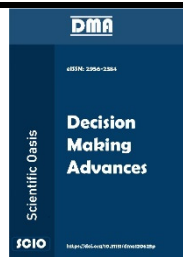




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A Bibliometric Analysis of Agro-Based Industries: Trends and Challenges in Supply Chain Management

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ABSTRACT

This paper presents a bibliometric analysis of supply chain management (SCM) research within agro-based businesses, reviewing publications from 2000 to 2024 to identify major trends, contributors, and research gaps. Using VOSviewer 1.6.20, 2,534 journal articles were evaluated, demonstrating three distinct phases: early development (2000–2008), steady growth (2009–2016), and rapid expansion (2017–2024). The rapid expansion phase is defined by an exponential increase in research addressing blockchain integration, IoT-based smart farming, carbon neutrality, and resilient supply chains, particularly during the COVID-19 pandemic. A co-authorship study identifies key contributors like Sachin Kumar Mangla and top institutions such as Wageningen University; however, findings reflect regional differences, with little contribution from emerging economies like India. Citation analysis suggests a drop in significant articles post-2021, indicating thematic saturation. This study underlines the need for interdisciplinary research, sustainable policies, and global collaboration to promote resilience and innovation in agro-industrial SCM, delivering actionable insights for researchers and policymakers.

1. Introduction

Supply chain management (SCM) in agro-based sectors involves managing the flow of goods, information, and funds from agricultural production to end consumers. It comprises tasks such as obtaining raw materials, producing, processing, packaging, distributing, and retailing agricultural products. Key issues include managing inventory, transportation, storage, and maintaining quality and safety standards. Factors including seasonality, perishability, and regulatory requirements face particular obstacles [1].

Effective supply chain management seeks to improve efficiency, avoid waste, assure timely delivery, fulfills consumer demands, and develop sustainability and resilience in the agricultural value

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chain [2, 3]. It assures timely delivery of agricultural products, minimizes waste and cost, and preserves consumer trust through transparency and traceability. Robust supply chain management strategies provide greater planning, coordination, and risk mitigation [4, 5]. Efficient supply networks enable economic growth and resilience in agricultural sectors worldwide [6].

The worldwide agriculture supply chain management market indicated a size of USD 0.83 billion in 2022, with estimates suggesting high growth. By 2032, it is anticipated to reach around USD 2.17 billion [7]. This growth trajectory reflects a compound annual growth rate (CAGR) of 10% for the expected period from 2023 to 2032. These estimations indicate the increasing significance of efficient supply chain management procedures in agro-based sectors and emphasize the substantial investment prospects and potential economic impact related with this sector's expansion [8].

1.1 The significance of SCM in Agro-based sectors

SCM plays a crucial role in agro-based sectors across all phases of production; processing, distribution, and retailing. Here are some important applications:

- i. **Sourcing Raw Materials:** SCM assists in discovering reputable sources for raw materials like as seeds, fertilizers, and insecticides, assuring quality and timely availability while optimizing prices [9].
- ii. **Production Planning and Management:** SCM facilitates the planning of agricultural production schedules based on demand predictions, weather conditions, and resource availability, assuring efficient use of land, labor, and machinery [10].
- iii. **Processing and Packaging:** Effective SCM ensures seamless coordination between farmers, processors, and packaging units to minimize post-harvest losses, maintain product quality, and comply with safety standards [11].
- iv. **Logistics and Distribution:** SCM supports in the effective delivery of agricultural items from farms to processing facilities, warehouses, and retail outlets, optimizing routes, modes of transport, and storage facilities to minimize transit times and costs [12].
- v. **Inventory Management:** SCM supports in managing inventory levels of agricultural inputs and products at various stages of the supply chain, minimizing stock outs, excess inventory, and wastage while maintaining uninterrupted supply to meet demand variations [13].
- vi. **Quality Control and Compliance:** SCM demands establishing quality control systems and maintaining compliance with regulatory requirements and certifications throughout the supply chain, guaranteeing food safety, traceability, and sustainability [14].
- vii. **Market Access and Consumer Engagement:** SCM enables agro-based industries to access diverse markets, both locally and globally, by establishing efficient distribution channels and engaging with consumers through transparent and traceable supply chains, enhancing brand reputation and consumer trust [15].
- viii. **Risk Management and Resilience:** SCM supports in recognizing and mitigating risks such as weather-related disruptions, supply chain bottlenecks, and market changes, enhancing the resilience of agro-based firms to external shocks and uncertainties [16].

Overall, excellent supply chain management in agro-based firms is crucial for optimizing production, cutting costs, assuring food security and safety, and supporting sustainability and resilience throughout the agricultural value chain.

1.2 Past Literature on Bibliometric Analysis in SCM within Agro-Based Industries

Bibliometric analysis has grown as a helpful approach for assessing and mapping research trends in several disciplines, including supply chain management (SCM) within agro-based sectors. Previous bibliometric analysis work in this industry has provided insights into the growing panorama of SCM practices, problems, and innovations, particularly in agricultural value chains. By thoroughly examining publication trends, citation patterns, and collaboration networks, earlier studies have identified key research issues, influential authors, and emerging topics in agro-based SCM. This introduction intends to give a complete evaluation of the existing corpus of research on bibliometric analysis in supply chain management within agro-based sectors (Table 1), establishing the framework for further exploration of this dynamic and diverse field.

Table 1
Summary of Past Literature on Bibliometric Analysis in (SCM)

SI No.	Authors	Research Title	Tools	Findings
1	Mhlanga et al. [17]	Shaping circular economy in the built environment in Africa. A bibliometric analysis.	VOSviewer	Growing interest in circular economy in Africa's built environment, highlighting interdisciplinary collaboration and regional differences for policy implications.
2	Samanta et al. [18]	Revolutionizing Agriculture Through Blockchain: A Bibliometric Analysis of Emerging Trends and Applications.	VOSviewer and CiteSpace	Blockchain's impact on agriculture: emerging trends, applications, and potential for revolutionizing the industry, as revealed by bibliometric analysis.
3	Ena et al. [19]	Development of Smart Farming Technologies in Malaysia - Insights from Bibliometric Analysis.	Bibliometric analysis	Bibliometric analysis reveals Malaysia's increasing focus on smart farming technologies, indicating trends and insights pivotal for agricultural development.
4	Tamasiga et al. [20]	The inter-relationship between climate change, inequality, poverty and food security in Africa: A bibliometric review and content analysis approach.	VOSviewer and graphical Analysis	Climate change, inequality, poverty, and food security interconnectedness in Africa, analyzed through bibliometric review and content analysis.
5	DosSantos Oliveira et al. [21]	Analysis of Conceptual Definitions of Agribusiness Using the Conceptual Bibliographic Method.	Bibliometric analysis	Nine agribusiness approaches and eight attribute groups were identified, showcasing evolutionary dynamics from rural to transnational production.
6	Saini et al. [22]	A closer look at farmers' participation in the supermarket supply chain using bibliometric and content analyses.	R-based Biblioshiny and VOS viewer	Trends in production, dominating keywords, top publication channels, and country-specific studies. The dominance of economic considerations and the expansion of supermarkets is evident, with emerging concerns about operational challenges, sustainability, and innovation.

Sl No.	Authors	Research Title	Tools	Findings
7	Murali et al. [23]	A bibliometric analysis is conducted on the field of agri-tech and agribusiness management to present the current accomplishments of agri-tech in India and outline the future research agenda.	Mendeley reference management software	Agritech improvements in India enhance production. Future study should focus on sustainability, market impact, and emerging technology.
8	Wang et al. [24]	Research Hotspots and Evolution Trends of Carbon Neutrality—Visual Analysis of Bibliometrics Based on CiteSpace.	VOSviewer and CiteSpace	Visual examination of bibliometrics highlights research hotspots and evolution trends of carbon neutrality, indicating growing fields and shifting research focuses.
9	Jusohet al. [25]	An overview of the internet of things (IoT) and irrigation approach through bibliometric analysis.	VOSviewer	Bibliometric study indicated patterns in IoT and irrigation, displaying new ideas for increased agricultural water management.
10	Zhu et al. [26]	Green supply chain management in China: pressures, practices and performance	VOSviewer	Statistical method for green supplier selection showed significant factors and indicators, boosting sustainability and efficiency in supply chain.

1.3 Novelty and Research Gap of the Present Study

Through bibliometric analysis utilizing VOSviewer and UGC Group-II publications, this study explores agro-based industries in a unique way, providing a thorough understanding of research trends, author partnerships, and topic progression in management, strategy, and commerce. This multidisciplinary approach fills in the gaps in theme continuity, institutional collaboration, and new developments in supply chain dynamics, in contrast to earlier research that focuses only on particular topics like blockchain, smart farming, or carbon neutrality. It offers a comprehensive road map for promoting innovative and sustainable practices in agro-industries across the globe by identifying areas of innovation and cultivating collaborations.

1.4 Objective of the Study

This study seeks to give a complete bibliometric analysis of research in agro-based industries, focused on trends, research effect, and network mapping. Specifically, the objectives are:

- Analyze Research Trends: Investigate the evolution of major themes, emerging issues, and publishing trends in agro-industries from 2002 to 2024, targeting areas such supply chain management, sustainability, and innovation.
- Evaluate Research Impact: Measure the influence of prominent authors, institutions, and journals by examining citation counts, h-index, and impact factors, identifying the most significant contributions to the field.
- Map Research Networks: Visualize co-authorship networks, institutional ties, and keyword co-occurrence to uncover research clusters, multidisciplinary links, and new research hotspots.

- iv. Identify Research Gaps and Future Directions: Highlight under-explored regions and emerging trends to drive future study, emphasis on innovation, sustainability, and cross-disciplinary methodologies in agro-industrial growth.

2. Bibliometric Analysis Methods

This study includes bibliometric analysis augmented by VOSviewer, specialist software for bibliographic mapping and visualization. The dataset comprises 2534 journal papers published between 2000 and 2024, focusing on "Supply Chain Management" and "Agro-Based Industries," indexed in the UGC Journal List Group II. This method gives a systematic study of research trends within disciplines such as strategy management and organizational behavior. VOSviewer's broad visualization features allow a deep investigation of scholarly contributions, highlighting noteworthy research, prolific writers, and collaborative networks. The bibliographic mapping depicts the history of research concerns and indicates linkages among major contributors and institutions. Through a careful analysis of bibliometric data, this study reveals major trends, research gaps, and areas for future exploration (Figure 1). The findings not only underscore the existing state of research but also give prospective paths for future study and collaborative efforts, encouraging innovation in agro-based supply chain management systems.

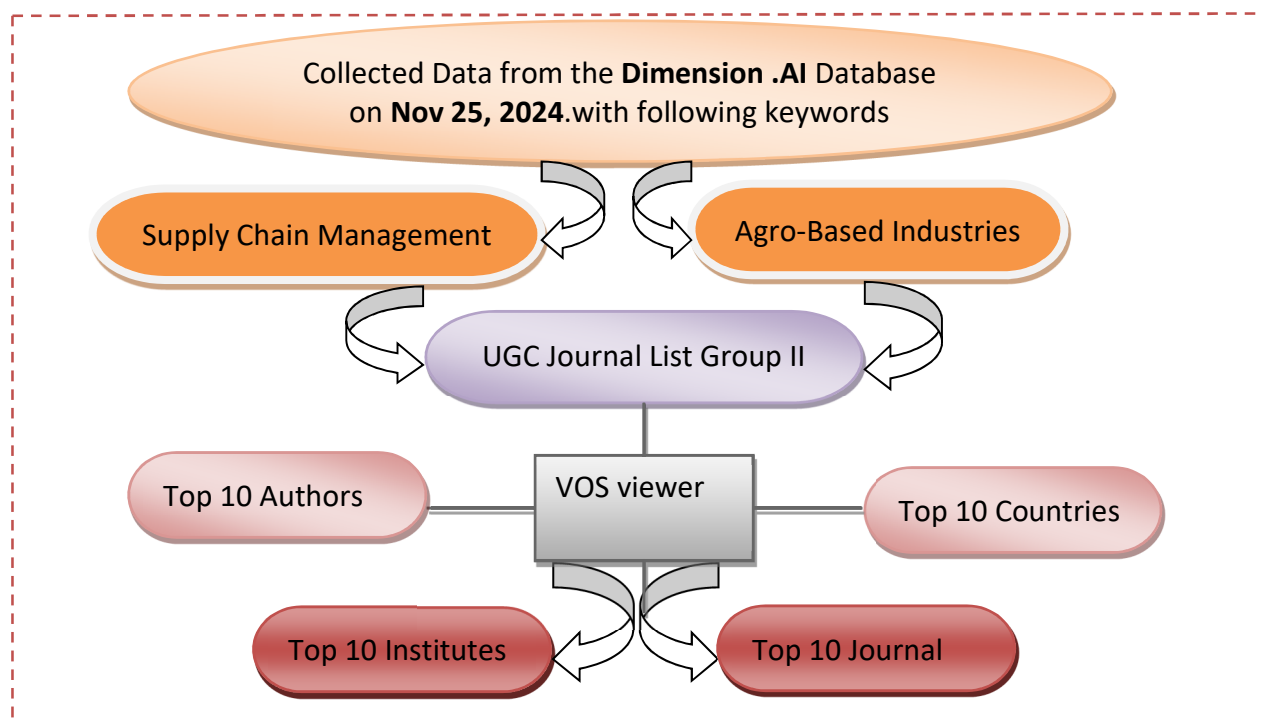


Fig. 1. Flowchart of bibliometric analysis

3. Results and Discussion

3.1 Trend Analysis

The bibliometric trend from 2000 to 2024 demonstrates a large surge in research on agro-based sectors, highlighting the increasing academic and industrial concentration on this topic (Figure 2). The investigation reveals three phases: early development (2000–2008), steady growth (2009–2016), and rapid expansion (2017–2024).

During the early development phase (2000–2008), research output climbed gradually from 8 articles in 2000 to 34 in 2008. This time mostly focused on specific concerns, including traditional farming techniques and underlying supply chain management issues. Limited multidisciplinary collaboration and technological constraints may have contributed to the slow development of research activities.

The steady growth phase (2009–2016) represented a major shift, with publications climbing from 38 in 2009 to 108 in 2016. This phase highlights the rising emphasis on addressing global concerns such as food security, agribusiness management, and sustainable farming methods. The adoption of bibliometric tools like VOSviewer helped academics uncover theme trends, while increased international collaboration encouraged improvements in agro-industrial research. The effect of rising economies during this period is clear, with an emphasis on regional agricultural breakthroughs and sustainable supply networks.

The rapid expansion period (2017–2024) depicts exponential growth, with publications reaching 300 in 2024. This time is marked by interdisciplinary research addressing complicated topics such as carbon neutrality, blockchain integration, and IoT-based smart farming. The COVID-19 pandemic (2020–2022) further highlighted the need for robust supply chains and sustainable food systems, generating a substantial spike in scholarly attention. Advanced bibliometric tools like CiteSpace and VOSviewer improved the display of research trends, co-authorship networks, and institutional links, enabling deeper insights into agro-industrial dynamics.

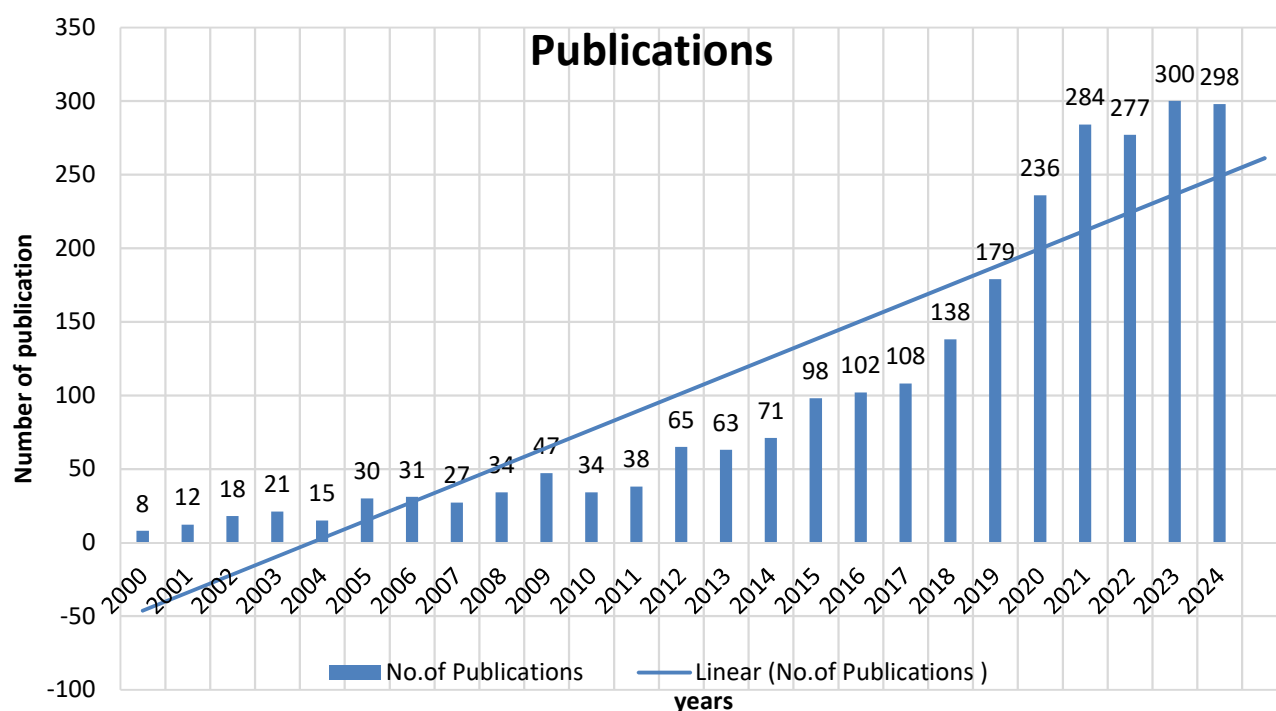


Fig. 2. Publications from 2000 to 2024 based on Dimension.ai Database

The citation trend from 2000 to 2024, displayed in Figure 3, reveals a spectacular and steady growth trajectory, indicating the increasing academic recognition and influence of research in agro-based businesses. The period can be split into three separate phases: the startup phase (2000–2008), the stable growth phase (2009–2016), and the rapid expansion phase (2017–2024).

During the initial phase, the number of citations remained low, with fewer than 100 per year until 2005, gradually growing to 313 by 2008. This modest expansion aligns with the foundational stage of research in agro-industries, mostly focusing on localized and less visible themes. The absence of

interdisciplinary collaboration and restricted global distribution of research findings contributed to the comparatively low citation activity during this period.

The steady development phase (2009–2016) had a large surge in citations, going from 448 in 2009 to 1,785 in 2016. This period highlights the development of the field, with research tackling critical global challenges such as sustainability, food security, and agribusiness management. The increased usage of bibliometric tools like VOSviewer and CiteSpace allowed researchers to map trends, networks, and gaps efficiently, thus raising the exposure and impact of published studies. This period also benefited from increasing international collaboration, substantially bolstering citation numbers.

The rapid expansion period (2017–2024) exhibits an exponential spike in citations, peaking at 12,873 in 2024. This rise correlates with the global shift towards interdisciplinary research focused on novel themes like blockchain integration, IoT-based smart farming, and carbon neutrality. The rising relevance of these themes, particularly during the COVID-19 pandemic (2020–2022), underlined the importance of resilient supply chains and sustainable agriculture systems, causing a boom in academic interest and citations. Advanced bibliometric visualizations during this period substantially increased the reach and engagement of scientific results.

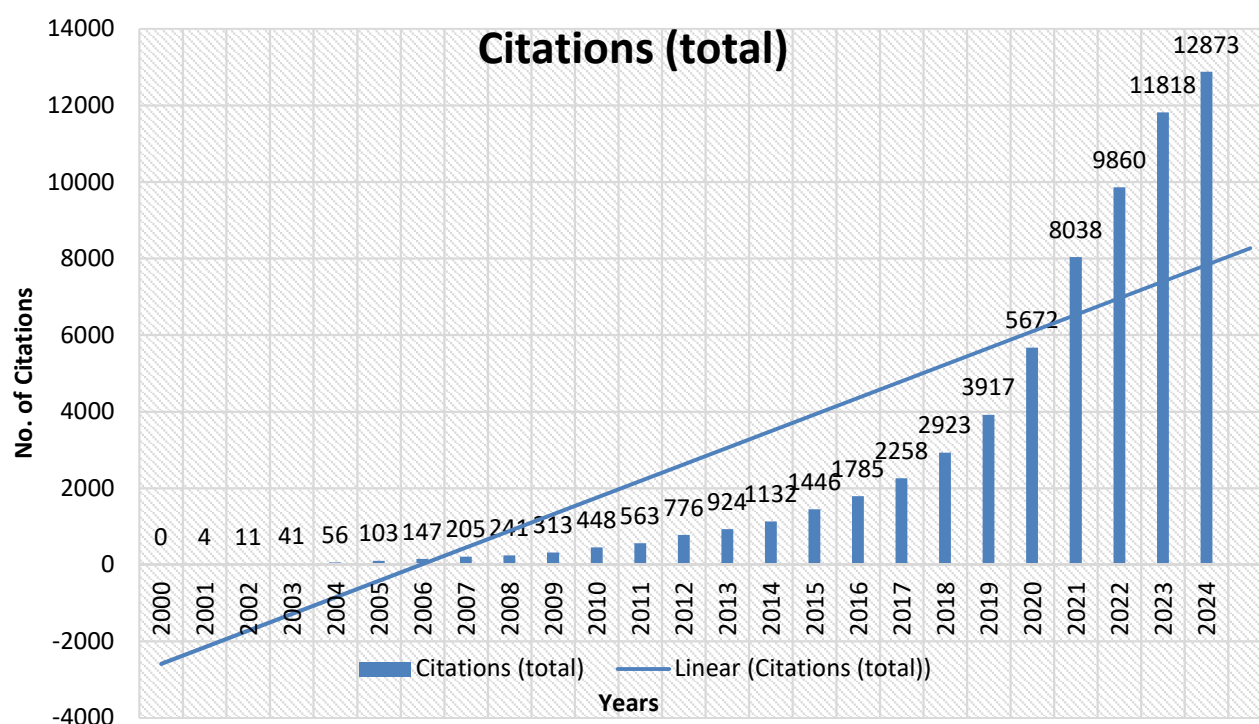


Fig. 3. Citations from 2010 to 2024 based on Dimension.ai Database

The trend of publications with at least 10 citations from 2000 to 2024 illustrates in Figure 4 a gradual rise in impactful research within the agro-industry area, demonstrating its expanding academic significance. The period can be categorized into three phases: a gradual development phase (2000–2010), a steady rise (2011–2017), and a peak followed by a fall (2018–2024). From 2000 to 2010, the number of publications with ≥ 10 citations remained quite low, varying between 6 and 32 annually. This period refers to the nascent stage of research visibility and limited multidisciplinary collaboration. Citations in this period were likely focused on fundamental studies and specialist themes.

The steady climb phase (2011–2017) shows an increase from 31 publications in 2011 to 127 in 2017. This growth reflects an expanded attention to global challenges, including food security, sustainability, and technological integration in agriculture. Publications during this period began

addressing broader challenges, earning increasing academic interest and citations. The peak phase occurred between 2018 and 2021, with a record high of 153 publications in 2020. This spike coincides with research on resilient supply chains and digital transformations under the COVID-19 pandemic. However, a fall follows, reducing to 72 publications in 2023, potentially due to saturation in high-impact themes or publication delays. Overall, the upward trend shows increasing research quality, while the recent fall highlights the need for fresh focus on developing high-impact topics.

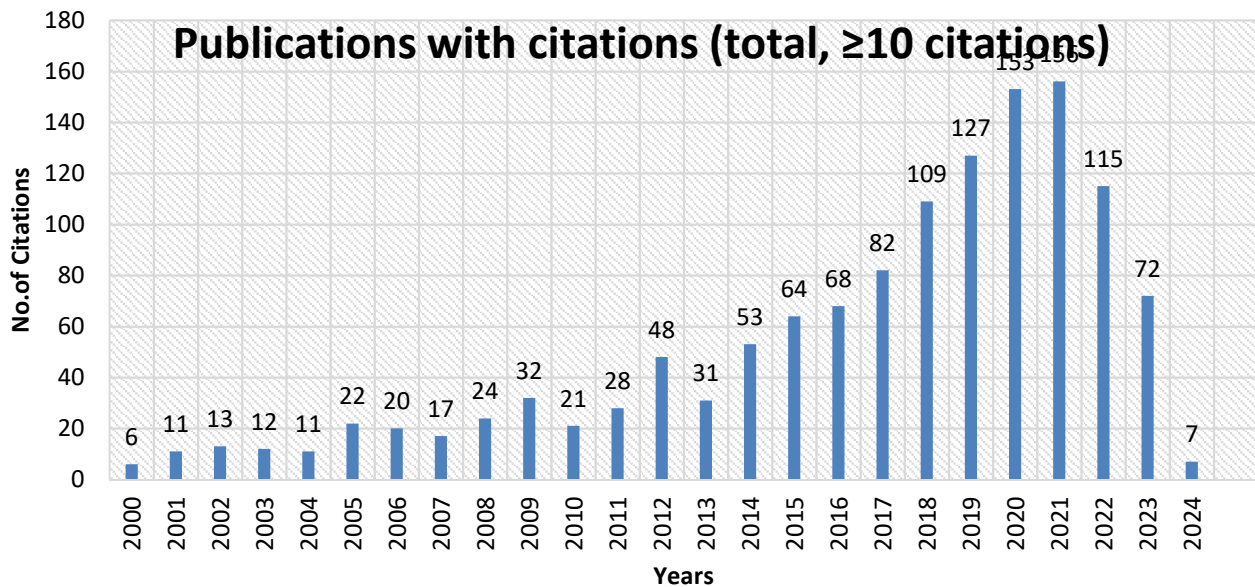


Fig. 4. Publication with Citations from 2010 to 2024 based on Dimension.ai Database

3.2 Co-authorship Analysis

VOSviewer visualizes networks where authors are nodes and partnerships are edges. It detects influential researchers, collaboration patterns, and clusters, aiding in understanding research dynamics and developing academic relationships [27].

- i. **Authors:** This investigation identifies 6,586 authors after removing texts with a maximum of 25 authors apiece. Out of these, only 186 authors match the criteria of having at least three documents and a minimum of two citations. Figure 5 demonstrates that among the 186 authors, 53 researchers had the highest number of linked works.

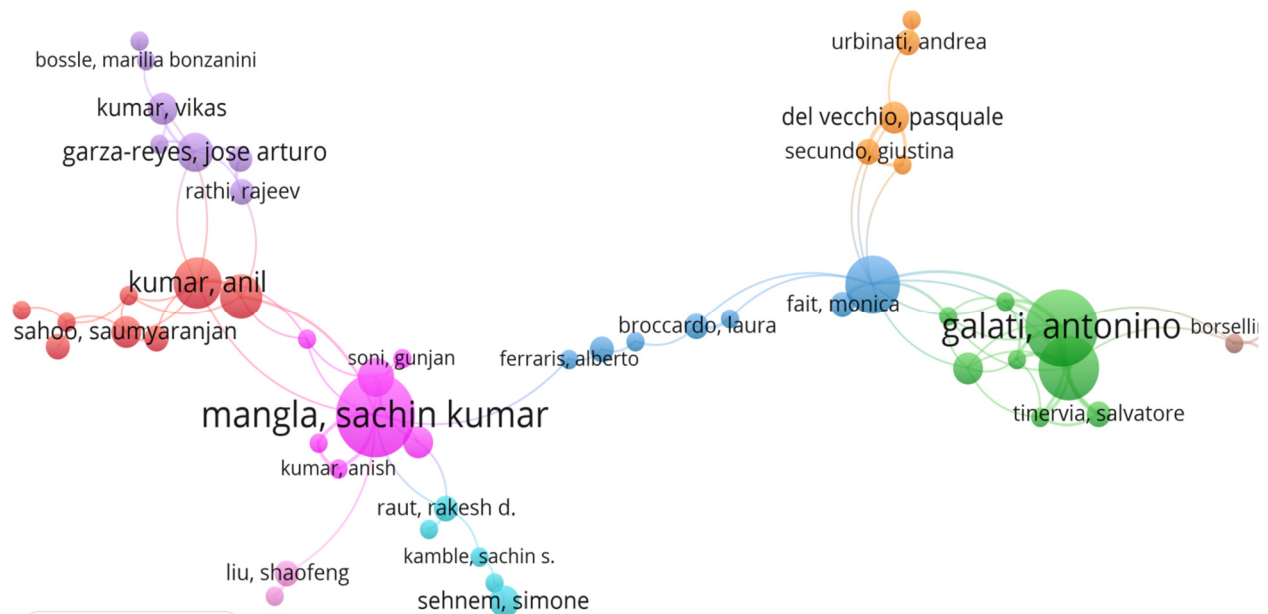


Fig. 5. Bibliometric map on co-authorship with Network visualization mode

Prominent scholars in Table 2, such as Sachin Kumar Mangla and Antonino Galati, have contributed considerably to increasing sustainability, innovation, and efficiency within agro-based supply chains. Their study, supported by excellent citation metrics, covers major difficulties in logistics, technology adoption, and policy development, delivering useful insights for improving supply chain management in agro-industrial environments globally.

Table 2

Top 10 Authors publications, citations, and average citation per article.

Rank	Author Name	Publications	Citations	Average Citations per Article
1	Sachin Kumar Mangla	13	775	59.62
2	Antonino Galati	12	299	24.92
3	Xavier Gellynck	11	326	29.64
4	Maria Crescimanno	10	296	29.60
5	Demetris Vrontis	9	212	23.56
6	Anil Kumar	8	255	31.88
7	Jacques Trienekens	8	73	9.13
8	Vincent Blok	6	87	14.50
9	Jos Bijman	6	137	22.83
10	Alberto Ferraris	6	16	2.67

- ii. Organizations (Affiliations): VOSviewer also enables the analysis of organizations or affiliations that authors are associated with, in addition to examining individual authors [28]. By restricting the analysis to a maximum of 25 organizations per document, a total of 2,567 organizations were found. After removing documents, only 223 organizations, each having at least five articles and citations, fit the criteria. Figure 6 demonstrates that out of these 223 organizations, 204 have the maximum number of linked works.

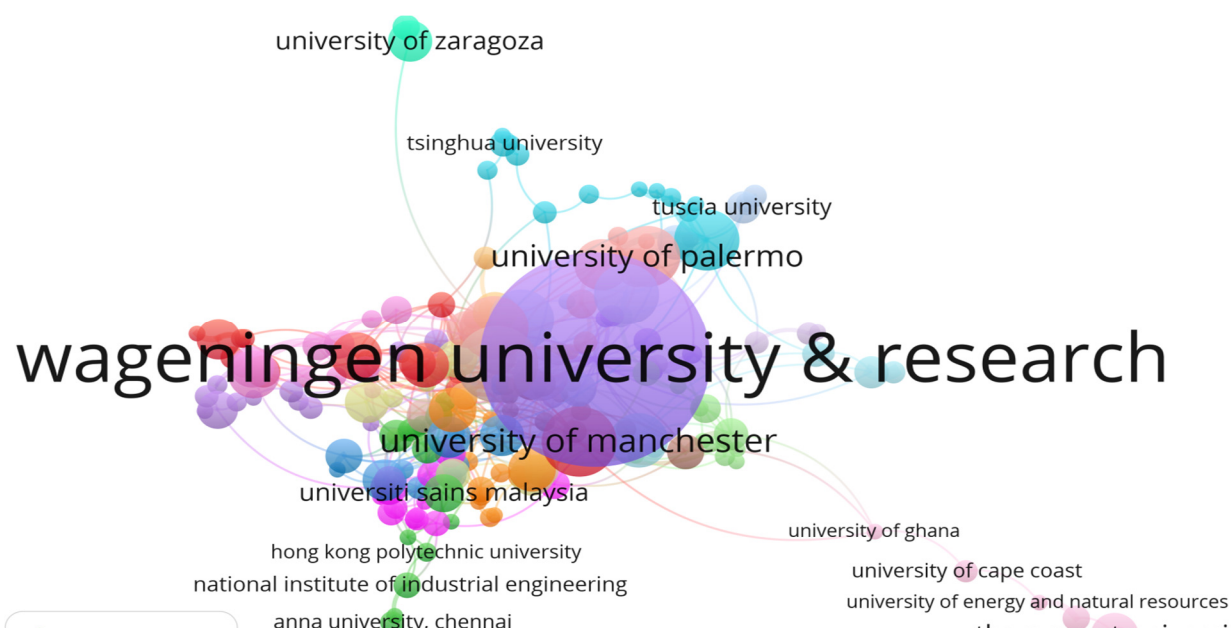


Fig. 6. Bibliometric map on Organization with Network visualization mode

Table 3 demonstrates the academic influence of ten universities, assessed through publications, citations, and average citations per article. Erasmus University Rotterdam excels in research impact, averaging 201.43 citations per article, despite a lower volume of publications. Wageningen University possesses the greatest quantity of publications (67), although it exhibits a moderate citation impact (27.75). The University of Manchester and the University of Sussex have significant impact, with 127.91 and 158.69 citations per publication, respectively, signifying concentrated and influential research production.

Table 3

Top 10 Organizations publications, citations, and average citations per article

Rank	Organization	Publication	Citations	Average Citations Per Article
1	Wageningen University & Research	67	1859	27.75
2	University Of Manchester	22	2814	127.91
3	University Of Sussex	16	2539	158.69
4	Erasmus University Rotterdam	14	2820	201.43
5	University Of Plymouth	14	738	52.71
6	Utrecht University	15	791	52.73
7	University Of Turin	19	515	27.11
8	University Of Naples Federico II	19	705	37.11
9	University Of Padua	19	484	25.47
10	UNIVERSITY OF BONN	12	209	17.42

- iii. Countries: VOSviewer supports the analysis of nations inside co-authorship networks, enabling a full understanding of collaborative patterns. This study identified 119 nations by eliminating articles that involved a maximum of 25 countries each. As indicated in Figure 7, only 79 organizations match the necessary criteria, which include having a minimum of four published papers and significant country-level citations.

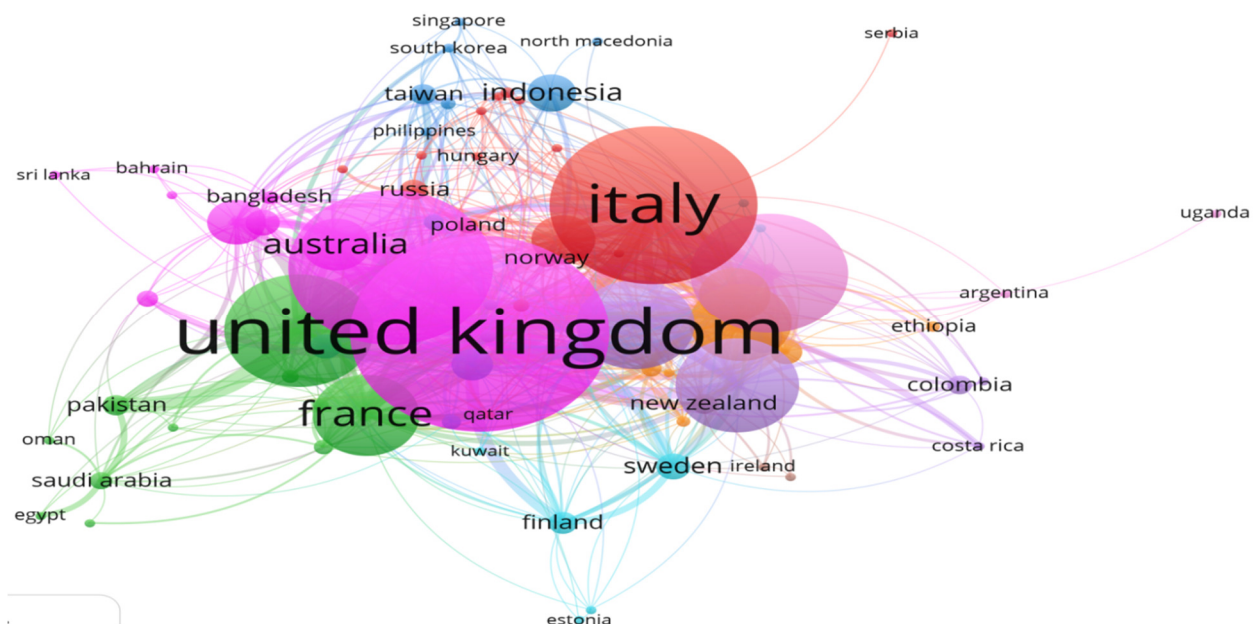


Fig.7. Bibliometric map on Country with Network visualization mode

Table 4 shows the top 10 countries performing in research output and impact. The United Kingdom leads with 318 publications and 13,798 citations, indicating substantial intellectual influence. The United States comes out with the highest average citations per paper (55.66), suggesting strong scientific influence. Italy, India, and China have outstanding productivity but little citation influence. The Netherlands, France, and Germany blend high publication counts with impressive citation averages, underscoring their global research importance and impact.

Table 4

Top 10 countries based on publications, citations, and average citations per article.

Rank	Country	Publications	Citations	Average Citations Per Article
1	United Kingdom	318	13,798	43.39
2	United States	194	10,798	55.66
3	Italy	255	7,523	29.50
4	India	251	6,325	25.21
5	Netherlands	126	6,716	53.29
6	France	131	5,398	41.21
7	China	184	3,606	19.60
8	Australia	84	3,368	40.10
9	Germany	88	3,388	38.50
10	Spain	152	4,405	28.97

3.3 Citation Analysis

VOSviewer, a known tool for bibliometric analysis, permits researchers to look into citation relationships across numerous units, including documents and sources [29]. Each element performs a different function in enriching citation analysis, delivering precise insights into intellectual linkages and research trends. Here's an outline of how these units contribute to the analytical capabilities of VOSviewer:

- i. Documents: Citation analysis typically focuses on individual academic works, including journal articles, conference papers, books, and patents. Using VOSviewer, researchers can investigate citation links among these papers, discover influential publications, trace the history of ideas, and grasp the intellectual structure of a certain field of study [30]. There are 2,504 documents found in this analysis. Merely 1777 documents satisfy the criterion with a minimum of four citations each. Figure 8 illustrates that, of the 1777 documents, 742 papers had the greatest number of related things.
- ii. Sources: Journals and conference proceedings are major examples of sources in academic publishing [31]. With VOSviewer, scholars may evaluate citation patterns across multiple sources, discovering frequently co-cited publications and understanding their contributions to the knowledge base of a certain topic or study area. There are 550 sources in this analysis. Merely 159 sources satisfy the required minimum of 4 documents and source citations. Figure 9 illustrates that of the 159 sources, 147 have the greatest collection of related items.

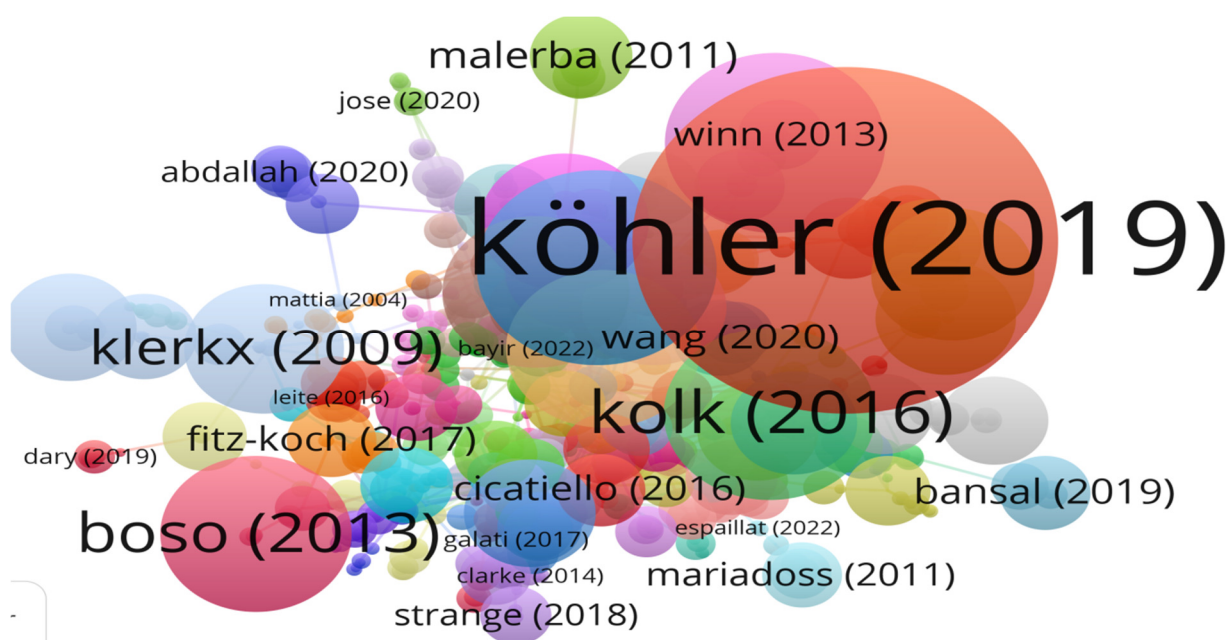


Fig. 8. Bibliometric map on co-citation with Network visualization mode

The data demonstrates Table 5 that publications like Sustainability and Business Strategy and the Environment excel in productivity and influence, with considerable document volumes and high CiteScores (5.8 and 11.2). Specialized journals such as Research Policy (h-index 299) and Technological Forecasting and Social Change prioritize niche, high-impact research with good citation metrics. Open-access models, like Sustainability, promote accessibility but may decrease citation quality (SJIR 0.672). Trends reveal a growing concentration on multidisciplinary research and sustainability-related subjects, mirroring global objectives. These publications appeal to different academic and practical audiences, providing vital forums for influential research and supporting innovation across domains.

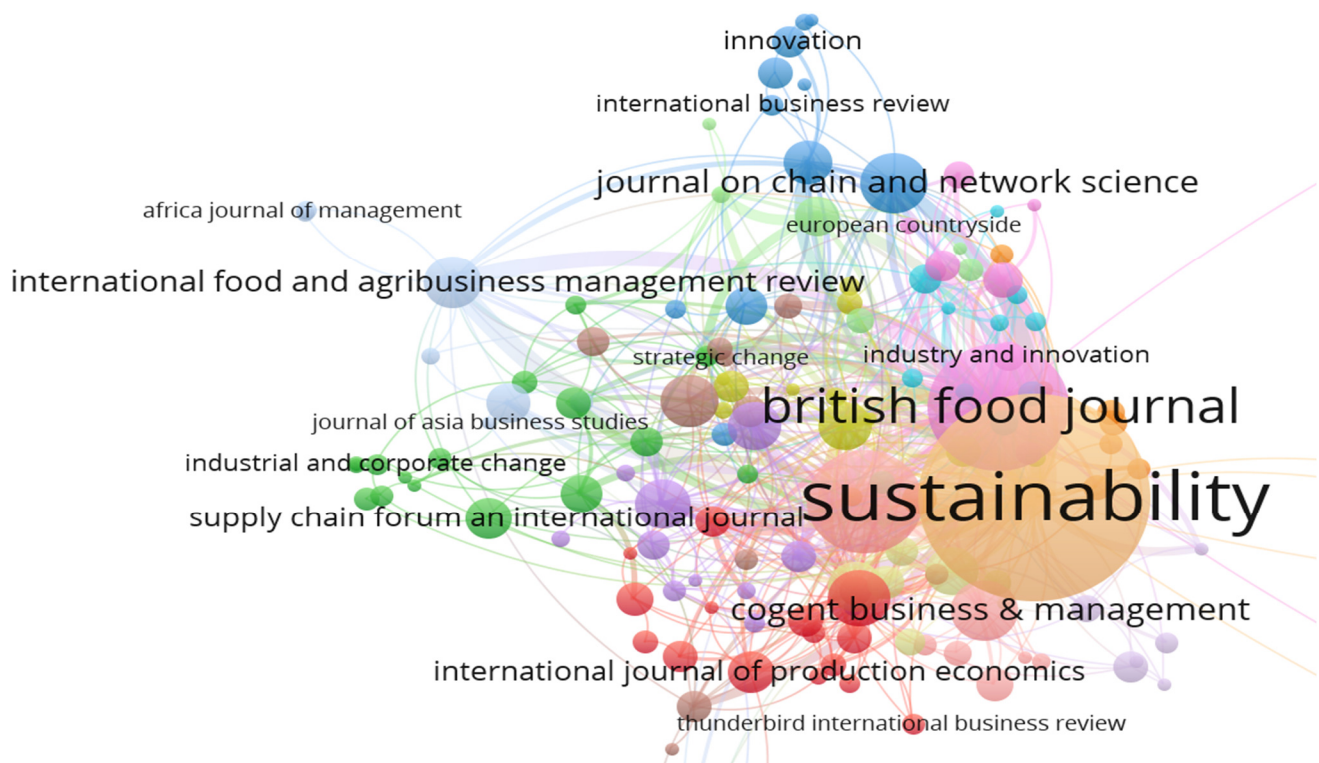


Fig. 9. Bibliometric map on co-citation with Network visualization mode based on sources

Table 5

The topmost productive sources with the most cited articles.

Rank	Source	Documents	Citations	Total Link Strength	CiteScore (2023)	Impact Factor	SNIP	SJR	h-Index	Publisher
1	Sustainability	230	4288	210	5.8	3.95	1.19	0.67	169	MDPI
2	Business Strategy and the Environment	82	3348	106	11.2	10.30	2.89	2.29	194	Wiley-Blackwell
3	British Food Journal	110	2328	189	6.0	2.91	1.73	0.87	129	Emerald Publishing
4	Research Policy	23	2297	29	12.3	10.50	3.91	3.52	299	Elsevier
5	Technological Forecasting and Social Change	25	1241	43	10.5	8.59	2.89	2.65	189	Elsevier
6	Supply Chain Management: An International Journal	25	1298	48	9.2	7.41	2.30	2.12	137	Emerald Publishing
7	Journal of Business Research	27	1107	43	10.8	6.60	2.45	1.95	175	Elsevier
8	International Journal of Production Research	9	831	14	9.8	5.92	2.11	1.81	147	Taylor & Francis
9	Technovation	14	864	9	9.4	8.23	3.22	2.51	223	Elsevier
10	Industrial Marketing Management	14	625	17	7.9	6.55	2.78	2.00	210	Elsevier

4. Discussion

This bibliometric analysis emphasizes major results and contributions in supply chain management (SCM) research within agro-based businesses, with an emphasis on trends, collaborations, and geographical discrepancies. The research finds three growth phases: early development (2000–2008), consistent growth (2009–2016), and rapid expansion (2017–2024). The rapid expansion phase, highlighted by increased publications and citations, fits with global emphasis on digital innovations like blockchain, IoT-based smart farming, and carbon-neutral practices. Co-authorship analysis finds contributions from prolific scholars such as Sachin Kumar Mangla and institutions like Wageningen University, but little participation from emerging nations like India suggests a need for deeper regional collaboration. Notably, our study finds a falling trend of influential publications post-2021, despite exponential expansion in the area, signifying topic saturation. By combining bibliometric techniques like VOSviewer, the research gives crucial insights into underexplored areas, including sustainable policy frameworks and resilience measures, to foster innovation and fairness in agro-industrial SCM globally.

5. Conclusion

The bibliometric analysis of agro-based sectors indicates a large rise in research production from 2000 to 2024, with a strong concentration on digital breakthroughs such as blockchain, IoT-enabled smart farming, and carbon neutrality during the rapid expansion phase (2017–2024). Leading publications like Sustainability and Research Policy have driven substantial contributions to sustainability and supply chain resilience. However, research remains spatially concentrated in industrialized nations, under representing growing economies such as India. A drop in high-impact publications post-2021 shows topic saturation, underscoring the need for interdisciplinary studies, inclusive collaboration, and policy-focused research to solve global concerns and foster innovation in agro-industrial supply networks.

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Conflicts of Interest

The authors declare no potential conflicts of interest in relation to this study.

References

- [1] Kiptum, C. K., Bouraima, M. B., Ibrahim, B., Oloketuyi, E. A., Makinde, O. O., & Qiu, Y. (2024). Implementation of effective supply chain management practice in the national oil corporation in developing country: an integrated BWM-AROMAN approach. *Decision making advances*, 2(1), 199-212. <https://doi.org/10.31181/dma21202439>
- [2] Mukherjee, A. A., Singh, R. K., Mishra, R., & Bag, S. (2021). Application of blockchain technology for sustainability development in agricultural supply chain: justification framework. *Operations Management Research*, 15(1-2), 46–61. <https://doi.org/10.1007/s12063-021-00180-5>
- [3] Yadav, V. S., Singh, A. R., Gunasekaran, A., Raut, R. D., & Narkhede, B. E. (2022). A systematic literature review of the agro-food supply chain: Challenges, network design, and performance measurement perspectives. *Sustainable Production and Consumption*, 29, 685–704. <https://doi.org/10.1016/j.spc.2021.11.019>
- [4] El Baz, J., & Ruel, S. (2020). Can supply chain risk management practices mitigate the disruption impacts on supply chains' resilience and robustness? Evidence from an empirical survey in a COVID-19 outbreak era. *International Journal of Production Economics*, 233(107972), 107972. <https://doi.org/10.1016/j.ijpe.2020.107972>
- [5] Sahoo, S. K., Goswami, S. S., & Halder, R. (2024). Supplier selection in the age of industry 4.0: a review on MCDM applications and trends. *Decision Making Advances*, 2(1), 32-47. <https://doi.org/10.31181/dma21202420>

- [6] Joshi, S., Sharma, M., Ekren, B. Y., Kazancoglu, Y., Luthra, S., & Prasad, M. (2023). Assessing Supply Chain Innovations for Building Resilient Food Supply Chains: An Emerging Economy Perspective. *Sustainability*, 15(6), 4924. <https://doi.org/10.3390/su15064924>
- [7] Sahoo, S. K., Choudhury, B. B., & Dhal, P. R. (2024). A bibliometric analysis of material selection using MCDM methods: trends and insights. *Spectrum of Mechanical Engineering and Operational Research*, 1(1), 189-205. <https://doi.org/10.31181/smeor11202417>
- [8] Kang, D., Suvitha, K., Narayanamoorthy, S., Sandra, M., & Pamucar, D. (2024). Evaluation of wave energy converters based on integrated ELECTRE approach. *Expert Systems with Applications*, 242, 122793. <https://doi.org/10.1016/j.eswa.2023.122793>
- [9] Kayikci, Y., Subramanian, N., Dora, M., & Bhatia, M. S. (2020). Food Supply Chain in the Era of Industry 4.0: Blockchain Technology Implementation Opportunities and Impediments from the Perspective of people, process, performance, and Technology. *Production Planning & Control*, 33(2-3), 1–21. <https://doi.org/10.1080/09537287.2020.1810757>
- [10] Lin, W., Huang, X., Fang, H., Wang, V., Hua, Y., Wang, J., Yin, H., Yi, D., & Yau, L. (2020). Blockchain Technology in Current Agricultural Systems: From Techniques to Applications. *IEEE Access*, 8, 143920–143937. <https://doi.org/10.1109/access.2020.3014522>
- [11] None Shabanam Kumari, & Dhingra, D. (2024). Post-Harvest Management of Fruits in India: A Review. *Journal of Agricultural Engineering (India)*, 61(2), 181–201. <https://doi.org/10.52151/jae2024612.1845>
- [12] Zhang, P. (2024). A STUDY ON THE LOCATION SELECTION OF LOGISTICS DISTRIBUTION CENTERS BASED ON E-COMMERCE. *Journal of Knowledge Learning and Science Technology ISSN 2959-6386 (Online)*, 3(3), 103–107. <https://doi.org/10.60087/jklst.vol3.n3.p103-107>
- [13] Tuladhar, A., Rogerson, M., Engelhart, J., Parry, G. C., & Altrichter, B. (2024). Blockchain for compliance: an information processing case study of mandatory supply chain transparency in conflict minerals sourcing. *Supply Chain Management*. <https://doi.org/10.1108/scm-11-2023-0585>
- [14] Durkin, M., McGowan, P., & McKeown, N. (2013). Exploring social media adoption in small to medium-sized enterprises in Ireland. *Journal of Small Business and Enterprise Development*, 20(4), 716–734. <https://doi.org/10.1108/jsbed-08-2012-0094>
- [15] Amer Jazairy, Mazen Brho, Manuj, I., & Goldsby, T. J. (2024). Cyber risk management strategies and integration: toward supply chain cyber resilience and robustness. *International Journal of Physical Distribution & Logistics Management*, 54(11), 1–29. <https://doi.org/10.1108/ijpdlm-12-2023-0445>
- [16] Liu, Q. (2024). Supply Chain Risk Management Strategies in the Era of Digital Intelligence Integration: Strategies and Insights. *Advances in Economics, Management and Political Sciences*, 102(1), 65–70. <https://doi.org/10.54254/2754-1169/102/2024ed0071>
- [17] Mhlanga, J., Haupt, T. C., & Loggia, C. (2022). Shaping circular economy in the built environment in Africa. A bibliometric analysis. *Journal of Engineering, Design and Technology*. <https://doi.org/10.1108/jedt-03-2022-0175>
- [18] Siti Fairuza Hassam, Adila Talip, Mohd Fazil Jamaludin, & Antara, P. M. (2024). Blockchain Revolutionizing Supply Chain Management: A bibliometric review of emerging research trends and challenges. *Environment-Behaviour Proceedings Journal*, 9(S119), 93–101. <https://doi.org/10.21834/e-bpj.v9isi19.5774>
- [19] Wee, G., & Ting, I. (2023). *Development of Smart Farming Technologies in Malaysia - Insights from Bibliometric Analysis*. 10(1). <https://doi.org/10.56527/fama.jabm.10.1.3>
- [20] Tamasiga, P., Onyeaka, H., Akinsemolu, A., & Bakwena, M. (2023). The Inter-Relationship between Climate Change, Inequality, Poverty and Food Security in Africa: A Bibliometric Review and Content Analysis Approach. *Sustainability*, 15(7), 5628. <https://doi.org/10.3390/su15075628>
- [21] Oliveira, S., Paulo, Craveiro, E. G., Bezerra, J. P., & Nascimento-e-Silva, D. (2023). Analysis of Conceptual Definitions of Agribusiness Using the Conceptual Bibliographic Method. *International Journal of Professional Business Review*, 8(12), e04190–e04190. <https://doi.org/10.26668/businessreview/2023.v8i12.4190>
- [22] Saini, M., Chandna, G., & Ubba, S. (2022). A closer look at farmers' participation in the supermarket supply chain using bibliometric and content analyses. *Journal of Agribusiness in Developing and Emerging Economies*. <https://doi.org/10.1108/jadee-06-2022-0128>
- [23] Karaman, D., & Sarikan, M. (2022). Bibliometric Analysis of Consumer Behaviour Research Conducted During the Covid-19 Pandemic Period. *Alanya Akademik Bakış*, 6(3), 2943–2959. <https://doi.org/10.29023/alanyaakademik.1141274>
- [24] Wang, D., Huangfu, Y., Dong, Z., & Dong, Y. (2022). Research Hotspots and Evolution Trends of Carbon Neutrality—Visual Analysis of Bibliometrics Based on CiteSpace. *Sustainability*, 14(3), 1078. <https://doi.org/10.3390/su14031078>
- [25] Mohd Fauzie Jusoh, M. Firdaus A. Muttalib, Krishnan, K., & Ayob Katimon. (2021). An overview of the internet of things (IoT) and irrigation approach through bibliometric analysis. *IOP Conference Series*, 756(1), 012041–012041. <https://doi.org/10.1088/1755-1315/756/1/012041>

- [26] Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International Journal of Operations & Production Management*, 25(5), 449–468. <https://doi.org/10.1108/01443570510593148>
- [27] García-García, L. A., & Rodríguez-Salvador, M. (2020). Disclosing Main authors and Organisations collaborations in bioprinting through network maps analysis. *Journal of Biomedical Semantics*, 11(1). <https://doi.org/10.1186/s13326-020-0219-Z>
- [28] Martins, J., Gonçalves, R., & Branco, F. (2022). A bibliometric analysis and visualization of e-learning adoption using VOSviewer. *Universal Access in the Information Society*. <https://doi.org/10.1007/s10209-022-00953-0>
- [29] Kirby, A. (2023). Exploratory Bibliometrics: Using VOSviewer as a Preliminary Research Tool. *Publications*, 11(1), 10. <https://doi.org/10.3390/publications11010010>
- [30] Newson, R., Rychetnik, L., King, L., Milat, A., & Bauman, A. (2018). Does citation matter? Research citation in policy documents as an indicator of research impact – an Australian obesity policy case-study. *Health Research Policy and Systems*, 16(1). <https://doi.org/10.1186/s12961-018-0326-9>
- [31] Brown, L., Griffiths, R., Rascoff, M., & Guthrie, K. (2007). University Publishing in a Digital Age. *The Journal of Electronic Publishing*, 10(3). <https://doi.org/10.3998/3336451.0010.301>