

ANALYSIS OF PUBLICATIONS ON DECISION-MAKING STRATEGIES IN HIGHER EDUCATION INSTITUTIONS

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Purpose: The aim of this article is to present analysis literature interested in decision-making strategies in higher education institutions. Author keywords contained in the publications were analysed to show links between them and present recent interested areas of strategies in higher education.

Design/methodology/approach: Analysis based on bibliometric data of world literature published in Web of Science and Scopus. The study included a quantitative analysis of publications. The results are presented in tables, graphs and figures.

Findings: The successive part of the publication analyses the 4125 documents in Web of Science and Scopus. Based on the 2886 documents searched in Scopus, author keywords were analysed and connections between them were visualised (software support visualisations). The study identified an increase in interest in topics such as “sustainability”, “instructional strategies”. The analysis of publications interested in strategies, higher education institutions and decision-making showed that 57 publications met the defined search criteria. Only 12 of these were published up to 2012, while the remaining 46 were published in the last 10 years. Recurring author keywords in recent publications are: "strategic management", "strategic decision-making", "strategic decisions". Earlier publications have also included such keywords as “innovation”, “sustainability”, “information systems”, “knowledge management”.

Research limitations/implications: Research based on two literature bases, limited to English language. Next step of research can be made in all languages and more publication bases. The study focuses on quantitative analysis of publications based on author keywords. The research should be expanded of a detailed and qualitative analysis of the publications found and their evaluation in terms of strategies in university decision-making. It would be reasonable in the analysis and interpretation of the results obtained to group or standardize the keywords used in publications, e.g. “decision making” and “decision-making”.

Originality/value: Paper presents bibliometric analysis of publication interested on strategies in higher education institutions decision-making. The analysis has made it possible to identify trends in the literature based on author keywords. The results of the survey shows the growing interest strategies in decision-making in higher education institutions.

Keywords: Decision-making, strategies, higher education institutions, universities.

Category of the paper: Literature review.

1. Introduction

There is no doubt that higher education organizations has strategic importance for society. Given the size of universities in Poland, the vast majority of them qualify for such management, as is the case in large companies (Popławski 2016, p. 423). Even the largest universities are managed by eminent scholars of various specialties and management is intuitive, generally ignoring the methods and techniques used in large business organizations (Dominiak, Leja, 2016, p. 27). Studies carried out in Polish universities showed the problem in the implementation of the strategy and its low usefulness in management (Zeller, 2011; Piotrowska-Piątek, 2015; Popławski, 2016). Antonowicz (2021, p. 22) in his report on the management of research universities, finds that in Polish higher education a substitute for such thinking is created by IDUBs (Excellence initiative - research university). This publications indicate the need for interest in this topic and practical application in higher education.

Recognizing this gap in the Polish literature while finding in it a justification for the need to improve the strategies in decision-making in management of higher education, the author undertook an analysis of the international literature in this area.

The main purpose of article is to analyze of strategies and decision-making in higher education institutions publications. To achieve this goal, a bibliometric analysis was used. Bibliometric analysis implies the quantification of documentary streams of information and the use of quantitative indicators of various databases, reflecting the state of science or its individual fields (Marszakowa-Szajkiewicz, 2009). The use of this method made it possible to conduct a literature review and identify trends in the literature based on author keywords.

2. Methods

The aim of this article is to present the results of a bibliometric analysis of publications meeting certain criteria in scientific publication databases. A diagram of the research procedure carried out is shown in Figure 1.

The analysis was carried out in two stages of work. The first stage was completed in June 2023 with the identification and definition of keyword search queries. Based on the literature review and the keywords used in terms of: strategies, higher education, decision-making.

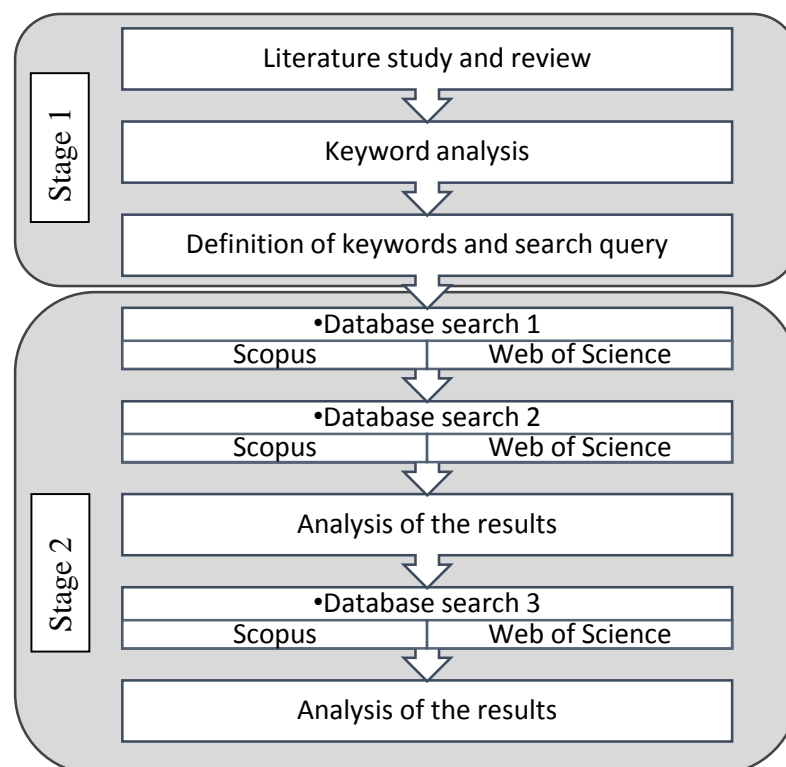


Figure 1. Scheme of the research procedure.

Source: author's own study.

The next stage (conducted in September 2023) of the research was to search the databases for selected author keywords. The analysis began with a search for publications in English in two bases: Scopus and Web of Science. The second search was conducted containing strategies and higher education institutions. Based on the results, a quantitative analysis of the publications, an analysis over time and a keyword correlation analysis were carried out. Using a spreadsheet and a visualisation tool, the results were analysed and presented in the results chapter 3.1. The next step was to deepen the analysis indicated to publications containing decision-making. The results obtained in each database were compared and analysed using a spreadsheet and visualisation tool. Section 3.2 describes the results obtained. The results were illustrated with graph, tables and visualisation views. The analyses carried out focused on quantitative analysis of usage in publications from author keywords over time. This analysis identified areas of interest in publications and their variability over time.

3. Results

First step of publication analysis was carried about language. The search identified the English language of publication as the most popular and widely used language in internationally recognized journals. In both analyzed bases English dominates and it represents more than 95%

of publications (Vera-Baceta, Thelwall, Kousha, 2019, p. 1806). The results were even greater in a survey conducted on 26.09.2023. In Scopus base more than 99% documents has English language 81,129,747 of 81,735,805 (filter on language: English). In Web of Science it is not possible to search the database for all English-language publications. It is necessary to add an additional query. Adding "1" to the search resulted in 97% having English language (22,387,118 out of 23,156,894). Further steps in searching and analysing data are described in the following subsections.

3.1. Strategies in higher education institutions

The first research topic was about strategies. There are a lot of variations to find strategies in the analysed publications: strategies, strategic, strategic planning, etc. It was decided to use the phrase "strateg*", which includes all these possibilities (using the "*" mark for wildcard search). Table 1 presents the search parameters for English-language publications and strategies.

Table 1.
Search parameters for English-language publications and strategies

	Web of Science	Scopus
Advance search query	AK=(strateg*) AND LA=(English)	AUTHKEY ("strateg*") LIMIT-TO (LANGUAGE , "English")
Results	186,793	229,881

Source: author's own study.

Finding keywords about higher education institutions was more complicated, authors use different phrases: higher education, universities, education in author keywords. For better fitting and narrowing for higher educations it was decided to use two phrases interchangeably in the search: "higher education" and "universit*" (for wildcard search to account for different variations: universities, university). Table 2 presents the search parameters for English-language publications and strategies in higher education. 2,619 publications (using a total of 16,885 keywords) meeting the criteria were found in the Web of Science database. In the Scopus database, 2,886 publications and 19,886 keywords were found.

Table 2.
Search parameters for English-language publications and strategies in higher education

	Web of Science	Scopus
Advance search query	AK=(strateg*) AND LA=(English) AND (AK=(higher education) OR AK=(universit*))	AUTHKEY ("strateg*") AND AUTHKEY ("higher education" OR "universit*") AND (LIMIT- TO (LANGUAGE , "English"))
results	2619	2886
Total number of occurrences of author keywords	16,885	19,366

Source: author's own study.

A comparative analysis of the results obtained for the individual databases showed a duplication of 1353 items in the Web of Science database. The sum of publications from both analyzed databases concerning strategies and higher education institutions was 4152. The analysis of publication years in figure (Figure 2) shows a dynamic increase over the last 20 years.

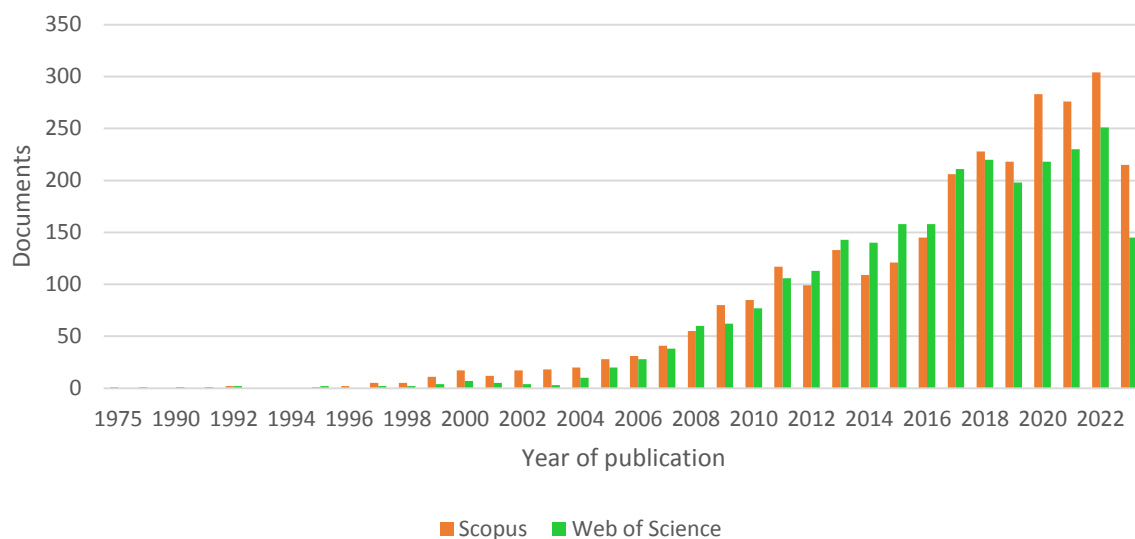


Figure 2. Comparison of the number of publications found in Scopus and Web of Science databases.

Source: author's own study.

Among the publications found 67% were Articles, 16% Proceedings Paper, 10% Conference paper (Table 3).

Table 3.

Number of publications by type of publication

Article	Proceedings Paper	Conference paper	Book chapter	Other
3185	782	395	154	359

Source: author's own study.

In the next step of the study, linkage analysis was performed using VOSviewer to visualise the networks between keywords. The creation of a linkage map requires the import of data extracted in the appropriate format from the selected bibliometric database. The system analysed 8905 keywords from 2886 publications. To visualize the data, the minimum number of occurrences was defined as 10. The system identified 211 thresholds (Figure 3).

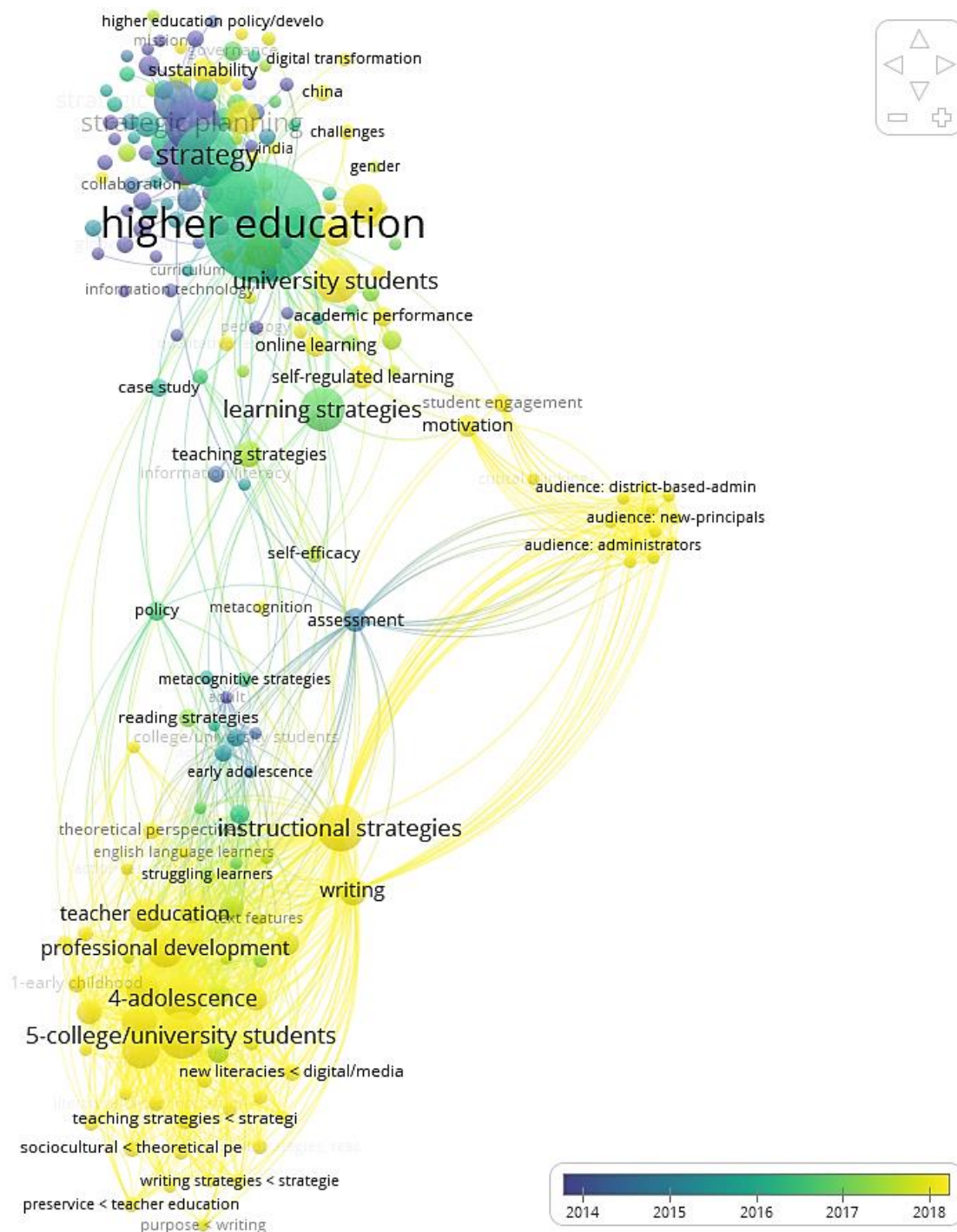


Figure 3. Overlay visualization of networks between keywords of 2886 publications from Scopus base by years.

Source: author's own study.

Analysis of the database allowed the number of occurrences of individual keywords to be determined. “Higher education” were used as a author keyword in 922 publications and next 480 times was element of phrase (“higher education institutions” 91, “higher education management” 10), next “strategy” 256 times, “strategic planning” 199 times, “universities” 167, “university” 165, “instructional strategies” 142. Figure 3 shows the results of the analysis in the form of a visualisation. In the image below, the colours indicate the years of appearance:

the lighter the colour, the greater the number of recent publications with the keyword. The visualisation makes it possible to assess trends in the occurrence of specific keywords in specific years, thus allowing to identify trends in the areas of interest of the publications under study over time. In recent years, there has been a clear increase in interest in topics such as “sustainability”: 127 appearances since 2000, including 90 since 2018, or “instructional strategies” 100 appearances since 2008, including 71 since 2018. “Innovation” has appeared in keywords in 162 publications, 127 of them in last 10 years. “4-adolescence” has appeared 121 times, but most publications were from 2017-2020 (98 which is 80%).

The oldest publications found that meet the criteria are from 1975 (Forward, Wells, Canter, Waggoner, 1975) and 1989 (Chapelle, Mizuno, 1989) both of which deal with students rather than university organisations. Two other publications were related to universities, but did not deal with issues of interest to this study (Potworowski, 1990), (Heiskanen, 1991). It was necessary to conduct a search that took into account the issue of decision-making, which is described in the next subsection.

3.2. Strategies in higher education institutions decision-making

Identification of publications related to decision-making required modification of the search. Query had to take include various phrases related to the issue of decision-making. Therefore, the decision was taken to use the phrase “decision*” which would take into account the later forms of writing (“decision making process”, “strategic decisions”, “decision analysis”, “decision process” etc.). Table 4 presents the used advance search query and given results in Scopus and Web of Science.

Table 4.

Search parameters for English-language publications and strategies in higher education

	Web of Science	Scopus
Advance search query	AK=(strateg*) AND AK=(higher education) AND AK=(decision*) AND LA=(English)	AUTHKEY ("strateg*") AND AUTHKEY ("higher education" OR "universit*") AND AUTHKEY ("decision") AND (LIMIT-TO (LANGUAGE, "English"))
Results	24	57
Total number of occurrences of author keywords	152	317
Number of used author keywords	100	242

Source: author's own study.

Search gives 57 documents found in Scopus and 24 in Web of Science, mostly after 2000 year. The number of publications by years is shown in Figure 4. By comparing the results obtained, it can be concluded that all 24 publications searched in Web of Science are included in the 57 publications meeting the criteria set in Scopus. A keyword analysis was therefore carried out on these 57 publications. Total number of occurrences of author keywords was 317. Number of used author keywords was 242.

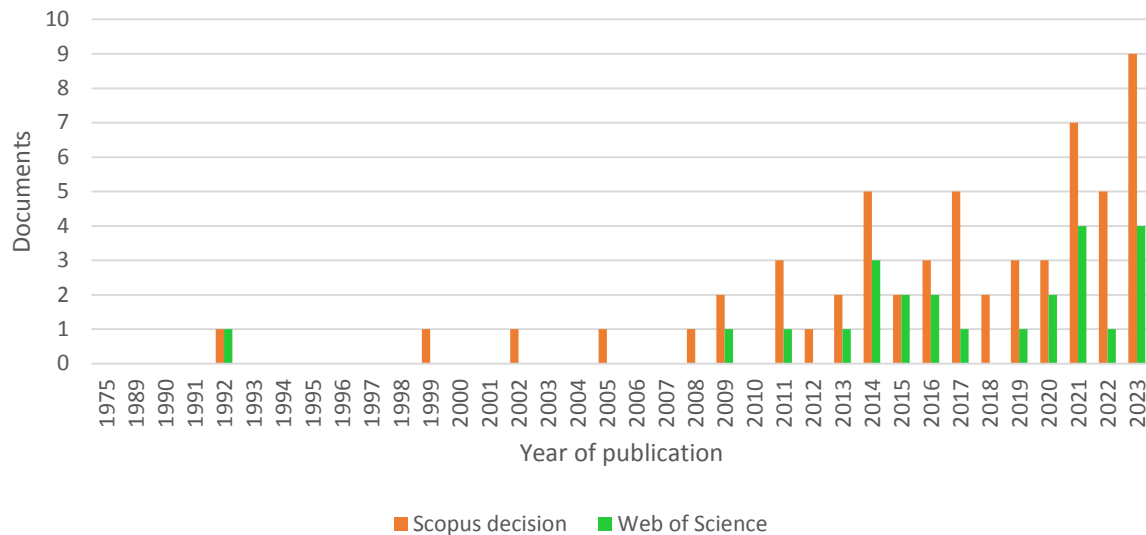


Figure 4. The number of publications found in Scopus and in Web of Science that included the term "decision".

Source: author's own study.

The oldest publication meeting the search criteria dates back to 1992 (Shipley, MF). Another publication was not issued until 1999 (Milton-Smith, Schmidenberg, Klass, 1999). Both publications dealt with the subject of decision support systems which appeared in 3 other publications (Ibrahim, Sundgren, Larsson, 2014; Akhmetov et al., 2018; Zagrajek et al., 2023). By 2012, there were only 11 publications addressing topics in decision-making, strategy and higher education institutions simultaneously. In the last 10 years, 46 publications have been published in this area. The largest number of results is from 2023 (9 publications), despite the study was conducted during its duration, which means that the number of papers meeting the selected criteria is likely to be much higher (especially given the delays in adding publications to the database, the length of publication cycles). The results of the survey shows the growing interest in the topics covered in this publication.

Linkage analysis was performed using VOSviewer to visualise the networks between author keywords for these 57 publications. The Figure 5 shows every single author keyword combination in the publications by years.

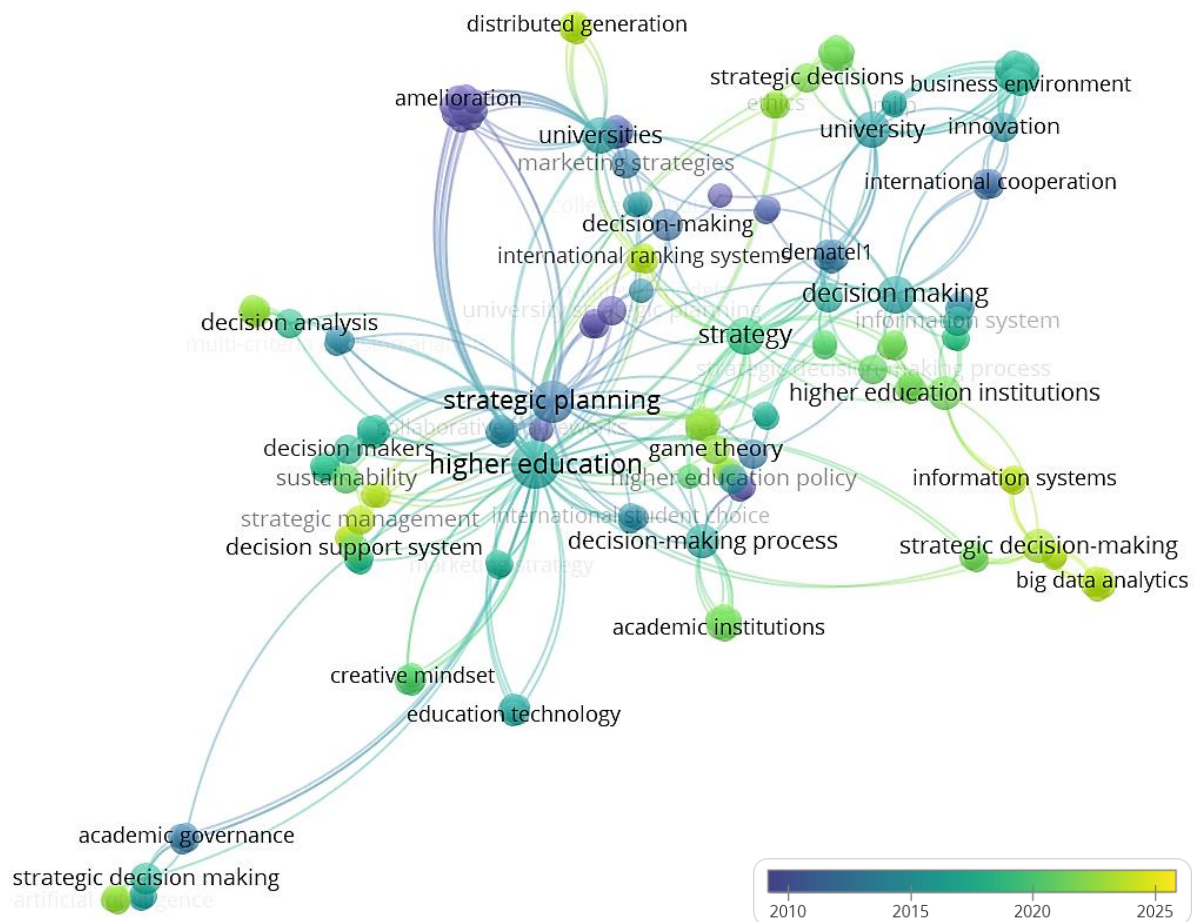


Figure 5. Overlay visualization of networks between 57 publications, 242 keywords base by years.

Source: author's own study.

Due to the diversity of keywords and the desire to find links between them in publications, it was decided to generate a visualization showing the links of keywords occurring a minimum of two times. This narrowed the number of keywords to 30. The visualization of links is shown in Figure 6. In the visualization shown, it can be seen that several other keywords reflecting the areas of interest of the authors of the research and publications appeared among the publications in the fields of strategy, decision-making and universities. Issues related to “game theory” were included in 2 of the 57 publications surveyed. Interestingly, in terms of 4125 publications from both analyzed databases concerning strategies and higher education institutions, “game theory” were included in 4. Other keywords recurring in recent publications are: “strategic management”, “strategic decision-making”, “strategic decisions”. Earlier publications have also included such keywords as “innovation”, “sustainability”, “information systems”, “knowledge management”.

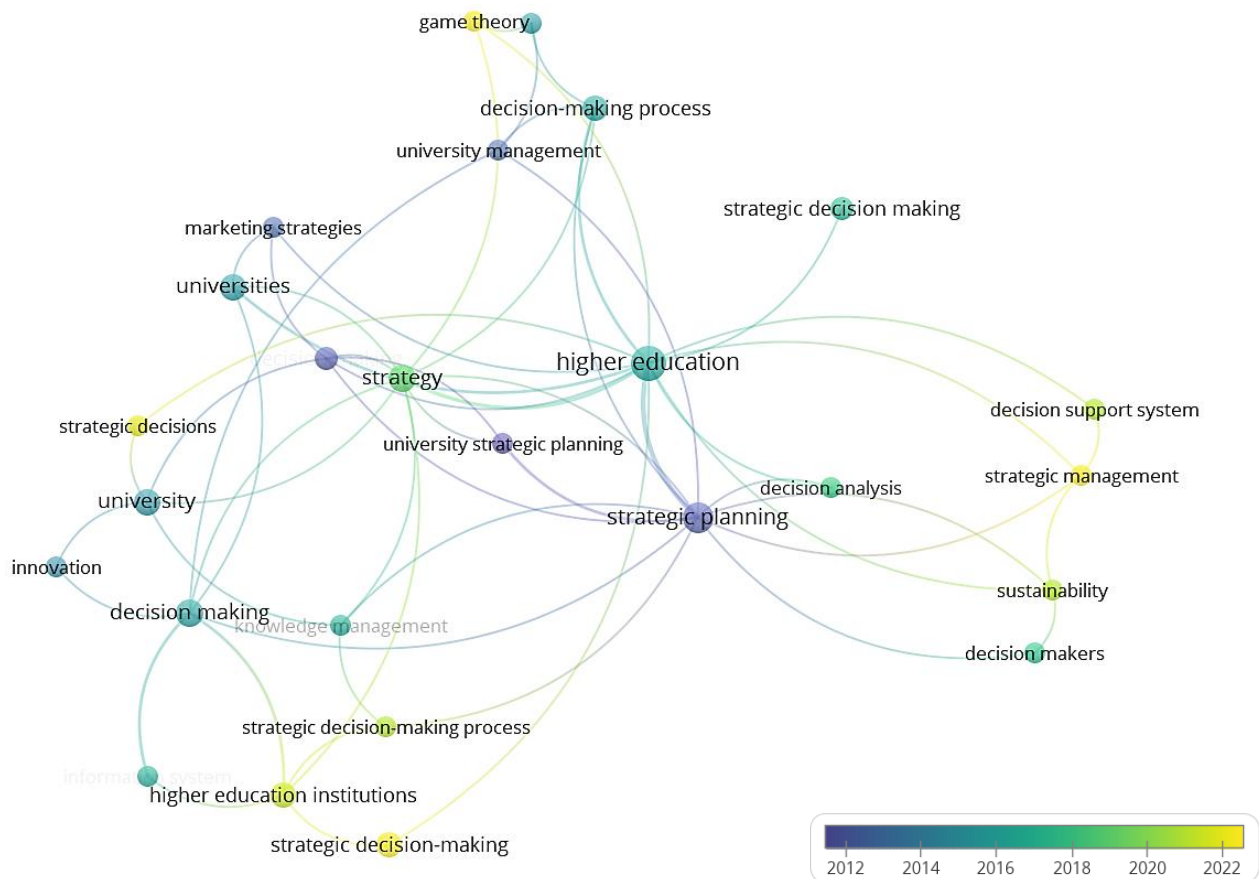


Figure 6. Overlay visualization of networks between 57 publications, 242 keywords (occurring a minimum of two times) base by years.

Source: author's own study.

4. Discussion

A preliminary analysis of the literature revealed the need for interest in decision-making strategies and their practical application in higher education in Poland. Recognising this gap in the Polish literature and at the same time justifying the need to improve decision-making strategies in higher education management, the author undertook an analysis of the international literature in this area. A systematic literature review using bibliometric analysis revealed a lack of similar studies in the literature. Therefore, a research gap was identified and the study is a contribution to scholarship. It is difficult to refer to similar studies as no such studies were found in the literature.

The study is a comprehensive literature analysis of the Scopus and Web of Science databases for the specified author keywords. It shows a growing interest in the topics covered and makes it possible to identify time trends in the topics covered. The study focuses on the quantitative analysis of publications based on keywords. The next stage of the research should

consist of a detailed qualitative analysis of the publications found and their evaluation in terms of strategies in university decision-making.

An analysis of 57 publications showed different keywords with the same meaning were used. Various publications have used the phrases: “decision making”, “decision-making”, “decision-making process”, which all mean the same thing. The same meaning also applies to “university” and “universities”. Although they are included in the search, they are shown separately in the visualisation. It would be reasonable in the analysis and interpretation of the results obtained to group or standardize the keywords used in publications.

5. Summary

The study finds 2619 publications (with a total of 16,885 keywords) in the Web of Science database, and 2886 publications in the Scopus (with 19,886 keywords) in English-language publications concerning strategies and higher education institutions in the author keywords. The sum of publications from both analyzed databases was 4,152 (comparative analysis showed a duplication of 1353 items). Based on the analysis, it is possible to indicate an interest in the topics as “sustainability”, “instructional strategies”, “innovation”, “4-adolescence”.

Deepening the analysis to publications that also included the issue of decision-making resulted gives 57 documents found in Scopus and 24 in Web of Science, mostly after 2000 year. All publications searched in Web of Science are included in the publications meeting the criteria set in Scopus. Therefore, 57 publications were analyzed. 81% of publications addressing the topics of decision-making, strategy and higher education institutions at the same time, were published after 2012. By September 23 in 2023, 9 items on this topic had already been registered in the publication databases. The results confirm the increasing interest in the topics taken up. Earlier publications have also included such keywords as “innovation”, “sustainability”, “information systems”, “knowledge management”. In recent publications, the most common keywords are: “decision support system”, “strategic management”, “strategic decision-making”, “strategic decisions”, “game theory”. Thus, it can be pointed out that these keywords indicate the current areas of research interest for scientists.

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