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Research Article

Bibliometric Analysis of Logistics and Artificial Intelligence Research Trends in the Last 10 Years

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ABSTRACT

In recent years, the integration of logistics and artificial intelligence has become increasingly important across various industries, fostering innovation and progress. This study seeks to uncover key contributors, prominent keywords, influential journals, and leading countries at the crossroads of logistics and AI to provide direction for future research. By analyzing 1118 articles from the past decade (2015–2024) using the Web of Science (WoS) database and VOSviewer software, several critical insights were derived. The analysis included co-occurrence of keywords, citation patterns (articles, sources, institutions, and countries), and co-authorship networks. Results from the keyword analysis reveal that “artificial intelligence” and “logistics” dominate, followed by terms such as “machine learning,” “deep learning,” “blockchain,” “optimization,” and “internet of things.” Citation analysis identified the study by Dwivedi et al. (2021) as the most cited work, with 1009 citations. Among journals, Engineering Applications of Artificial Intelligence stands out, featuring 58 papers and 894 citations. In co-authorship analysis, Angappa Gunasekaran emerges as the most impactful author with six publications and 330 citations. Institutionally, the Chinese Academy of Sciences leads with 342 citations, while China ranks first among countries with 3979 citations, followed by India and the United Kingdom. This bibliometric analysis highlights pivotal resources, influential studies, and leading contributors in the field of logistics and artificial intelligence, serving as a foundational guide and valuable reference for future researchers in this domain.

1. Introduction

In recent years, the integration of logistics and artificial intelligence (AI) has created a significant transformation in many sectors and the combination of these two fields has enabled the development of innovative solutions [1-4]. The advantages offered by AI technologies have enabled the optimization of logistics processes and significant efficiency improvements [5-8]. For example, AI-powered automation systems offer flexibility and efficiency in warehouse management and significant improvements in supply chain management [9-12]. Bibliometric analyses in the field of logistics and AI are of great importance to understand research trends at the intersection of these disciplines and to guide future work [13-16] . For this reason, some important bibliometric analysis articles in the literature are presented:

Bibliometric analyses in logistics and AI are crucial for understanding research trends at the intersection of these disciplines and to guide future studies. For example, Rana and Daultani examined the role of AI and machine learning applications in supply chain digital transformation and revealed the development trends in this field through bibliometric analysis [17]. Similarly, Hajizadeh et al. reviewed the literature on this topic, analyzing the interaction

This is the full version of the conference paper titled “Bibliometric Analysis of Research Trends in Logistics and Artificial Intelligence for 2015-2024” presented at the 2nd International Conference on Trends in Advanced Research (ICTAR 2024) held on November 22-23, 2024 and published on page 101 of the abstract book with ISBN number 978-625-6314-72-6.

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between AI and blockchain [18]. Bawack et al. examined the effects of AI in the field of e-commerce with bibliometric analysis and identified the most cited studies [19]. Zhu et al. examined the advantages of AI technology in modern logistics systems [20], Ponomarenko and Ponomarenko investigated the effects of logistics and digital marketing integration with AI on business optimization [21].

Unlike previous bibliometric analyses on the convergence of logistics and AI, this study aims to provide a more up-to-date perspective, especially by covering the literature between 2015 and 2024. The data obtained from bibliometric analyses in this field comprehensively analyzes current trends by identifying prominent authors, keywords, journals, countries, and institutions in literature.

2. Methodology

The Web of Science (WoS) database was searched using the keywords 'logistics' and 'artificial intelligence.' As of October 17, 2024, the studies of the last 10 years (2015-2024) were examined [22]. Only “Article” was selected as the study type and “English” as the language. A total of 1118 results were obtained. These data were exported in “tab delimited file” format for analysis and analyzed with VOSviewer software. Co-occurrence-Authors Keywords (keywords that appear together), Citation-Documents, Citation-Sources, Citation-Organizations, Citation-Countries and Co-authorship-Authors were analyzed. Figure 1 illustrates the methodological steps undertaken in this study.

Figure 2 shows the increase in the number of publications and citations by years. Since 2015, there has been a significant increase in the number of publications, and this increase has accelerated especially after 2019. In 2023 and 2024, the number of publications reached its peak, while the increasing trend in the number of citations also increased steadily. This shows that the topics of logistics and AI have attracted more and more attention in recent years and have gained an important place in literature.

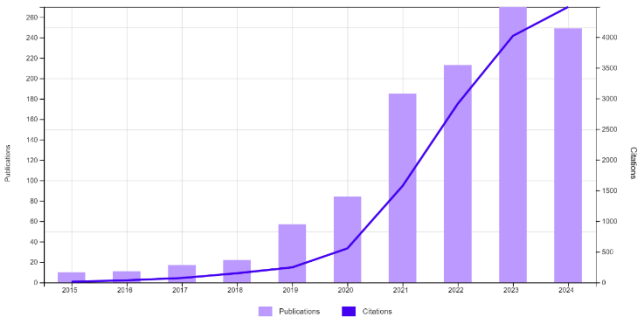

Figure 2. Times cited and publications over time

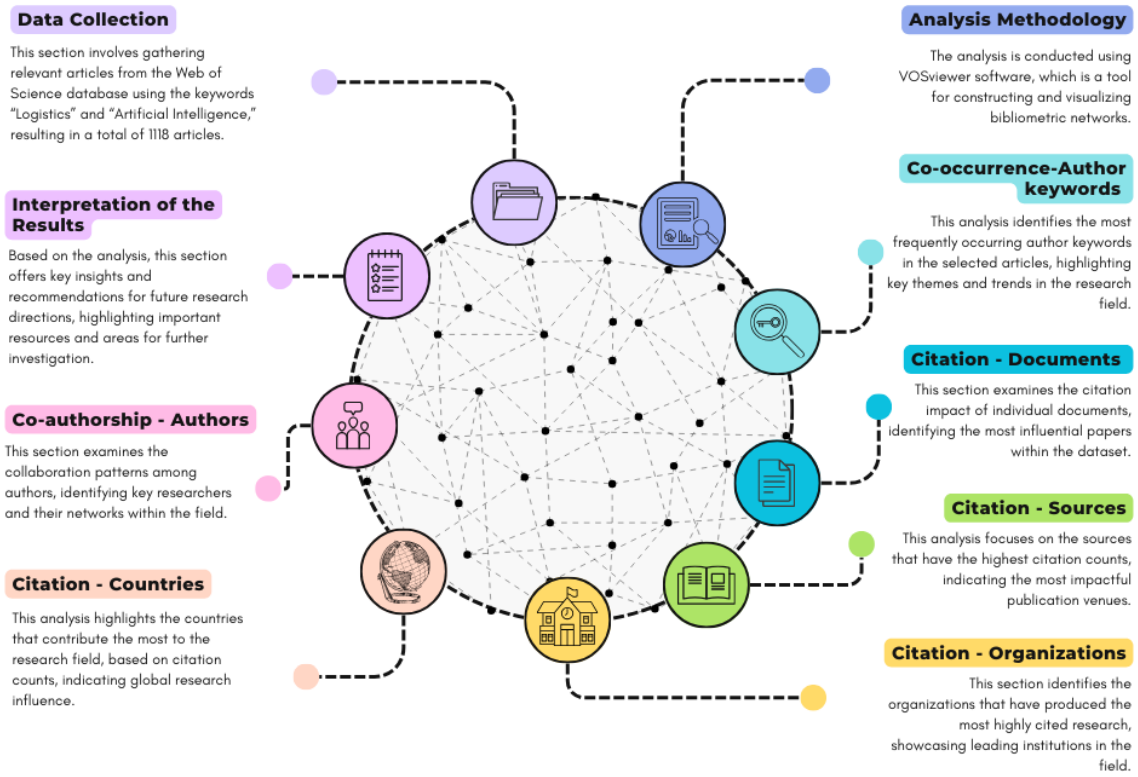

Figure 1. Process Flow Chart for Bibliometric Analysis of Research Trends in Logistics and AI

3. Results

Co-occurrence-Author keywords analysis shows that the most frequently preferred keywords of the authors are “artificial intelligence” and “logistics”. These keywords were used 218 and 116 times respectively. Other words that frequently followed these keywords were “machine learning” (72 times), “deep learning” (61 times), “blockchain” (38 times), “internet of things” (32 times) and “optimization” (30 times). The analysis highlights that, in addition to AI and logistics, concepts like machine learning, deep learning, blockchain technology, the Internet of Things, and optimization are prominent in literature.

Figure 3 lists the most frequently used keywords in the literature, while Figure 4 shows the cloud structure graph of keywords. As depicted in Figure 4, the keywords 'artificial intelligence' and 'logistics,' central to this analysis, form the core of the network and form strong ties with other keywords. In particular, words such as “machine learning,” “deep learning,” and “blockchain” are connected to these two main themes. These links visually illustrate the relationships between keywords and the main focal points in the field.

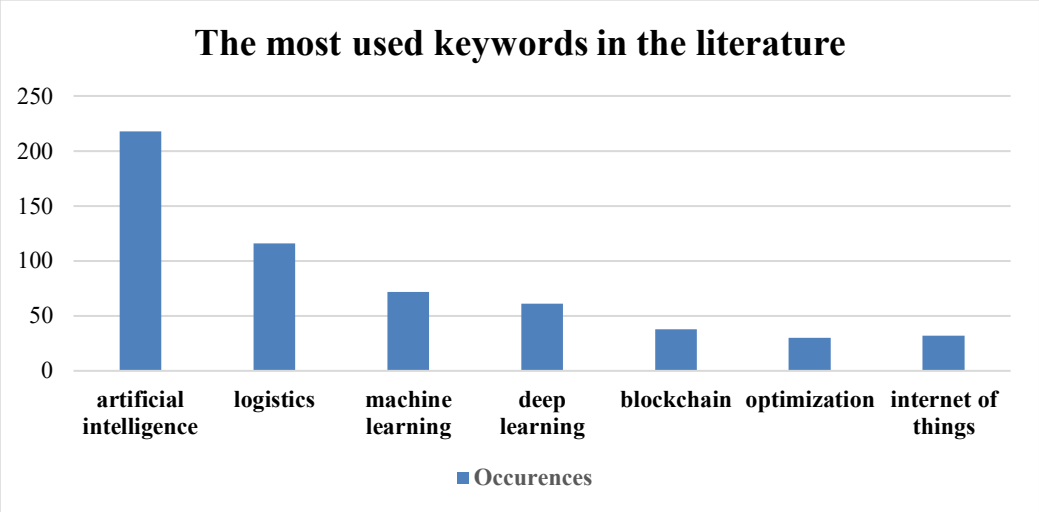

Figure 3. The most used keywords in literature

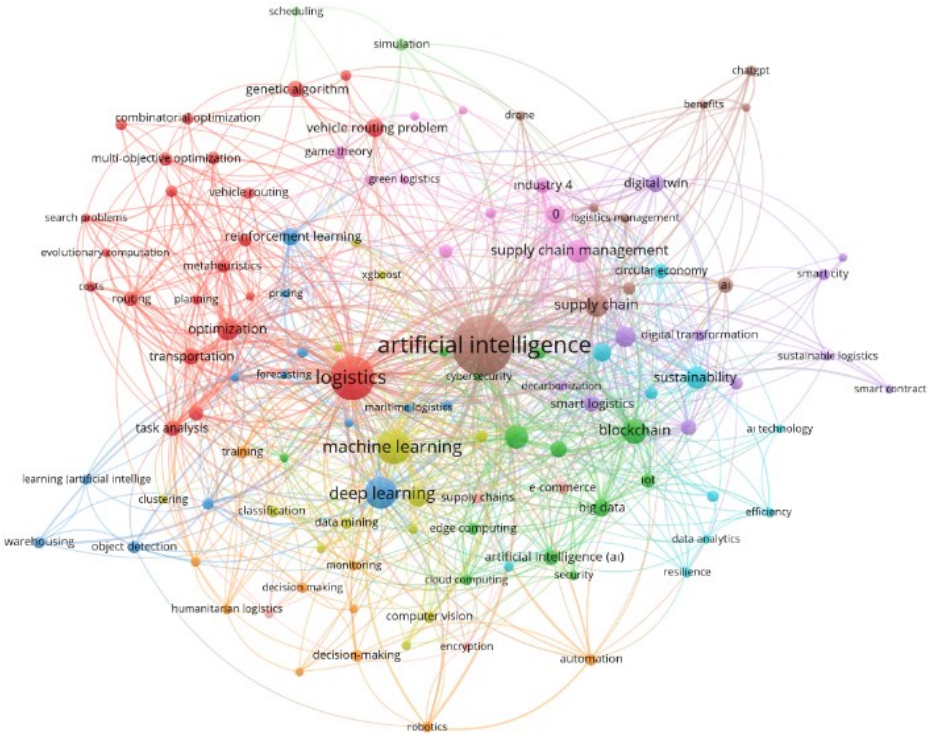

Figure 4. Cloud network structure of keywords

The citation analysis based on the results of bibliometric analysis shows that the most cited study in the field is "Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy". This article had a high impact compared to other studies in the field and received a total of 1009 citations [23]. This article is followed by Kristoffersen's "The smart circular economy: A digital-enabled circular strategies framework for manufacturing companies" with 307 citations [24]. In third place is Tang's article titled "The strategic role of logistics in the industry 4.0 era" with 268 citations [25]. Other notable studies include Benzidia's article "The impact of big data analytics and AI on green supply chain process integration and hospital environmental performance" with 256 citations [26], Ahad's study titled "Enabling technologies and sustainable smart cities" received 236 citations [27].

Since examining such studies can provide new perspectives for researchers and guide them in the research process, Table 1 lists the top five most reviewed articles in literature. These studies stand out in the literature and constitute important references for current research in the field. Figure 5 visualizes the citation relationships between these studies and the network structure of the authors. In particular, studies such as Dwivedi (2021) and Tang (2019) lead the literature by establishing strong links with other papers. Such highly cited studies are a source of inspiration for researchers and contribute to the development of knowledge in the field.

Table 1. The top five most scanned articles in literature

Documents	Citations
Dwivedi et al. (2021)	1009
Kristoffersen et al. (2020)	307
Tang et al. (2019)	268
Benzidia et al. (2021)	256
Ahad et al. (2020)	236

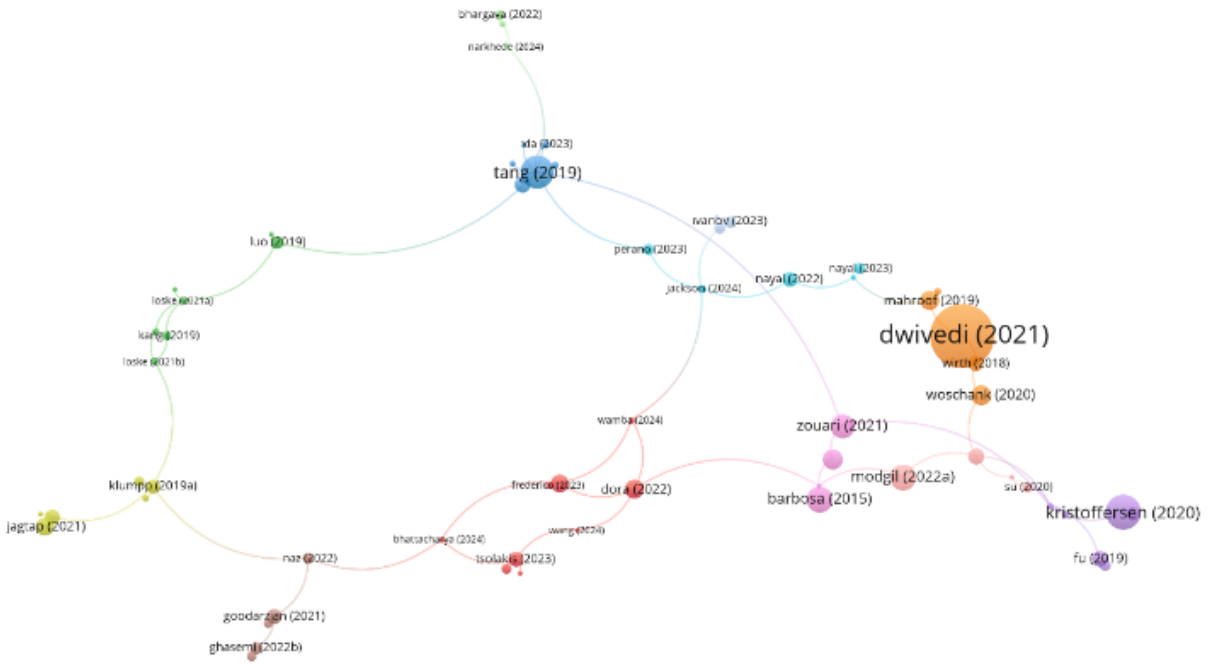

Figure 5. Cloud network structure of influential articles

According to the citation analysis on journal basis, the journal "Engineering Applications of Artificial Intelligence" stands out as the most cited journal with 58 articles and 894 citations. This journal is followed by "Transportation Research Part E-Logistics and Transportation Review" with 44 articles and 590 citations and "Sustainability" with 37 articles and 539 citations. Other notable journals are "International Journal of Production Research" with 13 articles and 507 citations and "Technological Forecasting and Social Change" with 7 articles and 459 citations.

While Table 2 lists the top five most cited journals in literature.

Table 2. The top five most cited journals in literature

Journals	Article	Citations
Engineering Applications of Artificial Intelligence	58	894
Transportation Research Part E-Logistics and Transportation Review	44	590
Sustainability	37	539

International Journal of Production Research	13	507
Technological Forecasting and Social Change	7	459

guide for researchers working in the field and are among the main sources that guide literature.

Figure 5 visualizes the cloud network structure of these journals. When Figure 6 is examined, it is seen that these journals visually reveal the impact of these journals in the field and their connections with other studies. In particular, the journals "Engineering Applications of Artificial Intelligence" and "Transportation Research Part E-Logistics and Transportation Review" stand out as prominent reference sources for research in the field of AI and logistics. It is understood that these journals serve as a

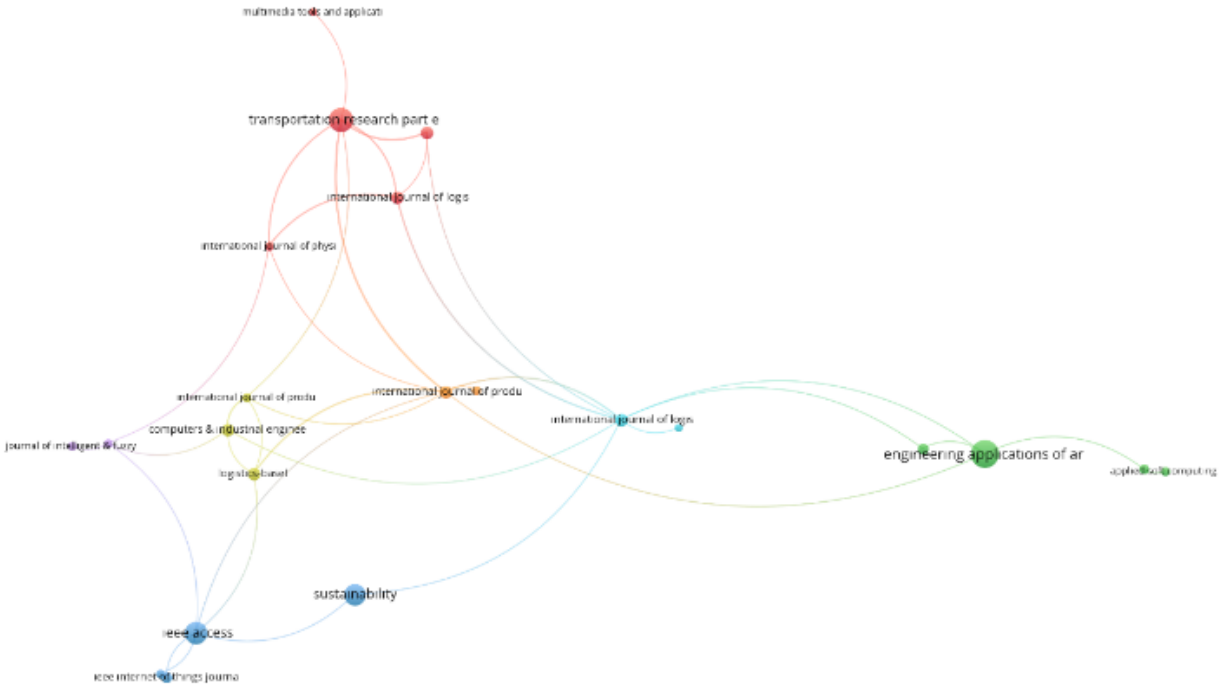

Figure 6. Cloud network structure of influential journals

Co-authorship-Authors analysis shows that the most influential author in the field is Angappa Gunasekaran. Gunasekaran has a significant influence in the field with 6 papers and 330 citations in total. Other prominent authors include Shivam Gupta with 6 articles and 264 citations, Fei-yue Wang with 7 articles and 179 citations, Ajith Abraham with 5 articles and 177 citations, and Fariba Goodarzian with 5 articles and 177 citations.

The collaborative network structure seen in Figure 7 shows that the authors form separate groups focused on different research areas. Authors such as Angappa Gunasekaran, Shivam Gupta, Zhou Guoxiong and Li Jiun are densely connected among themselves individually. This distribution suggests that authors are grouped according to specific areas of expertise and collaborate more closely in these areas.

Figure 7. Cloud networking of influential writers

According to the citation analysis based on institutions, the most cited institution was the Chinese Academy of Sciences with 342 citations and 20 articles. This institution is followed by Eindhoven University of Technology with 280 citations and 5 articles, Neoma Business School with 264 citations and 6 articles, Hong Kong Polytechnic University with 238 citations and 16 articles, and University of Cambridge with 231 citations and 8 articles.

As seen in Figure 8, centrally located institutions such as the Chinese Academy of Sciences and Tsinghua University have a wide network of collaborations and are increasing their influence in the field. On the other hand, some of the more marginalized universities have limited connections and operate more independently. This suggests that certain institutions play a central role in research collaborations.

Figure 8. Cloud network structure of influential organizations

In the country-based citation analysis, the People's Republic of China ranks first with 3979 citations (408 articles), followed by India with 2926 citations (101 articles), the UK with 2850 citations (80 articles), the USA with 2400 citations (135 articles) and France with 1667 citations (62 articles). As seen in Figure 9, countries such as China, India, the UK and the USA are positioned at the center of the network and have strong collaborative links with other countries. This shows that these countries play a central role in the international research network and increase their citation rates. Countries on the periphery have more limited collaborative relationships.

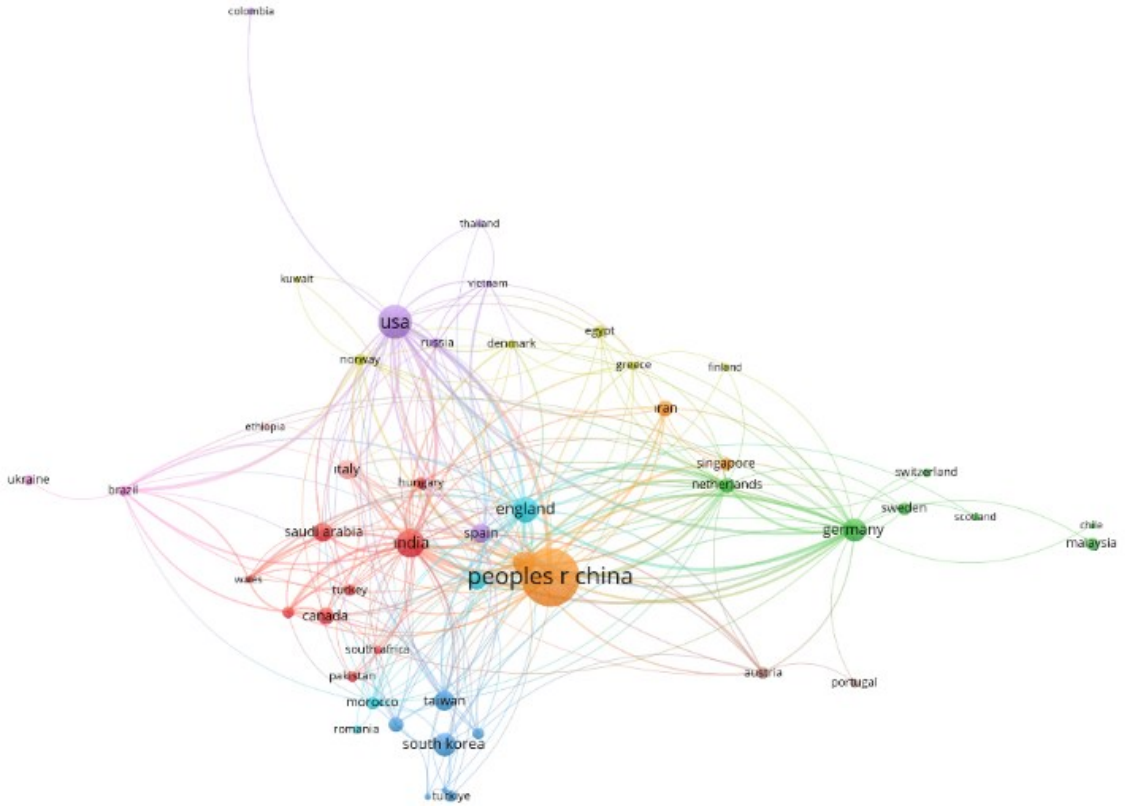

Figure 9. Cloud network structure of influential countries

4. Discussion

The co-occurrence author keywords analysis highlights the central themes and emerging trends in the intersection of AI and logistics research. The frequent appearance of keywords such as “artificial intelligence” (218 times) and “logistics” (116 times) underscores their pivotal role in the literature. Other terms like “machine learning” (72), “deep learning” (61), “blockchain” (38), “internet of things” (32), and “optimization” (30) point to the interdisciplinary nature of this domain, reflecting a convergence of cutting-edge technologies. The cloud structure showing strong interconnections between these core terms, emphasizing the thematic clustering around AI and logistics.

This interconnectedness is significant as it demonstrates how foundational concepts, such as machine learning and deep learning, serve as enablers for advanced applications in logistics. Moreover, the inclusion of blockchain and IoT reflects a growing interest in enhancing supply chain transparency, security, and operational efficiency. The prominence of "optimization" highlights the persistent need for improved resource management in logistics through AI-driven solutions.

The citation analysis provides insights into the most influential works that have shaped this field. The article by Dwivedi et al. (2021), with 1009 citations, stands as a cornerstone, offering a multidisciplinary perspective on the challenges and opportunities associated with AI. Other highly cited works, such as Kristoffersen’s framework for digital-enabled circular strategies and Tang’s exploration of logistics in Industry 4.0, further exemplify the depth and breadth of this research domain. The citation relationships, with these studies acting as pivotal nodes in the knowledge network. Their strong linkage to other papers demonstrates their foundational role in inspiring subsequent research.

The analysis also reveals the impact of specific journals, with “Engineering Applications of Artificial Intelligence” emerging as the most influential journal with 58 articles and 894 citations. This journal, along with others like “Transportation Research Part E-Logistics and Transportation Review” and “Sustainability,” serves as a primary reference for scholars in this domain.

The co-authorship and institutional analyses shed light on the collaborative dynamics within the field. Angappa Gunasekaran leads the co-authorship network, with 6 papers and 330 citations, reflecting his significant influence. Other prominent authors, such as Shivam Gupta and Fei-yue Wang, further enrich the collaborative landscape.

Institutions such as the Chinese Academy of Sciences, Eindhoven University of Technology, and Neoma Business School dominate in terms of citation impact. The central positioning of these institutions in the collaboration network suggests their pivotal role in advancing research. Conversely, institutions on the periphery highlight the

disparity in collaborative efforts and their resulting influence.

Finally, the country-based analysis underscores the global nature of AI and logistics research. China, with 3979 citations from 408 articles, leads the field, followed by India, the UK, the USA, and France. The centrality of these nations in the collaboration network, highlights their leadership roles and the strength of their research ecosystems. This dominance can be attributed to their robust academic infrastructure, significant investment in AI research, and global partnerships. On the other hand, peripheral countries with limited collaborations underscore the need for a more inclusive approach to foster global innovation.

This comprehensive analysis offers several implications for researchers and practitioners. The central role of AI and logistics underscores the need for continued exploration of their intersection, particularly in areas like machine learning and blockchain, which show strong potential for innovation. The influence of highly cited articles and journals provides a roadmap for researchers to identify key trends and seminal works, ensuring their contributions are aligned with the broader discourse.

Future research should aim to address gaps in underexplored regions and institutions, fostering greater inclusivity and collaboration. Additionally, expanding the thematic focus to include emerging technologies such as quantum computing and edge AI could further enrich the field.

This bibliometric analysis not only highlights the current state of research but also provides actionable insights for advancing the interdisciplinary domain of AI and logistics. By leveraging the identified trends and collaborative opportunities, researchers can drive innovation and contribute to solving complex logistical challenges through AI-enabled solutions.

5. Conclusions

This bibliometric [28, 29] analysis provides a comprehensive overview of the existing literature in the field of logistics and AI, revealing research trends, influential authors, keywords, journals, institutions, and countries. The results of the analysis show that the integration of AI and logistics has become a growing area of interest, with key technologies such as “machine learning,” “deep learning,” and “blockchain” being particularly prominent in this field. While the most used keyword referred to AI. The study by Dwivedi et al. is an important reference point in the field as the most cited paper. Furthermore, journals such as “Engineering Applications of Artificial Intelligence”, countries such as the People's Republic of China and institutions such as the Chinese Academy of Sciences play a central role in research in this field.

Future research should focus on specific application areas and technological advancements in logistics and AI integration. In addition, there is a need for increased collaboration between different geographical regions and interdisciplinary approaches. This analysis provides a foundational guide for researchers to navigate the existing body of knowledge in the field of logistics and AI and provides directions for new areas of study.

This work also acknowledges areas for improvement, including the refinement of academic language and the enhancement of graphical elements. Addressing these aspects will further strengthen the clarity and presentation of future bibliometric analyses. By serving as both a foundational guide and a springboard for new inquiries, this study contributes to the advancement of knowledge at the dynamic interface of logistics and AI.

CRediT Authorship Contribution Statement

This study was carried out with the collaborative efforts of Selime Sinem Bahar, Muslume Beyza Yıldız, Serkan Gerz, Elham Tahsin Yasin, Ahmet Goktas, and Murat Koklu. The conceptualization and design of the research were jointly handled by Selime Sinem Bahar, Muslume Beyza Yıldız, and Serkan Gerz. Methodology development and formal analysis were carried out by Muslume Beyza Yıldız, Elham Tahsin Yasin, and Murat Koklu. Data curation and software implementation were managed collaboratively by Serkan Gerz, Elham Tahsin Yasin, and Ahmet Goktas. Writing of the original draft was equally contributed by Selime Sinem Bahar, Muslume Beyza Yıldız, and Murat Koklu. Review and editing of the manuscript were carried out by Serkan Gerz, Ahmet Goktas, and Elham Tahsin Yasin. Visualization tasks were equally distributed among Selime Sinem Bahar, Muslume Beyza Yıldız, and Elham Tahsin Yasin. Supervision and overall project administration were undertaken jointly by Serkan Gerz, Ahmet Goktas, and Murat Koklu. All authors contributed to the study equally and have approved the final manuscript. All authors have read and approved the final manuscript.

Data Availability

The data used in this study was obtained by filtering from the Web of Science (WoS) database.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Author's Note

This is the full version of the conference paper titled “Bibliometric Analysis of Research Trends in Logistics and Artificial Intelligence for 2015-2024” presented at the 2nd International Conference on Trends in Advanced Research (ICTAR 2024) held on November 22-23, 2024, and published on page 101 of the abstract book with ISBN number 978-625-6314-72-6.

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