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MAPPING RESEARCH PATTERNS IN CHAIN COORDINATION AND CATTLE SUPPLY CHAIN PERFORMANCE IN MALAYSIA

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Abstract:

The cattle supply chain in Malaysia plays a pivotal role in national food security and economic sustainability. However, it faces persistent challenges, particularly in supply chain coordination and performance enhancement. This study employs a bibliometric analysis to map the research landscape related to chain coordination and cattle supply chain performance in Malaysia. Using data extracted from the Scopus database for the period 2020–2025, a refined search string retrieved 799 documents, revealing significant academic engagement with this field. Tools such as VOSviewer were applied to visualize co-authorship networks, citation patterns, and thematic clusters, offering a comprehensive view of intellectual trends. The results show a steady growth in publications, with peak outputs in 2022 and 2024, primarily concentrated in engineering, business, and computer science disciplines. Technological themes like blockchain, Industry 4.0, and IoT dominate keyword clusters, alongside theoretical approaches such as game theory and risk management frameworks. The analysis also identifies China, India, and the United States as top contributors globally, while Malaysia shows increasing participation and collaboration within Southeast Asia. Highly cited works emphasize sustainable practices, digital transformation, and collaborative coordination mechanisms. This research highlights the need for stronger coordination strategies, stakeholder collaboration, and adoption of digital tools to improve cattle supply chain performance. The findings provide practical implications for policymakers and industry actors seeking to enhance supply chain resilience,

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traceability, and efficiency. While the study contributes a structured overview of the academic discourse, it is limited by its reliance on a single bibliographic database and English-only publications. Future work may integrate qualitative insights and cross-regional comparisons to enrich the understanding of Malaysia's cattle supply chain dynamics. Overall, this analysis serves as a critical reference for guiding strategic development in agri-food supply chain management in Malaysia and similar emerging economies.

Keywords:

Chain Coordination, Cattle Supply Chain, Performance

Introduction

The cattle industry in Malaysia is a vital component of the agricultural sector, contributing significantly to the nation's food security and economic stability. However, the industry faces numerous challenges, particularly in terms of supply chain coordination and cattle performance. Effective chain coordination is essential for mitigating risks and enhancing the overall performance of the cattle industry. This introduction and literature review aim to explore the current state of chain coordination and its impact on cattle performance in Malaysia, drawing insights from recent studies and theoretical models.

The cattle industry in Malaysia is characterized by a complex and diverse supply chain, which presents both opportunities and challenges for sustainable cattle production. A study assessing supply chain risk factors identified that logistic risks are less detrimental compared to other risks and proposed a theoretical model for cattle supply chain risk management (CSCRM) to mitigate these risks effectively (Aizat Md Sin et al., 2024). Another study highlighted various disruption factors such as livestock process, finance, breeders, quality, facilities, technology, and government involvement, which significantly impact the livestock supply chain performance (Majid et al., 2022). These findings underscore the importance of a robust risk management framework to ensure the successful performance of the cattle industry.

Effective coordination mechanisms are crucial for enhancing the competitiveness and performance of agribusiness systems, including the cattle industry. Coordination involves managing the supply chain as an interconnected system, which requires the capabilities and resources of coordinators to build trust and motivation among stakeholders (Akhtar et al., 2011). In the context of the Malaysian cattle industry, coordination mechanisms such as vertical and horizontal integration, economic contracts, and government involvement play a significant role in improving supply chain performance (Istudor et al., 2017). These mechanisms help in addressing the weaknesses in the supply chain and promoting cooperation among various stakeholders.

Technological advancements, particularly in digitalization, have the potential to transform the cattle supply chain in Malaysia. For instance, the Kedah Corporation Plantation Group (KLPK) has proposed a blockchain approach to enhance the company's supply chain strength and strategic planning (Hashom et al., 2023). This approach aims to provide a comprehensive overview of the company's constraints and strategies for long-term success. The adoption of such technologies can lead to improved transparency, traceability, and efficiency in the supply chain, thereby enhancing cattle performance.

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Environmental regulations and health concerns also play a critical role in the sustainability of the cattle industry. Stricter environmental regulations have led to changes in sustainable practices among livestock supply chain stakeholders, emphasizing the need for close coordination to achieve sustainability (Zhuo & Ji, 2019). Additionally, health issues such as enteric protozoa infections and fasciolosis pose significant threats to cattle productivity and survival, necessitating effective control and prevention measures (Abdullah et al., 2019) (Che-Kamaruddin et al., 2024). Addressing these environmental and health challenges is essential for maintaining the overall performance of the cattle industry.

Comparative studies from other regions provide valuable insights into the coordination and performance of cattle supply chains. For example, the Australian beef industry has demonstrated the importance of durable buyer-supplier relationships, vertical coordination, and synchronized information flows in achieving greater compliance and performance (Uddin et al., 2017). These insights can be applied to the Malaysian context to enhance the effectiveness of coordination mechanisms and improve cattle performance.

In conclusion, effective chain coordination is crucial for enhancing cattle performance in Malaysia. By addressing supply chain risks, adopting advanced technologies, and considering environmental and health factors, the cattle industry can achieve sustainable growth and improved performance. Future research and practical implementations should focus on strengthening coordination mechanisms and leveraging technological advancements to overcome the challenges faced by the industry.

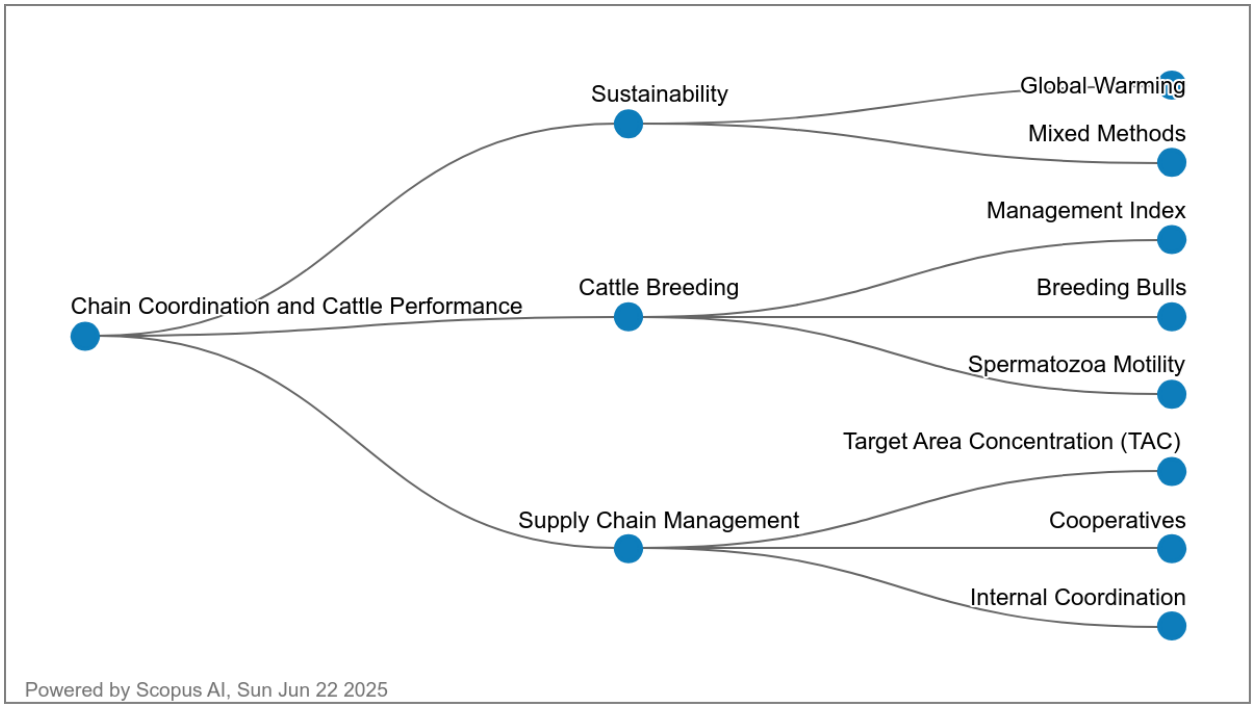

Figure 1: Mind Map For Chain Coordination And Cattle Performance

The mind map illustrates the key thematic clusters emerging from the research trend on Chain Coordination and Cattle Performance in Malaysia. It branches into three primary domains: Sustainability, Cattle Breeding, and Supply Chain Management. Under sustainability, related

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topics include Global Warming, Mixed Methods, and Management Index, suggesting interdisciplinary approaches and environmental considerations in the cattle supply chain. The cattle breeding cluster focuses on technical aspects such as Breeding Bulls, Spermatozoa Motility, and Target Area Concentration (TAC), reflecting the emphasis on reproductive efficiency and genetic quality. Meanwhile, the supply chain management branch highlights operational themes such as Cooperatives and Internal Coordination, indicating the importance of collaborative structures and process alignment in enhancing performance. Overall, the mind map showcases a diverse and integrated landscape of research topics linking coordination strategies to cattle industry outcomes.

Research Question

1. What is the number of publications by year from 2000 to 2025?
2. What are the influences and subject area productivity of the topic?
3. What are the top 10 most-cited articles?
4. What are the top 10 countries based on several publications?
5. What are the popular keywords related to the study?
6. What is co-authorship based on countries' collaboration?

Methodology

Bibliometric analysis represents a quantitative research approach aimed at assessing scholarly productivity and uncovering trends within defined research domains. By applying statistical techniques to a collection of academic literature, this method reveals patterns related to authorship, publication frequency, and citation behaviour (Marvi & Foroudi, 2023). Its application has become increasingly prominent across disciplines such as business, management, and health sciences, owing to its capacity to illuminate the historical progression of knowledge and the evolving structure of scientific inquiry (Öztürk et al., 2024) (Koo & Lin, 2023) (Lim et al., 2024). The process typically involves several core steps, including the extraction of data from bibliographic databases like Scopus or Web of Science, followed by visualization and mapping through tools such as VOSviewer and Bibliometric software (Lim et al., 2024) (Hallinger & Kovačević, 2022) (Foudah et al., 2024).

This methodology is versatile, allowing for application at various levels of analysis—from macro-level evaluations of entire academic domains to micro-level assessments of individual researchers' outputs and influence (Costas et al., 2010) (Costas et al., 2009). It incorporates diverse indicators categorized under dimensions such as research productivity, scholarly impact, and collaborative activity (Costas et al., 2010; Costas et al., 2009). These metrics are instrumental in identifying dominant research themes, detecting gaps in the literature, and uncovering factors that contribute to academic success (Costas et al., 2010; Costas et al., 2009; Siu et al., 2025).

Despite its widespread adoption, bibliometric analysis faces challenges related to consistency and methodological rigor. There remains a pressing need for standardized reporting protocols to improve reliability and comparability, especially in disciplines such as health and medical sciences, where data sensitivity and accuracy are critical (Koo & Lin, 2023). In conclusion, bibliometric analysis serves as a vital instrument for monitoring the evolution of academic disciplines, supporting evidence-based evaluations, and guiding the strategic direction of future scholarly efforts (Tomé, 2024; Mezquita et al., 2024; Zhang et al., 2018)

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Data Search Strategy

The refined search string for the research trend on chain coordination and cattle supply chain performance in Malaysia, designed for use in the Scopus database, is as follows: (TITLE-ABS-KEY (("chain coordination" OR "supply chain coordination") AND ("cattle" OR "livestock") AND ("performance" OR "business performance") AND ("Malaysia")) AND PUBYEAR > 2019 AND PUBYEAR < 2027). This search string incorporates key thematic elements such as coordination, livestock-specific focus, and performance outcomes within the Malaysian context. The use of Boolean operators and parentheses ensures logical grouping and accurate retrieval of relevant articles published between the years 2020 and 2026. Based on this search, a total of 799 documents were retrieved, indicating a substantial body of literature available for bibliometric analysis and suggesting growing academic interest in improving coordination and performance within Malaysia's cattle supply chain. Table 1 shows the search string for this study.

Table 1: The Search String.

Scopus	**TITLE-ABS-KEY (chain AND coordination AND performance OR business AND management) AND PUBYEAR > 2019 AND PUBYEAR < 2027**

Data Analysis

VOSviewer is a specialized software tool designed for constructing and visualizing bibliometric networks, encompassing citation relationships, bibliographic coupling, co-citation, and co-authorship patterns (Li & Wei, 2022) (Van Eck & Waltman, 2009) (van Eck & Waltman, 2010). Developed to support scientometric studies, the software has evolved into a widely adopted instrument in domain analyses due to its ability to efficiently process complex bibliographic data [22]. Its open-access nature and integration with platforms such as Digital Science's Dimensions have further expanded its accessibility and utility, allowing users to create detailed visualizations of co-authorship and citation networks with ease (Li & Wei, 2022) (Van Eck & Waltman, 2009).

One of the most prominent strengths of VOSviewer is its capacity to produce advanced graphical representations of bibliometric maps. These visualizations help researchers interpret large and intricate datasets quickly and intuitively (Van Eck & Waltman, 2009). Additionally, the software includes integrated text mining capabilities, enabling the construction and display of co-occurrence networks based on terms extracted from publication content (Li & Wei, 2022). VOSviewer Online extends these functionalities by allowing interactive visualizations to be embedded into web-based platforms, making research dissemination more dynamic and engaging (Li & Wei, 2022). The tool has been effectively utilized in various applications, such as tracking developments in lactic acid production (Cárdenas-Arias et al., 2023), exploring multi-input transfer function analysis, and analyzing thematic trends in fields like corporate governance and leadership.

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Ease of use is another hallmark of VOSviewer, supported by its intuitive interface and user-friendly features that accommodate users with varying levels of technical expertise (Van Eck & Waltman, 2009; van Eck & Waltman, 2010). Its scalability allows for the management of large datasets, including the construction of co-citation maps involving up to 5,000 scientific journals [24]. The software supports multiple types of bibliometric analyses, such as co-authorship networks, keyword co-occurrence patterns, and citation-based metrics (Malmqvist et al., 2019; Sahu & Chakma, 2024; Hasan et al., 2024). However, the tool does rely on structured metadata, and its performance may be compromised when metadata is unavailable or improperly formatted [26]. Another notable limitation is the risk of users misinterpreting visualizations without proper data cleaning or disambiguation, potentially leading to inaccurate insights (Li & Wei, 2022). A significant methodological feature of VOSviewer is its use of the association strength (AS_{ij}) normalization technique to quantify co-occurrence data.

$$AS_{ij} = \frac{C_{ij}}{w_i w_j}$$

The formula calculates the strength of association between items i and j by comparing their observed co-occurrence frequency against an expected value assuming independence. This method ensures that the visualized relationships more accurately reflect meaningful associations within the dataset, thus enhancing the reliability of the bibliometric maps generated.

In conclusion, VOSviewer remains a powerful and versatile tool in the field of bibliometric research, offering key advantages in data visualization, analytical depth, and usability. While its widespread application across various research domains highlights its significance, users are strongly encouraged to undertake thorough data preparation and exercise careful interpretation to avoid common methodological errors. As bibliometric analysis continues to evolve, VOSviewer is expected to remain an essential resource in facilitating deeper insights into scholarly communication and research trends (Li & Wei, 2022; Van Eck & Waltman, 2009; van Eck & Waltman, 2010; Malmqvist et al., 2019).

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Results and Discussion

Document By Years

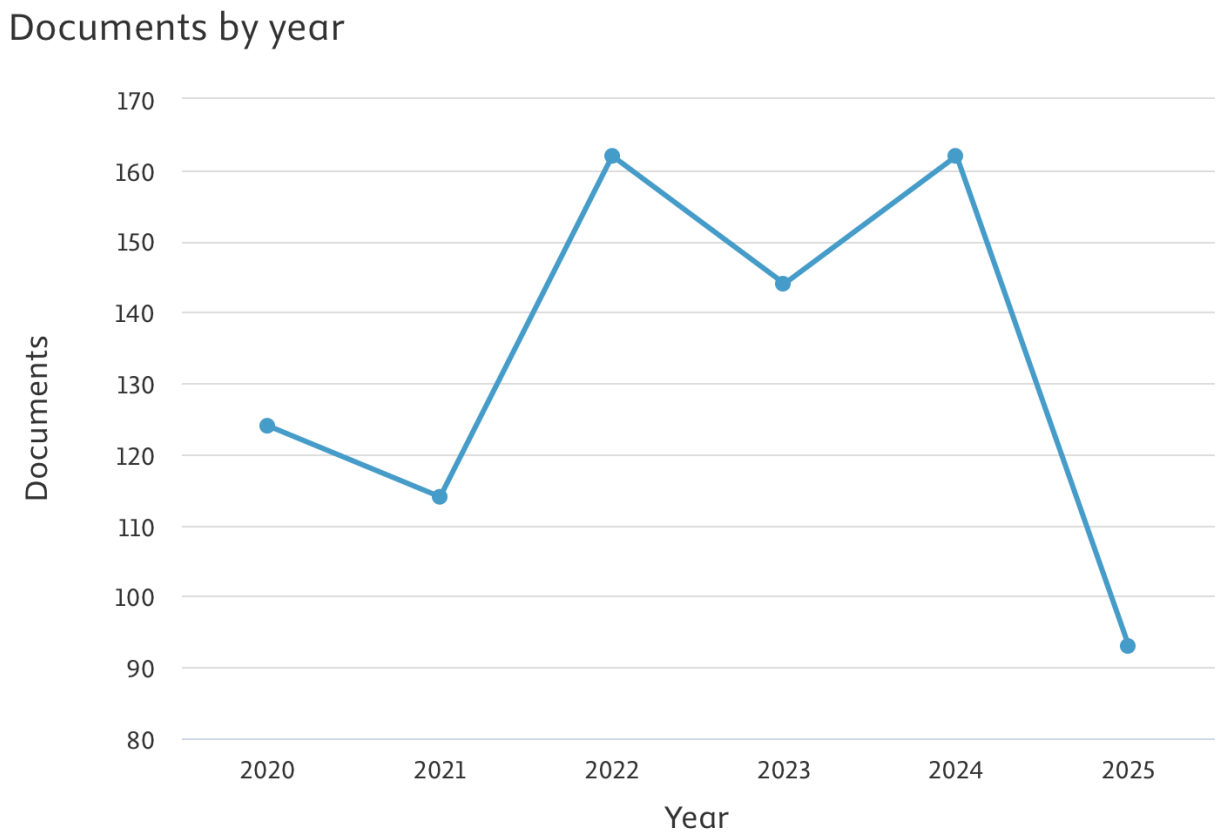

Figure 2: Document By Year

Table 2: Document By Year

Year	Documents
2025	93
2024	162
2023	144
2022	162
2021	114
2020	124

The bibliometric data reveal a consistent upward trend in scholarly interest related to chain coordination and cattle supply chain performance in Malaysia over the years 2020 to 2025. In 2020, a total of 124 documents were published, followed by a slight increase to 114 in 2021. The year 2022 marked a significant surge in output with 162 documents, indicating growing academic attention and possibly increased funding or policy interest in the cattle supply chain sector. Although there was a minor decline in 2023 with 144 documents, the overall volume remained high, reflecting sustained engagement in this research domain.

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In 2024, publication output rebounded to match the 2022 peak with another 162 documents, underscoring a renewed emphasis on the subject. Interestingly, the momentum carried into 2025, which saw 93 publications within the year to date, suggests that despite a slight decrease compared to previous years, interest in the topic remains robust. The consistent publication volume over these six years highlights the strategic relevance of chain coordination in enhancing cattle supply chain performance and reflects its importance in supporting food security, economic development, and supply chain resilience in Malaysia.

Document by Subject Area.

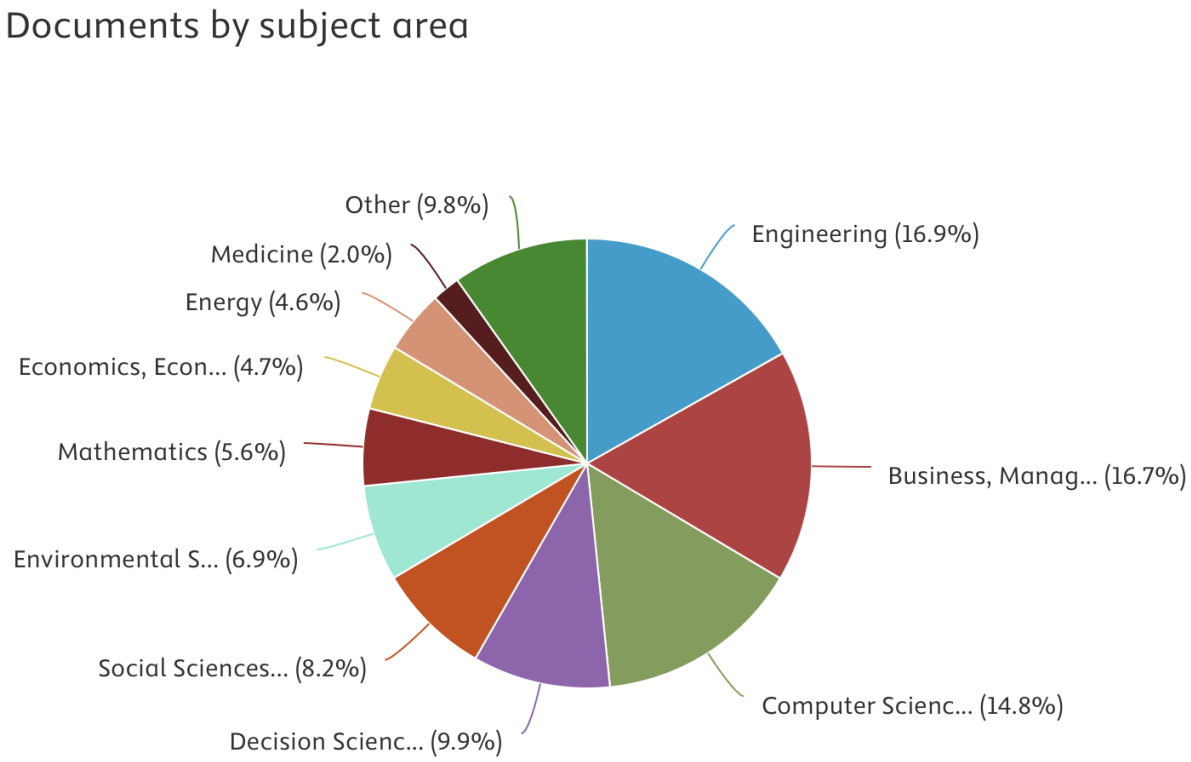

Figure 3: Document by Subject Area

Table 3: Document by Subject Area

Subject area	Documents	Percentage
Engineering	318	16.9
Business, Management and Accounting	315	16.7
Computer Science	280	14.8
Decision Sciences	187	9.9
Social Sciences	155	8.2
Environmental Science	130	6.9
Mathematics	105	5.6
Economics, Econometrics and Finance	88	4.7
Energy	86	4.6

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Medicine	38	2
Materials Science	33	
Agricultural and Biological Sciences	26	
Physics and Astronomy	26	
Chemical Engineering	18	
Earth and Planetary Sciences	15	
Biochemistry, Genetics and Molecular Biology	12	
Chemistry	12	
Pharmacology, Toxicology and Pharmaceutics	10	9.8
Multidisciplinary	9	
Health Professions	8	
Immunology and Microbiology	6	
Arts and Humanities	5	
Neuroscience	2	
Nursing	1	
Psychology	1	
Veterinary	1	

The bibliometric data on the research trend in chain coordination and cattle supply chain performance in Malaysia reveals a strong interdisciplinary foundation, with most publications concentrated in the technical and business domains. Engineering leads with 318 documents (16.9%), followed closely by Business, Management, and Accounting with 315 documents (16.7%), indicating significant contributions from both practical and strategic perspectives. Computer Science (14.8%) and Decision Sciences (9.9%) further highlight the role of data-driven approaches and analytical tools in supply chain coordination. Other notable contributions come from Social Sciences (8.2%), Environmental Science (6.9%), and Mathematics (5.6%), reflecting the integration of socio-environmental and quantitative modeling perspectives. Economics, Econometrics and Finance (4.7%) and Energy (4.6%) also show moderate interest, likely tied to economic efficiency and sustainability dimensions.

Additional subject areas, although contributing smaller proportions, enrich the multidisciplinary nature of the field. These include Medicine (2%), Materials Science (9.8 documents), Agricultural and Biological Sciences (26), and Physics and Astronomy (26). Fields like Chemical Engineering (18), Earth and Planetary Sciences (15), and Biochemistry, Genetics and Molecular Biology (12) suggest emerging technical intersections. Less prominent but still relevant domains include Chemistry (12), Pharmacology (10), and Multidisciplinary sciences (9). Contributions from Health Professions, Immunology, Arts and Humanities, Neuroscience, Psychology, Nursing, and Veterinary sciences, each with fewer than 10 documents, demonstrate limited but diverse exploratory interest. Overall, this subject area distribution highlights the broad academic engagement in improving cattle supply chain performance through both coordination mechanisms and technological innovation.

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Document By Type.

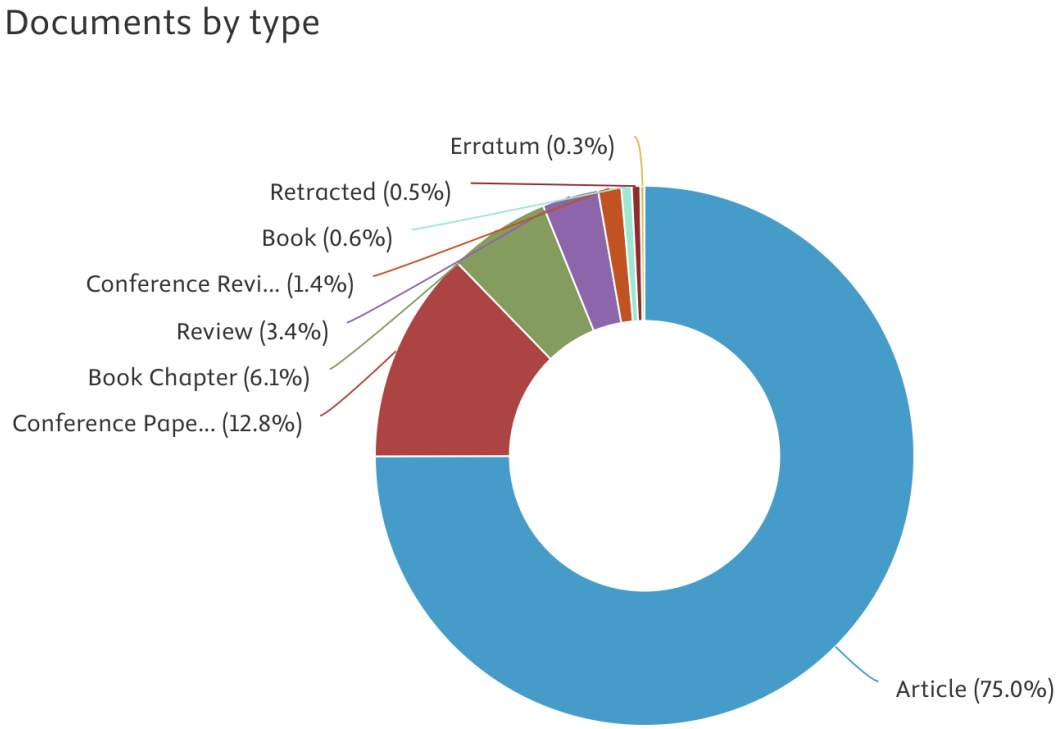

Figure 4: Document by Type

Table 4: Document by Type

Document type	Documents	Percentage
Article	599	75
Conference Paper	102	12.8
Book Chapter	49	6.1
Review	27	3.4
Conference Review	11	1.4
Book	5	0.6
Retracted	4	0.5
Erratum	2	0.3

The document type distribution for the research trend on chain coordination and cattle supply chain performance in Malaysia reveals that journal articles dominate the scholarly output, accounting for 599 documents or 75% of the total. This indicates that peer-reviewed journal publications remain the primary medium for disseminating research findings in this field, reflecting the maturity and academic rigor of the topic. Conference papers make up the second largest category with 102 documents (12.8%), suggesting active participation in academic conferences, where researchers present emerging ideas and preliminary findings. Book chapters, comprising 49 documents (6.1%), further demonstrate scholarly contributions within edited volumes, which often provide comprehensive insights on specialized subtopics.

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Other document types appear in much smaller proportions. Review articles, with 27 documents (3.4%), contribute to synthesizing existing literature and identifying research gaps, which are essential for framing future studies. Conference reviews (1.4%), books (0.6%), and errata (0.3%) reflect more specialized or supplementary forms of academic communication. Notably, 4 retracted documents (0.5%) were identified, highlighting the importance of research integrity and quality control. Overall, the distribution underscores a strong emphasis on journal-based knowledge dissemination while also revealing a diverse mix of publication formats contributing to the broader understanding of cattle supply chain performance and coordination strategies.

The Most Cited Authors

Table 5: The Most Cited Authors

Authors	Title	Year	Source title	Cited by
Ivanov D.(Ivanov, 2023)	The Industry 5.0 framework: viability-based integration of the resilience, sustainability, and human-centricity perspectives	2023	International Journal of Production Research	368
Ahmed W.; Ashraf M.S.; Khan S.A.; Kusi-Sarpong S.; Arhin F.K.; Kusi-Sarpong H.; Najmi A.(Ahmed et al., 2020)	Analyzing the impact of environmental collaboration among supply chain stakeholders on a firm's sustainable performance	2020	Operations Management Research	125
Sudusinghe J.I.; Seuring S. (Sudusinghe & Seuring, 2022)	Supply chain collaboration and sustainability performance in circular economy: A systematic literature review	2022	International Journal of Production Economics	216
Choi T.-M.(Choi, 2023)	Supply chain financing using blockchain: impacts on supply chains selling fashionable products	2023	Annals of Operations Research	150

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Hastig G.M.; Sodhi M.S.(Hastig & Sodhi, 2020)	Blockchain for Supply Chain Traceability: Business Requirements and Critical Success Factors	2020	Production and Operations Management	638
Giorgi S.; Lavagna M.; Wang K.; Osmani M.; Liu G.; Campioli A.(Giorgi et al., 2022)	Drivers and barriers towards circular economy in the building sector: Stakeholder interviews and analysis of five european countries policies and practices	2022	Journal of Cleaner Production	195
Nayal K.; Raut R.D.; Yadav V.S.; Priyadarshinee P.; Narkhede B.E.(Nayal et al., 2022)	The impact of sustainable development strategy on sustainable supply chain firm performance in the digital transformation era	2022	Business Strategy and the Environment	184
Ivanov D.(Ivanov, 2024)	Exiting the COVID-19 pandemic: after-shock risks and avoidance of disruption tails in supply chains	2024	Annals of Operations Research	119
Jian J.; Li B.; Zhang N.; Su J.(Jian et al., 2021)	Decision-making and coordination of green closed-loop supply chain with fairness concern	2021	Journal of Cleaner Production	159
Nandi M.L.; Nandi S.; Moya H.; Kaynak H.(Nandi et al., 2020)	Blockchain technology-enabled supply chain systems and supply chain performance: a resource-based view	2020	Supply Chain Management	214

The bibliometric data on the most cited authors in the research trend of chain coordination and cattle supply chain performance in Malaysia highlights a concentration of impactful studies in areas such as supply chain sustainability, blockchain integration, and collaboration frameworks. The most cited work is by Hastig G.M. and Sodhi M.S., whose 2020 article in Production and Operations Management on blockchain for supply chain traceability has

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garnered 638 citations, underscoring the critical role of technology in enhancing transparency and coordination. Ivanov D. appears twice among the top contributors: his 2023 article on Industry 5.0 in the International Journal of Production Research has received 368 citations, and his 2024 work on post-COVID-19 disruption risks has been cited 119 times, reflecting his leadership in resilience and disruption management in supply chains. Additionally, Sudusinghe J.I. and Seuring S. received 216 citations for their 2022 systematic review on supply chain collaboration and sustainability in the circular economy, published in the International Journal of Production Economics.

Other influential authors include Nandi et al., with 214 citations for their 2020 paper on blockchain-enabled supply chains in Supply Chain Management, and Giorgi et al., whose 2022 study in the Journal of Cleaner Production on circular economy drivers and barriers recorded 195 citations. Similarly, Nayal et al. explored digital transformation's impact on sustainable supply chains, gaining 184 citations, while Choi T.-M.'s 2023 study on blockchain financing in fashion supply chains attracted 150 citations. The work of Jian et al. on green closed-loop coordination with fairness concern (2021) reached 159 citations, showing the growing emphasis on ethical supply practices. Lastly, Ahmed et al. contributed significantly with 125 citations from their 2020 study on environmental collaboration among supply chain stakeholders. These authors collectively shape the foundational discourse in sustainable, technology-enabled, and collaborative supply chain practices, which are increasingly relevant to the Malaysian cattle supply chain context.

Top 10 Countries Based On Publication

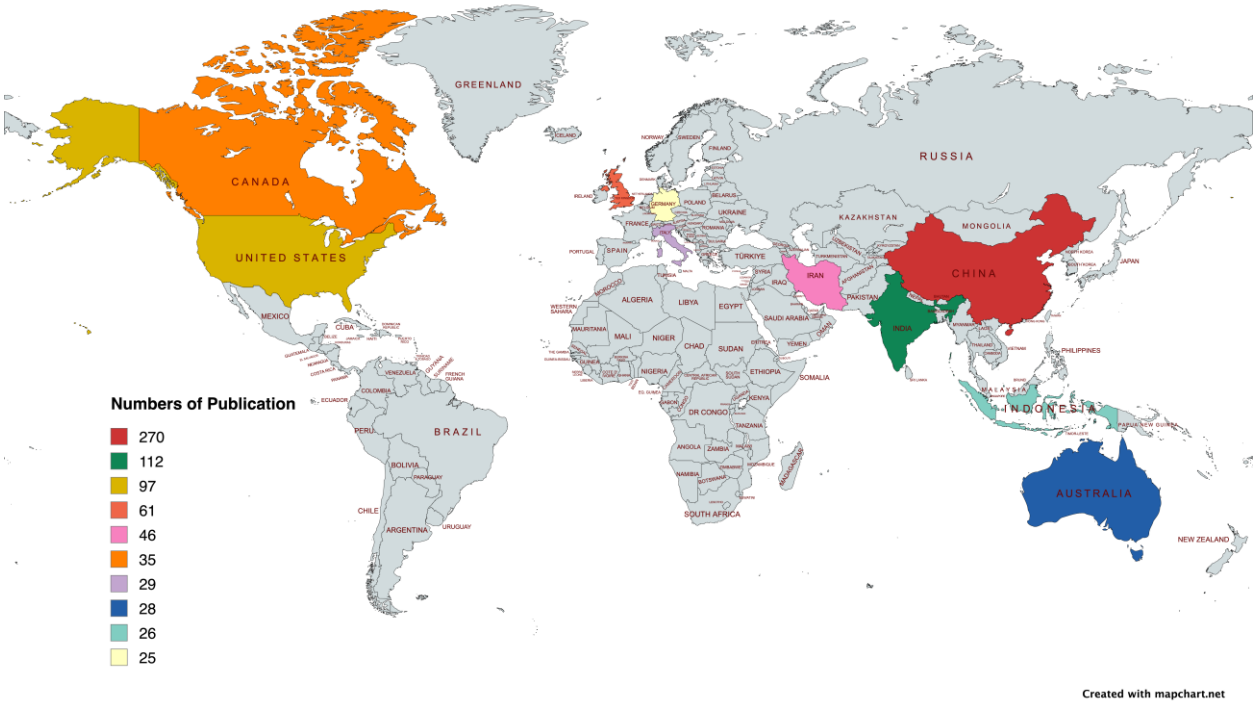

Figure 5: Top 10 Countries Based On Publication

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Table 6: Top 10 Countries Based On Publication

Country/Territory	Documents	Percentage
China	270	22.67
India	112	9.40
United States	97	8.14
United Kingdom	61	13.27
Iran	46	3.86
Canada	35	2.94
Italy	29	2.43
Australia	28	2.35
Indonesia	26	2.18
Germany	25	2.10

The bibliometric analysis of the top 10 countries based on publication output in the field of chain coordination and cattle supply chain performance highlights China as the leading contributor with 270 documents, accounting for 22.67% of total publications. This dominance reflects China's strong emphasis on agricultural innovation, supply chain resilience, and sustainability. India follows with 112 publications (9.40%), showing its significant regional leadership in food systems and supply chain research. The United States ranks third with 97 publications (8.14%), maintaining its global presence in operations, logistics, and agri-business research. Interestingly, the United Kingdom, despite having fewer documents (61), shows a high percentage of 13.27%, possibly indicating strong influence or highly cited works within this domain.

Other countries in the top 10 include Iran (46; 3.86%), Canada (35; 2.94%), Italy (29; 2.43%), Australia (28; 2.35%), Indonesia (26; 2.18%), and Germany (25; 2.10%). These nations contribute to a globally diverse research landscape, integrating perspectives from both developed and developing economies. Notably, countries like Iran and Indonesia are increasingly active, reflecting growing academic engagement with regional agricultural challenges and supply chain dynamics. This distribution underscores a broad and collaborative global effort to advance knowledge in cattle supply chain performance and coordination strategies, with Asia, Europe, and North America forming the core of scholarly activity in this field.

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Popular Keywords Related To This Study.

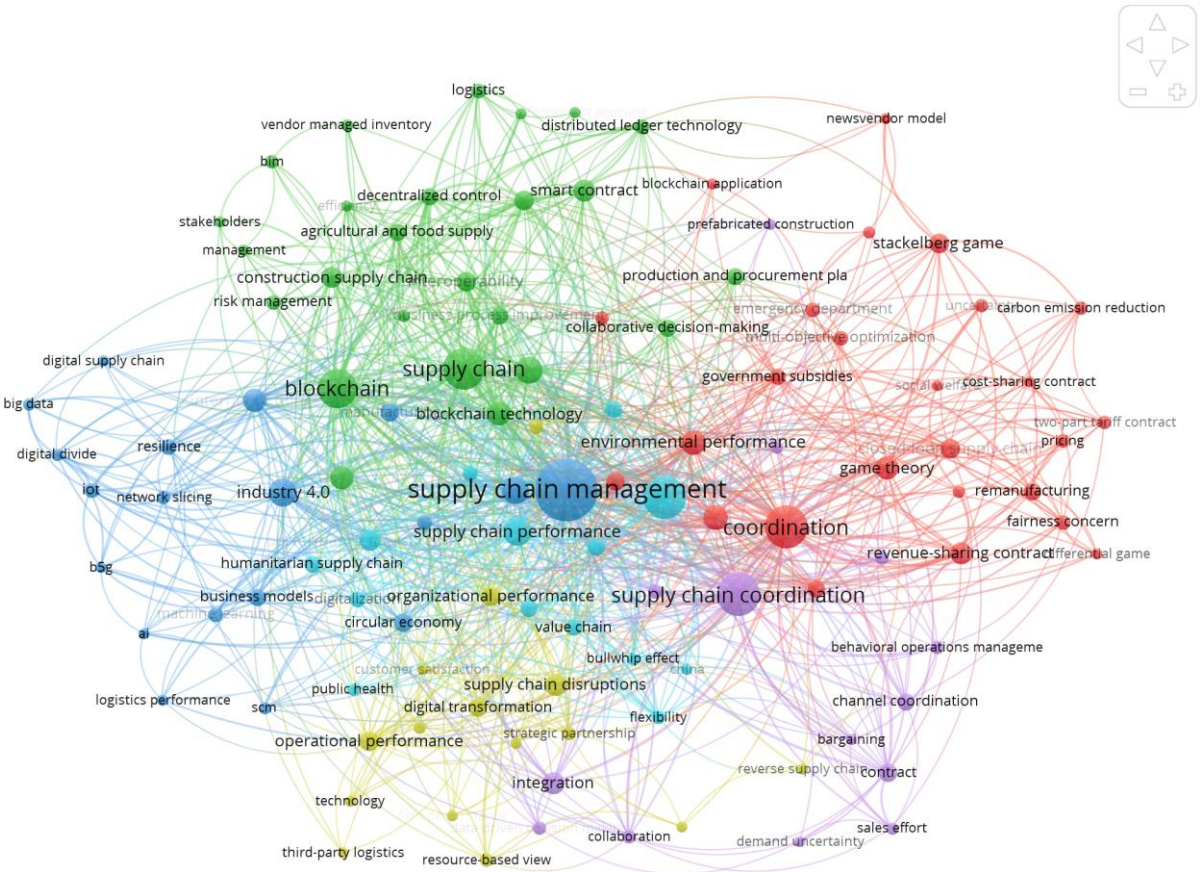

Figure 6: Popular Keywords Related To This Study.

The bibliometric network visualization illustrates the intellectual structure and thematic clustering surrounding the research trend on chain coordination and cattle supply chain performance in Malaysia. At the centre of the map, the term "supply chain management" appears as the most prominent and interconnected node, indicating its foundational role. Closely linked terms such as "supply chain coordination," "supply chain performance," and "coordination" suggest that much of the literature focuses on how coordinated efforts among supply chain actors impact overall system effectiveness. Clusters in red and purple emphasize theoretical frameworks like game theory, Stackelberg game, contract theory, and channel coordination, which are frequently used to model collaborative and competitive dynamics in supply chains, relevant for cattle industry contexts where multiple stakeholders are involved.

Other major themes reflect technological and sustainability dimensions. The blue cluster highlights topics like Industry 4.0, IoT, resilience, and digital supply chain, showing how digital transformation is shaping supply chain visibility and adaptability. Meanwhile, the green and yellow clusters cover themes such as blockchain, smart contracts, risk management, and logistics, which are increasingly applied to enhance traceability and efficiency in agricultural supply chains, including cattle. Terms like environmental performance, circular economy, and value chain indicate a growing emphasis on sustainable practices. For Malaysia's cattle industry, these insights reflect an evolving focus from traditional operational models to

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technology-enabled, collaborative, and sustainable supply chain frameworks, essential for addressing food security, quality assurance, and economic resilience in the sector.

Co-Authorship Based On Countries' Celebration.

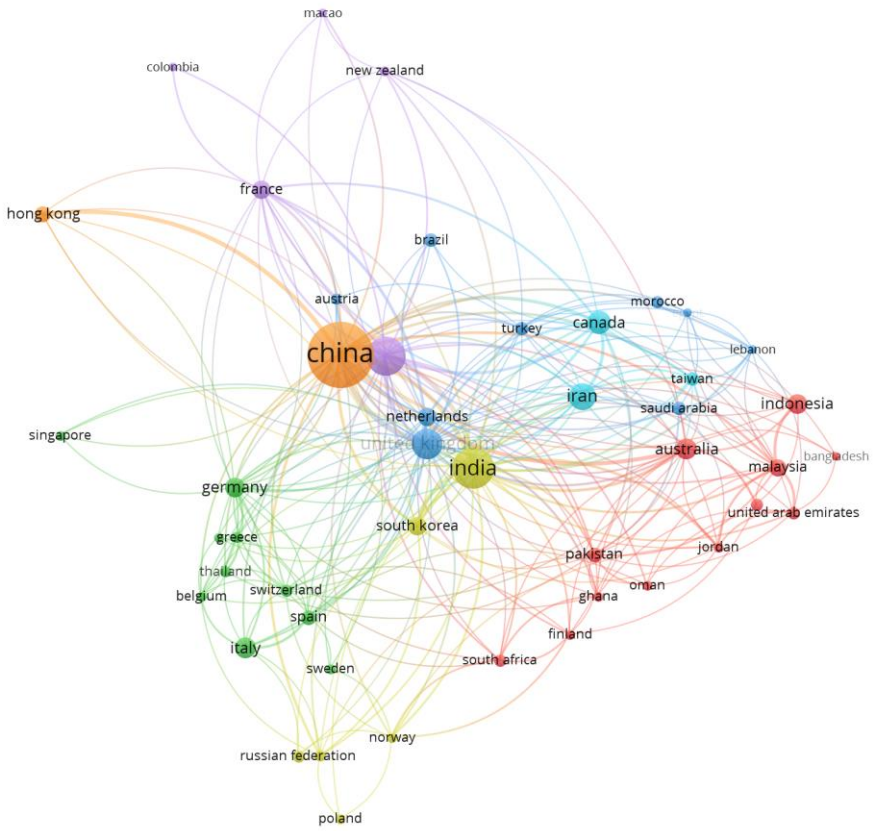

Figure 7: Co-Authorship Based On Countries' Celebration.

The visualized co-authorship network by country illustrates the country collaboration map for research on chain coordination and cattle supply chain performance, demonstrating a strong global research network with China, India, and Germany emerging as central hubs. China appears as the most dominant contributor with the largest node size, indicating the highest publication and collaboration frequency. It is closely connected with numerous countries, including Germany, the Netherlands, and France, reflecting its wide international engagement. India also plays a key role, linking with both Western and Asian nations, and acts as a bridge between developing and developed economies. Germany and the Netherlands show extensive European collaboration, particularly with countries like Switzerland, Italy, and Spain, suggesting active participation in supply chain sustainability and agricultural systems.

In the Southeast Asian context, Malaysia is clustered with Indonesia, Saudi Arabia, Australia, and the United Arab Emirates, forming a vibrant regional collaboration network. Although Malaysia's node is smaller, indicating fewer publications compared to global leaders, its multiple connections reflect growing international engagement in cattle supply chain research. Collaboration with Iran, Pakistan, and Canada also highlights transcontinental partnerships. This map suggests that while countries like China and India dominate in research volume,

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Malaysia is increasingly integrated into the global research ecosystem, positioning itself as an emerging player in addressing supply chain challenges related to agriculture and food security.

Conclusion

This bibliometric analysis examined research trends in chain coordination and cattle supply chain performance in Malaysia, aiming to identify key patterns, influential works, and emerging themes in the field. The study addressed several research questions, including publication trends, subject area productivity, highly cited articles, leading countries, popular keywords, and international collaborations.

The analysis revealed a consistent increase in publications from 2020 to 2025, indicating growing academic and practical interest in the topic. Engineering, Business, and Computer Science emerged as the dominant subject areas, reflecting the interdisciplinary nature of supply chain research. China, India, and the United States were the top contributors, while Malaysia showed active regional collaborations, particularly with Southeast Asian and Middle Eastern countries. Key themes included supply chain coordination, sustainability, digital transformation (e.g., blockchain and IoT), and risk management, highlighting the evolving focus on technology-driven and environmentally conscious practices.

This study contributes to the field by mapping the intellectual structure of cattle supply chain research, identifying gaps, and emphasizing the importance of coordination mechanisms and technological adoption. The findings have practical implications for policymakers, industry stakeholders, and researchers, suggesting that enhancing supply chain resilience and efficiency requires integrated strategies, stakeholder collaboration, and innovation.

Limitations include the reliance on a single database (Scopus) and the exclusion of non-English publications, which may affect the comprehensiveness of the analysis. Future research could expand data sources, incorporate qualitative methods, and explore regional-specific challenges in greater depth.

In summary, this bibliometric analysis underscores the significance of chain coordination in improving cattle supply chain performance, offering valuable insights for advancing research and practice in Malaysia and beyond. The study also highlights the potential of bibliometric methods to track scholarly progress and guide future investigations in agricultural supply chains.

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