

Global Trend on Logistics Research: A Bibliometric

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Abstract

This study uses bibliometric analysis, visualization, and VOS viewer application, which is based on the Scopus document database, to assess the research journals on logistics. The study used 1,000 papers on logistics-related themes from foreign authors. A number of factors are used to evaluate articles, including contributions from a country, an institution, an author, journal distribution, the most-cited articles, bibliographic coupling, and keyword analysis. The results showed that the first article indexed by Scopus, which discussed logistics, was published in 1984. Marija Bogataj from the Faculty of Economics, University of Ljubljana, Slovenia, is the most productive author, with nine articles discussing logistics. The United States is the country that produces the most articles on the theme of logistics, namely 194 articles, and Indonesia is ranked 11th. Hong Kong Polytechnic University is an institution that is the primary reference in research on logistics. The International Journal of Production Economics is the most published in logistics research. Potential logistics research themes include blockchain, outsourcing, gender, poverty, coordination, supply chain strategy, packaging, circular economy, and urban logistics. Research is carried out by collaborating across disciplines and countries to make a real contribution to research, education, and the logistics industry.

Keywords

Logistics; supply chain; humanitarian; connectivity; bibliometric analysis; vosviewer software

INTRODUCTION

The company grows and develops along with e-commerce, advances in information technology, and the improvement of supporting infrastructure networks such as roads, modes of transportation, and internet networks. The logistics industry grew 40 percent during the Covid-19 pandemic, especially last-mile delivery, namely delivery from retail or stores directly to consumers (Rabbi, 2021). Some logistics companies engaged in last-mile delivery, for example, PT Pos Indonesia, Tiki, JNE, J&T, Shopee Ekspres, Ninja, Antar Aje, etc. This has caused the logistics sector to absorb many human resources with various activities in the logistics sector, including Warehouse operators, Logistics Administrative officers, Warehouse Supervisor, Freight forwarders, Supply Chain managers, Freight Handler, Junior Warehouse Operator, LogOfficerData Entry Officer, Material Handling Equipment Operator, Pick Up and Delivery Order, Purchasing Manager, Senior Purchasing Officer, and Motorcycle Courier.

Therefore, the development of the field of logistics must be supported by education and research in the field of logistics. Education in the field of logistics is expected to supply superior human resources (Coordinating Ministry for Economic Affairs, 2021), while research is expected to produce innovations for improving services in effective and efficient logistics.

Education in the field of logistics is carried out through formal and non-formal education channels. Formal education is carried out through vocational programs (D1 to D4), and scientific program at the S1 to S3 levels in higher education. Based on data from BAN-PT in 2022 (BAN PT, 2022), as many as 29 study programs provide formal logistics education. The Logistics Diploma Program (D1-D4) has been established in the Vocational Program, including Diponegoro University, Padjajaran University, Bitung Logistics Community Academy, Pos Indonesia Polytechnic, APP Jakarta Polytechnic, and ATI Padang Polytechnic. While in the academic program of the S1 Logistics Study Program, among others: The College of Logistics Management (STIMLOG) Bandung, the Trisakti Institute of Transportation and Logistics (ITL), Semen Indonesia International University (UISI) Gresik, Pertamina University, STIAMI Institute Jakarta, Harapan Bangsa Institute of Technology in Bandung, IPB Bogor, ITS Surabaya. As for the Logistics Masters Program (S2), only ITB Bandung organizes the Master Program, while the Doctoral Program (S3), no universities organize logistics study programs in Indonesia, so job opportunities and the implementation of formal logistics education in Indonesia are still wide open.

The development of logistics education is multi-disciplinary; several disciplines that develop logistics include economics, management, marketing, administration, business, engineering, and transportation, so logistics research also uses a multi-disciplinary approach and lacks a strict orientation toward the development, testing, and application of theory (Karatas-Cetin & Denktas-Sakar, 2013) so that logistics is more suitable as applied science and logistics research as applied research.

Logistics is the management of the flow of goods between the point of origin and the point of consumption to meet some requirements, for example, customers or corporations (Li, 2014).

Logistics management includes three main parts: transportation, warehousing, and distribution (Mege et al., 2022). The broad scope of logistics activities and logistics science, including new and multi-disciplinary sciences, has caused the urgent need for research mapping in logistics that can illustrate the global trend of logistics research. Therefore the question of this research is what is the global trend of research publications on logistics? This Study aims to obtain information about the attribution of country/ institutional /author, distribution journal, article that is most cited, bibliographic coupling, and keywords analysis on logistics research. It is hoped that the research results can provide information about countries, authors, institutions, journals, and logistics themes that can be developed for further research.

METHODS

Bibliometrics analysis uses a literature review from the database. We use the Scopus database and the VOSviewer application to visualize the results (Abbas et al., 2022; Van Eck & Waltman, 2010; Widianingsih et al., 2021). The process of searching for literature to produce the final dataset can be seen in figure 1. On August 18, 2022, we retrieved data from the Scopus database. In this study we used a search operation on the Scopus database using the command:

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TITLE-ABS-KEY ( logistics ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( SUBJAREA , "ECON" ) ) AND ( LIMIT-TO ( EXACTKEYWORD , "Logistics" ) OR LIMIT-TO ( EXACTKEYWORD , "Supply Chain Management" ) OR LIMIT-TO ( EXACTKEYWORD , "Supply Chains" ) OR LIMIT-TO ( EXACTKEYWORD , "Transportation" ) OR LIMIT-TO ( EXACTKEYWORD , "Entrepreneurship" ) OR LIMIT-TO ( EXACTKEYWORD , "E-commerce" ) OR LIMIT-TO ( EXACTKEYWORD , "Indonesia" ) OR LIMIT-TO ( EXACTKEYWORD , "Humanitarian Logistics" ) )
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We use the keyword logistics in the Scopus database limited to documents published until 2022. We found 651.076 documents which is related to the keyword.

We identified as many as 6.594 documents when we re-selected the document exclusively from English-language publications and economic subjects that contained both an abstract and the full text. We re-limited it using the keywords "Logistics, "Supply Chain Management, "Supply Chains, "Transportation," "Entrepreneurship," " E-commerce," "Indonesia, and "Humanitarian Logistics ". The next step is to use the VOSviewer tool to do a bibliometric analysis. Years of publication, affiliations, international authors and co-authors, journals, keywords, and citations are all included in the bibliographic information. According to the report, there are increasingly more articles written about logistics. We look at trends in publishing that are relevant to the chosen area of study. Additionally, the author's affiliation with the nation and institution of origin is verified. We also analyze journals with logistics and articles with the highest citations and biographical analysis of coupling analysis. In the end, researchers present keyword analysis to find trends based on keywords.

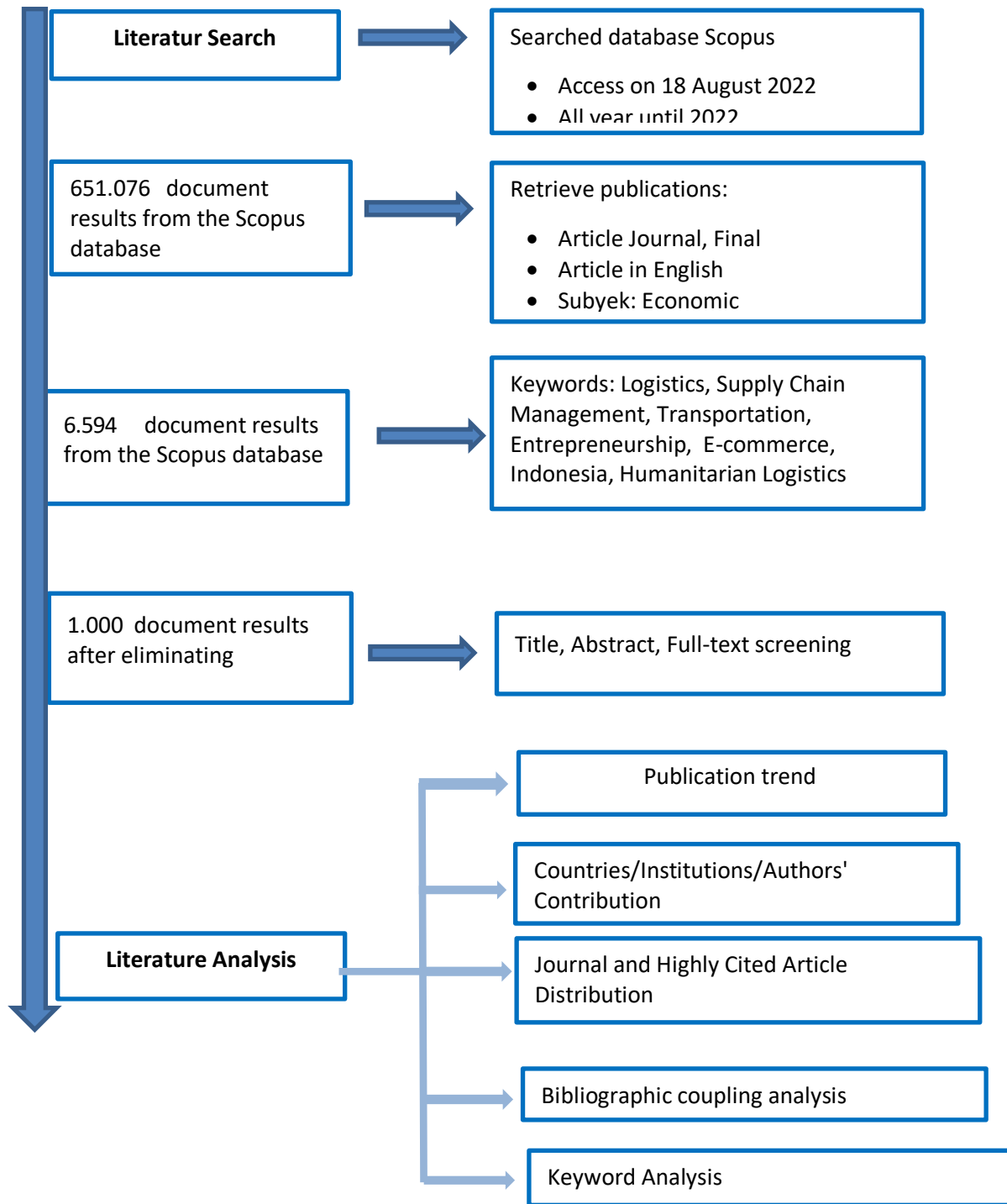


Figure 1. Research Process

RESULT AND DISCUSSION

Biographical analysis of logistics traced as many as 1,000 articles. The first scientific journal article relevant to the logistics theme was published in 1984. The first article was published in the Journal of Urban Economics titled "The effect of population growth, the pattern of demand and technology on the process of urbanization. "The development of articles related to logistics experienced relatively rapid development in the period 2000-2021 along with the development of the logistics industry, especially with the development of communication and information technology. In 2020-2021, there was a surge in articles related to logistics, namely 85 articles.

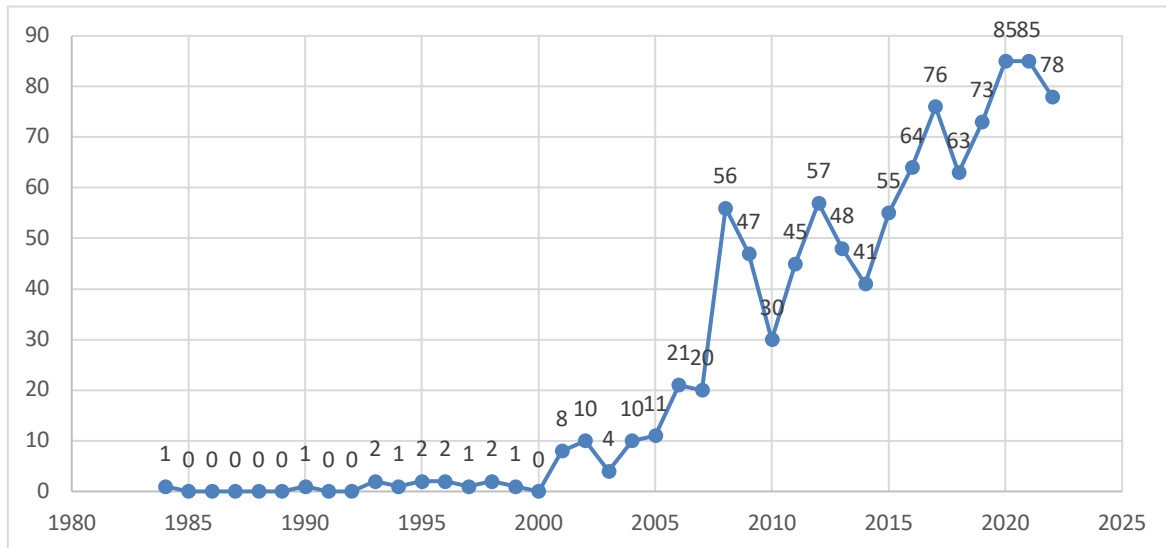


Figure 2. Logistics publication trends

Author By Country of Origin

According to the metadata of logistics research, the author is from 92 different countries. However, by using a minimum of 5 documents from each country, 52 countries achieve thresholds. 11 The country with most articles on logistics is the United States in number 1 order (Table 1). The United States as the country with most authors, recorded 194 articles with 10.224 citations, the United Kingdom ranked second with 94 articles, then China with 86 articles, Germany with 65 articles, India with 62 articles, Canada with 45 articles, Italy with 44 articles, France with 40 articles, Russia Federation with 36 articles and Hongkong with 34 articles, Indonesia was ranked 11th by publishing 32 articles. The data shows that logistics studies concern academics from the Americas, Europe, and Asia. There has not been any visible contribution from academics from the African continent in writing manuscripts on logistics.

Table 1. Top Countries With Origin of Author Affiliations with The Most Publications

Rank	Countries	Article	Cited
1 st	United States	194	10.224
2 nd	United Kingdom	94	4.238
3 rd	China	86	3019
4 th	Germany	65	2236
5 th	India	62	2822
6 th	Canada	45	2581
7 th	Italy	44	2188
8 th	France	40	1684
9 th	Russian Federation	36	232
10 th	Hongkong	34	1863
11 th	Indonesia	32	231

Bibliometric analysis showed the presence of 9 clusters based on the author's country of origin. The central cluster is cluster 2 (blue color), a network of researchers from the United States who collaborated with authors from India, Australia, South Korea, Kazakhstan, New Zealand, Singapore, South Africa, and Mexico (figure 3).

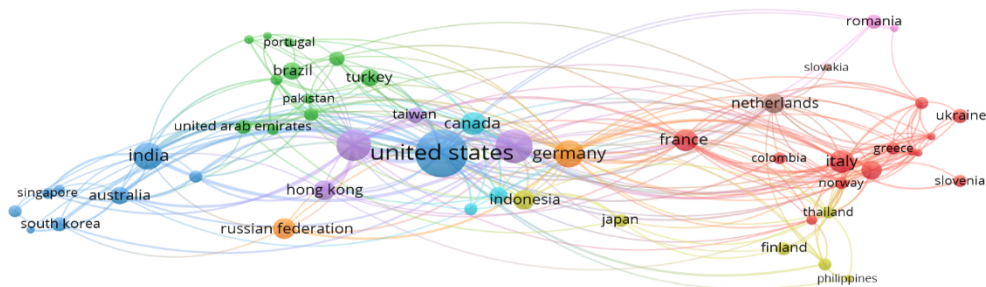


Figure 3. "Logistic" Author Network Cluster Based on State Affiliation

In research related to the logistics theme of Bogataj, M Univerza v Ljubljani, Ljubljana Slovenia was the most prolific author by producing as many as nine documents. Bogataj, D from Alma Mater Europaea, Department of Social Gerontology, Maribor, Slovenian Institute INRISK, Trebnje Slovenia took second place resulting in 6 documents, followed by Batta, R., Cheng, T.C.E. and Frein, Y. with five documents each.

Table 2. The Most Productive Author

Author	Article	Affiliation	Country
Bogataj, M.	9	Univerza v Ljubljani, Ljubljana	Slovenia
Bogataj, D.	6	Alma Mater Europaea, Department of Social Gerontology, Maribor, Slovenian Institute INRISK, Trebnje	Slovenia
Batta, R.	5	University at Buffalo, The State University of New York, Department of Industrial and Systems Engineering, Buffalo,	United States
Cheng, T.C.E.	5	Hongkong Polytechnic University, Kowloon	Hong kong
Frein, Y.	5	Universite Grenoble Alpes, Saint Martin d'Herès,	France
Govindan, K.	5	Syddansk Universitet, Odense, Denmark	Denmark
Sengupta, T.	4	Indian Institute of Management Ranchi, Department of Operations Management, Ranchi,	India
Zäpfel, G.	4	Johannes Kepler University Linz, Institute of Production and Logistics Management, Linz, Austria	Austria

Based on the author's affiliation, Hong Kong Polytechnic University is the institution that produces most articles related to logistics, as many as 22 articles with 1,342 cited with an h-index of 16 so that this institution can be used as a reference in the development of logistics education, and scientific publications with the theme of logistics. Although there is no logistics study program in Indonesia, the University of Indonesia ranks second in publications with the logistics theme. The university produced 12 documents, albeit with low citations of 83 cited, and has an h-index of 6

Table 3. The Most Active Institution In Logistics Publications

Affiliation	Document	Cited	h-index
Hongkong Polytechnic University	22	1.342	16
Universitas Indonesia	12	83	6
Cardiff Business School	10	754	10
Wageningen University & Research	8	594	7
Syddansk Universitet	8	1.475	8
Univerza v Ljubljani	8	136	5
Bucharest University of Economic Studies	8	86	5
The University of Tennessee	7	347	6

Michigan State University	7	341	6
University at Buffalo	7	553	7

Journal and Highly Cited Article Distribution

Bibliometric analysis shows that ten journals are the primary reference for logistics research. The International Journal of Production Economics ranks first, this journal published by Elsevier Ltd contains 321 documents with a Cite Score of 2021 with a score of 14.3, SJR 2021 with a score of 2,808, SNP 2021 with a score of 2,877 and has been indexed by Scopus from 1991 until now. Four of the ten most influential journals in the field of logistics were published by Elsevier Ltd: 1). International Journal of Production Economics, 2). Resources Conservation and Recycling, 3). Socio-Economic Planning Sciences and 4). Research In Transportation Business And Management. Publisher Emerald, Hindawi, The National Academy of Management Vul, Springer Nature, Editura ASE Bucuresti, and Wiley-Blackwell each published one journal with the logistics theme. The Journal of Actual Problems of Economics, although widely cited in 2021, will no longer be indexed by Scopus. Based on the Scimago Journal Ranking of 10 influential journals in the logistics field, six journals are included in the Q1 category: 1). International Journal of Production Economics, 2). Resources Conservation and Recycling, 3). Socio-Economic Planning Sciences, 4). Research In Transportation Business and Management, 5). Maritime Economics and Logistics, 6). Journal of Supply Chain Management.

Table 4. Top 10 Sources of Logistics on Number of Publications

Rank	Source	Publisher	Documents	Cite Score 2021	SJR 2021	SNP 2021
1 st	International Journal of Production Economics	Elsevier Ltd	321	14.3	2.808 Q1	2.877
2 nd	Resources Conservation and Recycling	Elsevier Ltd	75	17.9	2.589 Q1	2.943
3 rd	Socio-Economic Planning Sciences	Elsevier Ltd	36	6.7	1.095 Q1	1.951
4 th	Emerald Emerging Markets Case Studies	Emerald	30	0.2	0.225 Q3	0.203
5 th	Research In Transportation Business and Management	Elsevier Ltd	20	5.0	0.934 Q1	1.270
6 th	Journal of Advanced Transportation	Hindawi	18	3.7	0.569 Q2	1.038
7 th	Actual Problems of Economics	National Academy of Management Vul	15		Non Q	

8 th	Maritime Economics And Logistics	Springer Nature	15	4.9	0.783 Q1	1.345
9 th	Amfiteatru Economic	Editura ASE Bucuresti	13	3.1	0.370 Q2	0.681
10 th	Journal Of Supply Chain Management	Wiley-Blackwell	11	10.2	3.034 Q1	2.384

Based on the results of data processing, there are 5 articles that occupy the top positions related to the topic of logistics. In the first place is an article entitled "Supply chain design and analysis: Models and methods." This article was written by (Beamon, 1998) with a total of 1,270 citations. The article in the second position is "Supply chain integration and performance: The effects of long-term relationships, information technology, and sharing, and logistics integration" (Prajogo & Olhager, 2012). This article is cited in the amount of 715 citations. The third position is occupied by the article "Design of sustainable supply chains under the emission trading scheme" (Chaabane et al., 2012). The number of citations in this article is 600. The fourth place is occupied by the article "Coordination in humanitarian relief chains: Practices, challenges, and opportunities" (Balcik et al., 2010), this article cited 551 citations. The article titled "The total cost of logistics in supplier selection, under conditions of multiple sourcing, multiple criteria, and capacity constraint" (Ghodsypour & O'Brien, 2001) took fifth place with 540 citations.

Based on the five most influential articles in the field of logistics, there are eight articles published in the International Journal of Production Economics, so the International Journal of Production Economics is the primary reference in writing articles related to the theme of logistics. In the five most influential articles on logistics research, namely "Supply chain integration and performance: The effects of long-term relationship, information technology, and sharing, and logistics integration." (Prajogo & Olhager, 2012), written by an Indonesian author (Daniel Prajogo) despite being affiliated with the Department of Management, Monash University Australia.

Bibliographic Coupling Analysis

Bibliographic coupling is performed using an analysis unit, which is a document with a total counting minimum number of citations of 200. Figure 4 depicts a document-based bibliographic analysis that yielded eight clusters. The most significant nodes are found in four clusters: cluster 1 (red), cluster 2 (green), cluster 3 (blue), and cluster 4 (yellow).

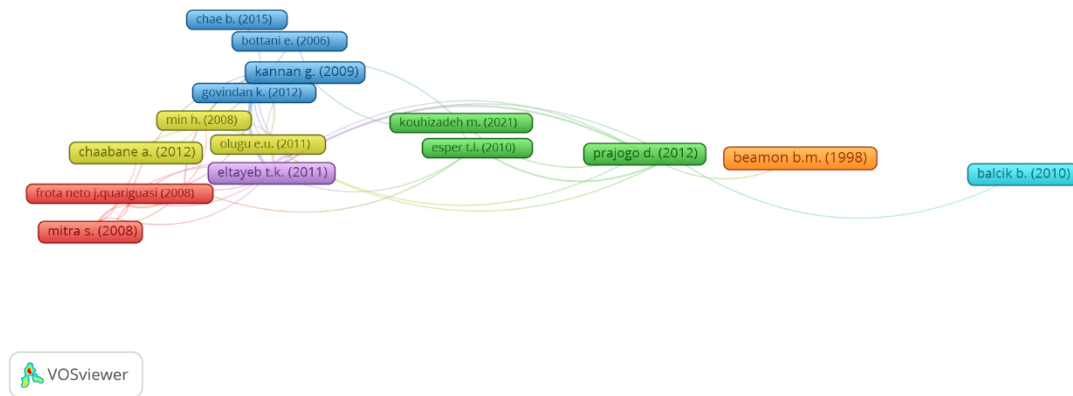


Figure 4. Bibliographic coupling analysis on Logistics by documents

The research entitled "Designing and evaluating sustainable logistics networks" (Frota Neto et al., 2008) is widely referred to in cluster 1 and other clusters such as (Chaabane et al., 2012) and (Eltayeb et al., 2011). Cluster 1 is red; it has a fairly central position in the logistics ka Jian because it is a pioneer cluster of studies on logistics, so other documents widely cite it. The article with a center is also found in cluster 2 in green. The article with the title "Demand and supply integration: a conceptual framework of value creation through knowledge management" (Esper et al., 2010) is connected to the article (Östlin et al., 2008), (Kim, 2009) and (Kouhizadeh et al., 2021).

Keywords Analysis

Vosviewer is used to visualize keywords used by researchers with logistics themes. This is very useful because it can show us to show logistics research trends. Vosviewer also provides analysis clusters that show the relationship between one topic and another (Hamidah et al., 2020). This research resulted in visualization of bibliometric analysis, namely 1) Network visualization, 2) Overlays visualization; and 3) Density visualization (Napitupulu, 2021).

Potential Topics of Logistics Research

In figure 6, you can see the overlay of keywords used by researchers in the field of logistics. At the beginning of the development of logistics research in the decade before 2014 (blue color), logistics research was mainly related to supply chain management, reverse logistics, inventory management, and freight transportation. In the decade 2014-2018 (green color), logistics research related to humanitarian logistics, vehicle routing, sustainable logistics, dynamic systems, and logistic management.

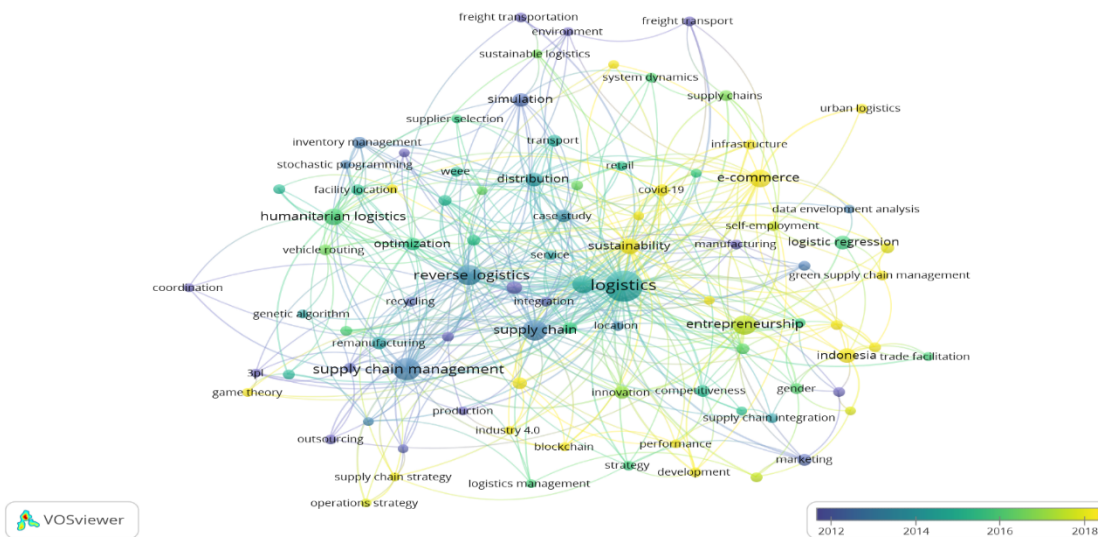


Figure 6. Overlay Visualization of Logistics

In the decade 2018 until now (yellow color), research on logistics has experienced very rapid development, and new keywords have emerged due to advances in information technology and the Covid-19 pandemic. Keywords that have become the topic of the latest logistics research include e-commerce, green supply chain management, industry 4.0, covid-19, urban logistics, blockchain, sustainability, Indonesia, infrastructure, and climate change.

In figure 7, you can see the density visualization of logistics research, the larger and brighter the image, the more often the theme is raised in research on logistics. Therefore, to get novelty and the renewal of research on logistics, researchers can conduct research that is rarely done by other research on the theme of logistics research but is the latest issue, including the theme of blockchain, outsourcing, gender, poverty, coordination, supply chain strategy, supply chain integration, packaging, circular economy, and urban logistics.

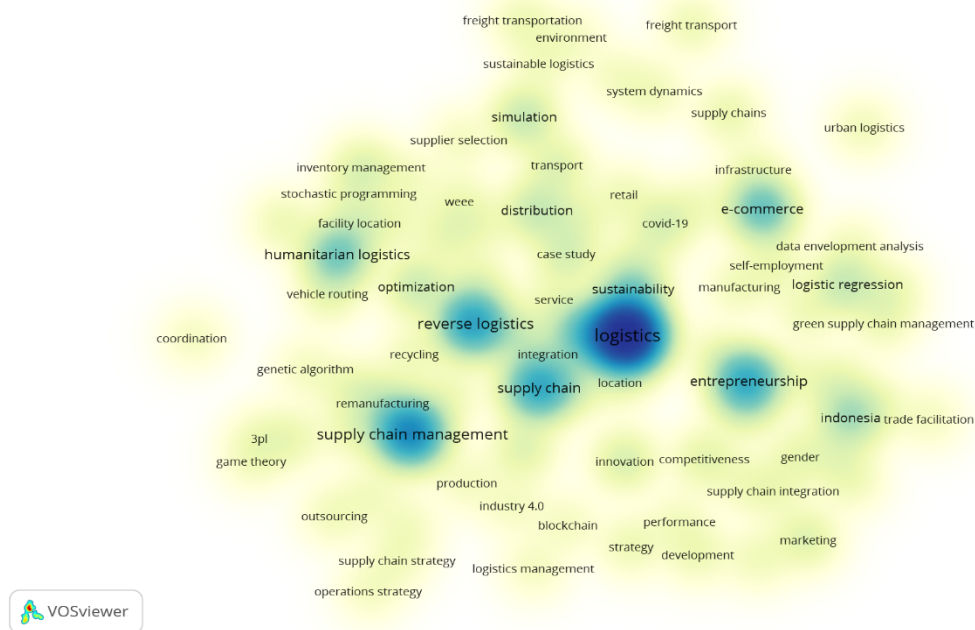


Figure 7. Density Visualization of Logistics

CONCLUSION

The first and indexed article of Scopus that discusses logistics was published in 1984 in the Journal of Urban Economics. Marija Bogataj from the Faculty of Economics, University of Ljubljana, Slovenia, is the most prolific author, with nine articles discussing logistics. The United States is the country that produces the most articles with logistics themes, namely 194 articles, and Indonesia is ranked 11th with 32 articles. Hong Kong Polytechnic University is an institution that is the primary reference in research on logistics. The International Journal of Production Economics is the most published and cited journal in logistics research, and an article entitled "Supply chain design and analysis: Models and methods" is an article that is the primary reference for logistics research.

The theme of logistics research but not much research has been done so that it has the potential to be used in the following research, including the theme of blockchain, outsourcing, gender, poverty, coordination, supply chain strategy, packaging, circular economy, entrepreneurship, and urban logistics. The research was carried out by collaborating across science disciplines and countries to contribute to developing education, research, and the logistics industry.

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