BIBLIOMETRIC ANALYSIS OF THE EVOLUTION OF THEMES AND RESEARCH DIRECTIONS IN ECONOMIC SECURITY IN THE CONTEXT OF DIGITALIZATION

БІБЛІОМЕТРИЧНИЙ АНАЛІЗ ЕВОЛЮЦІЇ ТЕМИ ТА НАПРЯМКІВ ДОСЛІДЖЕННЯ ЕКОНОМІЧНОЇ БЕЗПЕКИ В УМОВАХ ЦИФРОВІЗАЦІЇ

The aim of this article is to examine the evolution of scholars' understanding of economic security and identify specific aspects of ensuring economic security in the context of digitisation. To achieve this goal, a combination of methods, such as bibliometric analysis, the matrix method, and retrospective analysis, was employed. The primary data source was the Web of Science (WoS) Core Collection database, which was processed using the R software package bibliometrix. Results of the presented research allow us to assert that the study of economic security cannot disregard themes related to the digitisation of economic processes, emphasising the importance of topics such as "blockchain", "digitalization" and "digital economy" in creating an effective system for ensuring economic security at all levels of management in the conditions of digitisation.
Key words: *Economic security, Digital economy, Food security, Bibliometric analysis, Web of Science.*

Метою статті є вивчення еволюції розуміння економічної безпеки науковцями та виокремлення специфічних аспектів забезпечення економічної безпеки в умовах цифровізації. Для досягнення цієї мети використовувалася комбінація методів, таких як бібліометричний аналіз, матричний метод та ретроспективний аналіз. Основним джерелом даних була база даних Web of Science (WoS) Core Collection, обробка яких виконувалася за допомогою R-пакету програмного забезпечення bibliometrix. Стаття розглядає динаміку продуктивності у галузі економічної безпеки, що свідчить про зростання актуальності теми серед дослідників. Кількість публікацій в цій області зросла із 30 статей в 2011 році до 295 статей на кінець 2023 року в базі даних Web of Science. Аналіз найбільш цитованих країн показує лідерство США, Об'єднане королівство, Німеччина, Франція, Австралія, Швейцарія, Італія, Україна та Китай. Визначено трендові теми за напрямком «економічна безпека» та аналіз слів, що визначають зміст проблеми дослідження. Згідно результатам бібліометричного аналізу станом на 2023 рік трендовими темами у дослідженні проблеми економічної безпеки є з такими ключовими словами як «відновлювана енергетика» (з 2017 року), наслідки «пандемії» та «Європейський Союз» (з 2019 року). За результатами кластерного аналізу виокремлено 46 термінів, які розділені на 10 окремих кластерів. Базовим терміном є «продовольча безпека», який з'явився в 109 статтях і мав посилання на більшість ключових слів на карті кластерів; другим найчастішим терміном є соціальна безпека. Побудовано тематична карта еволюції, яка складається із трьох етапів: 1993–2013; 2014–2019; 2020–2023. Зроблено висновок, що перша та друга стадія мало пов'язані з третьою стадією, оскільки між цими стадіями є лише одне спільне ключове слово; крім того, перший етап і другий етап мають більше спільних ключових слів порівняно з третім етапом, що свідчить про те, що фокуси цих двох етапів відносно близькі. Через відмінність третього періоду вирішено виконати тематичний аналіз шляхом побудови тематичної мапи і що дозволило сформувати низьку рекомендацій: такі теми як пенсійне забезпечення, виход на пенсію, аграрна політика та експорт є потенційними темами, які варто докладніше досліджувати в контексті економічної безпеки; окрім того при дослідженні економічної безпеки не можна уникнути тем пов'язаних із діджиталізацією економічних процесів. Тому варто враховувати теми «blockchain», «цифровізація» та «цифрова економіка» для створення ефективної системи забезпечення економічною безпекою на всіх рівнях управління в умовах цифровізації.
Ключові слова: *економічна безпека, цифрова економіка, продовольча безпека, бібліометричний аналіз, Web of Science.*

UDC 330.132.3:004.738(043.3)
DOI: https://doi.org/10.32782/dees.9-18

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Problem statement. The growing relevance of economic security is driven by the peculiarities of contemporary economic development, which is characterised by its variability, dynamism, and the multidimensionality of the economic environment. Economic security is an indispensable component of national security and serves as a foundation and material basis. Ensuring and maintaining an adequate level (state) of economic security is an ongoing process that involves the timely and pertinent identification of the components of economic security and its influencing factors.

Understanding the current factors influencing the state of economic security, as well as determining the level of their impact and consequences, allows for the creation of an effective management system for economic security, and ensures successful prospects in the era of digitisation.

Analysis of recent research and publications. Contemporary scientific literature encompasses various interpretations of the definition of "economic security". For instance, Buzan B. considers economic security as the state of the economy in which the well-being of participants in social relations and the stability of the country's internal market depend on external factors. However, the negative impact of the latter is offset by the reserves of economic entities, allowing for stability preservation [1]. Meanwhile, Morgenthau H.J. views economic security as a state where the state guarantees individuals certainty, including economic and security, but simultaneously poses a threat to them [2] and Maul H.W. defines it as

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the absence of threats to the economy arising from uncontrolled political processes [3].

The results of theoretical research on the definition of "economic security" led to the conclusion that most domestic scholars identify economic security as a property or a set of properties of a system. For instance, R. Datskiv defines economic security as the state of economic development of an economic entity (individual, state, organisation, etc.) that ensures harmonious development, effective utilisation of opportunities and elimination of threats from the surrounding environment [4].

The understanding of economic security in terms of its ability to resist various destabilising factors is explored in the context of the following directions: "theories of catastrophes", "theories of risks" and "theories of conflicts" and conflicts [5].

The conditions of digitisation have imposed new requirements on economic security, which has become the subject of study and research by both domestic and international scholars.

The purpose of this article is to explore the evolution of scholars' understanding of economic security and identify specific aspects of ensuring economic security in the context of digitisation.

Research methodology. The research methodology encompasses the execution of several tasks, including the formation of a sample of scholarly works (articles) from both foreign and domestic researchers, based on a relevant query in the Web of Science bibliometric database. The investigation involves analysing the dynamics of productivity by theme, identifying the most cited countries, determining trending subtopics under the direction of "economic security" and analysing words defining the research problem. Our study employed a combination of methods, including bibliometric analysis, matrix method, and retrospective analysis.

To prepare for this bibliometric research, the term "economic securit*" was selected, utilising the asterisk symbol to encompass all words belonging to the same lexical family. The Web of Science (WoS) Core Collection database was chosen as the primary data source because it is the best option in terms of age and frequent usage for research evaluation [6]. The focus is primarily on articles, excluding books, conference materials, or reviews. Publications with russian affiliations were excluded. Following the selection of various terms and application of the aforementioned parameters, 2476 articles were obtained from 1993 to 2023.

The R software package Bibliometrix was used for data processing. The R package is open-source software that contains various tools for conducting quantitative bibliometric research, including essential statistical and scientific mapping algorithms. A web interface program (Biblioshiny) was added to the latest versions of the R package bibliometrix to assist users who may not have the ability to code in the R language to develop input data for bibliometric analysis. The Biblioshiny interface allows users to import data from the Scopus and Web of Science databases in BibTex, CSV, or Plain Text formats. Data filtration was performed using Biblioshiny software. The WoS dataset was imported from the R package using biblioshiny features for Bibliometrix.

Presentation of the main material. The research was based on data from the Web of Science bibliometric database, with a dataset comprising 2476 articles spanning the years 1993–2023 (Figure 1).

The number of studies in the field of economic security increased from 30 in 2011 to 295 in the Web of Science bibliometric database by the end of 2023. It is important to note that this is not a final count, as the publication and indexing lag spans several months. Therefore, the projected number of indexed articles on economic security may even be higher.

Ukraine ranks among the top ten most-cited countries with 1222 citations. Notably, despite the high citation rate, the average number of article citations was only 3 (Figure 2).

The USA is identified as the most cited country with 21137 citations during the research period, significantly surpassing other countries in the top ten. The United Kingdom ranks second with 4623 citations, and Germany holds the third position with 2937 citations. Other countries in the top ten include France (1516 citations), Australia (1492 citations), Switzerland (1402 citations), Italy (1325 citations), and China (1048 citations).

Over the past 30 years, transformative processes have significantly altered the concept of economic security. In the 1990s, economic security was perceived as a direct threat to food security and population welfare. Due to globalisation, pandemics, digitisation and wars, economic security in recent years has been refined with new factors and threats.

Within the research theme of economic security, the most frequently used words and phrases include "food security" (109), "social security" (79), "economic growth" (73), "COVID-19" (69) and "energy security" (48) (Figure 3).

Figure 3 illustrates the development of the research articles through key terms. During the years 2010–2020, the primary focus of trending hashtags in the field of economic security was on social security. In the years 2016–2022, the focus shifted to keywords such as "food security" alongside "energy security" and "economic growth".

During 2021–2022, a significant number of publications were dedicated to COVID-19 concurrently with the "pandemic". According to the results of bibliometric analysis as of 2023, trending topics in researching economic security issues include key terms such as "renewable energy" (since 2017), the

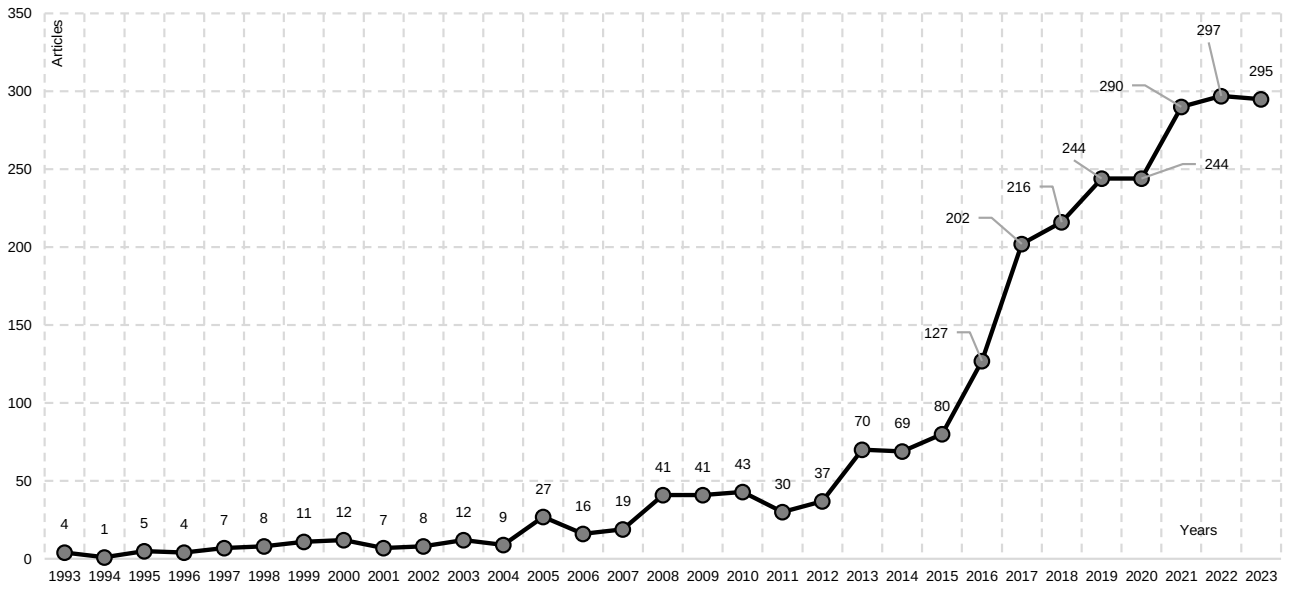

Figure 1. Annual Scientific Production in the direction of "Economic security" in the scientometric database WoS (1993–2023)

Source: authors' development via Biblioshiny app [7; 8; 9]

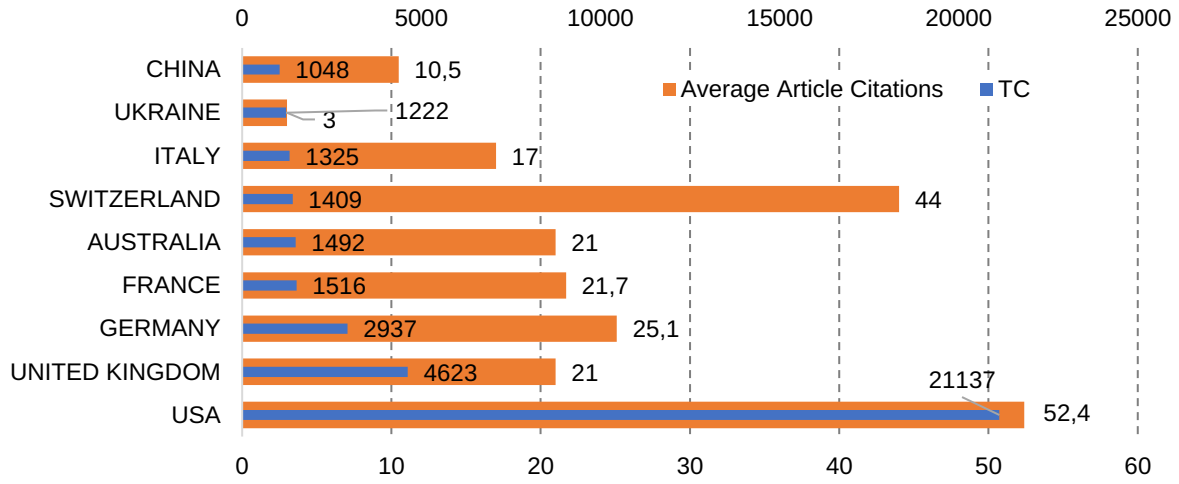

Figure 2. Most Cited Countries in the direction of "Economic security" in the scientometric database WoS (1993–2023)

Source: authors' development via Biblioshiny app [7; 8; 9]

consequences of the "pandemic" and the "European Union" (since 2019).

To analyse the key terms, a cluster map of word parallelism was prepared (Figure 5). A total of 46 terms were obtained and categorised into 10 distinct clusters.

The foundational term was "food security", appearing in 109 articles and references to most key terms on the cluster map, indicating its strong connection to economic growth, COVID-19, agriculture, poverty, climate change, migration, and food. Regarding geographical locations, the cluster included the term "Ethiopia".

The second most frequent term was "social security", highlighted in pink on the cluster map. It was closely associated with most key terms, albeit with few references. This second cluster map showed a strong connection to "retirement" and "health". In terms of geographical locations, the cluster included the term "China".

"Energy security" was marked in grey (cluster № 8), encompassing terms such as sustainability, sustainable development, and renewable energy.

Figure 6 illustrates the evolution of the key terms in three different stages (1993–2013, 2014–2019 and 2020–2023).

Figure 6 indicates that the first (1993–2013) and second stages (2014–2019) are less related to the third stage (2020–2023), with only one common key term between these stages. Additionally, the first stage

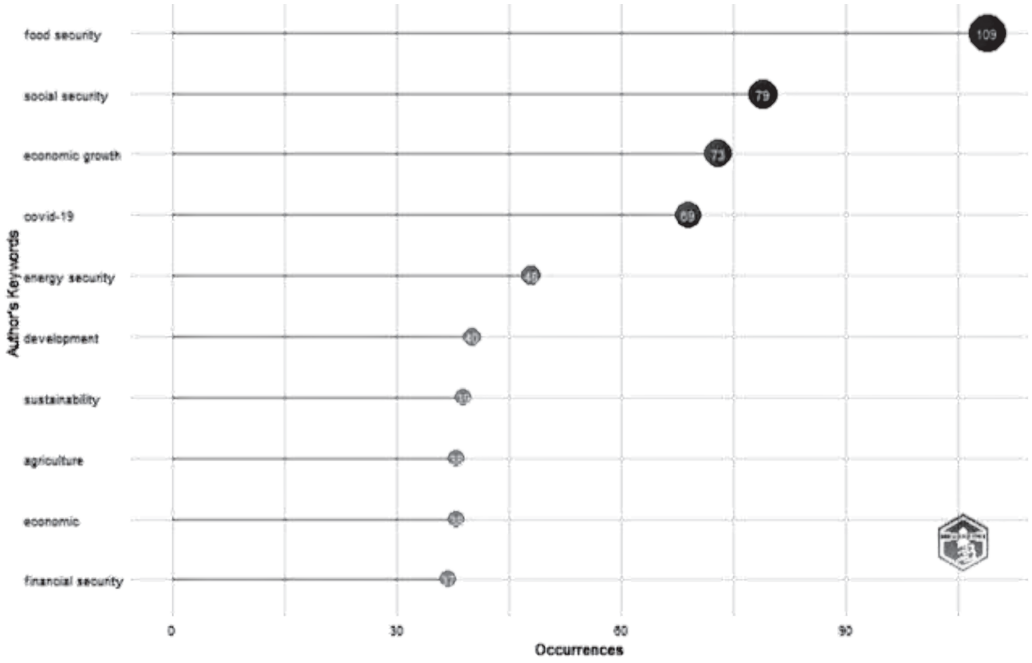

Figure 3. Most Relevant Words

Source: authors' development via Biblioshiny app [7; 8; 9]

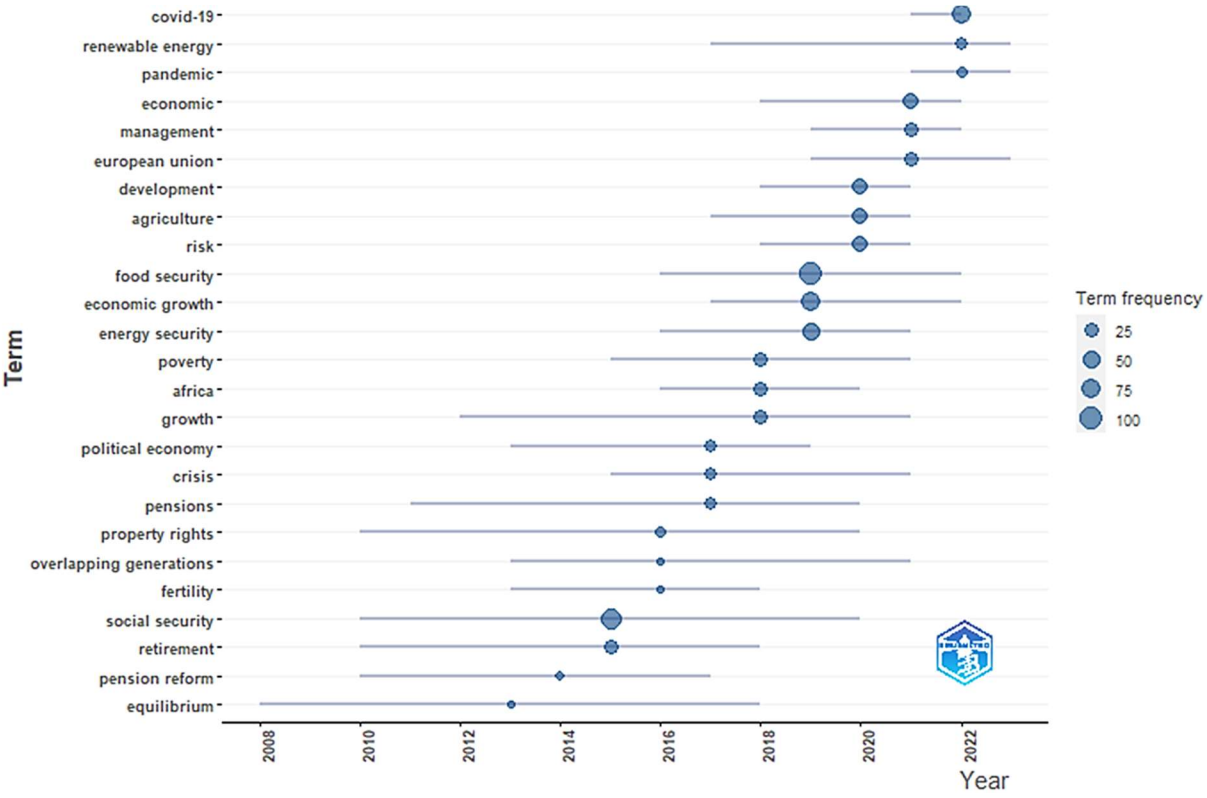

Figure 4. Keywords trend topics

Source: authors' development via Biblioshiny app [7; 8; 9]

(1993–2013) and the second stage (2014–2019) share more common key terms than the third stage, indicating that the focuses of these two stages are relatively close.

A thematic map was also developed for each stage based on density and centrality and divided into four topological zones. This article presents a thematic map of the third stage (2020–2023) in Figure 7.

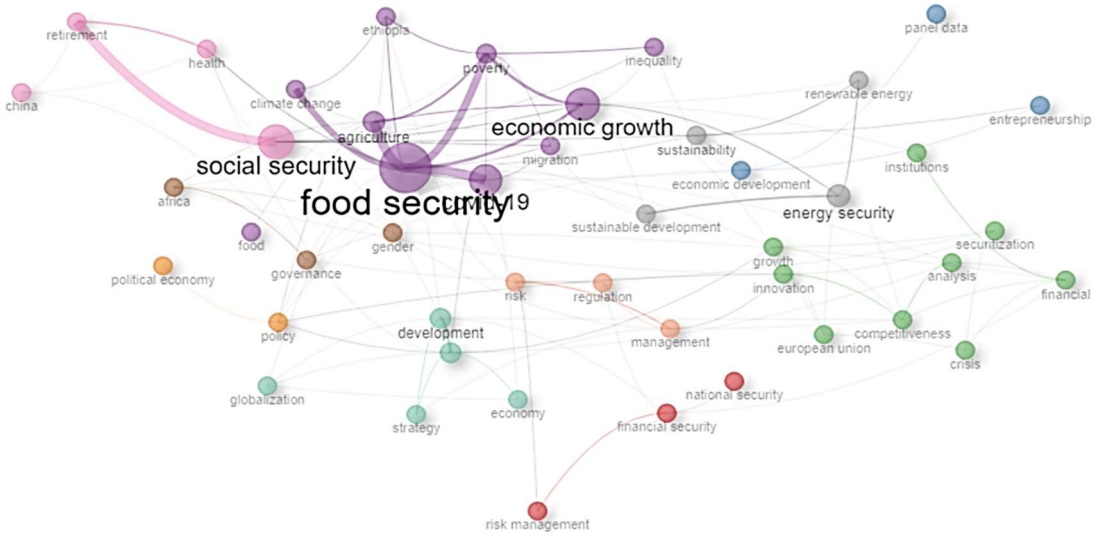

Figure 5. Keywords trend topics

Source: authors' development via Biblioshiny app [7; 8; 9]

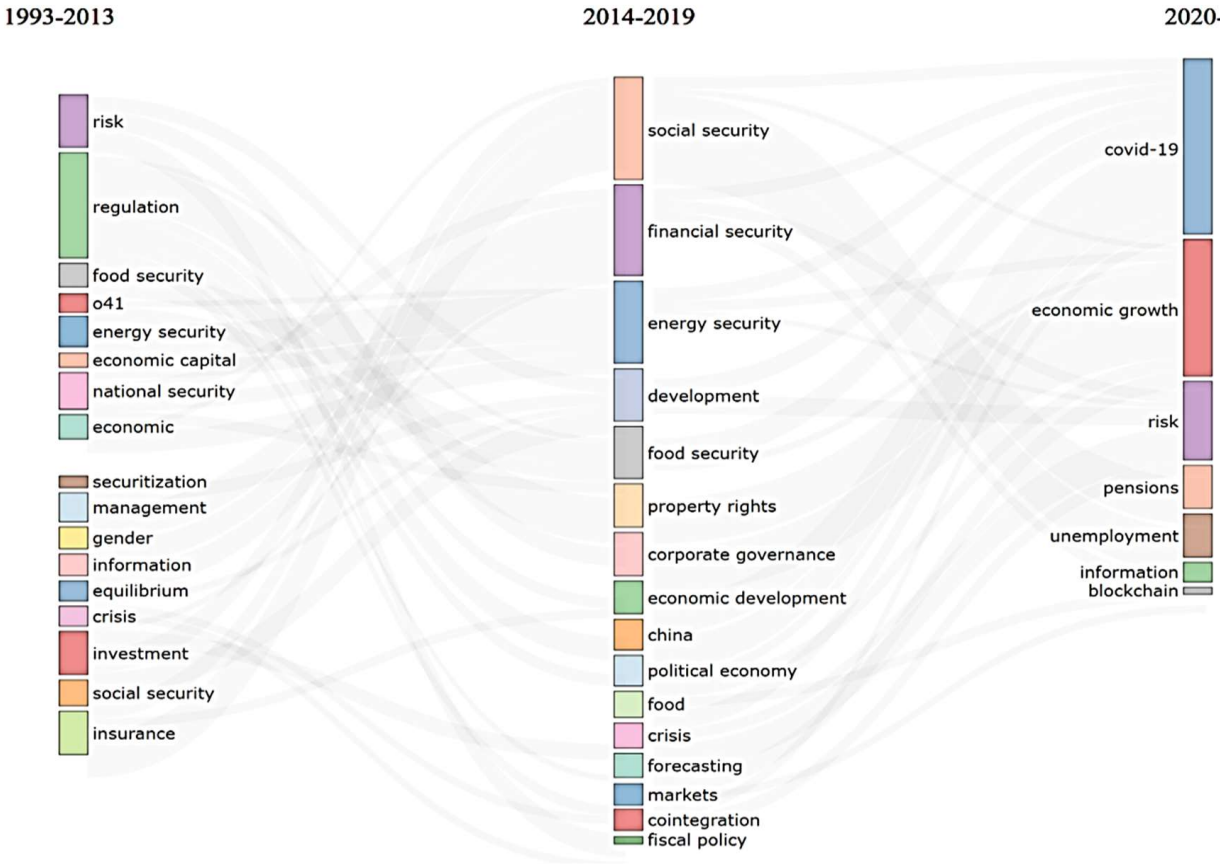

Figure 6. Thematic evolution map of keywords from 1993 to 2023 concerning economic security research

Source: authors' development via Biblioshiny app [7; 8; 9]

The thematic map illustrates the main research topics on economic security issues. Themes in the upper-right quadrant (risk, economic and management) are well-developed, essential for shaping the scientific domain and externally linked to concepts applicable to other themes. These themes, known as motor or driving themes, exhibit high density and centrality and are deemed highly crucial for future research. Future studies should focus on themes such as risk, economics, and management, as they are likely to define the direction of further scientific research in the field of economic security.

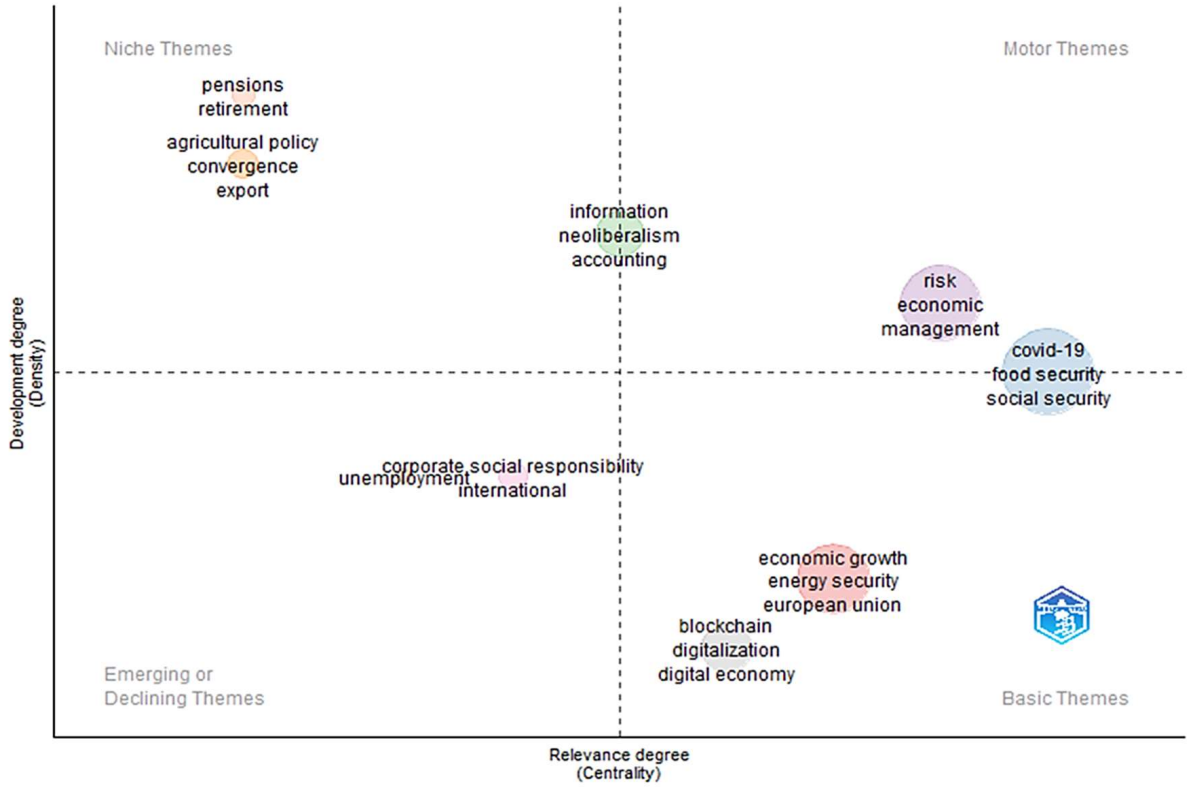

Figure 7. Thematic Map of Topics Discussed (2020–2023)

Source: authors' development via Biblioshiny app ([7; 8; 9])

Specialised themes in the upper-left quadrant support well-developed internal relations, but lack external connections. Themes in this quadrant, known as niche themes, such as pensions, retirement, agricultural policy, convergence, and exports, are underrepresented but indicate areas of rapid development due to their high centrality and low density [11].

Themes like "information", "neoliberalism" and "accounting" are positioned at the intersection of the two upper quadrants. Therefore, these themes can be described as having a high centrality and moderate density. These themes are central to the research field, but require more attention. This suggests that these themes should be examined under different lighting conditions.

Due to low density and a central position in the network, themes in the lower left quadrant ("corporate social responsibility", "unemployment" and "international") are considered emerging or declining. These themes have not received much attention and thus warrant further scrutiny.

Themes in the lower-right quadrant are fundamental, general, and crosscutting. Indicated by high density but low centrality, the primary themes in this quadrant include "economic growth", "energy security", "European Union", "blockchain", "digitalization" and "digital economy".

Themes such as "COVID-19", "food security" and "social security" are positioned on the border between the upper right and lower quadrants, well developed, and capable of structuring the research field. Thus, they remained the leading subthemes in the overall investigation.

Conclusions. The results of the bibliometric analysis of scientific publications on economic security issues, as presented in the Web of Science bibliometric database, allowed for the following conclusions.

The theme of economic security retains and enhances its relevance among researchers, as ensuring economic security is a continuous process that requires the timely identification of threats and formulation of corresponding measures for their prevention or mitigation.

The most cited countries in the field of economic security are the USA, the United Kingdom, Germany, France, Australia, Switzerland, Italy, Ukraine and China.

According to the results of the bibliometric analysis as of 2023, trending topics in the research of economic security issues include keywords such as "renewable energy" (since 2017), the consequences of the "pandemic", and the "European Union" (since 2019).

Cluster analysis resulted in a cluster map containing 46 terms divided into 10 individual

clusters. The base term, “food security”, appeared in 109 articles and had references to most key terms on the cluster map; the second most frequent term is “social security”.

The thematic evolution map comprises three stages: 1993–2013, 2014–2019, and 2020–2023. It was concluded that the first and second stages were less related to the third stage, with only one common keyword between these stages. Additionally, the first and second stages have more common keywords than the third stage, indicating a closer focus on these two stages. Therefore, it was pertinent to create a thematic map for the third period.

The results of the thematic analysis for the 2020–2023 period led to several recommendations.

Subthemes such as pensions, retirement, agricultural policy, convergence, and exports are potential topics that should be further investigated in the context of economic security.

Themes such as “information”, “neoliberalism”, and “accounting” accounting can be described as central to the research field, but require more attention. Furthermore, this implies that these themes should be viewed differently.

In the study of economic security, it is unavoidable to consider topics such as “blockchain”, “digitalization” and the “digital economy”, which emerged during the period of active digitisation. Digitisation, particularly the active implementation of blockchain and digitalisation technologies, has prompted the emergence of cybersecurity. Therefore, these themes should be considered when establishing an effective system to ensure economic security at all levels of governance.

A limitation of the present study is its reliance solely on data from the Web of Science bibliometric database, which will be considered in future studies.

REFERENCES:

1. Buzan, B. (2008). People, States & Fear: An Agenda for International Security Studies in the post-Cold War Era (introducción y capítulo 10). *Relaciones internacionales*, *9*, 6–53.

2. Morgenthau, H.J. (1958). Dilemmas of Politics. *Ethics*, *69*(3), 216–219.

3. Maull, H. (1984). *Energy, Minerals, and Western Security*. Johns Hopkins University Press.

4. Datskiv, R.M. (2004). Economic security in a global context, *Aktualni problemy ekonomiky*, vol. 7, pp. 143–153. (in Ukrainian)

5. Ivanova, N., Pryimak, N., Kozhukhova, T., Nieizviestna, O.; Chernega, O., Bocharova, Yu. (Eds.) (2022). Economic component of the security of the EU countries and Ukraine. Challenges and paradigm of national and international security of the XXI century: economic and technogenic discourse. Kharkiv: PC Technology Center, 43–64. doi: 10.15587/978-617-7319-59-6.ch3

6. Uchida, Y., & Ono, T. (2021). Generational conflict and education politics: Implications for growth and welfare. *Journal of Macroeconomics*, *69*, 103315. https://doi.org/10.1016/j.jmacro.2021.103315

7. Aria, M., & Cuccurullo, C. (2017a). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

8. R Core Team (2014). R: A language and environment for statistical computing. R foundation for statistical computing, Vienna, Austria. Retrieved from http://www.R-project.org/.

9. RStudio Team (2020). RStudio: Integrated development for R. RStudio, PBC, Boston, MA. Retrieved from http://www.rstudio.com

10. Kalachevska, L., Koblianska, I., & Holzner, J. (2023). Concept and measurement of the food system sustainability: A bibliometric research. *Scientific Horizons*, *1*(25), Article 25(1). https://doi.org/10.48077/scihor.25(1).2022.104-119

11. Smith, M., & Sarabi, Y. (2020). “What do interlocks do” revisited – a bibliometric analysis. *Management Research Review*. 44(4), 642–659.