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A Bibliometric Analysis of Logistics Efficiency and Economic Growth: Mapping Research Landscapes

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Abstract. This bibliometric study conducts a comprehensive analysis of the literature on the intricate relationship between efficient logistics and economic growth using the Scopus database from 2010 to 2023. Focusing on the title keywords "logistics" and "economic growth," the search yielded a substantial dataset of 1009 research documents. Leveraging the extensive coverage of the Scopus database, surpassing platforms like Web of Science and Google Scholar, this study aims to contribute a nuanced understanding of the logistics-growth nexus through a bibliometric lens. Employing VOSviewer software, the analysis visually represents geographical distributions, authorship networks, citation patterns, and research collaborations within this domain. The findings reveal surging publication trends over recent years, indicating heightened academic interest. However, variations in citation rates across different periods suggest nuances in research impact. By mapping interconnections between economic analysis, development, growth, and logistics, the study underscores logistics' pivotal role in shaping economic principles and growth strategies. While highlighting research hotspots and collaborative networks, this bibliometric inquiry identifies opportunities for fostering global synergies and data-driven policymaking to optimize the symbiosis between logistics prowess and sustainable economic progress

Keywords: Logistic, Economic Growth, Bibliometric Analyses, VOSviewer

1. Introduction

In the contemporary economic landscape, logistics holds a pivotal role in the development of many nations, influencing various sectors such as transportation networks, storage systems, information technology, packaging services, supply chain management, and the import-export domain (Sharipbekova & Raimbekov, 2018). Hayaloğlu (2015) underscores the evolving significance of logistics in trade, highlighting its active role in shaping economic progression. The continuous advancements in the logistics sector significantly contribute to growth and development, fundamentally altering the operational dynamics of both companies and countries.

The logistics efficiency directly impacts economic growth by enhancing the movement of goods and services, reducing costs, and improving overall productivity. Studies have shown that improvements in logistics infrastructure, such as transportation networks and information technology, contribute significantly to economic performance. For instance, Hayaloglu (2015) highlights the positive correlation between logistics efficiency and economic output in OECD countries, while Chu (2012) emphasizes the role of streamlined logistical operations in stimulating economic development.

The era of globalization has intensified the imperative for nations to enhance their logistical capabilities, given the increasing volume of international trade. Logistics innovations facilitate streamlined production, distribution, and marketing, conferring substantial competitive advantages in global trade. This necessitates strategic planning of logistics activities for countries to achieve cost-efficiency and operational effectiveness (Muslija et al., 2021). Consequently, logistical developments have become integral to trade, playing a fundamental role in fostering growth and development.

Logistics, including information flow, encompasses a broad spectrum of activities involving transforming and distributing goods, from raw material origins to consumption in end markets (Rodrigue, 2012, & Abdullahi et al., 2024). It pertains to the organization of domestic movements and the necessary infrastructure for diverse flows—material, financial, and informational—within a country (Navickas et al., 2011, & Mohamud et al., 2023). Logistics investments span various components such as transportation networks, storage systems, information technology, communication devices, packaging services, and financial supply chain management within enterprises.

However, the nexus between efficient logistics and economic growth remains an understudied dimension in contemporary research. Economic growth is intricately linked to the efficacy of logistical processes underpinning supply chain management and trade dynamics. Efficient logistics enhance the flow of goods and services and contribute significantly to overall economic productivity and competitiveness. This study builds on the foundational work of scholars who have explored the symbiotic relationship between logistics and economic growth. (Chu, 2012, & Warsame et al., 2023) emphasizes the pivotal role of logistics in facilitating global trade, asserting its capacity to stimulate economic development. Furthermore, Sezer and Abasiz (2017), and Jama & Mohamud, (2024) highlight the positive correlation between streamlined logistical operations and increased economic output, underscoring the need for a nuanced understanding of the intricate interplay between these two domains.

While extensive bibliographic research spans diverse fields like medicine (Liu et al., 2019), business (Fellnhofer, 2019), management (Silvente et al., 2018, & Warsame, 2023), and education (Hallinger & Kovačević, 2019), an investigation into bibliometric studies on Logistics and Economic Growth within the SCOPUS database in November 2023 yielded limited results.

In the current landscape of economic research, a discernible gap exists in the literature on the influence of efficient logistics on economic growth, mainly through a bibliometric lens. While numerous studies have explored the relationship between logistics practices and economic development, a comprehensive synthesis and analysis of this extensive body of literature using advanced bibliometric techniques is notably absent.

This bibliometric analysis offers a unique contribution by systematically evaluating the extensive body of literature on logistics and economic growth. By utilizing advanced bibliometric techniques, this study

provides a comprehensive overview of research trends, key contributors, and geographical distributions in this domain. The analysis highlights the interconnectedness of logistics and economic development, offering valuable insights for policymakers, researchers, and industry stakeholders to enhance logistical strategies and economic policies.

Consequently, the researchers conducted a bibliography assessment to address these literature gaps by pursuing three objectives: i) Investigate the publication and citation patterns of the most prominent papers on logistics and economic growth, ii) Analyze the contributions and collaborations of specific countries in the top 100 articles on logistics and economic growth, and iii) Identify the primary journals citing the top 100 papers in this domain.

2. Literature Review

The concept of logistics serves as a linchpin in the management of diverse items, both physical and abstract, navigating their transition from origin to consumption. Scholars such as D'Aleo and Sergi (2017) posit that logistics encompasses a spectrum of operations, ranging from packaging and material handling to warehousing, transportation, and security. Across the scholarly landscape, voices like Chu, Z. (2012), Nguyen et al. (2021), and Sharipbekova and Raimbekov (2018) resonate in asserting the positive contribution of logistics to economic growth.

However, the seemingly straightforward relationship between logistics and economic growth is not without its intricacies. Insights from Kuzu and Onder (2014) and Li et al. (2015) inject nuance by suggesting a non-linear dynamic, proposing an inverted U-quadratic relationship or even a unidirectional influence from GDP to logistics.

Studies often nest the logistics variable within broader economic growth models in examining this intricate relationship. Scholars such as Hayaloglu (2015), Saidi et al. (2022), and Tang and Abosedra (2019) advocate for a comprehensive approach that considers determinants beyond logistics, such as capital and employment. Arvis et al. (2010) contribute to this discourse by theorizing a model where investments in the logistics sector induce improved efficiency, reliability, reduced costs, and enhanced competitiveness, thereby acting as a catalyst for economic growth.

Empirical investigations spotlight the role of infrastructure-related logistics in propelling economic growth (Lean & Hong, 2014, & Warsame, 2023). in the context of China, utilizes cargo volumes via sea, rail, and air as proxies for logistics, underscoring its crucial role in sustaining economic growth. In Sichuan, China, Zou and Smith (2015) eximined into the interplay between regional logistics development and economic growth, using total freight traffic as a proxy. Their findings suggest a long-term equilibrium relationship between logistics industrial development and economic growth, unveiling a complex dynamic wherein the impact of the logistics industry on GDP growth declines as the logistics scale increases over time.

Furthermore, the Logistics Performance Index (LPI) of the World Bank emerges as a metric to gauge the economic role of the logistics industry. Sanchez et al. (2014) employ the LPI to investigate the probability of a country achieving economic development based on various explanatory variables. Their study underscores that enhanced logistics performance significantly augments the likelihood of a country becoming a developed economy.

While existing studies provide valuable insights, they also exhibit certain limitations. Many studies focus on specific regions or countries, limiting the generalizability of their findings. Furthermore, there is a lack of consensus on the best proxies for measuring logistics efficiency. For example, the use of cargo volumes as a proxy may not capture the full scope of logistics activities. Additionally, some studies may suffer from methodological weaknesses, such as small sample sizes or short time frames. These gaps highlight the need for a comprehensive bibliometric analysis that can synthesize and evaluate the breadth of research in this field, providing a more holistic understanding of the logistics-economic growth nexus.

In synthesis, the literature underscores the multifaceted relationship between logistics and economic

growth. While the positive impact of logistics on economic growth is a recurring theme, the non-linear and complex dynamics highlighted by various studies necessitate a deeper exploration. This complex interplay, influenced by efficiency, scale, and regional development, invites further investigation. Navigating these intricacies is essential for policymakers, businesses, and researchers seeking to optimize the symbiosis between logistics and economic growth for sustained and inclusive development.

3. Methodology

3.1. Data collection

For the scope of this investigation, the study has opted to utilize the Scopus database, covering the period from 2010 to 9 November 2023, as it stands as the world's largest citation and abstract database encompassing scholarly works from international publishers. Recognized for providing a comprehensive platform for scientific scholars, Scopus offers a singular resource for academic research (Heldens W. et al., 2020). Compared to other databases such as Web of Science (WoS), Google Scholar (GS), and PubMed, Scopus demonstrates superior versatility in publications and facilitates keyword searches and bibliographic analysis. Notably, Scopus exhibits a 20% higher coverage in citation analysis than WoS, while Google Scholar is noted for producing inconsistent results. Although PubMed is a commonly employed database in scientific research (Falagas et al., 2008). The present study aligns with Scopus due to its extensive coverage and reliability. Figure 1 illustrates the systematic search strategy and detailed steps employed in the data collection process for this research.

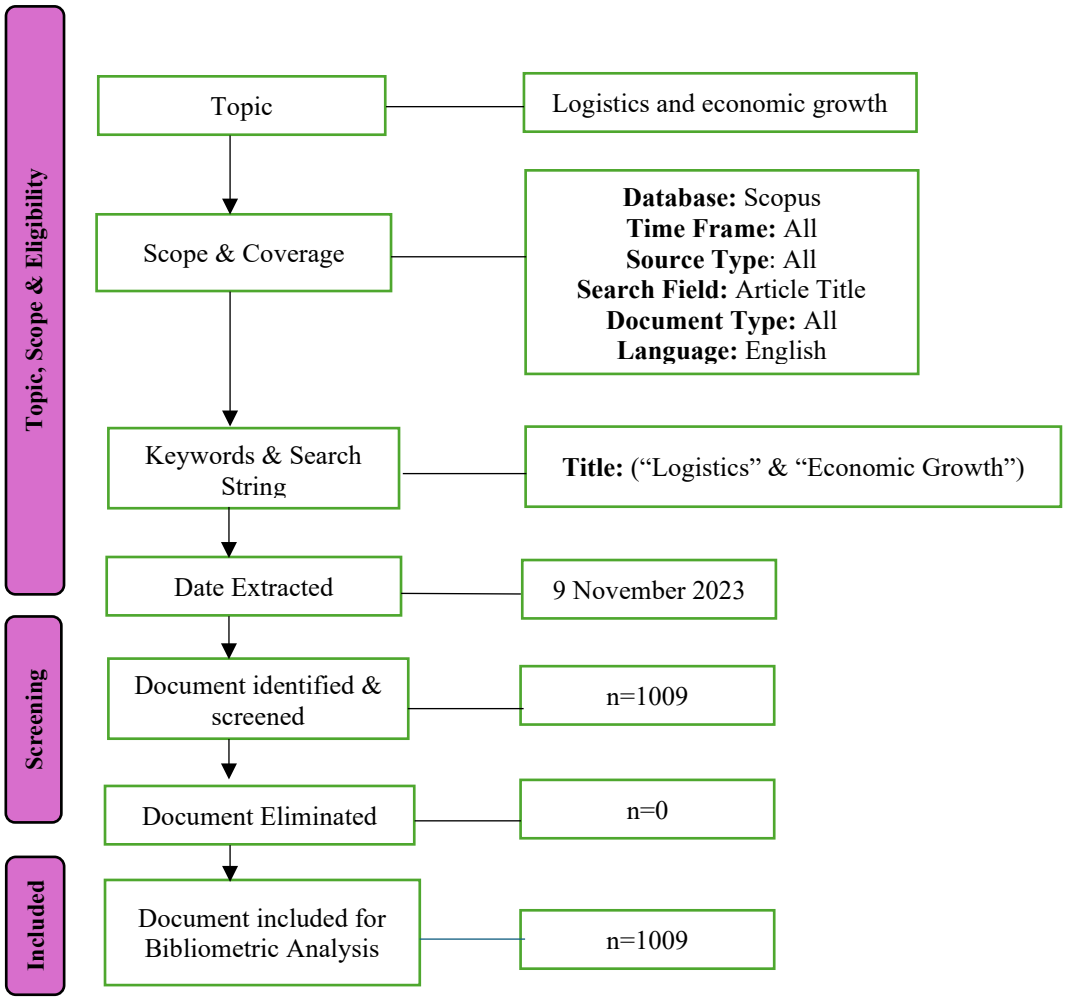

Figure 1: Flow diagram of article searching strategy of Logistic and economic growth documents

3.2. Inclusion and Exclusion Criteria

Inclusion and exclusion criteria for the selected documents were applied to ensure the relevance and quality of the dataset. Only articles with the title keywords "logistics" and "economic growth" were included. Documents such as conference papers, reviews, and editorials that did not provide empirical data or were not peer-reviewed were excluded to maintain the robustness of the analysis.

3.3. Search strategy

In the context of a bibliometric investigation, selecting pertinent keywords is pivotal. Aligned with the research inquiries, this study narrowed its search focus to two primary title keywords: "logistics" and "economic growth." Consequently, two distinct keyword combinations were formulated to encapsulate the essence of the study's theme. Acknowledging the pivotal role of an article's title in capturing readers' attention, the titles were crafted to convey information effectively. The search queries utilized for this study were TITLE ("logistics") AND TITLE ("economic growth"). A total of 1009 research documents from 2010 to 9 November 2023 were retrieved from the Scopus database without employing exclusionary methods, as illustrated in Figure 1.

3.4. Tools and data analysis

In the realm of tools and data analysis, VOSviewer has gained widespread adoption across various disciplines for conducting bibliometric analyses, including applications in social media, knowledge management, supply chain and logistics, presumption, business intelligence, health, and brand personality analysis (Noor S. et al.,2020, & Mohamud, 2023). To address the research objectives and questions, this study employed VOSviewer software. The bibliometric techniques employed in VOSviewer for this study include co-citation analysis and bibliographic coupling. Co-citation analysis identifies the relationships between documents based on the frequency with which two documents are cited together, providing insights into the structure of the research field. Bibliographic coupling, on the other hand, links documents that cite common references, highlighting the connections between contemporary studies. These techniques are appropriate for mapping the intellectual structure and identifying key research themes and collaborations in the logistics and economic growth domain (Van. 2010). Additionally, Microsoft Excel 365 tools were utilized to analyze primary data extracted from Scopus in CSV format.

4. Results and Discussions

4.1. Citation by years

The data illustrates the publication trends and their associated total citations concerning logistics and economic growth across various years. The total number of publications shows an escalating trend, peaking at 139 documents in 2022. In 2019, they marked a significant surge with 93 publications, followed by a substantial increase 2020 to 108 papers. These years signify a period of heightened academic activity and research interest in the intersection of logistics and economic growth, potentially indicating a growing emphasis on this area of study.

Conversely, the total citations paint a slightly different picture. The years with the highest publication count, particularly 2020 and 2021, do not necessarily correlate with the highest total citations. While 2020 saw a peak in publications, the total citations were lower compared to the preceding year, 2019. This discrepancy might indicate a phase where the number of published documents increased, possibly encompassing a broader range of topics, leading to a dispersion of citations across a larger number of works. On the other hand, the fewer documents in 2023 but with a relatively higher citation count could suggest a more focused or impactful research output within a specific niche or area of interest related to logistics and economic growth.

The overall trend showcases a steady rise in publications until 2022, signifying a continuous interest and growth in research activity within logistics and economic growth. However, a closer analysis of the

total citations reveals that the correlation between the volume of published works and the accrued citations is not uniformly aligned. This suggests varying degrees of impact or citation rates across different years, indicating fluctuations in the depth and influence of the research conducted in each respective period.

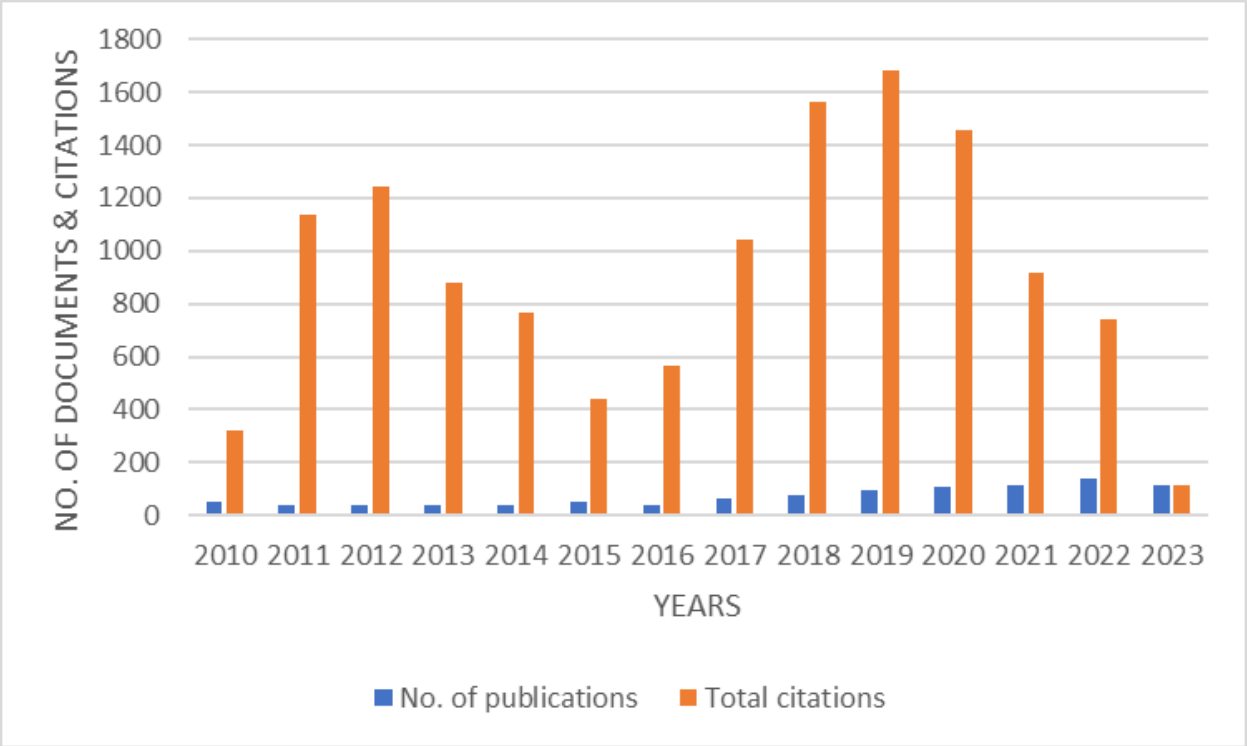

Figure 2: publications by yearly

4.2. Keywords

The study focusing on the impact of logistics on economic growth delves into a complex interplay between four central clusters: economic analysis, economics, economic development, and economic growth. These clusters are not siloed entities but intricately linked, each demonstrating connections within their economic realm and with logistics-related terms, underscoring the critical role of logistics in shaping economic principles and development strategies.

The primary cluster, economic analysis, forms the analytical foundation of the study and is significantly linked with economic and social effects. Moreover, it showcases connections with logistics-specific terms like logistic models, logistic regression, and logistics industry. This implies a deep integration of economic analysis with practical logistic methodologies, highlighting the significance of analyzing economic data within the logistics framework to understand its impact on economic growth.

The economics cluster is deeply connected with logistics through terms like international trade and investments. This points to intertwining economic theories with global trade and investment decisions within logistics. Economics also establishes significant links with economic growth and commerce, showcasing its broader impact on economic development, closely tied to logistical practices and frameworks.

In economic development, connections with logistic-related terms like logistic models, supply chain management, and supply chains highlight the critical role of logistics in strategies and planning for economic advancement. Simultaneously, the economic development cluster demonstrates robust links with economic growth, human-centric factors, and the progress of developing countries, showcasing the intricate relationship between logistical strategies and multifaceted aspects of economic development.

The central cluster, economic growth, is deeply intertwined with logistics through connections with

terms such as logistics, logistic regression, and logistic models. These links underscore the pivotal role of logistical strategies in fostering sustainable economic growth and innovation, emphasizing the importance of logistical methodologies in achieving sustained economic progress. These interactions highlight the dynamic relationship between economic clusters and logistics-related terms, emphasizing the significant impact of logistical strategies on economic principles, development, and sustained growth. The study's findings underscore the holistic approach needed to comprehend the multifaceted influences on economic progress and the integral role of logistics in shaping economic outcomes.

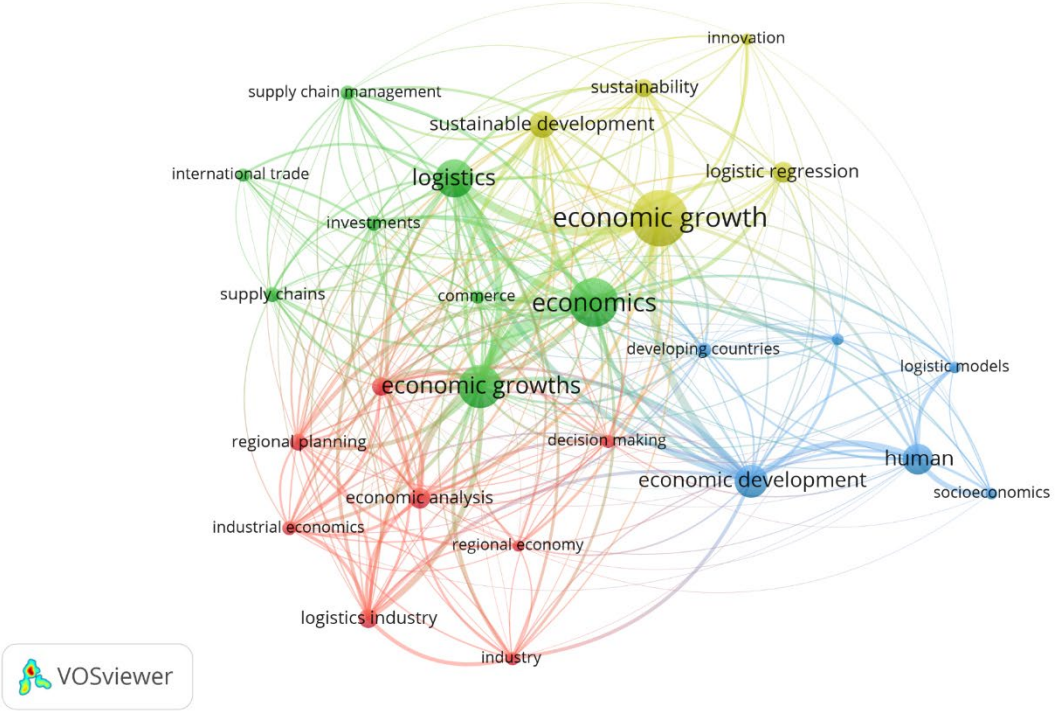

Figure 3: Matching network for the most common keywords

4.3. Countries

The provided data showcases the distribution of published documents related to logistics and economic growth across various countries. China leads significantly with 274 papers, signifying a substantial involvement and influence in this study area. The United States follows as a vital contributor with 108 documents, presenting a noteworthy presence in research on the correlation between logistics and economic growth. India's 72 documents highlight a considerable engagement but are notably lower than the top contributors. Countries like Malaysia and the United Kingdom have 44 papers indicating similar involvement and interest in this domain. Further down the list, nations such as South Korea, Pakistan, the Russian Federation, and Indonesia range between 33 and 36 documents, demonstrating a consistent but slightly lower level of participation. Meanwhile, countries like Canada, Japan, Germany, Australia, Brazil, Italy, Poland, Spain, and South Africa exhibit document counts in the mid-20s, indicating moderate yet relatively comparable contributions to understanding the relationship between logistics and economic growth.

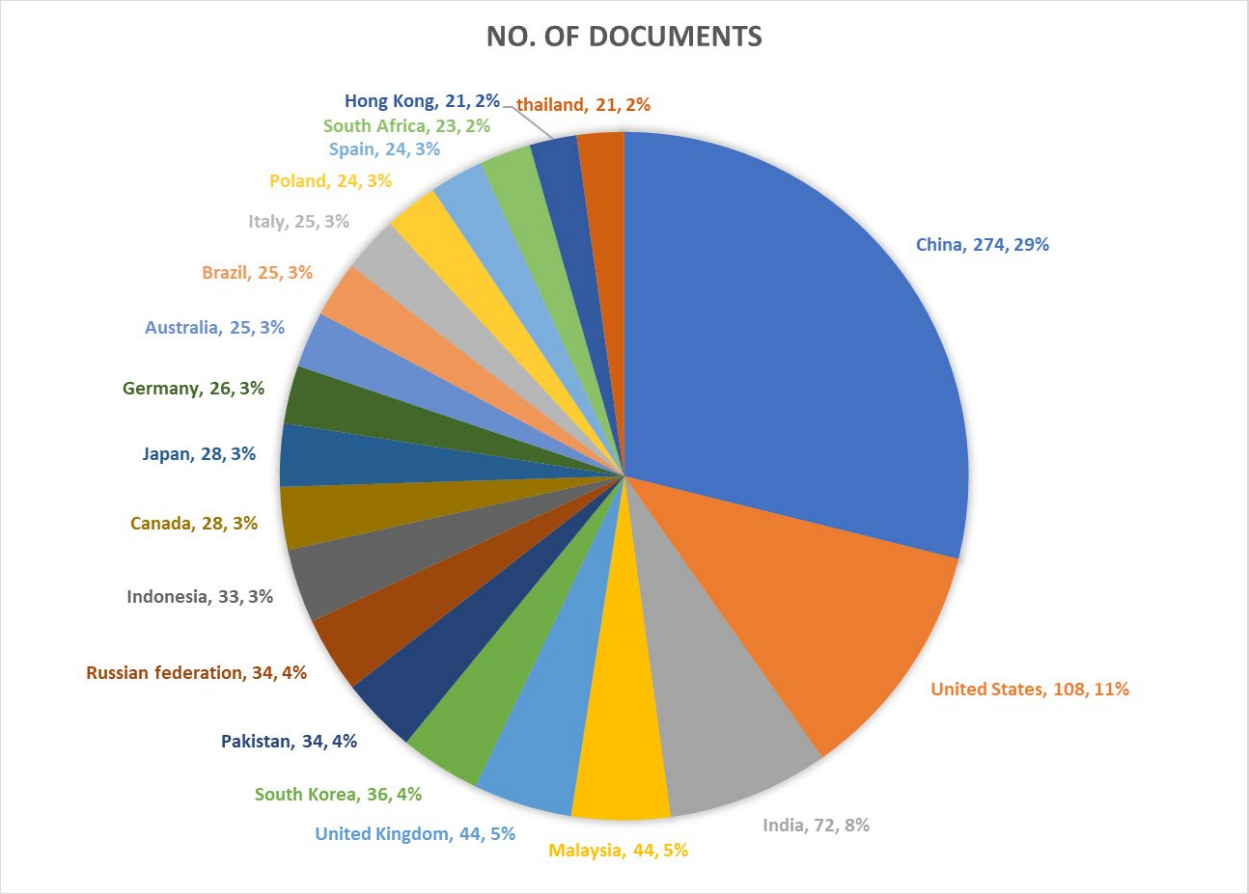

Figure 4: The contribution of numerous nations

On contrasting the countries based on their document counts, a clear divide is observable between the top contributors and the rest. China and the United States emerge significantly ahead, signifying a robust presence and impact in logistics and economic growth research. These leading countries demonstrate a substantial gap compared to the following contributors, such as India, Malaysia, and the United Kingdom, underlining an apparent disparity in their level of engagement or output in this field of study. While there is a consistent band of mid-tier contributors with similar document counts, there remains a distinct separation between the leading contributors and the rest, highlighting substantial differences in their research output, involvement, or influence within the studied logistics and economic growth field.

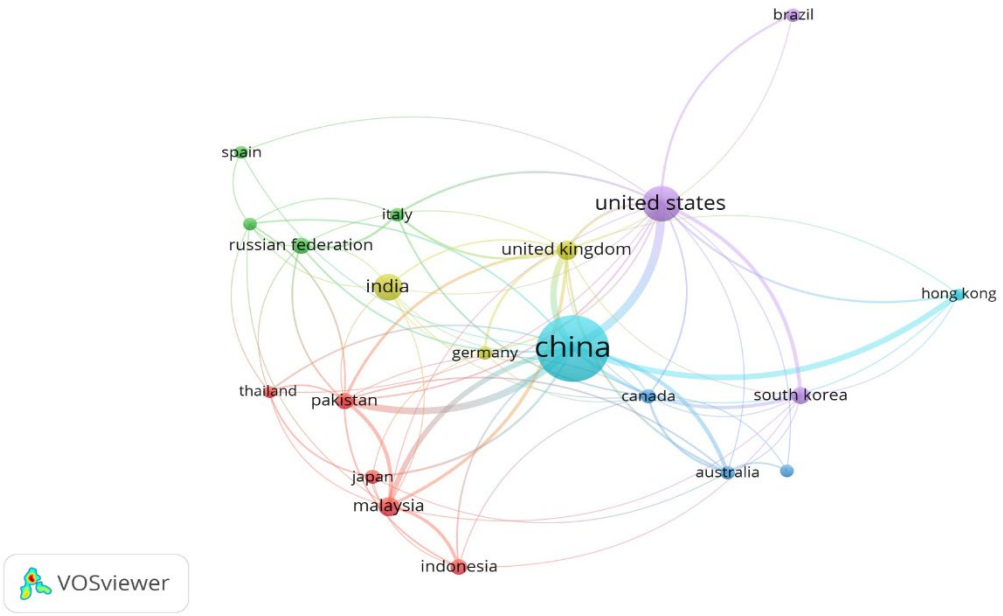

Figure 5: The contribution network of numerous nations

4.4. Journals

Table 1: Top- most frequently cited sources

Journals	TP	TC	TPP	CITE SCORE	SNIP	SJR	PUBLISHER
environmental science and pollution research	11	365	33.181	7.9	1.214	0.944	Springer Nature
International journal of environmental research and public health	9	132	14.667	5.4	1.28	0.828	MDPI
International journal of logistics research and applications	7	116	16.571	10.1	1.476	1.12	Taylor & Francis
journal of cleaner production	13	938	72.154	18.5	2.379	1.981	Elsevier
lecture notes in networks and systems	7	3	0.429	0.7	0.19	0.151	Springer Nature
plos one	16	467	29.188	6	1.253	0.885	Public Library of Science
sustainability (Switzerland)	41	510	12.439	5.8	1.198	0.664	MDPI

The table provides insight into various journals and their publication metrics within logistics and economic growth. The journals vary significantly in their publications, citations, and other bibliometric indicators, offering a diverse landscape of scholarly contributions and impacts within this study area. Among the highlighted journals, "The Journal of Cleaner Production" stands out with the highest

number of total publications (TP) at 13 and an impressive total citation (TC) count of 938. This suggests its substantial presence and influence within the field, reflected in its high citation per publication (CPP) of 72.15. These metrics emphasize the journal's widespread impact and significant readership, as it is a substantial source of scholarly references and information regarding logistics and economic growth. The high Cite Score, Source Normalized Impact per Paper (SNIP), and SCImago Journal Rank (SJR) indices further indicate its significant standing within the academic community.

In contrast, journals like "Lecture Notes in Networks and Systems" exhibit much lower publication and citation figures, with just seven publications and three citations. This indicates a significantly smaller impact on logistics and economic growth. The lower citation metrics, such as the citation per publication (CPP), further highlight its minimal visibility and impact within this field compared to other more influential journals.

Furthermore, "Sustainability (Switzerland)" presents an interesting case. Despite a notably high count of 41 publications, its total citation count is 510, yielding a relatively lower citation per publication (12.44). This might suggest a wide breadth of content but with a comparatively moderate influence or citation impact per individual article. The journal holds a moderate SNIP and SJR, indicating a reasonably average position regarding its impact and influence compared to the more focused and higher-impact journals.

4.5. Citation Network

The dataset comprehensively overviews various authors and their interconnectedness in logistics and economic growth. A range of authors displays significant variations in the total link strength, citations, and their relationships with other authors. Notably, authors like Zaman K. and Zhang Y. stand out with an extensive total link strength of 3,446 and 3,024, respectively, indicating a vast network of connections with other authors. These authors also command a high citation count, with Zhang Y. having 178 citations and Zaman K. possessing 127, highlighting their significant influence and contributions in this field.

In contrast, some authors, such as Subramanian S.V., demonstrate lower link strengths and citations, with only 13 links and 44 citations. The difference in their connections and citations compared to the high-impact authors showcases a considerable disparity in their involvement and influence in the discourse surrounding logistics and economic growth. Authors like Zhu Q., Wu J., and Ozturk I., with moderately lower link strengths and citations, present a tier of contributors with relatively lesser connectivity and impact within this domain.

A few authors, such as Chen Y., Liu Y., and Wang Y., exhibit high total link strengths along with substantial citation counts, showcasing a remarkable balance between their extensive network of connections and significant recognition through citations. Conversely, authors like Li W., Ojala L., and Shepherd B. demonstrate moderately lower link strengths and citations, indicating a certain level of involvement but a comparatively limited impact within this field. Overall, the dataset portrays a spectrum of authors, some with extensive connections and high citation counts, while others present a range of involvement and impact within logistics and economic growth.

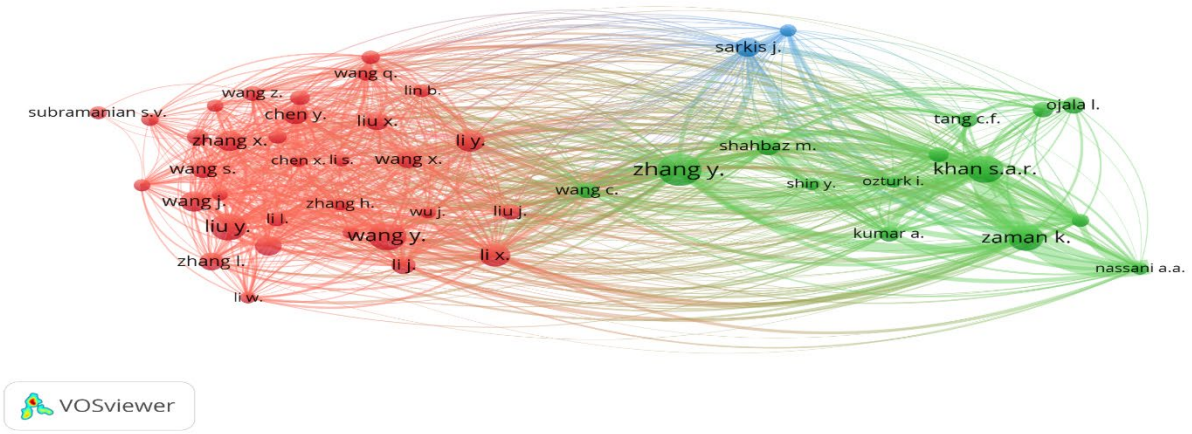

Figure 6: Collaborative network connections among renowned authors

5. Conclusion

This pioneering bibliometric study offers a comprehensive synthesis of the multifaceted relationship between efficient logistics and economic growth, bridging a critical literature gap. By leveraging the extensive Scopus database and employing robust visualization techniques through VOSviewer, the analysis unravels intricate patterns, trends, and collaborative networks within this domain. The findings accentuate the escalating research interest, as evidenced by the surge in publications, while also revealing nuanced variations in citation impacts
across different periods.

Crucially, the study's mapping of interconnections between economic clusters and logistics underscores the pivotal role of logistical strategies in catalyzing economic development and sustained growth. This holistic perspective not only contributes to advancing scholarly discourse but also holds significant implications for policymakers and stakeholders seeking to harness the synergies between logistics optimization and economic progress.

Looking ahead, further research could explore alternative bibliometric techniques, such as co-citation analysis or emerging trend detection, to uncover additional insights. Incorporating complementary databases or broadening the scope to include non-English publications could enhance the comprehensiveness of such inquiries. Additionally, integrating qualitative perspectives from experts and practitioners could enrich the understanding of the logistics-growth nexus, bridging the gap between academic research and practical implementation.

Ultimately, this study serves as a clarion call for continued emphasis on fostering global research collaborations, data-driven decision-making, and the strategic alignment of logistics capabilities with economic development goals. By navigating the intricate landscape unveiled through this bibliometric lens, stakeholders can chart informed pathways towards sustainable and inclusive growth, catalyzed by the transformative potential of efficient logistics operations.

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