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BIBLIOMETRIC ANALYSIS OF THE CURRENT STATE OF RESEARCH IN THE FIELD OF COGNITIVE TECHNOLOGIES IN LOGISTICS

This study explores the development of cognitive technology in logistics research from 1998 to 2023 through a bibliometric analysis. Using data from the Web of Science Core Collection and Scopus, the research examines how knowledge in this field has evolved, focusing on global knowledge exchange and emerging research trends. The study employs a quantitative approach, utilizing a bibliometric analysis model supported by specific research questions. The analysis covers document sources, geographic origins, publishers, document types, and publication peaks. A keyword connection map illustrates key findings, revealing notable differences in publication numbers between the two databases, with Scopus containing a broader range of research areas. The United States is identified as a leading source of publications, primarily scientific articles. Key themes include demographics, controlled studies, cognition, logistics, machine learning, and technology. The research highlights the importance of bibliometrics in understanding knowledge dynamics and suggests further exploration of cognitive technologies in Logistics.

Keywords: bibliometric method, cognitive technology, logistics, research, Scopus, Web of Science Core Collection.

1. INTRODUCTION

Some research methods are extremely helpful in categorizing concepts in the literature (Martínez-López et al., 2018). In recent years, researchers have observed a significant surge in the popularity of bibliometric analysis within specialized research (Donthu et al., 2020; 2021b), which allows for the quantification of scientific publications presented in selected databases (Zupic, Cater, 2015; Horzela-Miś, 2022), which are useful for assessing the connections between key elements of a given publication (Stanescu et al., 2021; Arita, 2017; Khan et al., 2021). This analysis combines statistical and mathematical methods to quantify recorded information in scientific publications (Suriyankietkaew, Petison, 2020). Bibliometric analysis, an immensely important tool in the study of scientific literature as repeatedly emphasized in the literature by researchers like Donthu et al. (2021a), Persson

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et al. (2009), and Alsharif et al. (2020), allows for deep insights into the structures and dynamics of publications (Gholampour et al., 2019; Du et al., 2021) across various knowledge domains (Li et al., 2020). It is key to understanding how scientific disciplines evolve (Franceschini et al., 2016; Albareda, Hajikhani, 2019) through the identification of major trends (Arbeláez-Gómez, Onrubia-Goñi, 2014) research directions (Santos, 2015), and influential works (Allen et al., 2009) as well as the proposed discipline affinity. In a scientific article, the introduction to bibliometric analysis serves as a guidepost, leading the reader through the complex world of research, highlighting the goals, scope, and methodology of the study (Leal Filho et al., 2023; Yin, 2009). A general overview of the scientific field in which the analysis is conducted outlines the context and signifies the importance of bibliometrics as a crucial research tool (Moral-Munoz et al., 2020). Bibliometric analysis is essential for understanding a specific scientific area (Verma and Gustafsson, 2020) and the introduction should emphasize how this method allows for observing changes and patterns in scientific publications (González-Serrano et al., 2020).

Bibliometric analysis is valuable for deciphering and mapping accumulated scientific knowledge and the subtle evolution of established fields, thereby rigorously organizing the significance of large amounts of unstructured data (Baako, Abroampa, 2023). Well-conducted bibliometric studies have the potential to lay solid foundations for new and significant advancements in a given field (Yilmaz, Tuzlukaya, 2023). These methods equip researchers with a broad perspective, pinpoint overlooked areas of inquiry, inspire fresh lines of investigation, and help them integrate forthcoming projects into the wider discipline (Simion et al., 2023). A critical element of bibliometric analysis is also a clear presentation of the research methodology (Chai, Xiao, 2012), including data collection methods, selection criteria, and analysis techniques (Ellegaard, Wallin, 2015; Gan et al., 2022). This part should be detailed enough for the reader to understand how the data were collected and processed, which enhances the transparency and credibility of the study. Mapping and clustering methods are frequently employed to examine such networks (Bartolacci et al., 2020; Cobo et. al., 2011). Bibliometric analysis, a computer-driven method for performing metrological and content-based research on bibliometric data (Sri et al., 2020), can help address certain constraints. Specialized tools can automatically detect and extract relevant information, then display it in an Excel spreadsheet or visually map it for easier interpretation (Xia et al., 2022). The results are fast, simple, coherent, and comprehensive (Zhao, Li, 2019).

Automated tools are often used for bibliometric analysis in modern times (Maoral--Munoz et al., 2020). The advantages and disadvantages of using automated tools for bibliometric analysis are significant. A tool often chosen for bibliometric analysis is the VOSviewer software (Yu et al., 2020; Kuzior, Sira, 2022; Tamala et al., 2022). The advantages of automatic bibliometric analysis, as exemplified by VOSviewer, include primarily its efficiency and objectivity (Van Eck, Waltman, 2021; Linnenluecke et al., 2020). Automation allows for processing vast data sets in a short time, which is impossible with manual analysis (Van Raan, 2014), enabling quick identification of trends, patterns, and key works in a field (Shang et al., 2015). The use of this software also allows you to visualize the network of connections between key words co-occurring with the studied concepts (Rahmawati, Subardjo, 2022; Effendi et al., 2021). On the other hand, the disadvantages of automatically conducted bibliometric analysis, also using VOSviewer, mainly stem from the limitations of the tool itself and the nature of the data. Automated tools may struggle with interpreting the context and significance of some publications, especially those that are interdisciplinary or of an unusual nature (Karanatsiou et al., 2017).

There is also the risk of over-reliance on quantitative metrics, which can lead to the neglect of qualitative aspects of research (Brown et al., 2020).

The aim of this paper is to share the findings of a bibliometric analysis on the topic of cognitive technology in logistics. In its opening section, the article explains the theoretical basis of the chosen research methodology. The subsequent presentation of results concentrates on academic works addressing cognitive technology in logistics between 1998 and 2023, drawn from two of the most prominent global research databases: Web of Science Core Collection and Scopus. The principal method employed involves a keyword-based examination of bibliometric data indexed in these sources. Publications from 1998 to 2023 were evaluated both quantitatively and through an analysis of co-occurring words and authors. This approach made it possible to pinpoint influential research centers and notable scholars focusing on cognitive technology in logistics. The study also scrutinizes the periods during which this topic garnered the most attention, as well as the thematic areas most frequently associated with it. Furthermore, leveraging data from Web of Science Core Collection and Scopus allowed identification of the publication types and key publishers with the highest volume of works linked to the keywords "cognitive technology in logistics".

2. METHODOLOGY

In this study, the bibliometric analysis method has been chosen for its capacity to address research inquiries concerning the fundamental principles and subjects in the research field. The utilization of this method offers several advantages, particularly objectivity and quantifiability, aiding in avoiding subjective biases (Linnenluecke et al., 2020). This selection justifies the appropriateness of adopting this methodological approach. This article aims to share the findings of a bibliometric investigation into scientific research on cognitive technology in logistics, focusing on publications from 1998 to 2023 sourced from the Web of Science Core Collection and Scopus databases. The following research questions were formulated as part of the research process:

1. What is the total number of publications on cognitive technologies in logistics?
2. What is the number of publications on cognitive technologies in logistics considering criteria such as title or abstract or keywords?
3. What is the number of publications that include terms such as cognitive technologies and logistics in the title?
4. In what years were the most publications related to the studied areas produced?
5. In which journals have the most papers related to cognitive technologies in logistics been published?
6. What research areas are most often associated with cognitive technologies in logistics?
7. In which countries are publications related to cognitive technologies in logistics most frequently produced?
8. What keywords most often co-occur with the terms cognitive technologies and logistics?

To refine the research process, a research model was developed and illustrated in Figure 1.

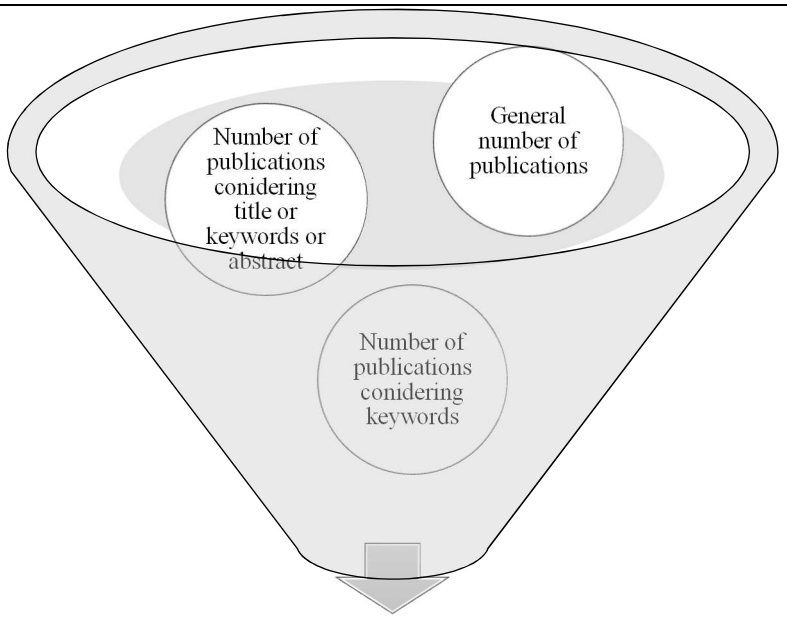

Figure 1. Research model

Source: Own conception.

The introduced research model delineates the structure and methodology employed in conducting the study. Based on this model, the authors conducted an analysis, interpretation, and presentation of the research findings. According to Figure 1, in the initial phase of the study, the authors task was to investigate what is the general number of publications on issues of cognitive technology in logistics in two selected databases. The next stage focuses on criteria such as title, keywords or abstract. Finally, the authors conducted a comparative analysis of the results for the Scopus database and the Web of Science Core Collection for the keywords criteria.

This search was performed and compared on the April 24, 2024. Providing the date of document collection holds immense importance due to the dynamic nature of databases, which undergo continuous updates and changes (Liu et al., 2015). This article presents a bibliometric analysis of scholarly works published between 1998 and 2023, retrieved from two of the largest global repositories of scientific publications: the Web of Science Core Collection and Scopus. The study covers all articles in the Web of Science Core Collection™ indices (SSCI, SCI-Expanded, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, and ESCI) addressing the topic of cognitive technology in logistics, regardless of the research domain. The resulting data from Web of Science Core Collection were then compared with those from Scopus, chosen for their multidisciplinary scope and high standards of scientific publication quality. The main keywords chosen for the article are cognitive technologies and logistics.

The article uses descriptive bibliometrics. A refined search was conducted within the topic field, encompassing titles, abstracts, or document keywords. The choice of this field stemmed from its widespread use in bibliographic studies (Thananusak, 2019; Calabuig--Moreno, 2020; Terán-Yépez, 2020), considered more suitable than other options because it houses the most pertinent words related to the article's subject within these sections. The search words was cognitive technology and logistics. The findings presented here should be interpreted with caution, as they represent just one possible perspective on scholarly efforts concerning cognitive technology in logistics. They should ideally be complemented by a more in-depth examination of data from the Web of Science Core Collection, Scopus, and other widely recognized international databases. The analysis focused on metrics of scientific output and associated indicators, such as the annual publication volume, the most prevalent research fields featuring cognitive technology in logistics, publication types, frequently occurring journal titles, key authors, and the academic centers that publish the most in this domain. Additionally, this article explores the applicability of bibliometric methods to studying cognitive technology in logistics and highlights the main constraints encountered when conducting this form of analysis.

3. RESULTS

3.1. Scopus

Considering the total number of publications in the Scopus database for a search for cognitive technology in all fields received result of 1,168,721. With reference to the title or abstract or keywords in all research areas in April 2024, the Scopus database recorded 55,786 scientific publications related to the term cognitive technologies. They are mainly related to areas such as Computer Science (43%), Engineering (27%), Social Sciences (23%), Medicine (20%), Psychology (9%). They are mainly scientific articles and conference materials. On the other hand, considering the term logistics itself, these publications have already been recorded by far more, as many as 749,166, of which nearly 87% were articles. These publications are mainly in areas such as Medicine, Engineering, Biochemistry, Genetics and Molecular Biology, Computer Science, and Social Sciences. The vast majority, as more than 13,130 publications were published in the journal Plos One. The most popular affiliation of authors is Harvard Medical School, with 11,231 authors.

Wanting to combine the two concepts studied, i.e. cognitive technology and logistics, the Scopus database considering all fields reports 51, 390 results. Limiting the search to article title, abstract, keywords the result obtained was 460. Then limiting search to only one variable, i.e. the title of the publication, provides only one result. This is an article from the journal Smart Innovation, Systems and Technologies from 2020, which deals with the optimization of logistic business processes based on the implementation of cognitive information technologies. On the other hand, expanding the research area and focusing on keywords, the database reports 50 publications related to the concepts studied. Figure 2 presents the time range of these publications.

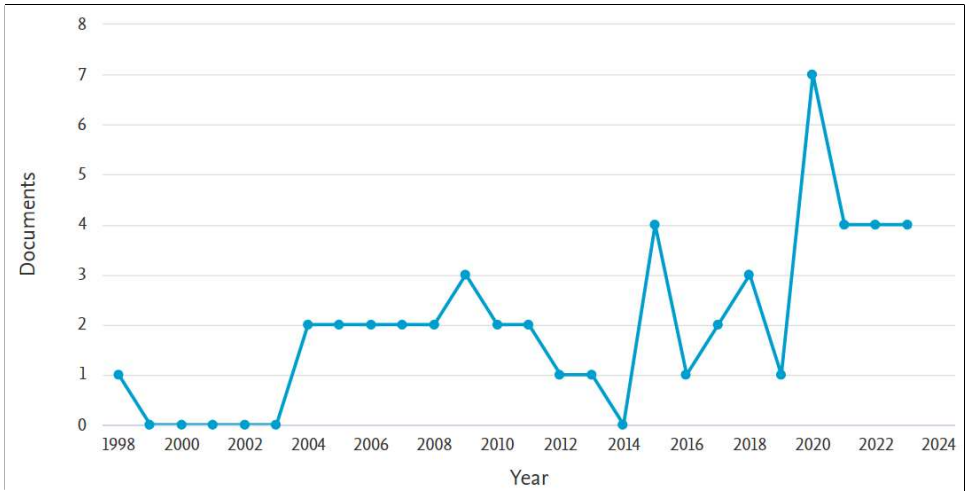

Figure 2. Publication years

Source: Adapted from: "Scopus".

According to Figure 2, the first publication related to the areas of cognitive technology and logistics was in 1998. There were no publications related to the areas of cognitive technology and logistics in 1999–2003 and 2014. This may be due to the lack of significant research or low interest in the area during these specific periods. There were 3 publications each in 2009 and 2018, and 4 publications each in 2015 and 2021, indicating some stability in researchers' interest in this area. The largest increase in the number of publications occurred in 2020, when as many as 7 papers were published. This may suggest that this particular year saw a spike in research or interest in the area of cognitive technology and logistics. Also in 2023, there was a significant number of publications, namely 4. This suggests that interest in the area remains high, which may be due to the continued development of technology or the growing importance of cognitive technology and logistics issues. In summary, the chart shows the variation in the number of publications over the years, with the biggest jump in 2020, which could be a key point for further analysis and exploration of the reasons for this increase.

Considering the type of publication, the Scopus database distinguishes only three groups: articles (27), conference papers (20), reviews (3). Analysing the number of articles, 2 each were published in journals such as: Frontiers In Neurology, Journal Of Medical Internet Research. The remaining articles were published in single journals. 5 researchers qualified for authorship with 2 publications each. Considering their affiliation, the most authors are credited to the University of California, Los Angeles, and 2 authors each from centers such as Defense Science and Technology Group, David Geffen School of Medicine at UCLA, University of South Australia, Fraunhofer Institute for Material Flow and Logistics IML, Royal Australian Air Force, VA Greater Los Angeles Healthcare System. The greatest disparity in the base of these 50 publications related to the keywords cognitive technologies and logistics can be seen by analysing the country from which the authors of the publications come. The vast majority, as many as 38%, come from the United States, 12% from Germany, 10% each from Australia and China, the remaining countries are:

United Kingdom, India, Norway, Netherlands, South Korea, Taiwan, Brazil, France, Hong Kong, Israel, Italy, Latvia, Nigeria, Slovenia, Spain.

The last point to make when discussing the base of 50 articles that keywords are related to cognitive technologies and logistics is the areas in which these works are produced. Details of the scientific areas in which authors are most likely to publish are presented in Figure 3.

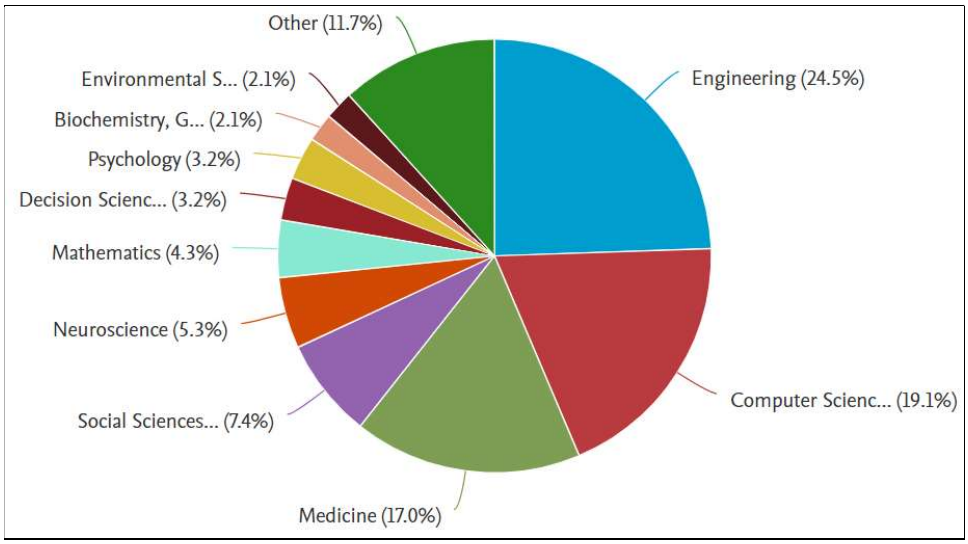

Figure 3. Document by subject area

Source: Adapted from: "Scopus".

These results indicate that areas such as Engineering, Computer Science and Medicine are the main areas in which works related to cognitive technologies and logistics are published (total more than 60%). Meanwhile, Social Sciences, Neuroscience and Mathematics also feature prominently in publications related to these areas. Other areas such as Decision Sciences, Psychology, Biochemistry, Genetics and Molecular Biology, Environmental Sciences, Health Professions and Nursing were also represented, although to a lesser extent. In contrast, fields such as agricultural sciences, arts and humanities, business management and accounting, chemistry, earth and planetary sciences, and physics and astronomy are less common in cognitive technology and logistics publications.

A recent bibliometric analysis conducted in the Scopus database was carried out taking into account the studied 2 concepts in the abstract area. In this case, the total number of publications is considerably higher – 327. The first article was written in 1996. The number of articles in successive years is gradually increasing, as of 2017 their number exceeded 10, in 2018 – 20, 2021 it was 51, 2022 – 55. Considering the types of publications, the situation is more diverse than in the previous analysis. Detailed results are presented in Figure 4.

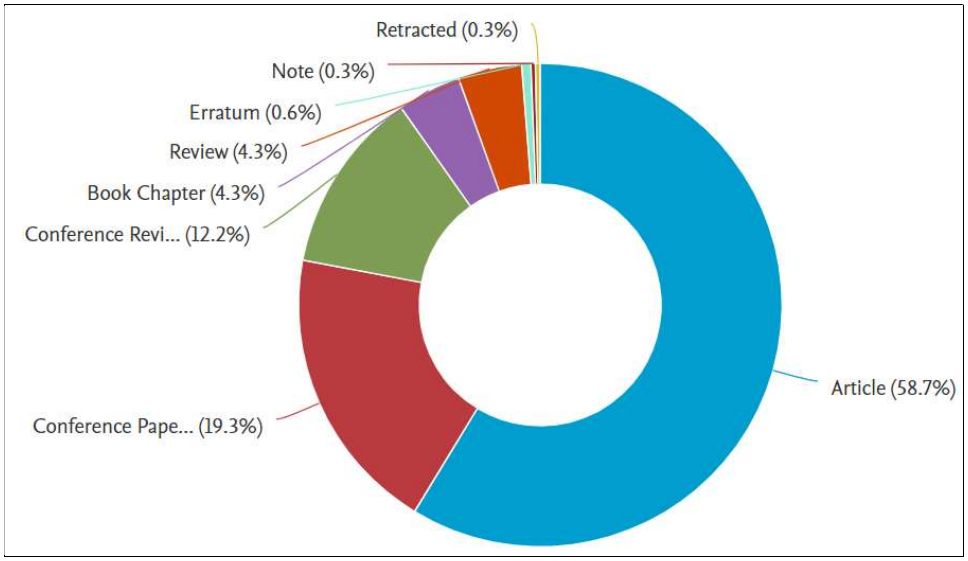

Figure 4. Documents by type

Source: Adapted from: "Scopus".

According to Figure 4, we can see that scientific articles account for the largest share of publications related to the field under study (almost 60%). Their high number indicates deep, detailed research, which suggests intensive research activity and significant contributions to the development of knowledge related to cognitive technologies and logistics. A total of 103 papers were produced as a result of participation in scientific conferences (Conference Paper – 63, Conference Review – 40), which also indicates the involvement of researchers in presentations and discussions at conferences on the areas under study. Chapters in books appear for the first time in this compilation, but they account for only 4% of the total number of all publications.

Analysing the areas in which the publications originated, we can see a very high probability to the previous bibliometric analysis, which took into account the co-occurrence of the studied terms only in the keywords. Analysing them in the abstract, we can see that these areas recur, among the most popular are: Computer Science (19,7%), Medicine (17%), Engineering (15,7%), Social Sciences (7,6%), Mathematics (5,2%) and the other.

The last two issues that will be discussed are the journals with the most publications per year and the documents by country or territory. Considering the journals in which authors were most likely to publish their work related to cognitive technologies and logistics, 5 leading journals can be identified (Figure 5).

As can bee seen in Figure 5 these documents are: Advances In Intelligent Systems And Computing (8 publications), Communications In Computer And Information Science (8 publications, that were produced in the years 2011-2013), Journal Of Medical Internet Research (7 publications), Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics (6 publications), Lecture Notes In Networks And Systems (5 publications). Most of the papers were

produced from 2018–2023, which indicates the high research potential of the areas of logistics and cognitive technologies.

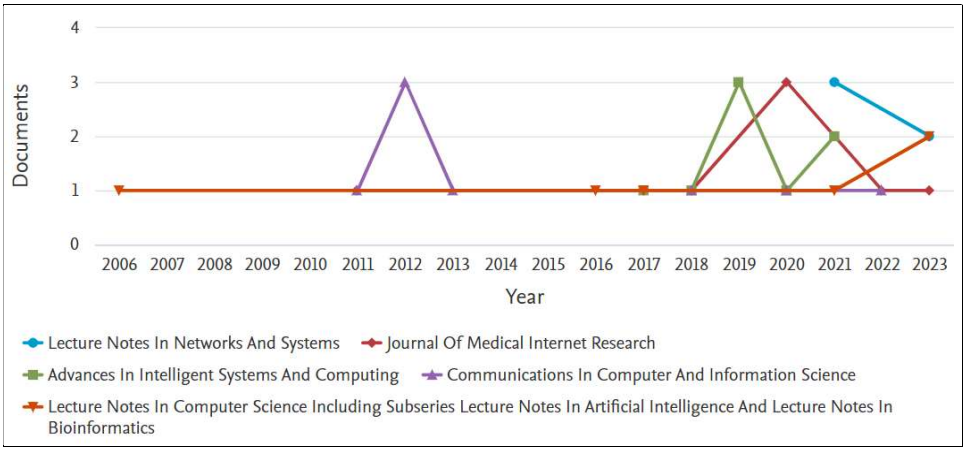

Figure 5. Documents per years by source

Source: Adapted from: "Scopus".

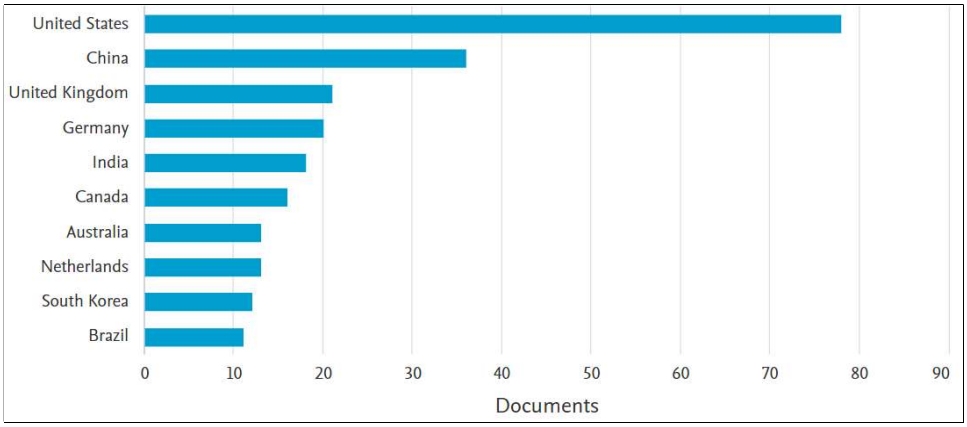

Figure 6. Documents by country or territory

Source: Adapted from: "Scopus".

Analysing the data presented in Figure 6, one can see a convergence with the previous analysis. The largest number of works also originated in the United States (78 publications). This confirms their significant role in research on cognitive technologies and logistics. This was followed by the increased activity of China, with 36 publications. Other countries with developed research sectors, such as the United Kingdom (21), Germany (20), India (18), and Canada (16), are also in the mix, with a significant share of publications.

Based on data downloaded from the Scopus database, a map of the association of the two terms under study with the keywords that appeared most frequently in connection with the issues under study was developed. Taking the value of 9 as the minimum number of keyword occurrences, then out of 4327 keywords 113 meet the threshold. The map of the co-occurrence of keywords for the term cognitive technology and logistics is presented in Figure 7.

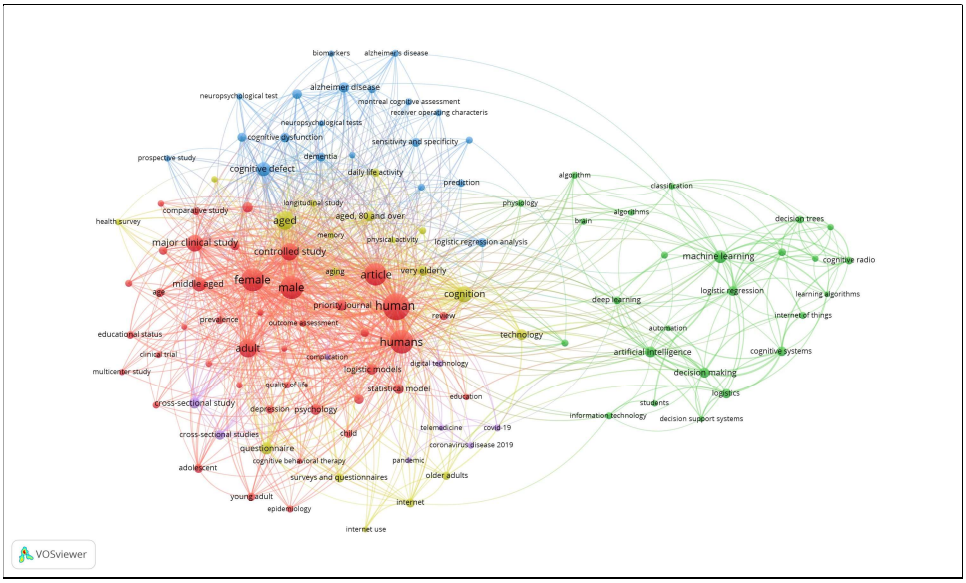

Figure 7. Map of co-occurrence of keywords for the term Cognitive technology and logistics

Source: Own work.

Figure 7 stands for the network visualization that emerged in the scientific papers in Scopus database. The clustering technique was used to distinguish 4 main clusters (red, green, yellow and blue). The word map illustrates the frequency of word occurrences within an article and the interrelation between keywords. In the network, each term is depicted as a circle, where the size of the circle corresponds to the number of publications in which the term was found. Each colour represents a group of interconnected terms forming clusters, and the curvature of the lines approximates the connections between repeated instances of the term, while the thickness of the lines indicates the strength of associations between thematic areas or keywords. The blue area consists of topics related to cognition, the red one is about human, the yellow one is about cognitive defect and the green is connected to machine learning. Clusters represent the relationship between one topic and another. Limiting the search to 113 keywords from all the surveyed papers, 3744 links were obtained, and total link strength was 18543. The next figure shows the keywords that appeared most frequently in the 4 clusters generated.

According to figure 8, visualization of keywords for the concepts studied, presented in this article, indicated that they are most often linked to issues such as: human, adult, female, male, article, aged, controlled study, major clinical study, cognition, cognitive defect,

middle aged, logistic models, cohort analysis, psychology, sensitive and specificity, procedures, risk factors, machine learning, daily life activity, technology.

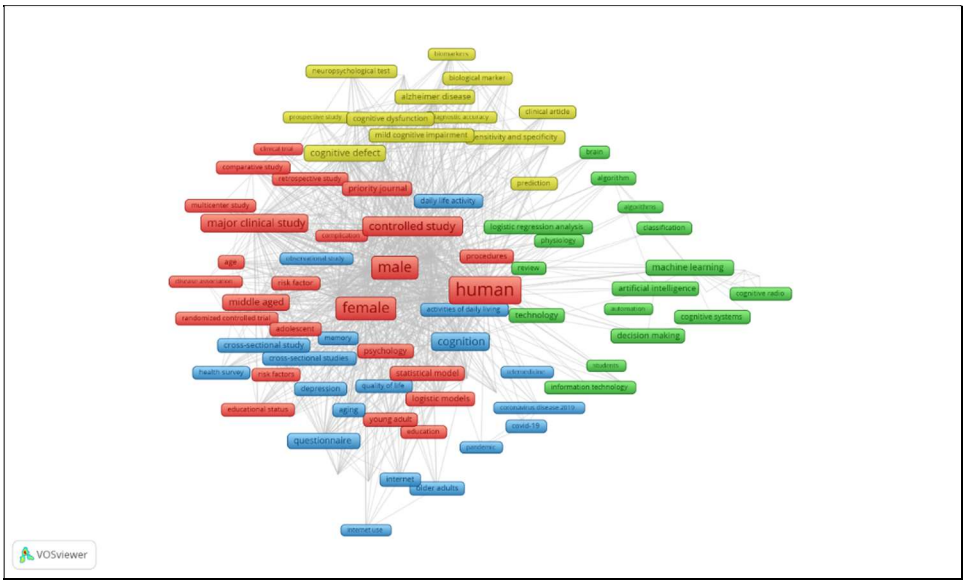

Figure 8. Visualization of keywords for the term Cognitive technology and logistics

Source: Own work.

3.2. Web of Science Core Collection

With reference to the total number of publications in the Web of Science Core Collection database for a search for cognitive technology in all fields received result of 96,024. This is 10 times less compared to the Scopus database. With respect to title, abstract or keywords in all research areas in Aril, 2024, the Web of Science Core Collection database recorded 30,937 scientific publications related to the term cognitive technologies. They mainly concern such areas as Engineering Electrical Electronic, Educational Research, Telecommunications, Comuter Science (Information Systems, Theory Methods, Artificial Intelligence, Interdisciplinary Applications), Neurosciences, Cybernetics, Management. However, taking into account the term logistics itself, there were already many more such publications, as many as 575,809 of which nearly 92% were articles. These publications are mainly in areas such as Public Environmental Occupational Health, Medicine General Internal, Surgery, Oncology, Clinical Neurology. More than 530,000 of these publications are scientific articles, and most were published in journals: Plos One, BMC Public Health, International Journal of Environmental Research and Public Health, Scientific Reports.

General number of publications related to cognitive technology and logistics in all fields in Web of Science Core Collection is 1, 759. This is significantly less considering the result from the Scopus database (51, 390). Considering the title or abstract or keywords in all research areas in April 2024, the Web of Science Core Collection database recorded 222 scientific publications related to the term cognitive technologies in logistics. If we compare the result with the data of the Scopus it is twice as much. These were mainly

scientific articles – more than 71% that were related to such scientific areas: Operations Research Management Science, Management, Engineering Electrical Electronic, Engineering Industrial, Computer Science Information Systems, Environmental Studies, Economic, Business, Transportation. On the other hand, if we maximally restrict searches in the Web of Science Core Collection database to only one variable – the title of the publication, we get 1 result. This is a proceedings paper from 2020 and its authors are the same team of scientists as the article searched in the Scopus database (Volodina, E.V., Kudryashova, P.A., Studentova, E.A.). The topic of the paper is optimization of logistics business processes within the framework of export activities based on the introduction of cognitive information technologies.

To develop a detailed bibliometric analysis comparing to the Scopus database, the research area analysed focused on keywords related to cognitive technologies and logistics. In this area, the Web of Science Core Collection database generated only 2 results (where the Scopus database had as many as 50). The detailed characteristics of these two works are presented in Table 1.

Table 1. Papers focused on keywords related to cognitive technologies and logistics in Web of Science Core Collection

	Paper 1	**Paper 2**
Title	Cognitive approach in the analysis of using financial technologies in corporate finance	Healthcare Logistics Optimization Framework for Efficient Supply Chain Management in Niger Delta Region of Nigeria
Author	Morozko, NINA Morozko, NAT Didenko, VY	Umoren, IJ Etuk, UE Ekong, AP Udonyah, KC
Document type	Proceedings Paper	Article
Source	Gcpmed 2018 – International Scientific Conference Global Challenges and Prospects of The Modern Economic Development, Vol. 57	International Journal of Advanced Computer Science and Applications, Vol. 12, issue 4
Published	2019	2021
Keywords	Financial technologies, corporate finance, cognitive management, valuation, cost factors, logistic regression	Dedicated logistics department (DLD), Quality of Care (QoC), Quality of Experience (QoE), information/cognitive technologies (ETA) and type-1 fuzzy logic model
Research areas	Development Studies, Business & Economics	Computer Science
Development StudiesEconomics	Development Studies, Economics	Computer Science, Theory & Methods

Source: Own work.

According to Table 1, only 2 scientific papers related to cognitive technologies and logistics were recorded in the Web of Science Core Collection database. Paper 1 focuses

on the cognitive approach in analysing financial technologies within corporate finance, emphasizing valuation and cost factors using logistic regression. Paper 2 concentrates on developing a Healthcare Logistics Optimization Framework for efficient supply chain management in the Niger Delta region of Nigeria. It includes elements like Dedicated Logistics Department (DLD), Quality of Care (QoC), Quality of Experience (QoE), information/cognitive technologies (ETA), and a type-1 fuzzy logic model. Both papers share common authors (Morozko, NINA, and Didenko, VY), but they are published in different document types and sources. Document 1 is a Proceedings Paper in Gcpmed 2018, while Document 2 is an Article in the International Journal of Advanced Computer Science and Applications in 2021. Paper 1 falls within Development Studies, Business & Economics domains, focusing on the economic aspects of utilizing cognitive approaches in financial technologies. The second one spans Development Studies, Economics, and Computer Science, emphasizing logistics optimization in healthcare using advanced computer science methods and fuzzy logic models. The keywords in Paper 1 revolve around financial technologies, corporate finance, cognitive management, valuation, and logistic regression. Paper 2's keywords highlight healthcare logistics optimization, Quality of Care/Experience, information/cognitive technologies, and a type-1 fuzzy logic model.

The last stage of bibliometric analysis for the two concepts of cognitive technology and logistics under study is the overall compilation of the results obtained from the two databases. The aggregate results for each search criteria are presented in Table 2.

Table 2. Number of publications related to the terms cognitive technologies and logistics limiting searches to selected variables of the Scopus database and Web of Science Core Collection

Cognitive technology and logistics	Scopus	Web of science Core Collection
General number (in all fields)	51, 390	1, 759
Article title, abstract, keywords	460	222
Abstract	326	222
Keywords	50	2
Title	1	1
First publication (considering keywords)	1998	2019

Source: Own work.

According to Table 2, there is a noticeable difference in the total number of publications between the two databases analysed. Scopus records significantly more scientific papers in the overall number considering all fields in an area of cognitive technology and logistics (right 30 times more). These differences are greatly diminished by narrowing the research area to the title, abstract and keywords. In this case, the difference is just over 200 scientific papers. Another significant difference can be seen by analysing the studied concepts in keywords. There are as many as 50 documents in the Scopus database, where only 2 were noted in Web of Science Core Collection. These differences, in turn, are lost in the title of scientific papers, since the result for both databases studied was the same – 1 paper. Considering keywords, in the Scopus database the first article appeared in 1998, while in the Web of Science Core Collection database only in 2019. These differences may be due to the extent of coverage of these databases, their indexing criteria, differences in the

journals reviewed, and differences in the inclusion of different types of publications. Such differences in data between different bibliometric databases are relatively common and result from the different data collection methodologies and indexing criteria used by each platform. It is important to take these differences into account when analysing bibliometric data.

4. CONCLUSION

Analysing the results from all the databases studied, no books covering the topic of cognitive technologies in logistics were noted. Limiting the search only to the co-occurrence of the studied keywords in the title of the publication, both the Web of Science Core Collection and Scopus databases recorded 1 paper each addressing these issues (from 2020). The article from the Scopus database deals with the optimization of logistic business processes based on the implementation of cognitive information technologies. On the other hand, an proceedings paper from the Web of Science Core Collection database deals with optimization of logistics business processes within the framework of export activities based on the introduction of cognitive information technologies. The authors of these two papers are the same research team: Volodina, EV, Kudryashova, PA, Studentova, EA. An extended bibliometric analysis, limiting searches to the abstract, showed 222 items in the Web of Science Core Collection database, and 326 items in the Scopus database. Publications addressing the areas under study are mainly articles, and their total number is relatively small.

It is important to keep in mind that Scopus and Web of Science apply different indexing methods and cover distinct publication sets, which can lead to variations in bibliometric analysis outcomes. Among the most significant differences may be the indexing area. The Scopus database typically includes a larger number of journals from different areas of science, often including publications from outside the sciences. This database takes into account a larger time range compared to the Web of Science Core Collection. Scopus uses more automatic indexing methods, which can result in a larger number of indexed publications, but can sometimes be less precise about quality, while the Web of Science Core Collection has a reputation for focusing on careful and accurate indexing, which can result in fewer indexed publications, but usually ensures high quality. As a result, this may influence the perceived significance of certain publications and the prominence of specific citations. The uniqueness of journals for a single database can also be pointed out as a difference between the databases studied. Some journals and publications appear exclusively in one database rather than both, meaning authors publishing in those journals will only be listed as lead authors in the respective database. In addition, discrepancies in citation counts often stem from the fact that certain institutions or countries may only have access to one database, which influences authors' decisions on where to publish. Nonetheless, despite these potential differences, the bibliometric analysis remains a valuable tool for gauging the influence of scientific publications and identifying key areas of research.

Future research should incorporate a broader range of metrics, particularly those related to citations, collaborations, and the national dimension of cognitive technology publications in logistics. Although this study primarily draws on data from the Web of Science Core Collection and Scopus, these databases can be employed more extensively going forward. The scope can also be broadened by examining additional internationally recognized databases. While these repositories grant access to a wealth of global

publications and knowledge, many journals remain unindexed, rendering the resulting picture incomplete - especially because such databases typically focus on English-language sources. The analysis that was conducted relied mainly on quantitative indicators. The qualitative aspects of the research are also worth developing in the future.

Considering all the years studied, i.e. 1998–2023, it can be seen that the total number of publications addressing cognitive technologies in logistics is small. This study confirms the existence of a research gap and the great potential of the studied scientific area. Hence, the current analysis serves as an initial examination and warrants more extensive investigation.

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