the relevance scores were selected, reducing the number of terms to 95. The terms were then manually checked to remove words that discussed the research process (e.g. data, article, Scopus, author, proceedings) or concerned the countries surveyed (e.g. Germany, Greece, Poland, Lithuania, United Kingdom). The exclusion of such general terms has left 47 phrases (terms, expressions) in the system.

Figure 3 shows the generated terms and their network of co-occurrences. The co-occurrence of the term in the network of links can help to understand the elements of knowledge and the structure of knowledge in this field. The analysis shows that innovation is one the main research topic undertaken in S3 literature.
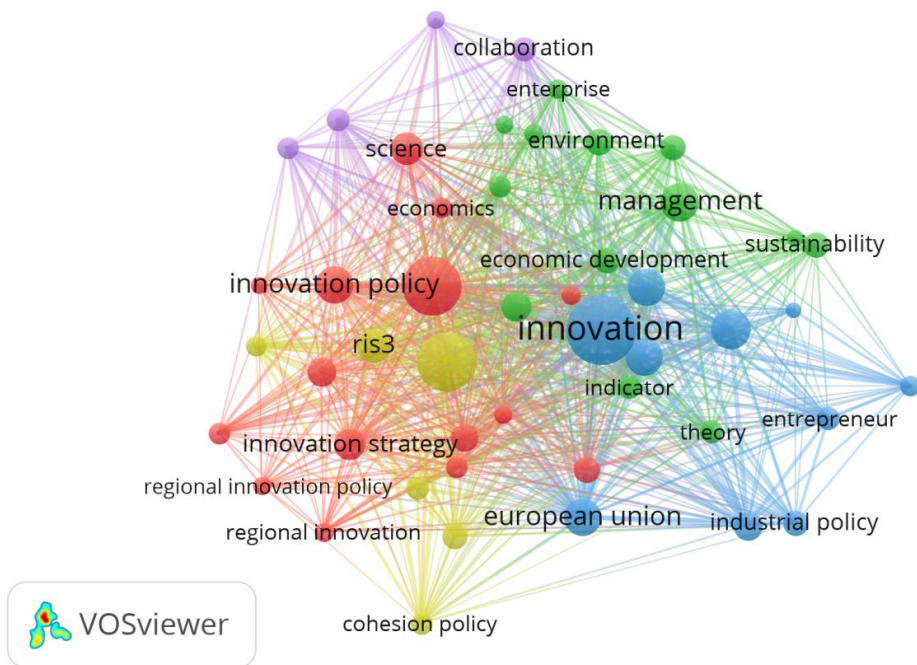

Fig.3. Network of terms from publication abstracts, title and keywords

Source: Authors' Vosviewer analysis.

Innovation is the process of elaborating and implementing new concepts and new ways of production, distribution or sales [Seidler-de Alwis and Hartmann, 2008, p. 133; Nazarko 2018, p.37]. In a rapidly changing environment, innovation is crucial for the survival and progress of companies in the marketplace [Drucker 1986, p.10; Dyhdalewicz, 2017, p. 629]. Research underlines that innovation has the effect of increasing sustainable competitive advantage [Holtsman 2014, p. 24; Nazarko 2019, p. 342], effectiveness and improvement of the organisation's output [Abeyratne, 2016, p. 131]. Cooperation between the organization's employees [Bulińska-Stangrecka, Bagieńska 2019; Sacramento et al., 2006, p. 82], customers

[Ryzhkova 2015, p.327] and other entities [Reficco et al. 2018, p.1170; Korzeb 2019] is very important in the development of innovation. As Figure 3 shows, smart specialisation is close-coupled to innovation, regional policy and sustainable development.

The last element of the bibliometric analysis is the analysis of co-occurrence of words, which was used for grouping, i.e. analysis of clusters reflecting research subareas. VOSviewer uses colors to visualize the bibliometric network to indicate clusters.

Cluster analysis of our study showed the existence of five main clusters (Figure 4). The first cluster is regional S3 discovery process (red), which is associated with 15 items such as entrepreneurial discovery process, science, foresight, innovation policy, innovation strategy, regional innovation policy or regional economy.
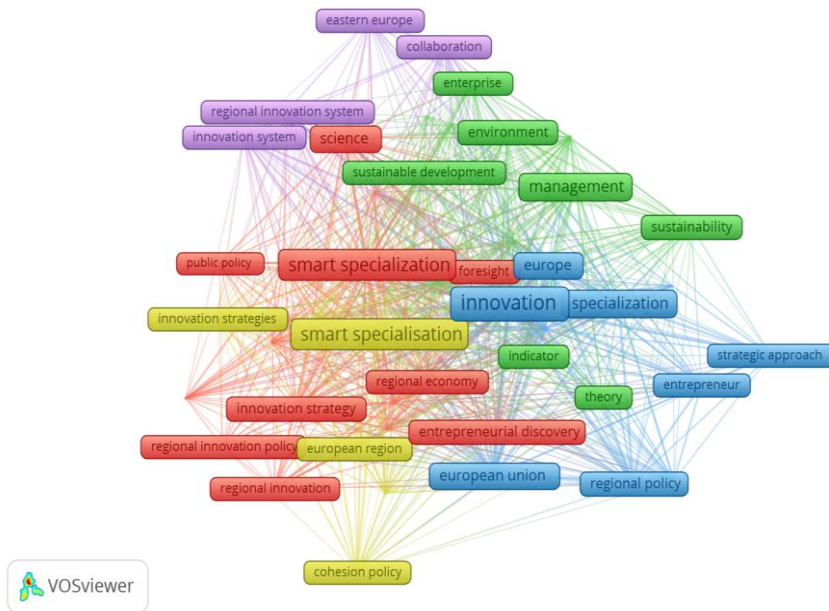

Fig.4. The clusters of Smart Specialisation Strategy publications

Source: Authors' Vosviewer analysis.

The second cluster (green) is management for sustainable development, which consists of 13 items such as management, sustainable development, environment, enterprise, indicator, smart growth, sustainability which are the most studied. The

third cluster (blue) is innovation- a key to EU development with 10 items such as innovation, European Union, regional policy, strategic approach, specialisation. The fourth cluster (yellow) is European cohesion policy with 6 items such as smart specialisation, cohesion policy, European region, innovation strategies. The five cluster (purple) is innovative collaboration system with 4 items, such as: collaboration, Eastern Europe, regional innovation system.

2.3. Transnational Smart Specialisation Strategy (Trans-S3) as a result of the GoSmart BSR project

The elaborate of Trans-S3 for many regions was one of the main elements of the project 'Strengthening smart specialisation by fostering transnational cooperation' (GoSmart BSR) [https://gosmartbsr.eu/]. The publication 'Methodology for Transnational Smart Specialisation Strategy' presents the methods and tools used to identify common Trans-3. The methodology can be far-ranging when many regions try to intensify cooperation based on the concept of smart specialisation.

The main reason for the elaborate of Trans-S3 by the GoSmart BSR project partners was the statement that the overarching goal of smart specialisation strategies is to achieve global competitiveness of regions. An important element of Trans-S3 is to identify common areas of smart specialisation and areas of knowledge and economy not for one region, but for groups of regions [Girejko et al. 2019, p. 28].

The Trans-S3 methodology is composed of two main components:
•   Trans-S3 identification,
•   Trans-S3 management.

The first concerns the subsequent steps to be taken to identify common smart priorities and domains at the transnational level. Trans-S3 identification covers the following sequences (Figure 5):

1. Search for common sets (defining initial priorities).
2. Analytical review and profiling target regions (verifying priorities).
3. Markets and technology trends review (refining priorities).
4. Internationalisation potential assessment (assessing priorities).
5. Stakeholders consultations and entrepreneurial discovery (finalising priorities).

The second management component Trans-S3 regulates all steps and sequences and the entire strategy. It includes the following elements:

6. Governance.

7. Shared vision.
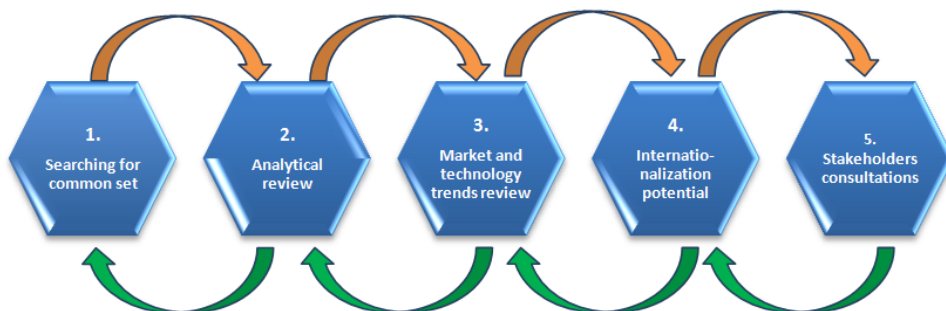8. Action plan.
9. Monitoring and evaluation.

Fig. 5. Trans-S3 identification process (5-sequence)

Source: (Girejko et al. 2019, p. 20).

The whole process of identification of Trans-S3 is repeatedly go over (verifications and evaluations are carried out at all steps), strongly participatory and allows for rich feedback.

Sequence 1. Searching for common set of priority areas - rely on primarily analysing and comparing sets of priority areas smart specialisation at national level contained in already existing Research and Innovation Strategies for Smart Specialisation (RIS3) and identifying common areas. As a result of the above analysis and the application of the selection methods Trans-S3 are determined.

In sequence 2. Analytical review and profiling of target regions/countries - re-examines whether the identified priority areas of smart specialisation (and their core areas) are now relevant. This is confirmed by a statistical analysis and a comparison of the concentration of the industry sector in a region or country. Verification and profiling of the target areas so far included in S3 strategies is necessary due to changing economic and technological conditions. Based on the analytical review and profiling of the target territories, the identified Trans-S3 (smart specialisation priority areas) areas are verified. Whereas on the basis of statistical data basic domains are added or eliminated.

In sequence 3. Market and technology trends review (global and for target regions/countries) - other aspects with a strong impact on Transnational Smart Specialisation Strategy are examined. This step is more environment and future oriented. The relevant markets and technology trends affecting the target areas are ana-

lysed, based on statistical data, industry and technology forecasts, qualitative analysis or foresight analysis. This step provides another important revision of the initial Trans-S3 Strategy and improves it.

In sequence 4. Internationalisation potential assessment of priorities - assesses the internationalisation potential of previously identified, verified and improved smart priorities and domains (sequences 1-3). The domains of Trans-S3 that will receive high (sufficiently high) performance/rankings should be further considered in order to determine the final content of Transnational Smart Specialisation Strategy.

Sequence 5. Stakeholders consultations and entrepreneurial discovery - concerns stakeholders' involvement, broad consultation and Entrepreneurial Development Process (EDP) which [Girejko et al. p. 24-25]:

- Encourages and ensures integrated bottom-up involvement of participants from the quadruple-helix (policy, business, academia, NGO sector) to assess the proposed smart areas and identify new potential, mostly based on market and/or technological opportunities in the process.
- It provides a tool for integrating the entrepreneurial knowledge of many environments and institutions by establishing more frequent and stronger links and partnerships.

It should be noted that stakeholder consultation and discovery of entrepreneurs is strongly emphasised in the final sequence, and they are present in all phases of the Trans-S3. Each type of decision and discussion involves key stakeholders and allows everyone to comment.

3. Discussion

Smart specialisation strategies have been implemented in the European Union's cohesion policy in order to achieve economic, social and territorial development by reducing disparities between regions [Polido et a. 2019]. The results of the bibliographic analysis confirm the greatest interest of researchers in the S3-based regional development policy making process using the regional S3 discovery process. The GoSmart BSR project assumes that the best way to achieve the competitiveness of the region and primarily of SMEs is internationalisation. Thereupon a joint transnational smart specialisation strategy (Trans-S3) has been developed for the 7 project target regions [Girejko et al. 2019, p.27]. So far, only one publication in the Scopus database has highlighted the importance of transnational S3 in regional

policy [Radosevic, Ciampi Stancova, 2018, p.265]. It should therefore be concluded that Trans-S3 is a new area in both research and practice.

Mapping the results of bibliographic analyses allows to find research gaps. On the basis of the results presented, it should be concluded that little attention is paid to SMEs. SMEs in each EU region are a group of actors whose role in the economy is very important. In Poland, they generate over 49,8% of GDP [Zakrzewski, Skowrońska 2019, p.5]. Taking into account the needs of SMEs for internationalisation and inclusion in S3 is come from the competitiveness of the local economy. Innovative actions in a small company are more difficult to implement. This is due to a number of reasons: lack of appropriate knowledge, financial resources or market opportunities. The GoSmart BSR project was constructed on the basis of a common preliminary understanding that the internationalisation of innovation activities in enterprises, especially SMEs, is one of the key areas, and in fact a decisive factor for the success of specialisation.

The literature highlight the need to involve stakeholders in identifying S3. The Entrepreneurial Development Process considers that all triple-helix stakeholders such as industry, university, and government should be involved [Corpakis, 2020, 98]. Marques et al. (2020) believe that universities have an important role in the creation of S3. The GoSmart BSR project involved representatives of all quadruple-helix environments (policy, business, academia, NGO sector) in a series of consultations. The inclusion of associations and business environment entities associating SMEs allowed, among other things, to better understand the needs and possibilities of this sector in the region. Practical solutions in the project are consistent with research identified as a cluster - Innovative collaboration system.

The GoSmart BSR project is addressed to less innovative and less developed regions of the Baltic Sea. These regions can become more competitive through mutual learning, the application of S3 and best practices from more developed regions. Mutual learning is a new paradigm in innovation policy. It requires the inclusion of monitoring schemes that integrate assessment of a dynamic process. Public administrations as well as other innovation stakeholders learn and improve their performance through the knowledge accumulated during S3 implementation [Esparza Masana, Fernández 2019].

Conclusion

According to the researchers, progress has been noted with regard to regional development management, mainly involving stakeholders and institutional processes [Trippl 2019. p. 352-354]. Kroll (2017) sees great potential in S3 to change

policy orientation towards a more effective approach stakeholder to developing and implementing S3.

The bibliometric analysis showed an increased interest of researchers in the smart specialisation strategy. The analysis presents the distribution of conducted research by country and the clusters (sub-areas) of research problems dominating in the study. The analysis of the network connections showed that innovation is the most important element of S3. The research focuses on S3 identification in EU regional policy, sustainable development management, innovation, cohesion policy and innovative mutual cooperation. The research gaps identified are the role of S3 in the development of SMEs and involvement participants in identifying S3 representing all quadruple-helix environments.

The implementation of the Smart Specialisation Strategy (S3) required European regions to identify technological areas where they have a unique innovative capacity. Regional specialisation shows dependence and connection to the existing knowledge base [D'Adda et al. 2019, p.1006].

Elaborated within the GoSmart BSR Trans-S3 project, it is the result of a combination of literature knowledge, existing EU practices in the implementation of S3, and the involvement of stakeholders such as: policy and decision-makers, representatives of business and clusters, local/regional/national associations and governments, experts and practitioners in the field of European regional and urban policy, NGOs, academia.

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Strategia Inteligentnych Specjalizacji - analiza bibliometryczna i praktyki projektu GoSmart BSR

Streszczenie

Celem artykułu jest przedstawienie praktycznych rozwiązań zastosowanych w projekcie GoSmart BSR do identyfikacji transnarodowych strategii inteligentnych specjalizacji w świetle aktualnych kierunków badań naukowych na rzecz strategii inteligentnych specjalizacji. W artykule wykorzystano analizę opisową wyników i analizę bibliometryczną z zastosowaniem narzędzi dostępnych w VOSviewer oraz w bazie SCOPUS. Przegląd bibliometryczny opiera się na danych z bazy Scopus. Wyszukiwane artykuły zawierały słowa kluczowe „Strategie Inteligentnych Specjalizacji". W artykule przedstawiono wyniki badań bibliograficznych z wyodrębnieniem 5 klastrów oraz założenia Metodyki dla Strategii Transnarodowych Inteligentnych Specjalizacji, które porównano z kierunkami badań występującymi w literaturze.

Słowa kluczowe

analiza bibliometryczna, GoSmart BSR, Strategie Inteligentnych Specjalizacji (S3), Transnarodowe Strategie Inteligentnych Specjalizacji (Trans-S3)