INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 15, Issue 9, (2025) E-ISSN: 2222-6990

A Bibliometric Analysis of Logistics Risk and Supply Chain Performance Research with Insights for the Cattle Industry

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DOI Link: http://dx.doi.org/10.6007/IJARBSS/v15-i9/26420

Published Date: 12 September 2025

Abstract

This study applies bibliometric methods to examine the evolution of research on logistics risk and supply chain management performance, with attention to its relevance for the cattle supply chain in Malaysia. 271 publications indexed in Scopus between 2020 and 2025 were analyzed to identify publication trends, subject areas, document types, citation patterns, country contributions, and collaborative networks. The results indicate a sharp increase in scholarly output from 2020 to 2023, reflecting the growing importance of risk management in supply chains during the post-pandemic period. Business, management, engineering, and computer science emerged as the most productive subject areas, highlighting the interdisciplinary nature. Journal articles dominated the publication landscape, followed by conference papers and book chapters, underscoring the role of peer-reviewed outlets in shaping knowledge dissemination. Highly cited works focused on resilience, risk mitigation, and adopting digital technologies, aligning with current industry challenges. China and India were the most productive countries, while Malaysia contributed significantly to halal assurance and livestock-related supply chain issues. The findings provide a comprehensive overview of global research developments, highlight opportunities for cross-country collaboration, and suggest practical implications for strengthening resilience, sustainability, and performance in supply chain management.

Keywords: Logistics Risk, Supply Chain, Cattle Industry, Bibliometric Analysis, Research Trends

Introduction

The cattle supply chain in Malaysia is a critical component of the agricultural sector, contributing significantly to the nation's food security and economic stability. However, this supply chain faces numerous logistical risks that can disrupt operations and affect overall performance. These risks include transportation inefficiencies, inventory management issues, and external environmental factors, all of which can hinder the smooth flow of cattle from

farms to markets. Understanding and managing these risks is essential for ensuring the sustainability and resilience of Malaysia's cattle supply chain.

The cattle supply chain in Malaysia is fraught with logistical risks that can impede its efficiency and effectiveness. These risks include transportation delays, inventory inaccuracies, and external environmental challenges such as disease outbreaks and market fluctuations. Despite the importance of these risks, there is limited research on their specific impact on the cattle supply chain in Malaysia. This gap in knowledge hinders the development of effective risk management strategies, which are crucial for maintaining the stability and sustainability of the supply chain.

The literature on supply chain risk management highlights the importance of identifying and mitigating risks to ensure the smooth operation of supply chains. Several studies have identified key logistical risks and their impact on supply chain performance in Malaysia's cattle supply chain context.

A study assessing the supply chain risk factors in the Malaysian cattle industry found that logistical risks, although less detrimental than other risks, still pose significant challenges. These include transportation inefficiencies and inventory management issues, which can disrupt the supply chain and affect overall performance (Aizat Md Sin et al., 2024).

Research focusing on Malaysia's live animal trading industry identified multiple logistical challenges, including transportation delays and quarantine issues. These challenges are critical for business continuity and require effective strategies to achieve competitive advantages and sustainable supply chain management (Rahim et al., 2020).

A study on logistics and supply chain issues SMEs face in Malaysia highlighted that inventory-related problems, such as forecasting inaccuracies and inventory shortages, are among the most severe issues. These problems can lead to significant disruptions in the supply chain, emphasizing the need for effective inventory management strategies (Abdullah et al., 2018). External factors such as disease outbreaks and market fluctuations also pose significant risks to the cattle supply chain. For instance, the prevalence of diseases like bovine cryptosporidiosis and fasciolosis in Malaysia has been linked to logistical challenges, including inadequate biosecurity measures and poor farm management practices (Abdullah et al., 2019; Che-Kamaruddin et al., 2024).

Various studies have proposed risk management frameworks to address logistical risks in supply chains. For example, a study on the dairy industry in Indonesia employed the House of Risk model to identify and prioritize supply chain risks, providing actionable mitigation strategies (Hendayani et al., 2021). Similarly, research on Malaysia's halal food supply chain suggested implementing systematic risk control measures to maintain transparency and integrity (Ramli et al., 2020).

The primary objective of this study is to identify and analyze the logistical risks affecting the cattle supply chain in Malaysia. By understanding these risks, the study aims to develop a comprehensive risk management framework that can help stakeholders mitigate potential disruptions and enhance the overall performance of the supply chain. This framework will

provide practical insights and strategies for cattle farmers, suppliers, and policymakers to address logistical challenges and ensure a resilient supply chain.

The cattle supply chain in Malaysia plays a key role in food security and economic stability. However, it faces significant logistical risks, including transport delays, inventory issues, disease outbreaks, and market fluctuations. These risks are more critical given Malaysia's high beef import dependency and the need to maintain halal integrity, where disruptions can affect consumer trust and national competitiveness.

However, research on logistics risk in the cattle industry remains limited. This study applies bibliometric analysis to map global trends on logistics risk and supply chain performance, offering insights for scholars, practical strategies for farmers and logistics providers, and evidence-based recommendations for policymakers to strengthen resilience under the National Agro-Food Policy 2.0. The significance of this study lies in its ability to bridge research gaps, support sustainable practices, and enhance the resilience and competitiveness of Malaysia's cattle supply chain.

In conclusion, the literature underscores the importance of identifying and managing logistical risks in the cattle supply chain. By developing a comprehensive risk management framework, stakeholders can mitigate potential disruptions and enhance the overall performance and sustainability of the supply chain in Malaysia.

Concept Maps

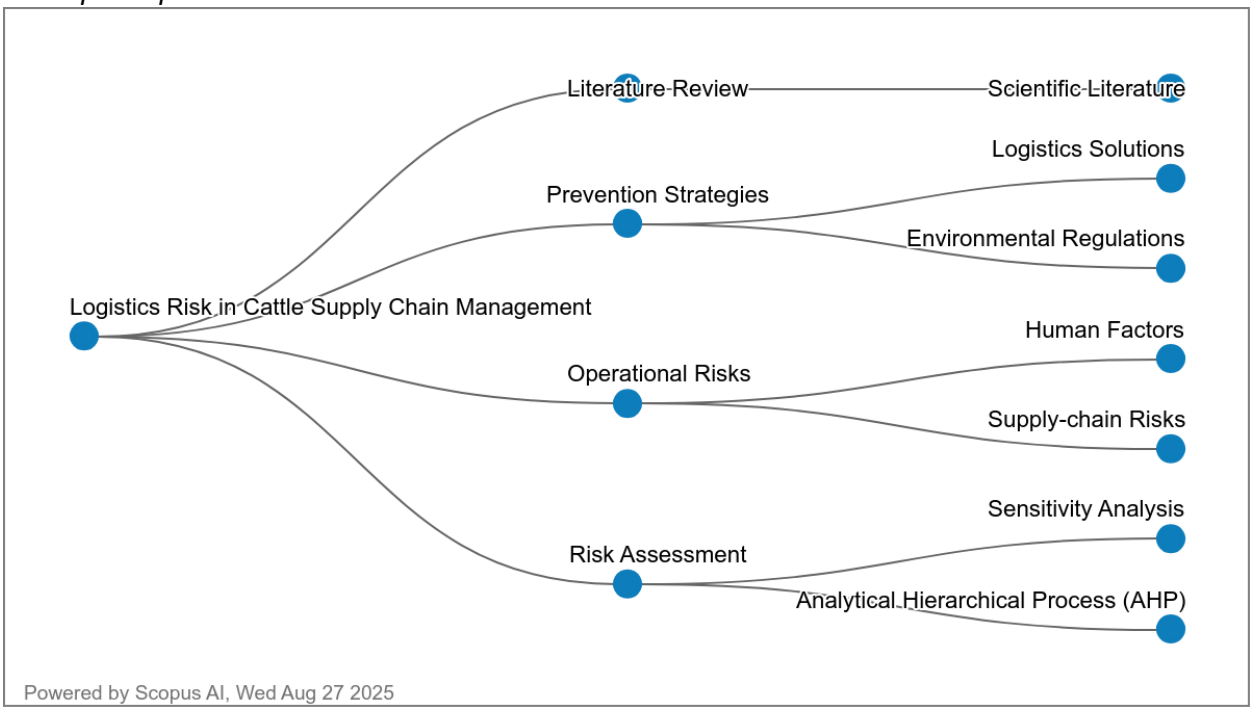

Figure 1: The concept map for logistics risk in cattle supply chain management

This concept map illustrates that logistics risk in cattle supply chain management is a multidimensional issue requiring theoretical and practical approaches. It begins with insights from scientific literature to build a solid knowledge base, followed by prevention strategies such as logistics solutions and adherence to environmental regulations to reduce disruptions

and compliance risks. At the operational level, risks stem from human factors like errors and training gaps and broader supply-chain risks such as feed shortages, transport delays, and market fluctuations. Finally, practical risk assessment is achieved through tools like sensitivity analysis, which tests the impact of variable changes, and the Analytical Hierarchical Process (AHP), which helps prioritize risks and select appropriate mitigation strategies. Together, these elements provide a comprehensive framework for identifying, analyzing, and managing logistics risks in the cattle supply chain.

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 documents for the topic by type?
4. What are the top 10 most-cited articles?
5. What are the top 10 countries based on several publications?
6. What are the popular keywords related to the study?
7. What is co-authorship based on countries' collaboration?

Methodology

Bibliometric analysis represents a quantitative method for evaluating scholarly productivity and identifying emerging patterns within specific research fields. Applying statistical techniques to collections of academic publications allows researchers to examine authorship trends, publication dynamics, and citation behaviors (Marvi & Foroudi, 2023). Over the years, its use has expanded considerably across areas such as business, management, and health sciences, mainly because of its ability to trace the historical development of knowledge and illustrate the evolving landscape of scientific inquiry (Öztürk et al., 2024; Koo & Lin, 2023; Lim et al., 2024).

The process generally consists of several stages, beginning with data extraction from major bibliographic databases like Scopus or Web of Science, followed by visualization and mapping through platforms such as VOSviewer and other bibliometric software (Lim et al., 2024; Hallinger & Kovačević, 2022; Foudah et al., 2024). Its versatility makes it applicable at different scales, ranging from macro-level analyses of entire disciplines to micro-level examinations of individual researchers' productivity and impact (Costas et al., 2010; Costas et al., 2009). The approach relies on multiple indicators categorized under dimensions such as research productivity, scholarly influence, and collaborative networks (Costas et al., 2010; Costas et al., 2009). These indicators are fundamental in detecting prevailing research themes, identifying gaps in the literature, and highlighting determinants of academic success (Costas et al., 2010; Siu et al., 2025).

Despite its advantages, bibliometric analysis also faces notable limitations, particularly concerning methodological rigor and consistency. The absence of standardized reporting practices raises concerns about reliability and comparability, especially in sensitive domains such as health and medical sciences, where precision is critical (Koo & Lin, 2023). Even so, bibliometric analysis continues to serve as an indispensable tool for tracking the development of academic fields, enabling evidence-based assessments, and shaping the strategic orientation of future research endeavors (Tomé, 2024; Mezquita et al., 2024; Zhang et al., 2018).

Data Search Strategy

The refined search strategy identified 271 documents in Scopus using the query: TITLE-ABS-KEY (logistics, risk, supply, chain, management, AND performance) AND PUBYEAR > 2019 AND PUBYEAR < 2026. This search was designed to capture publications produced between 2020 and 2025. The selected timeframe is particularly significant, as it encompasses the post-pandemic period during which global supply chains faced unprecedented disruptions, exposing critical vulnerabilities in logistics, risk management, and performance measurement. Within this window, scholarly interest intensified around themes such as supply chain resilience, digital transformation, and strategic adaptation to uncertainty, making it an essential period for understanding challenges and innovations shaping the logistics and supply chain management landscape.

Table 1
The Search String

Scopus	**TITLE-ABS-KEY (logistics AND risk AND supply AND chain AND management AND performance) AND PUBYEAR > 2019 AND PUBYEAR < 2026**

Data Analysis

VOSviewer

VOSviewer is a specialized software designed for constructing and visualizing bibliometric networks, including citation relationships, bibliographic coupling, co-citation, and co-authorship structures (Li & Wei, 2022; Van Eck & Waltman, 2009; van Eck & Waltman, 2010). Initially developed to support scientometric research, the tool has since become widely adopted in domain analyses due to its efficiency in processing complex bibliographic datasets. Its open-access availability and integration into platforms such as Digital Science's Dimensions have expanded its accessibility, allowing researchers to easily generate detailed co-authorship and citation network visualizations (Li & Wei, 2022; Van Eck & Waltman, 2009).

One of VOSviewer's notable strengths is its ability to produce advanced graphical representations of bibliometric maps, enabling the interpretation of large and intricate datasets clearly and intuitively (Van Eck & Waltman, 2009). Beyond network visualization, it incorporates text-mining functions that facilitate the construction of co-occurrence networks from terms extracted directly from publication content (Li & Wei, 2022). With the introduction of VOSviewer Online, these capabilities have been extended to interactive web-based platforms, thereby enhancing research dissemination and engagement (Li & Wei, 2022). The tool has demonstrated versatility across disciplines, including applications in tracking developments in lactic acid production (Cárdenas-Arias et al., 2023), analyzing multi-input transfer function systems, and exploring thematic trends in corporate governance and leadership.

Ease of use is another defining feature of VOSviewer, with its intuitive interface and user-friendly design accommodating both novice and experienced users (Van Eck & Waltman, 2009; Van Eck & Waltman, 2010). Its scalability enables the analysis of large datasets, such as co-citation maps involving up to 5,000 journals, while supporting a variety of bibliometric approaches, including co-authorship networks, keyword co-occurrence, and citation-based

analyses (Malmqvist et al., 2019; Sahu & Chakma, 2024; Hasan et al., 2024). Nevertheless, the reliability of results depends heavily on metadata quality. Incomplete or inconsistent metadata can distort findings, and improper data cleaning or disambiguation may lead to misinterpretation of visualizations (Li & Wei, 2022).

A distinctive methodological feature of VOSviewer is its use of the association strength (AS_{ij}) normalization technique for quantifying co-occurrence data:

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

This formula estimates the strength of association between items i and j by comparing the observed co-occurrence frequency with the expected frequency under independence. Such normalization ensures that the visualized connections represent meaningful relationships, enhancing bibliometric maps' validity and interpretability.

In summary, VOSviewer is a powerful and versatile tool in bibliometric research, combining strong visualization capabilities with analytical rigor and ease of use. While its broad adoption underscores its value across research domains, the accuracy of insights depends on careful data preparation and prudent interpretation. As bibliometric methodologies continue to advance, VOSviewer is likely to remain a central resource for uncovering patterns of scholarly communication and mapping research trends (Li & Wei, 2022; Van Eck & Waltman, 2009; Van Eck & Waltman, 2010; Malmqvist et al., 2019).

NotebookLM

NotebookLM is an emerging AI-driven research assistant developed by Google that supports the synthesis and interpretation of multiple sources, making it particularly valuable for academic research. This study, 50 abstracts were analyzed using NotebookLM, which systematically extracts dominant themes, recurring concepts, and theoretical foundations from the literature. This approach enables researchers to move beyond isolated article summaries and instead identify broader patterns, such as the persistent emphasis on managerial skills concerning business performance or the repeated focus on supply chain vulnerabilities within the livestock sector. By leveraging its clustering and synthesis capabilities, NotebookLM provides a structured basis for developing a comprehensive and evidence-driven discussion section that not only aligns with contemporary debates but also underscores the unique contribution of the present study.

Results

Document by Years

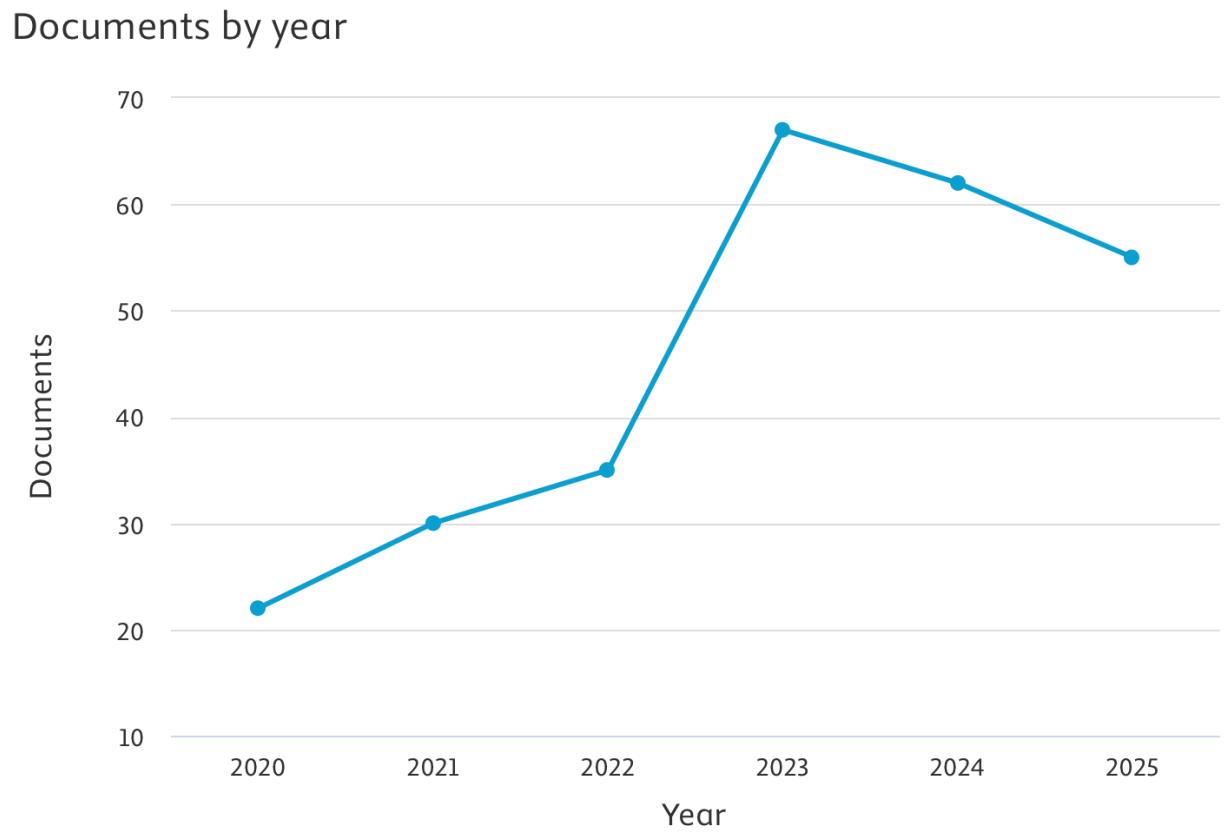

Figure 2: Document by year

Table 2
Document by year

Year	Documents
2025	55
2024	62
2023	67
2022	35
2021	30
2020	22

The annual publication trend from 2020 to 2025 highlights a clear growth trajectory and shifting scholarly attention. Beginning with 22 documents in 2020, the number of publications increased steadily, reaching 30 in 2021 and doubling to 67 in 2023. This sharp upward movement suggests a period of accelerated academic engagement, likely driven by the growing recognition of the field's importance and its relevance to broader societal, economic, and policy concerns. The peak observed in 2023 indicates that research interest reached its highest momentum, with scholars actively exploring diverse dimensions and contributing to consolidating knowledge in the area.

However, a noticeable decline followed in 2024 (62 documents) and 2025 (55 documents), even though the numbers remained significantly higher than in the earlier years. This downward trend may reflect a stage of maturity, where the field begins to stabilize after an initial phase of rapid expansion. Alternatively, it may signal a shift in research focus, with scholars branching into more specialized or interdisciplinary topics that are not fully captured within the same categorization. Such fluctuations are common in bibliometric analyses, as they demonstrate the dynamic nature of knowledge production. Overall, the data illustrate the remarkable growth between 2020 and 2023 and emphasize the need to sustain research momentum and adapt to evolving directions within the discipline.

Document by Subject Area

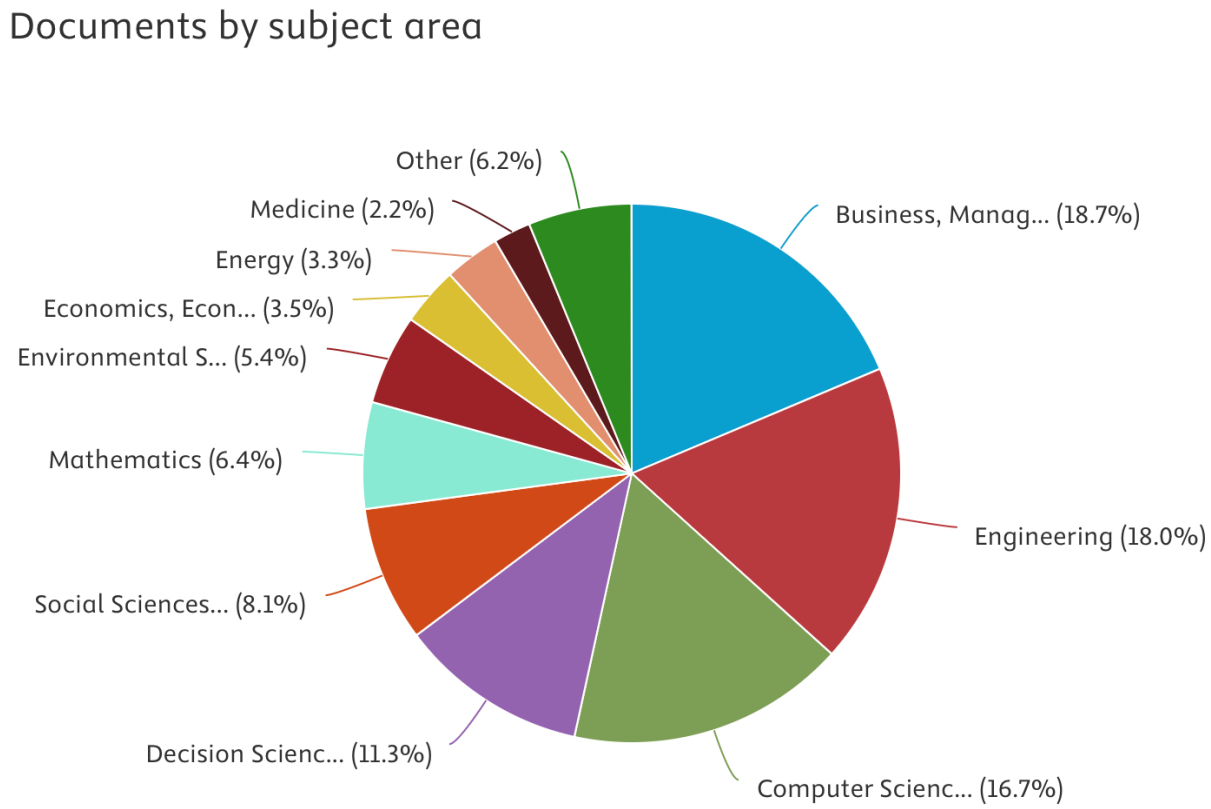

Figure 3: Document by Subject Area

Table 3
Document by Subject Area

Subject area	Documents
Business, Management and Accounting	117
Engineering	113
Computer Science	105
Decision Sciences	71
Social Sciences	51
Mathematics	40
Environmental Science	34
Economics, Econometrics and Finance	22
Energy	21
Medicine	14
Agricultural and Biological Sciences	9
Earth and Planetary Sciences	6
Chemical Engineering	5
Multidisciplinary	5
Arts and Humanities	3
Materials Science	3
Immunology and Microbiology	2
Psychology	2
Biochemistry, Genetics and Molecular Biology	1
Health Professions	1
Neuroscience	1
Physics and Astronomy	1

The distribution of publications across subject areas indicates that research within this domain is highly interdisciplinary, with the strongest representation in Business, Management and Accounting (117 documents), followed closely by Engineering (113 documents) and Computer Science (105 documents). This dominance suggests that much of the scholarly attention is focused on the field's organizational, technical, and digital aspects, highlighting the role of management strategies, engineering solutions, and computational tools in addressing contemporary challenges. Other significant subject categories include Decision Sciences (71 documents) and Social Sciences (51 documents), reinforcing the importance of decision-making frameworks, behavioral insights, and societal considerations in shaping the knowledge base.

Beyond these leading disciplines, contributions from Mathematics (40 documents), Environmental Science (34 documents), and Economics, Econometrics, and Finance (22

documents) demonstrate the integration of quantitative modeling, sustainability, and economic perspectives into the research landscape. Meanwhile, subject areas such as Agricultural and Biological Sciences (9 documents), Medicine (14 documents), and other smaller categories indicate niche but valuable contributions that enrich the field from specialized angles. The relatively lower presence in domains like Psychology, Biochemistry, Health Professions, and Physics underscores that while the research area is broadly interdisciplinary, it remains concentrated within applied sciences, management, and technology. Overall, the subject area distribution highlights a strong balance between managerial, technical, and scientific approaches, confirming the field's evolving and multi-faceted nature.

Document by Type

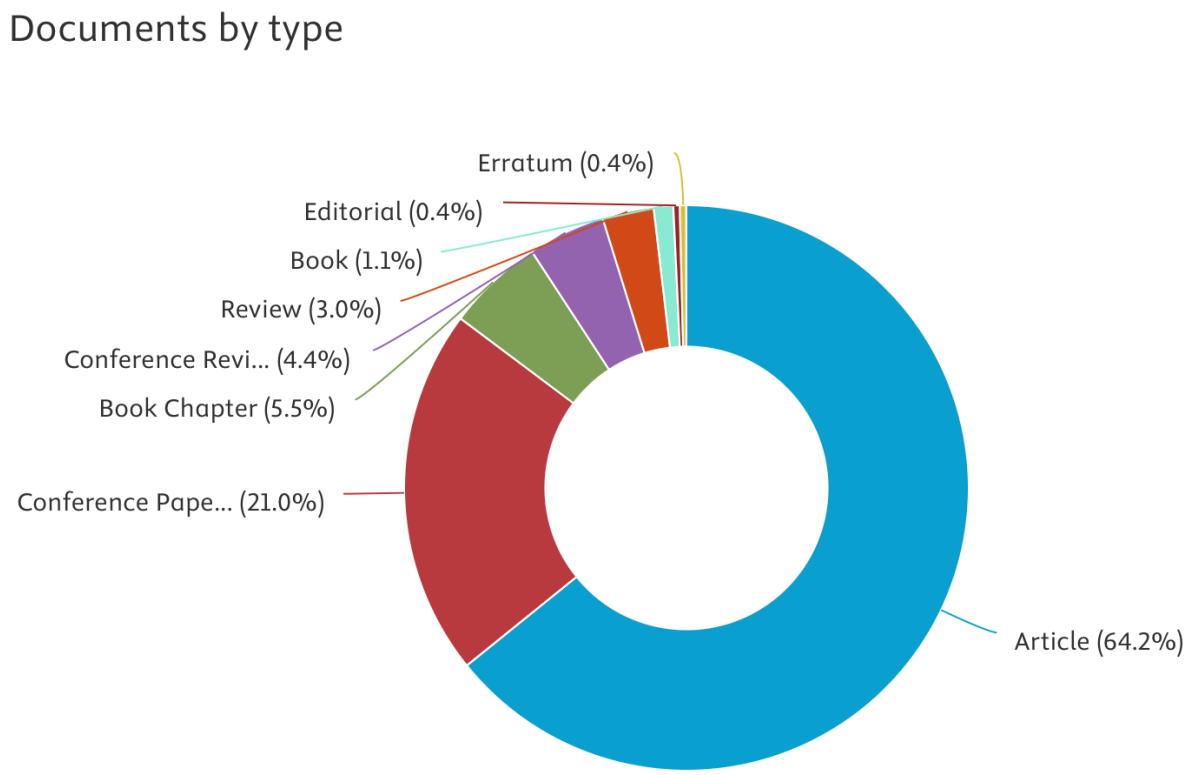

Figure 4: Document by Type

Table 4
Document by Type

Document type	Documents
Article	174
Conference Paper	57
Book Chapter	15
Conference Review	12
Review	8
Book	3
Editorial	1
Erratum	1

The analysis of document types shows that most contributions come in the form of journal articles (174 documents), which reflects the field's emphasis on peer-reviewed and rigorously validated knowledge production. Articles are often regarded as the primary medium for advancing theoretical, empirical, and methodological contributions, highlighting the maturity and academic credibility of the research domain. The second most common category is conference papers (57 documents), indicating that scholarly dialogue and the rapid dissemination of new findings through academic conferences also play a significant role. These two categories combined account for the bulk of knowledge output, emphasizing the dual importance of established journal publications and more experimental or preliminary conference work.

Other forms of publication, such as book chapters (15), conference reviews (12), and reviews (8), contribute supplementary perspectives that enrich the field through theoretical syntheses, literature overviews, and specialized discussions. Meanwhile, the presence of books (3), along with a small number of editorials (1) and errata (1), suggests that while less common, these formats add depth and breadth by addressing broader narratives, correcting inaccuracies, or setting agendas for future inquiry. The distribution indicates a firm reliance on journal articles as the core medium of scholarly communication, supported by conferences and selective book-based contributions that diversify and extend the field's intellectual reach.

The top 10 most cited authors

Authors	Title	Year	Cited by
Hohenstein N.-O.(Hohenstein, 2022)	Supply chain risk management in the COVID-19 pandemic: strategies and empirical lessons for improving global logistics service providers' performance	2022	112
Haghjoo N.; Tavakkoli-Moghaddam R.; Shahmoradi-Moghadam H.; Rahimi Y. (Haghjoo et al., 2020)	Reliable blood supply chain network design with facility disruption: A real-world application	2020	104
C.R V.; Sridharan R.; Gunasekaran A.; Ram Kumar P.N.(C.R et al., 2020)	Strategic capabilities for managing risks in supply chains: current state and research futurities	2020	38
Liu Y.; Ma L.; Liu Y.(Liu et al., 2021)	A novel robust fuzzy mean-UPM model for green closed-loop supply chain network design under distribution ambiguity	2021	47
Kumar A.; Mangla S.K.; Kumar P.; Song M. (Kumar et al., 2021)	Mitigate risks in perishable food supply chains: Learning from COVID-19	2021	193
Tadayonrad Y.; Ndiaye A.B.(Tadayonrad & Ndiaye, 2023)	A new key performance indicator model for demand forecasting in inventory management considering supply chain reliability and seasonality	2023	68
Esmizadeh Y.; Mellat Parast M. (Esmizadeh & Mellat Parast, 2021)	Logistics and supply chain network designs: incorporating competitive priorities and disruption risk management perspectives	2021	43

Kazancoglu Y.; Ozkan-Ozen Y.D.; Sagnak M.; Kazancoglu I.; Dora M. (Kazancoglu et al., 2023)	Framework for a sustainable supply chain to overcome risks in transition to a circular economy through Industry 4.0	2023	65
Gholizadeh H.; Fazlollahtabar H.; Khalilzadeh M.(Gholizadeh et al., 2020)	A robust fuzzy stochastic programming for sustainable procurement and logistics under hybrid uncertainty using big data	2020	113
Li L.; Gong Y.; Wang Z.; Liu S. (L. Li et al., 2023)	Big data and big disaster: a mechanism of supply chain risk management in global logistics industry	2023	57

The top ten most cited works related to logistics and supply chain risk provide important insights that can be adapted to the context of the cattle supply chain. Although these studies are not directly focused on livestock, they highlight risk factors, management frameworks, and technological approaches that are highly applicable to cattle logistics.

For instance, pandemic-related disruptions have reshaped how supply chains are managed. Hohenstein (2022) examined risk strategies during COVID-19 and demonstrated how logistics service providers improved resilience (112 citations), while Kumar et al. (2021) highlighted mitigation strategies in perishable food supply chains (193 citations). These insights are directly relevant to cattle supply chains, where live animals are highly perishable and vulnerable to transport delays, making resilience planning critical.

Other studies emphasize network design and facility disruptions. Haghjoo et al. (2020) explored reliable blood supply chain network design under facility disruption (104 citations), and Gholizadeh et al. (2020) proposed a fuzzy stochastic model for procurement and logistics under uncertainty (113 citations). Such frameworks can be extended to cattle supply chains, which face similar risks in slaughterhouses, quarantine facilities, and cold-chain distribution points.

Strategic and technological approaches also dominate the top-cited works. C.R. et al. (2020) reviewed strategic capabilities for risk management (38 citations), while Liu et al. (2021) advanced a robust green closed-loop supply chain model under uncertainty (47 citations). These perspectives underline the importance of managerial skills and sustainability in cattle supply chains, especially with increasing pressure for eco-friendly livestock logistics.

Meanwhile, the integration of big data and Industry 4.0 offers transformative opportunities. Kazancoglu et al. (2023) proposed a sustainable supply chain framework leveraging Industry 4.0 for circular economy transitions (65 citations), while Li et al. (2023) examined how big data analytics supports disaster-driven risk management in logistics (57 citations). These approaches could strengthen cattle logistics by enabling real-time tracking of animal health, transport conditions, and market demand.

Finally, risk measurement and forecasting remain crucial themes. Tadayonrad and Ndiaye (2023) introduced a novel KPI model for demand forecasting with reliability and seasonality considerations (68 citations), while Esmizadeh and Mellat Parast (2021) incorporated

disruption risk into supply chain network design (43 citations). In the cattle sector, these methods can improve feed supply planning, inventory control of live cattle, and disease outbreak management.

In summary, the most cited works are on logistics risk stress resilience, uncertainty management, digital innovation, and sustainability. Applying these principles to the cattle supply chain highlights the need for robust network design, biosecurity measures, accurate demand forecasting, and digital traceability. This provides a solid foundation for developing a tailored risk management framework for Malaysia's cattle industry.

Top 10 countries based on publication

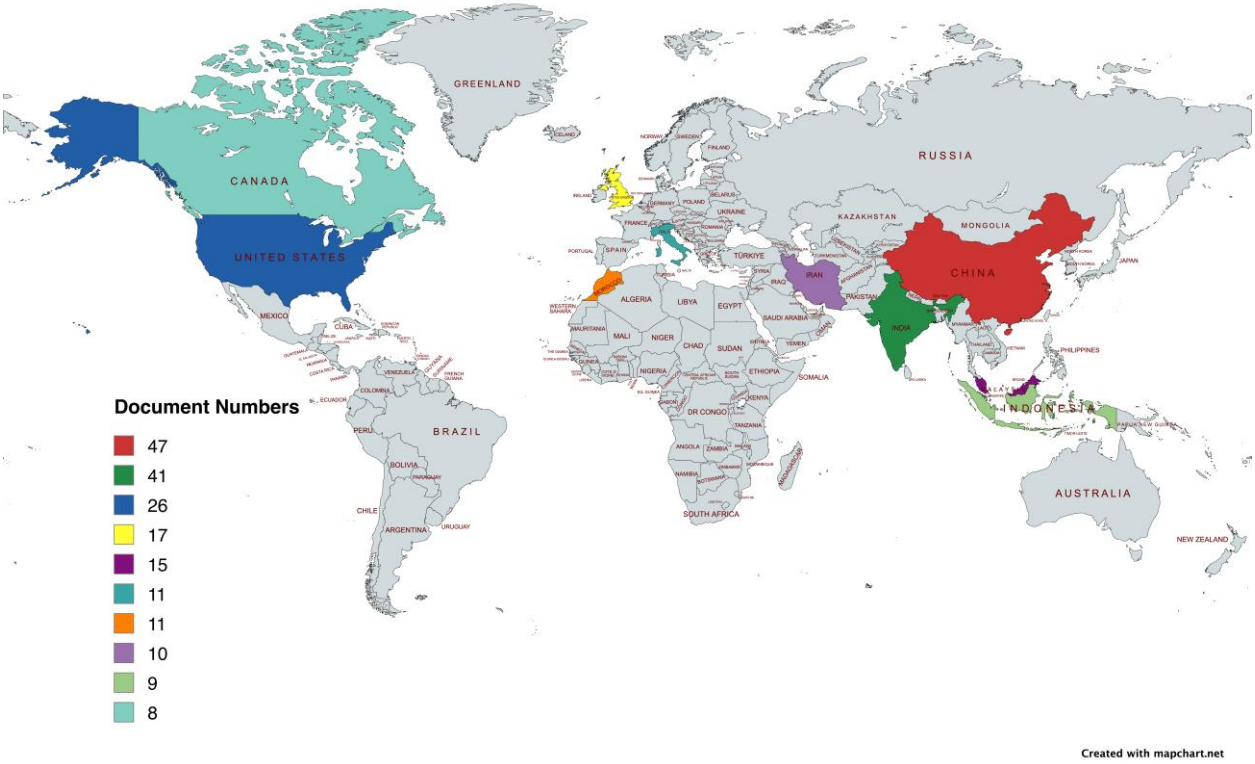

Figure 5: Top 10 countries based on publication

Table 6
Top 10 countries based on publication

Country/Territory	Documents
China	47
India	41
United States	26
United Kingdom	17
Malaysia	15
Italy	11
Morocco	11
Iran	10
Indonesia	9
Canada	8

The bibliometric analysis reveals that research on logistics risk within the cattle supply chain is dominated by contributions from Asian countries, particularly China (47 documents) and India (41 documents), which account for the largest share of publications. This strong representation may be attributed to the scale of their livestock industries, increasing demand for beef and dairy, and government emphasis on improving food security through advanced supply chain management.

In contrast, Western nations such as the United States (26 documents) and the United Kingdom (17 documents) also play a significant role, contributing through theoretical advancements, risk management frameworks, and technology integration in agri-food logistics. Among developing nations, Malaysia (15 documents), Morocco (11 documents), Iran (10 documents), and Indonesia (9 documents) stand out, reflecting growing regional concerns about supply chain vulnerabilities, particularly in halal food systems, disease management, and import dependency. Meanwhile, Italy (11 documents) and Canada (8 documents) contribute research primarily focused on sustainability, animal welfare, and cold-chain logistics.

Overall, the geographical distribution indicates that logistics risk in livestock supply chains is a global research priority, but with varying emphases: Asian countries focus on production and food security, Western countries on frameworks and innovation, and Muslim-majority nations such as Malaysia, Morocco, and Iran on halal integrity and disease-related risks. This suggests opportunities for cross-country knowledge transfer, particularly for Malaysia, to adapt lessons from larger livestock economies while addressing its unique challenges of scale, halal compliance, and biosecurity.

Popular keywords related to this study

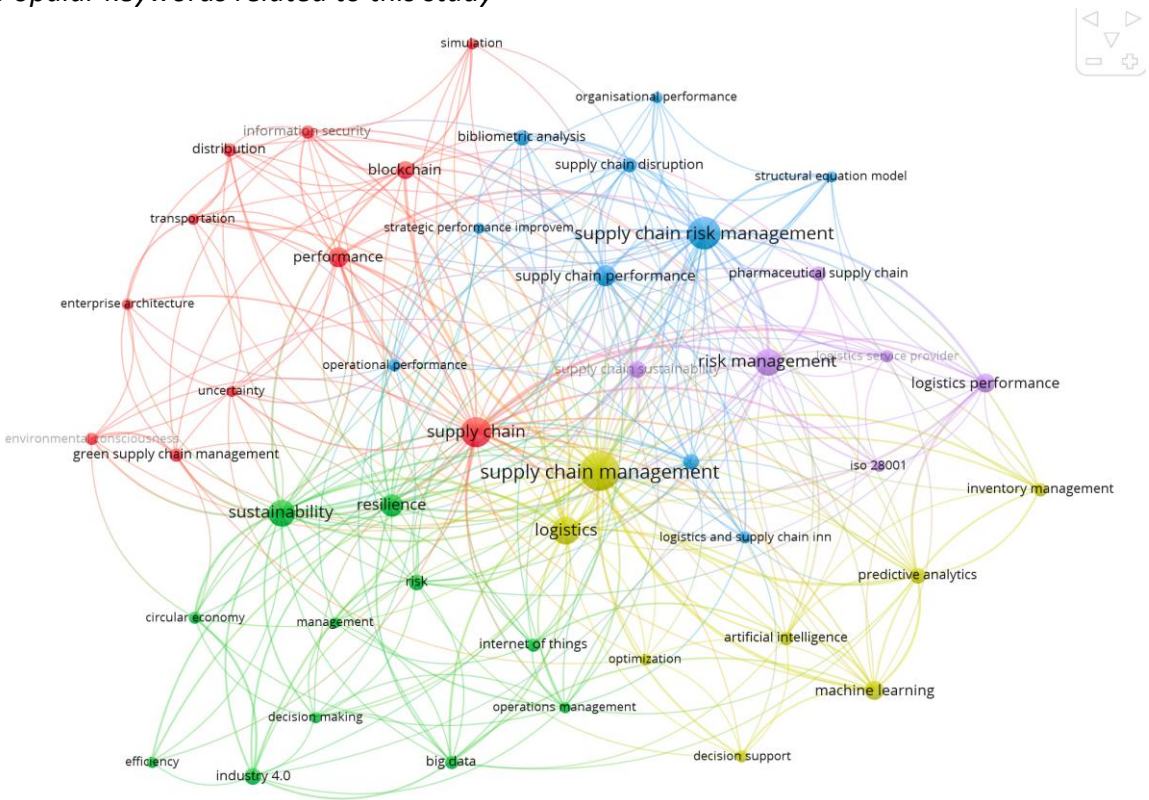

Figure 6: Popular keywords related to this study

Based on the author keywords, this VOSviewer map illustrates a research landscape focused on modern, technology-driven supply chain management. The central, most connected themes are "supply chain management," "performance," and "risk management," forming a core concern for improving efficiency and resilience. This central focus then branches out into several key clusters: one emphasizes performance measurement (e.g., operational, logistical, strategic performance), another tackles risk and resilience (e.g., disruption, uncertainty, ISO 28001 standards), while others highlight sustainability (green supply chain, circular economy) and the adoption of advanced technologies (AI, IoT, blockchain, predictive analytics) for optimization and decision-making.

The presence of "simulation," "structural equation model," and "optimization" points to a strong methodological trend, showing researchers rely on modeling to understand this complex system. Overall, the map reveals a field that is no longer just about logistics but is increasingly defined by its response to disruption, its pursuit of sustainability, and its integration of cutting-edge Industry 4.0 technologies to build smarter, more robust supply chains.

Co-authorship based on countries' collaboration

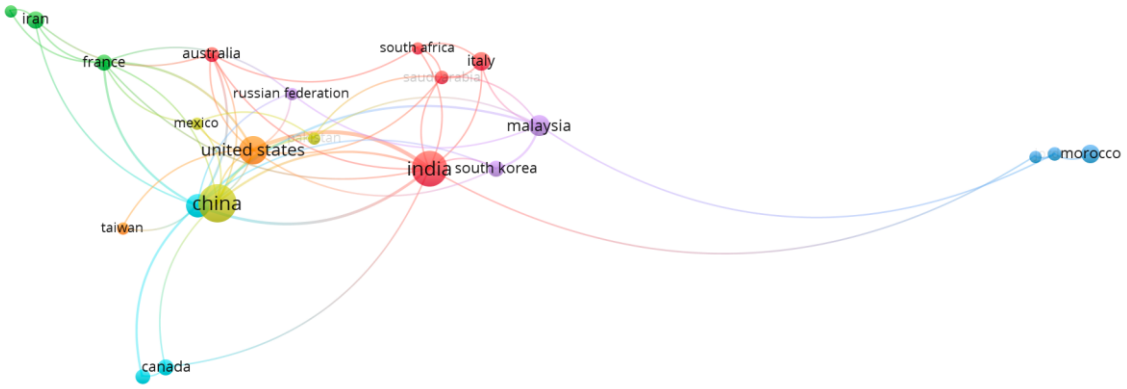

Figure 7: Co-authorship based on countries' collaboration.

The network visualization illustrates the interconnections among countries, with each node representing a nation and the connecting lines denoting collaborative links. The size of the nodes reflects their centrality and level of influence within the network, where China, India, and the United States emerge as dominant hubs due to their extensive connections with multiple partners. Different colors highlight distinct clusters or communities, suggesting regional or thematic groupings in which countries are more closely linked. For instance, China demonstrates strong linkages with the United States, Canada, and Taiwan, whereas India shows significant ties with South Korea, Malaysia, Italy, and South Africa. In contrast, peripheral nodes such as Morocco indicate limited connections, forming smaller, more isolated clusters. Overall, the visualization underscores the pivotal role of major countries in

facilitating cross-national interactions, while also revealing disparities in connectivity across the global network.

Discussion

Considering the extensive research on logistics risk in supply chain management, a key decision for organizations is to proactively adopt an integrated, adaptive, and technology-driven supply chain risk management (SCRM) strategy to enhance resilience and maintain competitiveness in dynamic and uncertain environments. The severe impact of events like the COVID-19 pandemic has underscored the critical need for robust and agile SCRM systems.

The sources highlight that supply chains face numerous challenges, including vulnerabilities from globalization and complexity, geopolitical tensions, economic uncertainty, and natural catastrophes. Operational risks such as inefficiencies in transport, inventory management, and delivery performance are persistent. Furthermore, the increasing reliance on digital technologies introduces risks like cybersecurity breaches and information fraud. At the same time, environmental concerns related to carbon emissions and the transition to a circular economy add further complexity.

Organizations should prioritize developing strategic capabilities such as resilience, robustness, agility, adaptability, flexibility, and responsiveness to mitigate these risks effectively. Learning from past experiences and reconfiguring SCRM designs in response to acute disruptions is crucial. Strong relationship management, trust with supply chain partners, and deep supply chain integration are vital for collaborative risk management and improving overall performance. Moreover, adopting innovative practices and digital technologies, including big data analytics, artificial intelligence, and smart logistics, can significantly enhance visibility, transparency, forecasting accuracy, and operational efficiency, mitigating risks and boosting performance. Focusing on strategic risk management capabilities over purely operational ones has also positively impacted supply chain performance and customer relationships. Implementing structured approaches like the ISO 28001 standard for security risk assessment and utilizing frameworks like the D.L.A.R.C.S. paradigm for third-party logistics provider selection can further strengthen risk management processes. Therefore, the overarching decision for managers is to invest in a comprehensive SCRM framework that emphasizes collaboration, continuous adaptation, and technological leverage to build resilient, efficient, and high-performing supply chains capable of navigating future disruptions.

Conclusion

This study aimed to examine research productivity, thematic directions, and scholarly collaboration on logistics risk and supply chain management performance, with a particular interest in insights relevant to the cattle supply chain in Malaysia. By applying bibliometric techniques, the study sought to answer questions concerning publication trends, subject area distribution, document types, citation impact, country contributions, keyword patterns, and collaborative networks.

The analysis revealed a notable increase in publications between 2020 and 2023, reflecting heightened academic attention during the post-pandemic period when supply chain vulnerabilities became more visible. Business, management, and engineering emerged as

dominant subject areas, supported by substantial contributions from computer science and decision sciences, indicating that this research domain is characterized by strong interdisciplinarity. Journal articles formed most outputs, underscoring the importance of peer-reviewed dissemination. Highly cited works emphasized resilience, risk mitigation, technological adoption, and sustainability, all of which resonate with the challenges of the cattle supply chain. Geographically, Asia, particularly China and India, led publication output, while countries such as Malaysia contributed meaningfully to areas tied to halal assurance and livestock management. Popular keywords highlighted a growing emphasis on digitalization, resilience strategies, and sustainable practices, while co-authorship patterns confirmed the influence of global academic hubs in shaping collaborative networks.

This study contributes to the field by providing a consolidated view of knowledge production around logistics risk and supply chain performance. It identifies emerging themes such as integrating Industry 4.0 technologies, circular economy considerations, and advanced risk management frameworks that can guide further exploration. For practitioners, the findings underscore the importance of adopting resilience-oriented strategies, improving data-driven decision-making, and investing in sustainable practices to enhance supply chain reliability.

However, limitations must be acknowledged. The analysis was based on publications indexed in a single database, which may not fully capture contributions from other sources. In addition, bibliometric indicators reflect patterns of scholarly communication but do not provide a detailed qualitative assessment of research content. Future studies may expand by incorporating multiple databases, applying advanced text-mining approaches, or conducting systematic reviews that complement bibliometric mapping.

Overall, this study demonstrates the value of bibliometric analysis in understanding the evolution of research on logistics risk and supply chain performance. Tracing knowledge flows, identifying key contributors, and highlighting thematic priorities not only strengthen the academic foundation of the field but also provide actionable insights for policy and practice. The significance of this research lies in its ability to guide future inquiry, inform practical strategies, and promote resilient and sustainable supply chain systems in diverse contexts, including the cattle industry in Malaysia.

Acknowledgement
The authors would like to express their sincere appreciation to Universiti Islam Antarabangsa Tuanku Syed Sirajuddin (UniSIRAJ) for their continuous support and encouragement in this study. The authors are also grateful to colleagues and respondents who generously contributed their time, insights, and cooperation, which greatly assisted in completing this research.

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