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ORIGINAL

Logistics digitization of international customs processes: a bibliometric analysis

Digitalización logística de los procesos aduaneros internacionales: un análisis bibliométrico

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ABSTRACT

The present study aimed to conduct a bibliometric analysis on the logistic digitalization of international customs processes between 2013 and 2024. The analysis of the data through bibliometrics made it possible to quantify scientific production. Relevance and keywords in English (logistics digitalization, international customs processes) allowed the selection of the 37 Scopus publications used in the study. The largest significant increase in scientific production occurred between 2022 and 2023 (n=43,2; 16 %), with Germany being the leading country (n=6 publications, 13,3 %). Lecture Notes in Networks and Systems was the most important source, with three publications. Author Belov, V.B. had the highest number of citations (06) and one article. Of these publications, 49 % were scholarly articles and 36 % were classified in the topics of computer science and engineering. It is concluded that the digitization of international customs regimes in logistics has more sources overall, a wider range of writers and topics covered, and more sources, providing a more complete picture of the visibility, impact and importance of scientific output on a global scale. This bibliometric analysis lays a solid foundation for further research by providing evidence-based support through a rigorous examination of the existing literature.

Keywords: Digitization; Logistics; Customs; Bibliometric.

RESUMEN

El presente estudio tuvo como objetivo realizar un análisis bibliométrico sobre la digitalización logística de los procesos aduaneros internacionales entre 2013 y 2024. El análisis de los datos a través de la bibliometría permitió cuantificar la producción científica. La relevancia y las palabras clave en inglés (logistics digitalization, international customs processes) permitieron seleccionar las 37 publicaciones Scopus utilizadas en el estudio. El mayor aumento significativo de la producción científica se produjo entre 2022 y 2023 (n=43,2; 16 %), siendo Alemania el país líder (n=6 publicaciones, 13,3 %). Lecture Notes in Networks and Systems fue la fuente más importante, con tres publicaciones. El autor Belov, V.B. tuvo el mayor número de citas (06) y un artículo. De estas publicaciones, el 49 % eran artículos académicos y el 36 % estaban clasificados en los temas de informática e ingeniería. Se concluye que la digitalización de los regímenes aduaneros internacionales en logística tiene más fuentes en general, una gama más amplia de autores y temas tratados, y más fuentes, lo que proporciona una imagen más completa de la visibilidad, el impacto y la importancia de la producción científica a escala mundial. Este análisis bibliométrico sienta unas bases sólidas para futuras investigaciones, al proporcionar un apoyo basado en pruebas mediante un examen riguroso de la bibliografía existente.

Palabras clave: Digitalización; Logística; Aduanas; Bibliometría.

INTRODUCTION

Currently, it is essential that public institutions providing services lead the use and application of various resources to increase efficiency in service to citizens, in light of the rapid changes brought about by advances in information and communication technologies (ICT); for such reason, the digital era has brought customs as a technical innovation (Espinoza et al., 2022).

In this regard, new technologies make it possible to better create, apply and support the information that is kept (Reyes et al., 2022). Computer hardware and application programs are the most used components of a computer system. In addition, it should be noted that when a digital system is acquired, there is the advantage over the competition thanks to the innovation and technology that is incorporated into the procedures (Loo & Mariátegui, 2022). Consequently, the goal of technological progress is to create a contemporary philosophy that facilitates simpler procedures (Rachinger, 2019).

On the other hand, customs administrations around the world have adopted digitization to renew their operations and take advantage of improved communication capabilities (Cosío, 2021). It follows that these modifications make it possible to streamline procedures, communicate information, and improve border control regularization and smuggling prevention (Barrero, 2021). In other words, technology has greatly improved customs processes, making them more efficient (Zuñiga, 2022).

In addition, the customs online platform facilitates the exchange of information on their processes, activities and services, implementing these technical advances, the progressive eradication of the physical presentation of customs documents to maximize clearance times, efficient coordination between customs offices in the country, and the use of electronic methods for labeling and correcting customs declarations (Nikiforovich, 2023). In this way, the customs administrations of the future will be responsible for more than just facilitating and controlling the flow of goods; their facilitating and supervisory role in the transport of goods, people and means of transport will ensure better service and on-time arrivals (Naula, 2021).

In that sense, studies on the logistics of digitizing international customs procedures have increased in the last decade. Therefore, as its use increases, it becomes easier to digitize analog procedures and store paperwork in an electronic file, both of which are necessary requirements for the customs clearance of goods (Zamora & González, 2019). In any case, by analyzing written and other scholarly works, bibliometrics allows scholars to track the growth of knowledge and determine the relative value of different publications (Caló, 2022; Leyva et al., 2022).

Therefore, for databases to function as tools for identifying scientific background, accurate research data collection capabilities are necessary (Sanz, 2022). Consequently, bibliometric indicators are used, which are measures that quantify the amount of literature on a particular topic or set of related topics (García-Villar & García-Santos, 2021; Llerena & Arévalo, 2021).

Similarly, research and knowledge on the logistical digitization of international customs operations requires a bibliometric framework for data collection. When carrying out an evaluation, the following indicators will be taken into account: the year of publication of the document, country of origin, subject matter, type of file, institution of affiliation, source and authors. Thus, it is proposed as a research objective to conduct a bibliometric analysis on the logistical digitization of international customs processes between 2013 and 2024.

METHOD

To evaluate the present dataset on the logistical digitization of international customs operations, bibliometric analysis will be used. Thus, bibliometrics will play a crucial role in facilitating data collection for the research (Salinas and Garcia, 2022). Likewise, the uniqueness of the topic also motivated the search in Scopus, an internationally renowned database that collects and evaluates academic articles.

To delimit the research object, 86 academic publications were retrieved using Boolean search terms such as logistics AND digitization and international AND customs AND processes, after data cleaning and collection, 37 academic papers were selected. In addition, the exclusion criteria for studies from the dataset were (1) research conducted before 2013 or after 2024; (2) publications that were duplicates of each other; and (3) research unrelated to the present research.

In contrast, 37 papers were evaluated based on bibliometric criteria for their overall contribution to the logistical digitization of international customs processes (Florez-Fernández & Aguilera-Eguía, 2020). In addition, characteristics such as date of publication, authors, journals, country of origin, type of file, academic discipline and affiliations were taken into account. Excel was used for data processing and analysis (descriptive statistics and count data). While the keyword co-occurrence map was created using VOSviewer V_1.6.19.

RESULTS

This bibliometric study focused on academic papers published between 2013 and 2024. For this analysis of academic publications on the logistics digitization of international customs operations, 37 papers were chosen. Consequently, the most current global papers included in the Scopus index are shown in figure 1. And as can be

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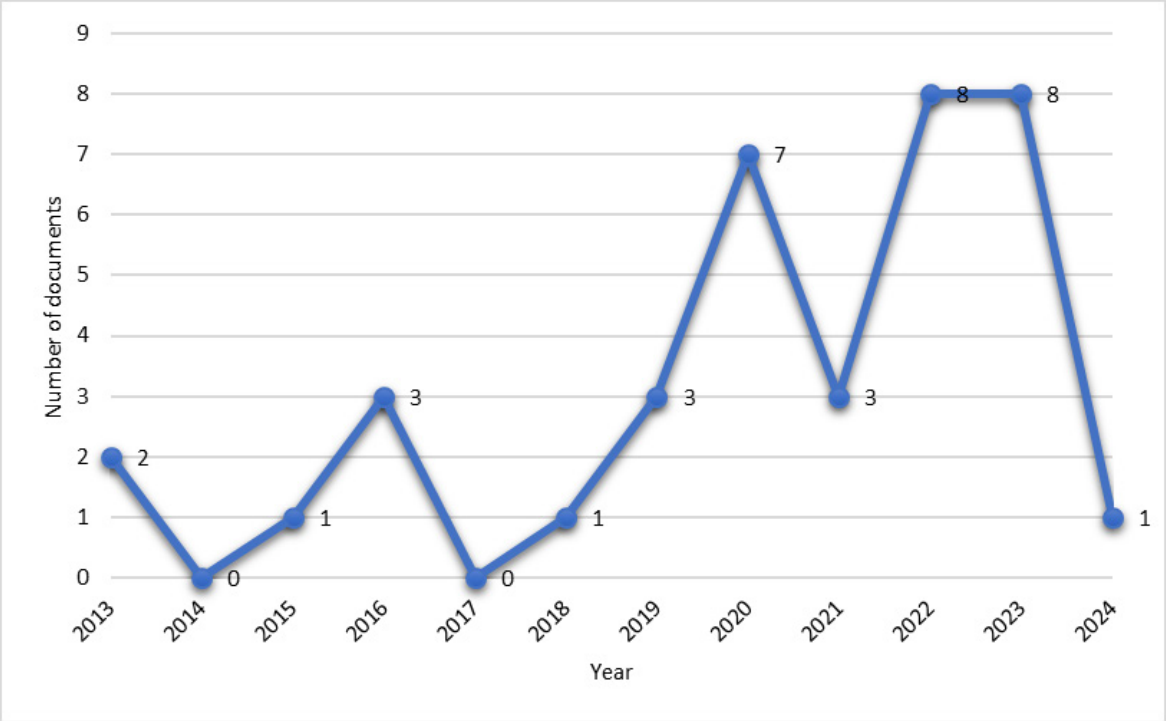
seen in the figure, the annual publication rate reaches an all-time high of 43,2 % of all global publications (16 scholarly papers) in the years 2022 and 2023.



Source: Scopus data (2024)
Figure 1. Documents published by year

Table 1 shows that a total of twenty-one countries were considered for the study. The ranking of scientific productivity was as follows: Germany with 13,3 %, India with 8,9 % and China with 6,7 %. English was the language of publication for 78,4 % of the texts, Spanish for 13,5 % and Portuguese for 8,1 %.

Table 1. Publication of documents by country

N°	Country	Number of documents	%	N°	Country	Number of documents	%
1	Germany	6	13,3	12	Greece	1	2,2
2	India	4	8,9	13	Italy	1	2,2
3	China	3	6,7	14	Lithuania	1	2,2
4	Russian Federation	3	6,7	15	Morocco	1	2,2
5	Poland	2	4,4	16	Peru	1	2,2
6	Slovakia	2	4,4	17	Serbia	1	2,2
7	South Africa	2	4,4	18	Spain	1	2,2
8	Ukraine	2	4,4	19	Thailand	1	2,2
9	Austria	1	2,2	20	United Kingdom	1	2,2
10	Canada	1	2,2	21	Indefinite	9	20,0
11	Chile	1	2,2		Total	21	

Source: Scopus data (2024)

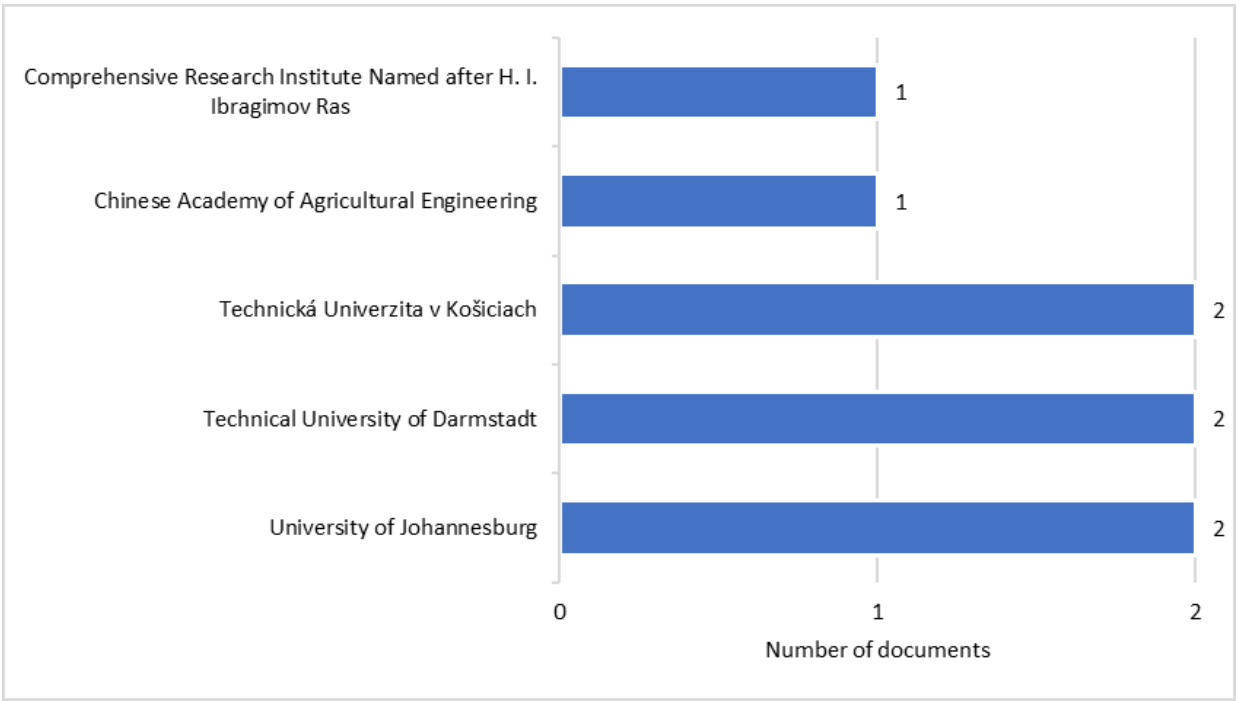
A total of twenty-three academic sources were used for this evaluation. A summary of all the data collected for this study can be seen in table 2. It also shows the overall count of papers published in other journals and sources, such as Lecture Notes in Networks and Systems, which has three publications. While, International Multidisciplinary Scientific Geoconference Surveying Geology and Mining Ecology Management Sgem and Sustainability Switzerland, published two papers each. Not only that, but these sources have had a significant impact on their respective fields of research.

Table 2. Publication of documents by source or journal

Source or Magazine	Number of documents	Source or Magazine	Number of documents
Lecture Notes in Networks and Systems	3	Lecture Notes in	1
International Multidisciplinary Scientific Geoconference Surveying Geology and Mining Ecology Management	2	Lecture Notes of The Institute for Computer Sciences Social Informatics and Telecommunications Engineering	1
Sustainability	2	Nase More	1
Bibliothecae	1	Nongye Gongcheng Xuebao Transactions of The Chinese Society of Agricultural Engineering	1
Ceur Workshop	1	Politicka	1
Developments in Marketing Science Proceedings of The Academy of Marketing Science	1	Problemy	1
Emerald Emerging Markets Case Studies	1	Procedia Computer	1
IFIP Advances in Information and Communication Technology	1	Proceedings of the Laccei International Multi Conference for Engineering Education and Technology	1
Iop Conference Series Earth and Environmental Science	1	Scientometric	1
Journal of Engineering and Applied Sciences	1	Partner Economic Planning	1
Journal of Physics Conference Series	1	Sovremennaya	1
Journal of Transport and Supply Chain Management	1	Total magazines	23

Source: Scopus data (2024)

The 37 scientific papers were the result of the collaboration of academics from more than 48 different institutions. Figure 2 shows the institutions that generated the largest number of academic papers over the study period. This group consists of three universities, each of which produced two publications: the University of Johannesburg, Technische Universität Darmstadt and Technická Univerzita v Košiciach.



Source: Scopus data (2024)
Figure 2. Documents published by institution

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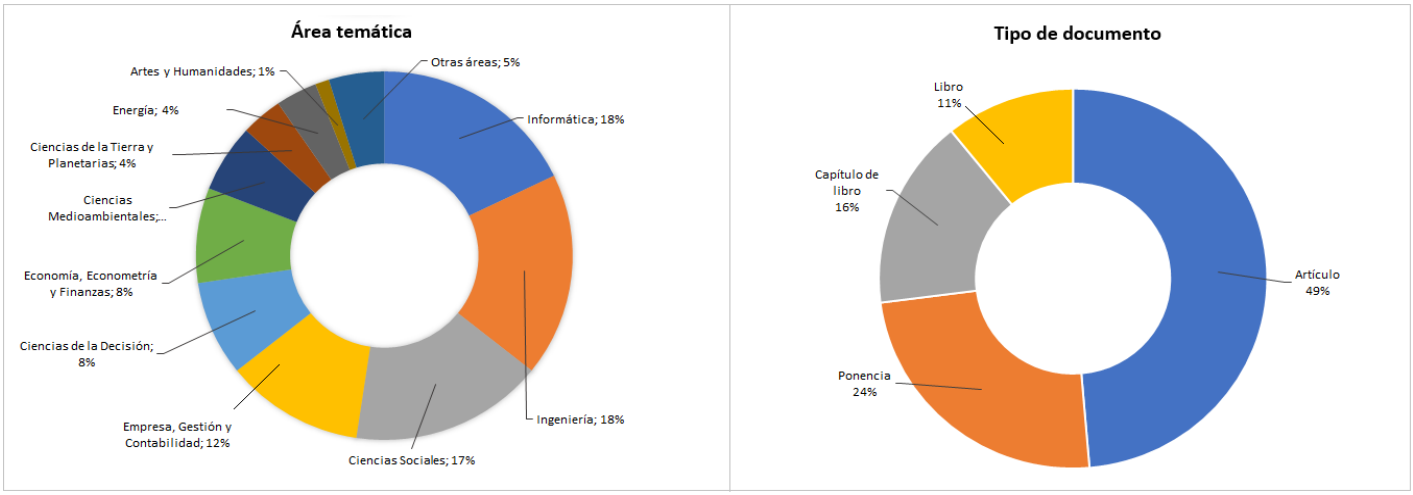
The authors of the chosen academic papers were 83. Table 3 shows that, of all the writers, Belov, V.B. received the highest number of citations (15 in total). He was followed by three authors; Atug, J., Berger, C. and Braunreuther, S., each with only one publication and eight citations.

Table 3. Published papers by author

By author	Quantity	Total citations	By author	Quantity	Total citations
Acevedo-Duque, Á.	1	6	Barykin, S.E.	1	0
Amditis, A.	1	2	Belov, V.B.	1	15
Anand Babu, R.	1	6	Bensfia, C.	1	5
Antonopoulos, M.	1	2	Berger, C.	1	8
Appianing, C.B.	1	3	Borisova, V.V.	1	4
Atug, J.	1	8	Bouklata, A.	1	5
Aćimović, S.	1	0	Braunreuther, S.	1	8
Baldarrago, L.A.A.	1	0	Bugarčić, F.	1	0

Source: Scopus data (2024)

Figure 3 presents a review of studies covering the logistical digitization of international customs procedures between 2013 and 2024. The most up-to-date data on this topic come mainly from the fields of computer science (18 %) and engineering (18 %), while social sciences contribute 17 % of all publications. Likewise, separating the production by type of document, it is observed that scientific articles account for 49 %, papers for 24 %, book chapters for 16 % and books for 11 %.

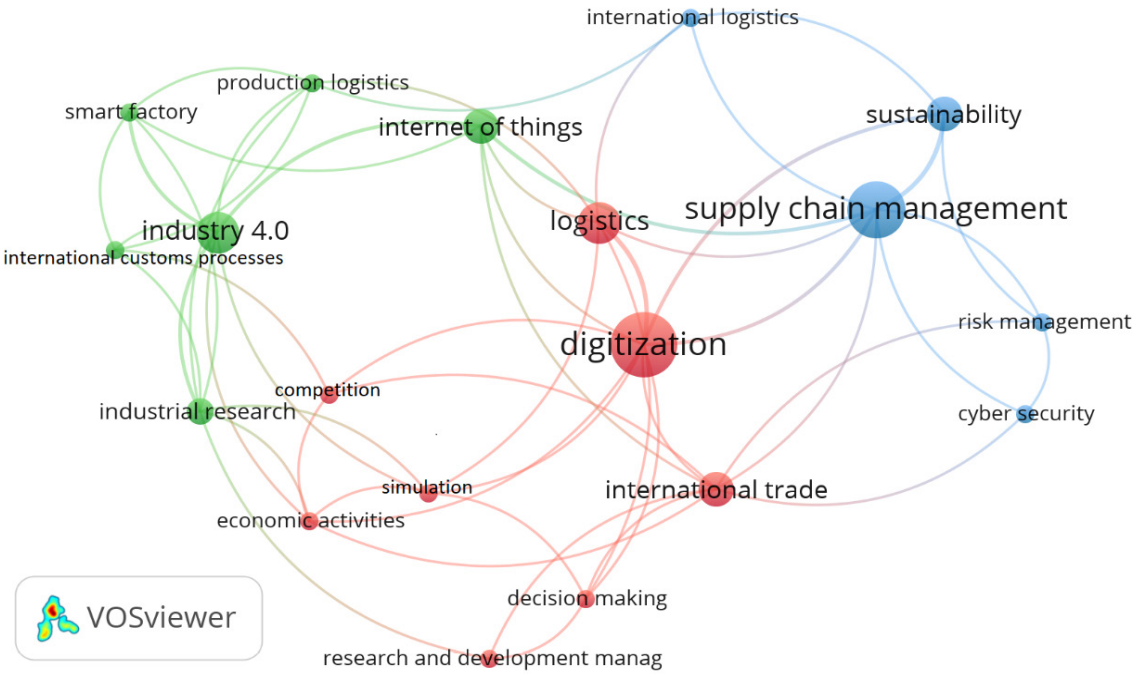


Source: Scopus data (2024)

Figure 3. Publication of documents by thematic area and type

Figure 4 shows the terms that appeared in the titles, abstracts and keyword lists of the documents studied. To facilitate the observation of groups of related words, Visual Object Sense (VOSviewer) uses colors to show the degree of linkage between terms.

- Red cluster. “digitization” (n=63 occurrences), groups the following words: logistics, international trade, simulation, competition, economic activities, decision making, research and development management.
- Blue cluster. “supply chain management” (n=48 occurrences), groups the following words: sustainability, international logistics, risk management, cybersecurity.
- Green cluster. “industry 4.0” (n=29 occurrences), groups the following words: smart factory, production logistics, internet of things, international customs processes.
- Using this categorization approach, most of the terms used in the study have their origin in the subject under investigation.



Source: Results in VOSviewer (2024)
Figure 4. Map of keyword co-occurrence

DISCUSSION

The time period covered by this analysis is from 2013 to 2024, making a worldwide literature review. According to the data, the highest number of scientific papers on logistics digitalization of international customs processes were published in 2022 and 2023. According to Gonzalez et al. (2020), digitalization is driving rapid changes in the transportation and logistics business. Also, as a result of the digital revolution, several new concepts, titles and names have emerged, thus the widespread use of digital technologies has become a common phenomenon that has permeated all facets of the economy (Peña & Alarcón, 2021).

For their part, Velásquez-Monroy & Eslava-Sarmiento (2021) state that customs clearance times are cut in half thanks to digitalization, which eliminates the need for human scrutiny and processing, improves openness as a result of the ability to track procedures and shipments in real time and link customs offices. In addition, Valencia & Vázquez (2023) state that by spending less time on these tasks, companies save money, generating greater competitiveness as a result of their ability to offer faster turnaround times, as well as greater adaptability to changing market conditions and greater efficiency throughout the supply chain.

In general, according to Del Do et al. (2023), the digitization process allows full visibility of all aspects of the overall organization, from the shipment to the importing country, passing through the hands of the importer, it is crucial to know what has happened at each stage of the logistics chain. Consequently, González-Cancelas et al. (2020) agree that moving the customs sector into the digital era obviously requires close cooperation between customs administrations and companies to overcome the obstacles of customs operations and processes.

CONCLUSIONS

In line with the stated purpose of the study, research on the logistical digitization of international customs operations has increased in recent years. The bibliometric analysis reveals an increase of 43,2 % (n=16) when considering all papers indexed by Scopus between 2022 and 2023. Among the countries studied, Germany stands out with a production rate of 13,3 %, the proportion of publications in English was 78,4 %. In addition, the author Belov, V.B. was referenced 15 times; the most significant source was Lecture Notes in Networks and Systems, which published three scientific papers.

Likewise, scientific articles accounted for 49 %, with computer science and engineering accounting for 36 % of the total, while social sciences accounted for 17 %. In the VOSviewer keyword analysis, the term “digitization” had 63 occurrences. In addition, the terms “supply chain management” and “industry 4.0” have to be taken into account, as they are related to the selected research.

On the other hand, the 37 papers analyzed underline the importance of digitizing the logistical aspects of international customs procedures, since, being a widespread practice worldwide, it greatly reduces operational costs while improving the efficiency of customs administration. Finally, it is concluded that the logistical digitization of international customs regimes has more resources in general, a wider range of authors and topics

addressed, and more sources, which provides a more complete view of global scientific production in terms of its visibility, influence and significance. This bibliometric analysis lays a solid foundation for further research by providing evidence-based support through a rigorous review of the existing literature.

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