

ROMANIA AND INTERNATIONAL RELATIONS. BILIOMETRICALLY ANALYSED

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ABSTRACT: *The purpose of this research is to examine the way to analyse Romania's international relations in the current context of expanding international collaborations and the globalization process through scientific articles. The bibliometric analysis was carried out on 335 articles selected with the help of keywords and filters specific to bibliometric analysis from the Web of Science database. Romania international relations is the keyword and we used following the filters: the countries from Europe and the publication period of articles to have been between 2019-2023. Analyses on territorial distribution and author affiliation were based on WOS and VOSviewer software functions, and those on word and phrase density used word cloud software, Word Art, and VOSviewer software. The generated results after we used filtering in VOSviewer revealed 4 clusters containing 41 words. The conclusions highlighted the medical field as predominant in our selection, also considering the current post-pandemic period.*

KEY WORDS: *Romania international relations, Web of Science, bibliometric research, Word art, VOSviewer.*

JEL CLASSIFICATIONS: *F50, H70, P33.*

1. INTRODUCTION

Based on the current state of international relations and global security, international organizations face challenges in maintaining a world order. In the existing scientific works in the WOS database, various perspectives are highlighted aimed at a

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more complete understanding of the problem of defining international relations and security in the fields of politics, law, sociology, history, economics, cyber terrorism, as well as in other fields of modern society. The behaviour of people today leads to the preservation of borders, closer or more distant, for adaptation and understanding the different contexts, that leads to transformation, progress and development of economic structures through the internationalization process (Militaru et al., 2023).

Interaction and interconnection within the European continent and states worldwide is constantly developing, so that goods, capital, people and knowledge easily cross-national borders. Global economic systems, finance and production are interconnected, while modern communication networks and information technologies are changing the very nature of communication. However, this international cooperation process also brings certain problems. The biggest problem when it comes to developed countries is related to the problem of inequality, which is divided into two dimensions, both within and between countries. The process of globalization, which is the basis of international relations, is not finished, nor will its achievement be easily definitive. As long as forces are opposing the process, globalization will not be fully achievable, but it will be more decisive. If globalization is the achievement of economic growth and progress, then by definition that process should refer to all countries as a global community and not lead to a widening of the gap between countries. Thereby, the digital and socioeconomic differences must be taken into account, to highlight the exclusions and constraints from the globalization course to which the states are subjected in this period of transformations (Velicu et al., 2022).

In the actual financial context, the international relations of the states must be related with the fluctuation or volatility of profit, the analysis also consider the recent manifested worldwide pandemic and which, through the measures of distancing people, caused an unexpected drop in business and consumer revenue. This state led to a recession that affected the economy at global level (Manea et al., 2022).

Romania is and has been a component of regional relations at the European level. Through this paper, I want to do a bibliometric analysis of scientific articles from the Web of Science database regarding the capture of aspects related to Romania's international relations. Romania at the level of the national economy is still in a situation of unfavourable imbalance. Still, there are also signs of recovery of the trade deficit, from the point of view of specific indicators of a stable market economy. But Romania's international relations are not only focused on economic flows. That is why through the current research we want to discover what other aspects can be related to the intonation relations of Romania.

2. LITERATURE REVIEW

Scientific research, practical experiments and conclusions presented in scientific papers provide a quality basis for improving the vision of international relations, a current topic in globalization, and can provide a scientific approach to identifying and solving this problem. At the same time, scientific research provides guidelines for future topics that should be discussed and researched in more detail. That is why in this article we have tried to approach this topic to be updated by

processing several software the scientific articles present in the Web of Science database.

A critical reflection on the current situation of international relations, which is contained in various scientific works in various fields, can show where international relations are today, being burdened by war conflicts, refugee columns, and threats to the international address. legislation and reducing the role and importance of international organizations such as the UN. The search for the prospects of a multipolar world is the search for peace, the search for the further development of civilization and the survival of nature in the broadest sense of the word (Tripunoski et al., 2022).

European approaches to international relations theory are a house with many rooms, (Routledge et al, 2004) but need to be analysed through systematic studies that can be focused on the scientific publications of researchers, at the European level, to assess the impact of the studies presented taking into account the field, the theoretical approach and the methodological bases of each article, to generate previously unexplored findings on research in the field of international relations (Calcara & Vittori, 2019).

An adjacent problem of the international relations process is represented by citizens' digital skills. Thus, states must implement policies regarding skills improvement or retraining to be able to add value within the economic organizations in which digitization efforts have been applied. (Barbu et al., 2023). Thus, almost half of Europe's population does not have the basic skills in digitalization, and a third of European citizens do not have digital skills. The current situation constitutes a risk to the labour market and may lead to problems regarding the capacity for innovation in existing industries at the European level (Alexe & Alexe, 2021). Other research identifies that management policies considering international politics can influence financial results at the economic agent level, at the national or international level (Păunică et al, 2021).

3. RESEARCH METHODOLOGY

Bibliometric analysis was carried out on the data from Web of Science using the World Art and Vosviewer programs as work tools. In 2010, two Dutch researchers, Nees Jan van Eck and Ludo Waltman, from the Center for Science and Technology Studies, Leiden University and the Econometric Institute, Erasmus School of Economics, Erasmus University Rotterdam, announced in an article published in *Scientometrics* that they created a software tool for creating bibliometric maps based on network data, but also for viewing and exploring these maps, a tool called VOSviewer that offers three types of views of a bibliometric map: network view, overlap view and density view.

The term "bibliometrics" was presented in the *Journal of Documentation* for the first time, by Robert Fairthorne in 1969, which he defined as having been introduced "spontaneously" by Alan Pritchard (Fairthorne, 1969). Bibliometrics is based on principles from bibliography and statistical bibliography, as defined by Pritchard, being an application of mathematical and statistical methods to books and other means of communication. (Broadus, 1987).

The database was queried for the tag "Romania international relations", without filters, and the result was 1123 articles. The authors wanted to capture Romania in international relations with European states and to analyse the latest published scientific articles, and that is why we used the following filters consecutively: publication years 2019-2023 and the authors' affiliation - European states, with a result of 355 articles, on which we will do the bibliometric analysis.

The first and foremost approach in bibliometric analysis we used the analysis appropriated to the years of publication, the number of articles per nation (also through WOSviewer) and according to affiliation. We continued with an analysis in which we starting to compare from the density of word through the word cloud, to see the similarity of words often used in association with "Romania international relations", according to the article's names, the abstract, keywords of authors and keywords plus.

The analysis was conduct using the WOSviewer application, to identify the density of words or phrases that were used within the selected articles. We used filters for co-occurrence, author keywords, minimum of 10 co-occurrences. The specific networks generated by applying this are presented as pairs of items that used a specific set of co-occurrences when the functions of the WOSviewer software are applied (Radu et al, 2022).

After presenting the results provided by the WOSviewer software, we analysed the 4 resulting clusters by associating them with Romania's international relations. Phrases and words with the highest link strengths were associated with research cluster-specific graphs with the component notions and links to the other clusters.

4. RESULTS

The sample of articles on which we performed the bibliometric analysis was constituted by querying the Web of Science database for the tag "Romania international relations", the outcome is a number of 1123 articles that contain in the title, in the content of the article or in the abstract this tag. The first filter applied was that the period of publication of the articles should be 2019-2023 and the second specific filter was that the articles be written by authors from European countries. In Table 1 we presented the specific steps by which 355 articles remained in the selection.

Table 1. Filters used when querying Web of Science

Filter applied	Number of items in the selection
Keywords " <i>Romania international relations</i> "	1123
Period of publication 2019-2023	850
State from Europa	355

Source: Web of Science database (accessed on 04.11.2023)

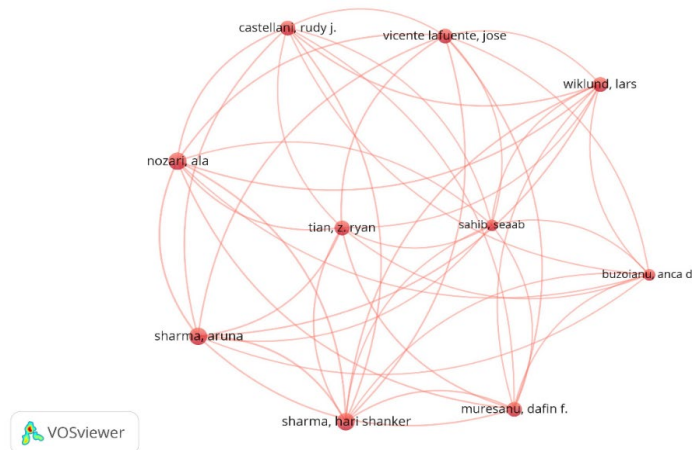
In Table 2 we presented the distribution over the 5 years of publication of scientific articles in which we observe an increasing evolution of the number of articles within our section, less 2023 which is incomplete because the research on the sample was carried out on November 04, 2023, which leads us to the conclusion that there is a growing interest in analysing Romania's international relations.

Table 2. Distribution of the 355 articles retrieved from the Web of Science query

Year	2019	2020	2021	2022	2023
Number articles	52	77	88	84	54

Source: Web of Science database (accessed on 04.11.2023)

In figure 1, we presented the first 10 authors according to the number of articles in the database subject to our research, using the analysis of the bibliometric results from the Web of Science database. From the analysis of their membership, we see that the majority are representatives of medical universities both at international and national level, namely Northwestern University - Feinberg School of Medicine, University of the Basque Country, Boston University, Iuliu Hatieganu University of Medicine Pharmacy, Carol Davila University of Medicine Pharmacies. Also, another observation is that of the collaboration in writing the articles are researchers from outside Europe.



Source: Own conceptualization, data processing from Web of Science

Figure 1. Relation of the first 10 authors of articles in the selection

Considering that the first 10 authors are both Romanian authors and institutions from Romania, we continued the analysis of the sample by comparing the results of the existing filters at the level of the Web of Science database and the processing of these data with the WOSviewer software. Thus, in table 3 we have represented the number of articles for the first 10 affiliations of higher education institutions, in table 4 the links resulting from processing with WOSviewer, having established as conditions a minimum number of 5 documents per organization and a minimum number of 5 citations per organization. Thus, only 29 affiliations complied with these conditions.

From the analysis of the 2 tables, we see that the trend is maintained for universities with specific medical or those that have faculties in the medical field to have more scientific articles and more links. Considering that in this post-pandemic period the medical field is marked by discoveries and collaborations to face the new realities is also validated by the scientific publishing activity.

Table 3. Number of articles per affiliation retrieved from the Web of Science query

Affiliations	Record Count
Babes Bolyai University from Cluj	56
Bucharest University of Economic Studies	28
Alexandru Ioan Cuza University	26
Romanian Academy of Sciences	25
Carol Davila University of Medicine Pharmacy	23
West University of Timisoara	23
Iuliu Hatieganu University of Medicine Pharmacy	21
Transylvania University of Brasov	21

Source: Own conceptualization, data processing from WOS (accessed on 04.11.2023)

Table 4. Number of articles, citations and links per affiliation

Organization	Documents	Citations	Total link strength
Iuliu Hatieganu University of Medicine Pharmacy	15	55	19
Roneuro Institute	5	39	18
Babes Bolyai University from Cluj	42	311	15
Alexandru Ioan Cuza University	19	73	10
West University of Timisoara	21	146	10
Carol Davila University of Medicine Pharmacy	12	296	8
Bucharest University of Economic Studies	22	136	7
Romanian Academy	19	163	7
Grigore T Popa University of Medicine Pharmacy	5	23	6

Source: Own conceptualization, data processing with WOSviewer (accessed on 04.11.2023)

The analysis of the sample of articles from qualitative point of view was first performed using the cloud of words contained in the article title, author keywords, abstracts and plus keywords. The plus keywords analysed in a bibliometric search are as actual as the authors' keywords for analysing the structure of knowledge in each scientific field.

The words that have the highest frequency following the analysis with the Wordart software: *Relate, Study, Result, Develop, Effect, Model, Country, Analysis, Differ, Research, Data, Level, Factor, Associate, Base, and Economic*. Using this analysis, it come out that the scientific articles are oriented to studies results and analyses of some research studies. As we have seen, articles in the medical field have strong connections. Using the Wordart application, we highlighted the words with the greater frequency by aspect size in figure 2.

The second analysis regarding the density of phrases or words used in the articles in our selection was carried out through the VOSviewer software, where we applied the co-occurrence filter, for all keywords, minimum number of occurrences of a word 6. Of the 2917 words with 41 frequent occurrences met this criterion and the graphic representation made with the VOSviewer software is presented in figure 3.

Table 5. Link strength between articles analysed by Keyword function

No	Keyword	Occurrence	Total link strength
1	impact	21	39
2	depression	16	33
3	anxiety	13	32
4	performance	19	32
5	adolescents	13	30
6	management	16	29
7	covid-19	17	27
8	risk	18	24
9	health	10	20
10	satisfaction	10	19
11	romania	20	15

Source: Own conceptualization, data processing from WOS with the VOSviewer software.

Table 6. VOSviewer clusters and related colours

Cluster 1 (12 items)	Cluster 2 (11 items)
behaviour cancer country determinants economic growth Europe growth participation risk Romania trends women	attitudes european union governance impact impacts management migration perceptions policy quality sustainable development
Cluster 3 (11 items)	Cluster 4 (7 items)
anxiety covid-19 depression gender personality prevalence scale stress symptoms validation	adolescents children health oxidative stress performance satisfaction technology

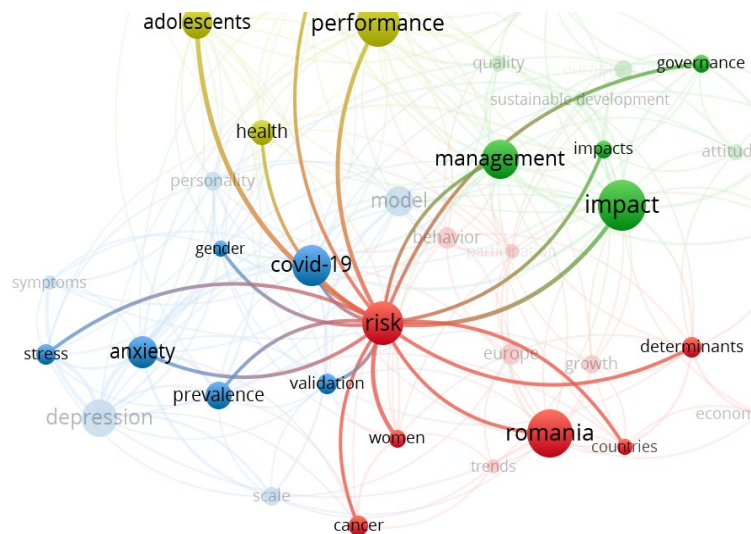
Source: Own conceptualization, data processing with VOSviewer (accessed on 04.11.2023)

We grouped the keywords into 4 clusters in which are 41 items. The cluster in the VOSviewer software represents a suite of items that are included in a bibliometric map, an article can be found only in one cluster, but some articles are not included to any cluster. Table number 6 includes the essences of the 4 clusters that results from the

analysis with the VOSviewer application. According to this data, the analysis will continue with each cluster.

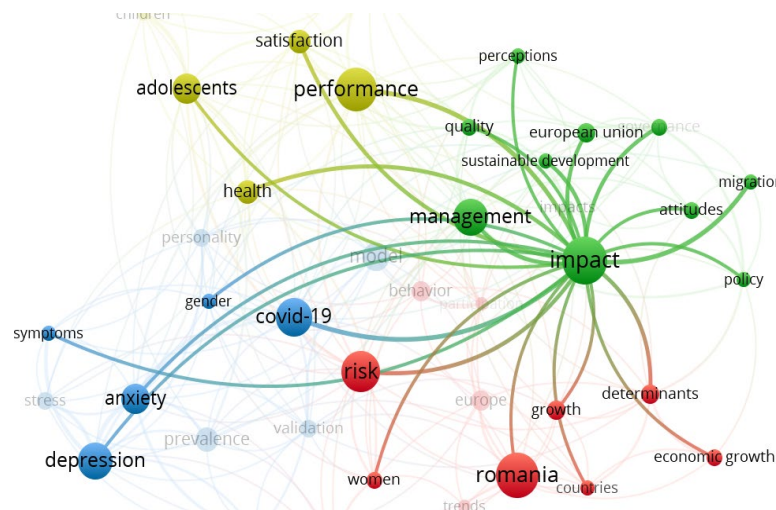
To analyse the links between and within the clusters, we chose one word from each, with the strongest links within each, according to the data in table 7 as follows:

- cluster 1 - "keyword risk with link strength 24", (figure 4);
- cluster 2 – "keyword impact with link strength 39", (figure 5);
- cluster 3 - "keyword depression with link strength 33", (figure 6);
- cluster 4 - "keyword performance with link strength 32", (figure 7).



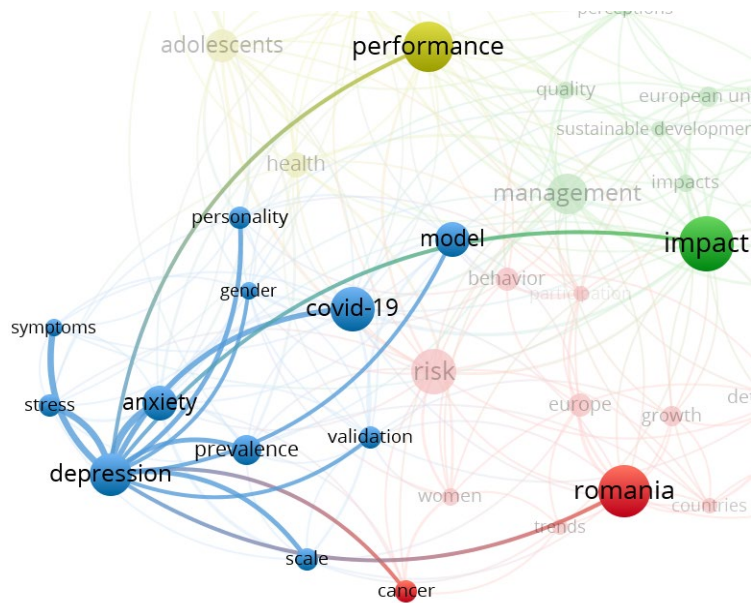
Source: WOS database (accessed on 04.11.2023), made with the VOSviewer software

Figure 4. The links keyword risk



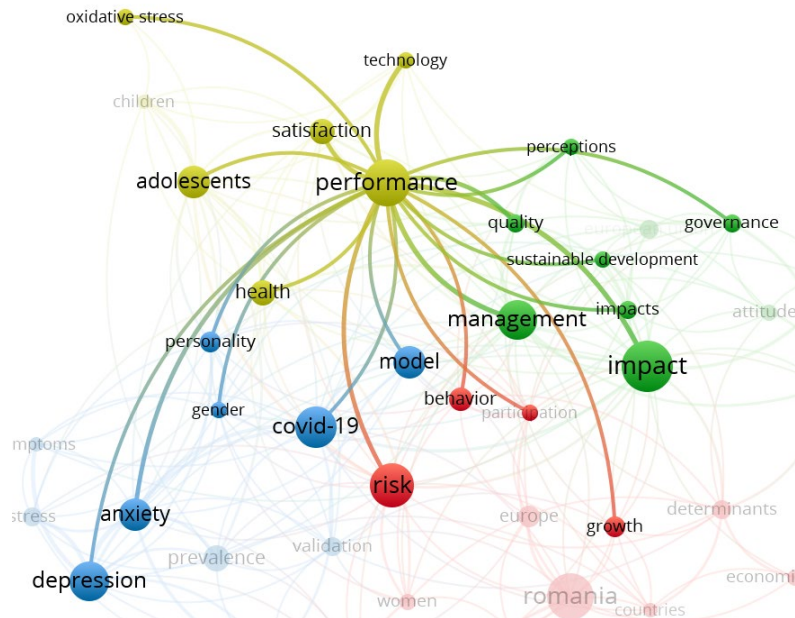
Source: WOS database (accessed on 04.11.2023), made with the VOSviewer software

Figure 5. The links keyword impact



Source: WOS database (accessed on 04.11.2023), made with the VOSviewer software

Figure 6. The links keyword depression



Source: WOS database (accessed on 04.11.2023), made with the VOSviewer software

Figure 7. The links keyword performance

Limitations of bibliometric analysis

Following the application of specific Web of Science filters, some scientific articles could have been excluded that could have modified the analysis carried out. To deepen research on the topic of international relations, bibliometric maps can be extended beyond the current study, by analysing the network of co-authors, number of citations, analysis of worldwide authors, correlations between membership groups, etc. To have a more comprehensive analysis, we should also access other databases: Scopus, Dimension, Lens or PubMed.

5. CONCLUSIONS

The research based on the bibliometric analysis within this article is a tool with which we observed the current state of Romania's international relations.

The results of the analysis within the 4 clusters are:

- Cluster 1 draws attention to the possibility of the emergence of some risks that Romania may face, such as economic growth in the context of globalization and its participation in various European and world projects. We also see the links with the other 3 clusters in terms of impact, management, performance and influences following the covid 19 pandemic.
- Cluster 2 analyses international relations from the point of view of the impact of the implementation of sustainable growth policies at the European level.
- Cluster 3 deals with international relations from a medical point of view in the post-COVID-19 pandemic period, namely the symptoms of depression, stress and anxiety caused by it.
- Cluster 4 contains articles that perform at the level of international relations because of the implementation of technological development, under conditions of risk and in compliance with the principles of management and sustainable development.

Romania's international relations can be analysed, at the level of the results from each cluster separately, highlighting the authors' countries of origin and the structures to which they belong.

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