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(JISTM)**www.gaexcellence.com/jistm**RESEARCH LANDSCAPE OF SUPPLY CHAIN RISKS IN
CONSTRUCTION: A BIBLIOMETRIC REVIEW**Muhamad Norsyafiq Muhamad Nazri¹, Ahmad Shabudin Ariffin^{2*},¹Faculty of Business and Management Science, Universiti Islam Antarabangsa Tuanku Syed Sirajuddin (UniSIRAJ), Perlis muhamadnorsyafiq@gmail.com <https://orcid.org/0009-0004-0678-6160>²Faculty of Business and Management Science, Universiti Islam Antarabangsa Tuanku Syed Sirajuddin (UniSIRAJ), Perlis shabudin@unisiraj.edu.my <https://orcid.org/0000-0003-0288-8931>

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Abstract:

The increasing complexity of global construction activities has intensified exposure to supply chain disruptions, creating significant challenges related to procurement, logistics, infrastructure vulnerability, and project sustainability. Despite the growing importance of supply chain risk management in the construction industry, existing studies remain fragmented, with limited understanding of the intellectual structure, research evolution, and emerging thematic trends within this domain. Therefore, this study aims to systematically analyse the research landscape of supply chain risks in the construction industry through a comprehensive bibliometric approach. Data were collected from the Scopus database using an advanced search strategy based on three primary keyword groups: supply chain, risk, and construction industry. Following the screening and refinement process, a total of 76 relevant publications were selected for analysis. The collected bibliographic data were subsequently analysed using the Scopus Analyzer to evaluate publication trends, citation structures, leading countries, influential articles, and source titles. To improve data consistency and reliability, OpenRefine was utilized for data cleaning and harmonization, while VOSviewer was employed to construct visualization networks for keyword co-occurrence and thematic mapping. The findings reveal a significant increase in publication output after 2019, indicating growing scholarly attention toward construction supply chain resilience, infrastructure vulnerability, and sustainability-related risks. The United States, China, and the United Kingdom emerged as the leading contributors to the field, while keyword analysis identified “supply chain management,” “critical infrastructure,” and “vulnerability” as dominant research themes. The study contributes to the body of knowledge by providing a structured overview of the research domain, identifying emerging research directions, and offering valuable insights for

researchers and industry practitioners seeking to strengthen supply chain resilience and risk management strategies in the construction sector.

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Bibliometric Analysis; Construction Supply Chain; Construction Industry; Supply Chain Resilience; Research Landscape; Risk Management; Sustainable Construction; Supply Chain Risk



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Introduction

The construction industry, a cornerstone of global economic development, is characterized by its intricate supply chains and the involvement of a diverse array of stakeholders, including contractors, subcontractors, suppliers, and clients. This sector's reliance on complex, project-based supply networks render it particularly susceptible to a multitude of risks that can disrupt project delivery, inflate costs, and compromise quality. In recent years, the volatility of global markets, the increasing frequency of geopolitical events, and the intensification of climate-related disruptions have amplified the exposure of construction supply chains to both predictable and unforeseen risks. The COVID-19 pandemic, for instance, exposed vulnerabilities in labour availability, material procurement, and logistics, while ongoing geopolitical tensions and climate change have further complicated the risk landscape, especially in developing economies where resource constraints and institutional fragility are more pronounced (Al-Mhdawi, Brito, Abdul Nabi, et al., 2022; Althaqafi, 2025; Furrer et al., 2022; Kadan & Wium, 2024; Nandan, 2025).

A substantial body of literature has emerged to identify and categorize the risks inherent in construction supply chains. These risks are broadly classified into internal and external categories. Internal risks typically encompass issues such as poor communication, inadequate planning, cash flow problems, and negative attitudes towards supply chain management among subcontractors. External risks, on the other hand, include currency fluctuations, adverse climate conditions, political instability, and market volatility. The literature further distinguishes operational risks such as supply, process, and demand-side risks and highlights the critical role of stakeholder-associated risks that span the entire project lifecycle, from design and tendering to installation and maintenance (Czajkowska & Ingaldi, 2025; Deng et al., 2025; Koc & Gurgun, 2021; Shahbaz et al., 2020; Wang et al., 2008). Quantitative models and risk

assessment tools, including the Analytical Hierarchical Process (AHP), Failure Mode Effect Analysis (FMEA), and simulation-based approaches, have been developed to systematically evaluate these risks and their impacts on project outcomes such as cost, schedule, and performance (Dvaipayana et al., 2024; Wang et al., 2008). Despite these advances, the fragmented nature of construction projects and the prevalence of informal risk management practices—especially among small and medium-sized enterprises (SMEs) continue to challenge the effective implementation of these frameworks (Pham et al., 2023; Soykan & Rabadi, 2025).

Recent global events have introduced new risk factors and exacerbated existing vulnerabilities within construction supply chains. The COVID-19 pandemic, for example, led to widespread supply chain disruptions, contract disputes, and financial instability, particularly in developing countries where adaptive resource planning and stakeholder coordination were often lacking (Al-Mhdawi, Brito, Abdul Nabi, et al., 2022; Al-Mhdawi, Brito, Onggo, et al., 2022; Furrer et al., 2022; Nandan, 2025). Geopolitical conflicts, such as the Russia-Ukraine war, have resulted in material shortages, price volatility, and logistical bottlenecks, further straining supply chain resilience (Chang et al., 2025; Rasshyvalov et al., 2024). Climate change and extreme weather events have also emerged as critical external risks, disrupting manufacturing, inventory management, and transportation. In response, the literature has increasingly focused on the integration of digital technologies such as real-time monitoring systems, artificial intelligence (AI), and blockchain to enhance transparency, facilitate rapid information sharing, and enable dynamic risk mitigation strategies (Arar & Halicioglu, 2025; Tian et al., 2025). However, the adoption of these technologies is not without challenges, including concerns over data quality, cybersecurity, and the need for workforce upskilling.

In conclusion, the synthesis of current research underscores the multifaceted and evolving nature of supply chain risks in the construction industry. While significant progress has been made in risk identification and assessment, notable gaps persist in the areas of risk treatment, monitoring, and the practical application of advanced digital tools particularly for SMEs and in low-income settings (Pham et al., 2023; Ting et al., 2020). The literature highlights the importance of strengthening inter-organizational trust, fostering long-term stakeholder relationships, and developing comprehensive, technology-enhanced risk management frameworks that are tailored to the unique characteristics of construction projects. Bridging the divide between academic theory and industry practice, and addressing the specific vulnerabilities of different stakeholder groups, will be essential for advancing supply chain resilience and ensuring the sustainable delivery of construction projects in an increasingly uncertain global environment (Halicki & Uphaus, 2025; Pham et al., 2023; Ting et al., 2020).

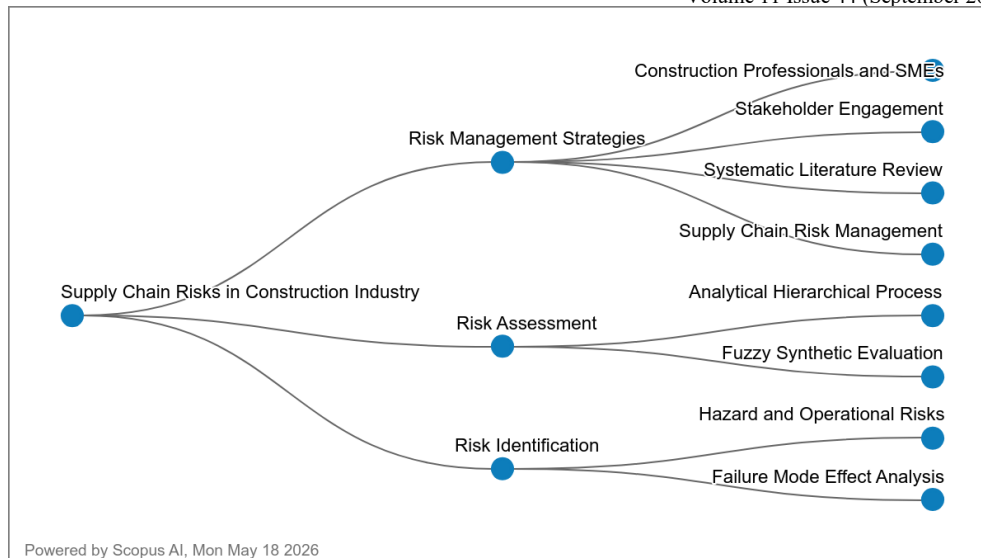


Figure 1: Concept Map of Analysing Supply Chain Risks in The Construction Industry

Figure 1 presents a concept map of the literature review on analysing supply chain risks in the construction industry, highlighting three major thematic areas: risk management strategies, risk assessment, and risk identification. The map shows that risk management strategies are closely associated with stakeholder engagement, systematic literature review approaches, supply chain risk management practices, and the involvement of construction professionals and SMEs in mitigating supply chain disruptions. Meanwhile, risk assessment is strongly linked to decision-making and evaluation tools such as the Analytical Hierarchical Process (AHP) and Fuzzy Synthetic Evaluation methods, which are commonly used to prioritize and analyse risks. In addition, risk identification focuses on hazard and operational risks as well as Failure Mode Effect Analysis (FMEA) techniques to identify potential weaknesses within construction supply chains. Overall, the concept map demonstrates that effective supply chain risk management in the construction industry requires an integrated approach combining systematic risk identification, quantitative risk assessment methods, and strategic stakeholder-driven management practices to improve project resilience and operational sustainability.

Research Question

This study was guided by five key research questions designed to explore the intellectual structure and development of research on supply chain risks in construction. RQ1 examines the publication trend over the years to understand how scholarly interest in this field has evolved and fluctuated over time. RQ2 focuses on the ten most frequently cited articles to highlight influential works that have made substantial academic and practical impact. RQ3 analyses the top ten countries based on the number of publications, providing insights into global research distribution and the region's most actively engaged in supply chain risks in construction analysis. Finally, RQ4 investigates the most frequently used author keywords to reveal the major themes, concepts, and emerging topics that define the current research landscape in this domain.

RQ1: What is the publication trend of research in this field over the years?

RQ2: Which studies represent the ten most frequently cited articles?

RQ3: Which countries rank among the top ten based on their number of publications?

RQ4: Which author keywords are most frequently associated with research in this area?

Methodology

Bibliometric analysis refers to the systematic collection, organization, and evaluation of bibliographic information derived from scientific publications (Alves et al., 2021; Assyakur & Rosa, 2022; Verbeek et al., 2002). In addition to conventional descriptive assessments, such as identifying prominent journals, publication years, and influential authors (Wu & Wu, 2017), bibliometric studies also employ advanced analytical approaches, including document co-citation analysis, to explore intellectual structures and research relationships within a field. An effective literature review requires a rigorous and iterative methodology involving the identification of appropriate keywords, comprehensive database searching, and critical evaluation of the retrieved literature. Such a process facilitates the development of a robust bibliographic dataset and enhances the reliability and validity of the research outcomes (Fahimnia et al., 2015). Accordingly, this study emphasized high-impact scholarly publications, as these sources offer substantial insights into the theoretical and conceptual foundations underpinning the research domain. To ensure the reliability and accuracy of the dataset, Scopus was utilized as the principal database for data retrieval (Al-Khoury et al., 2022; di Stefano et al., 2010; Khiste & Paithankar, 2017). Furthermore, to preserve the academic quality and integrity of the analysis, only peer-reviewed journal articles were included, while books, conference notes, and lecture materials were intentionally excluded (Gu et al., 2019). Due to its extensive multidisciplinary coverage and comprehensive indexing capabilities, publications indexed in Scopus between 2000 and May 2026 were selected for subsequent bibliometric analysis.

Data Searching

The bibliometric data for this study were retrieved from the Scopus database using a structured and systematic search strategy to ensure comprehensive coverage of literature related to supply chain risks within the construction domain. The search query was developed by combining three major thematic groups using Boolean operators. The first group focused on supply chain-related terms, including “supply chain,” “supply chain management,” “logistics,” “procurement,” and “distribution.” The second group represented risk-related concepts such as “risk,” “risks,” “uncertainty,” “vulnerability,” “threat,” and “hazard.” The third group targeted the construction context through terms including “construction industry,” “construction sector,” “building industry,” “infrastructure,” and “civil engineering.” The search was restricted to article titles using the TITLE function to improve the relevance and specificity of the retrieved documents (show in **Table 1**). Furthermore, the search was limited to publications written in English and documents with a publication stage categorized as “final” to ensure consistency, accessibility, and quality of the selected literature. The initial search process identified a total of 77 documents from the Scopus database. Subsequently, refinement criteria were applied to exclude records that did not meet the predefined inclusion requirements. Specifically, filters restricting in **Table 2** shown dataset to English-language publications and documents in the final publication stage were implemented. After the screening and filtering process, one document was excluded, resulting in a final dataset of 76 publications for bibliometric analysis.

Table 1: The Searching String

SCOPUS	TITLE ((“supply chain” OR “supply chain management” OR “logistics” OR “procurement” OR “distribution”) AND (“risk” OR “risks” OR “uncertainty” OR “vulnerability” OR “threat” OR “hazard”) AND (“construction industry” OR “construction sector” OR “building industry” OR “infrastructure” OR “civil engineering”)) AND (LIMIT-TO (LANGUAGE , “English”)) AND (LIMIT-TO (PUBSTAGE , “final”)) Date of excess: Jun 2026
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Table 2: The Selection Criterion In Searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Publication stage	Final	In Press

Data Analysis

VOSviewer is a widely recognized bibliometric analysis tool developed by Nees Jan van Eck and Ludo Waltman at Leiden University (van Eck & Waltman, 2010, 2017). The software is extensively employed for the visualization and exploration of scientific literature through advanced network mapping and clustering techniques. Its capabilities include the analysis of co-authorship, co-citation, and keyword co-occurrence networks, enabling researchers to systematically identify intellectual structures, research collaborations, and emerging thematic trends within a specific domain. In addition to generating network visualizations and density maps, VOSviewer provides customizable analytical features and interactive interfaces that facilitate the efficient interpretation of large-scale bibliometric datasets. The software's compatibility with multiple bibliographic data sources, combined with its continuous methodological improvements, has established VOSviewer as an essential tool for conducting comprehensive bibliometric and scientometric investigations.

In this study, bibliographic datasets containing information related to publication year, article title, author name, journal source, citation data, and keywords were extracted from the Scopus database in PlainText format, covering publications from 2000 to May 2026. The retrieved data were subsequently analyzed using VOSviewer version 1.6.20 to perform clustering, mapping, and network visualization analyses. Through the implementation of the Visualization of Similarities (VOS) mapping technique, the software enabled the construction of low-dimensional bibliometric maps in which the spatial distance between items accurately represents the degree of relatedness and similarity among them (van Eck & Waltman, 2010). Although conceptually comparable to the Multidimensional Scaling (MDS) approach (Appio et al., 2014), VOSviewer differs in its normalization procedure by applying a more suitable co-occurrence normalization technique, namely association strength (AS_{ij}), rather than relying solely on similarity measures such as cosine and Jaccard indices in **Equation 1** (Van Eck & Waltman, 2007). This methodological advantage enhances the reliability and interpretability of bibliometric network structures and thematic relationships within the analyzed research field.

$$AS_{ij} = \frac{C_{ij}}{w_i w_j} \quad \text{Eq (1)}$$

Which is “proportional to the ratio between on the one hand the observed number of cooccurrences of i and j and on the other hand the expected number of co-occurrences of i and j under the assumption that co-occurrences of i and j are statistically independent” (Van Eck & Waltman, 2007).

Result And Discussion

The results and discussion section presents the bibliometric findings related to supply chain risks in the construction industry based on four primary research questions. The analysis examines the publication trends over time, identifies the most influential and highly cited studies, evaluates the leading countries contributing to this research domain, and explores the most frequently occurring author keywords. These analyses collectively provide insights into the development, intellectual structure, and emerging thematic directions within the field.

What Is the Publication Trend of Research in This Field Over the Year?

Figure 2 show the publication trend on “Supply Chain Risks in the Construction Industry” from 2000 to 2026 demonstrates a highly uneven but overall upward trajectory in research output. In the early period (2000–2007), scholarly activity was extremely limited, with several years recording zero publications and only isolated outputs (1 document in 2000 and 2002, and none between 2003 and 2007). This indicates that the topic was still in its formative stage, with limited academic consolidation and low interdisciplinary integration between supply chain management and construction risk studies. A gradual emergence begins from 2008 to 2015, where publication output remains modest but more consistent (1–2 documents per year), suggesting initial recognition of supply chain risk as an emerging research niche within construction management literature. However, the overall contribution during this phase remains marginal, reflecting limited methodological development, fragmented research interest, and the absence of major global disruptions that would otherwise accelerate scholarly attention.

A significant acceleration is observed from 2019 onwards, marking a clear transition into a mature and rapidly expanding research domain. Publications increase sharply from 5 documents in 2019 and 2020 to 9 in 2021, with sustained high output in subsequent years, peaking at 11 documents in 2025. This growth can be attributed to several reinforcing global and disciplinary drivers, including the increasing complexity and globalization of construction supply chains, heightened awareness of risk management practices, and major disruptive events such as the COVID-19 pandemic, which exposed critical vulnerabilities in global supply networks. Additionally, advancements in digital technologies, such as Building Information Modelling (BIM), Industry 4.0, and data-driven risk analytics, have further stimulated academic interest in supply chain resilience within construction systems. The slight decline observed in 2026 (6 documents) likely reflects partial-year indexing limitations or publication lag rather than a true decline in research interest. Overall, the trend confirms that the field has transitioned from an exploratory phase to a highly active and rapidly evolving research frontier.

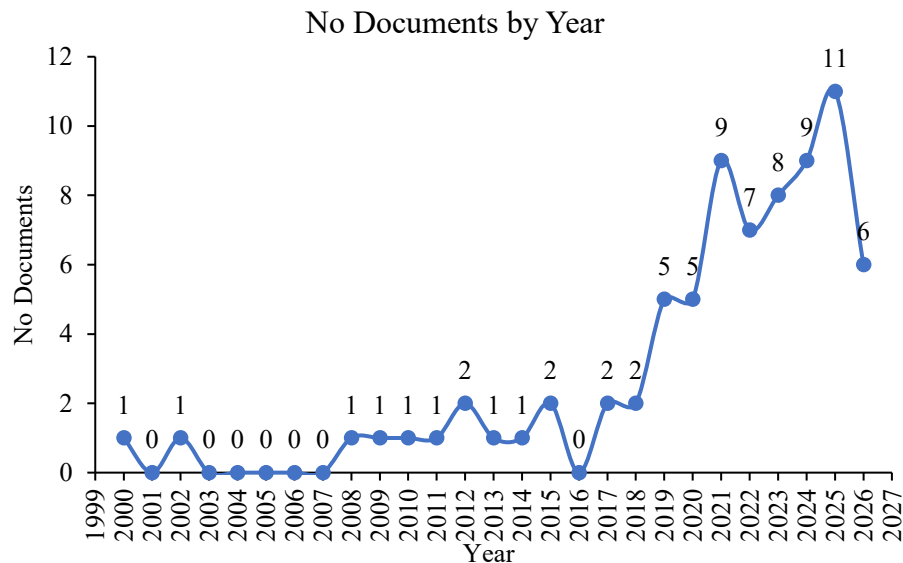


Figure 2: Trend Of Research in Supply Chain Risks in the Construction Industry.

Which Studies Represent the Ten Most Frequently Cited Articles?

The most cited articles in the dataset reveal that research on supply chain risks in construction is strongly anchored in infrastructure vulnerability, risk management frameworks, and multi-hazard system resilience show in **Table 3**. The highest-cited work by Aloini et al. (2012), with 126 citations, highlights supply chain management implementation risks in construction, indicating that early foundational studies focusing on conceptual and managerial risk frameworks have had the greatest long-term academic impact. Similarly, earlier works such as Ezell et al. (2000) and Larsson & Field (2002) remain highly cited, reflecting their pioneering contribution in establishing risk analysis methodologies within infrastructure and occupational safety contexts. These studies gained sustained citation influence due to their foundational nature, methodological originality, and continued relevance as baseline references for later research. The dominance of journals such as Safety Science, Journal of Infrastructure Systems, and Business Process Management Journal further indicates that high-impact citations are concentrated in interdisciplinary outlets bridging construction management, engineering systems, and safety science.

More recent highly cited articles (2019–2024) demonstrate a clear shift toward complex systemic risks, including cyber-physical vulnerabilities, climate-related disruptions, and global supply chain interdependencies. For example, studies such as Oughton et al. (2019) and Verschuur et al. (2023) focus on stochastic risk modeling and multi-hazard impacts on infrastructure networks, reflecting increasing methodological sophistication and data-driven approaches. The emergence of COVID-19-related supply chain risk research (Radanliev et al., 2021) also explains heightened citation activity, as pandemic disruptions significantly intensified academic and practical attention toward supply chain resilience. Furthermore, highly cited recent works emphasize infrastructure interconnectivity (power, water, ports) and sustainability-driven innovation risks, indicating a broadening of the field beyond traditional construction boundaries. Overall, citation patterns suggest that early conceptual studies dominate long-term citation accumulation, while recent works gain rapid citations due to their relevance to global disruptions and evolving risk landscapes.

Table 3: Most cited Articles

No	Authors	Title	Year	Source title	Cited by
1	Aloini et al., (2012)	Supply chain management: A review of implementation risks in the construction industry	2012	Business Process Management Journal	126
2	Larsson & Field, (2002)	The distribution of occupational injury risks in the Victorian construction industry	2002	Safety Science	95
3	Verschuur et al., (2023)	Multi-hazard risk to global port infrastructure and resulting trade and logistics losses	2023	Communications Earth and Environment	78
4	Ezell et al., (2000)	Infrastructure risk analysis of municipal water distribution system	2000	Journal of Infrastructure Systems	66
5	Sun et al., (2023)	Water transfer infrastructure buffers water scarcity risks to supply chains	2023	Water Research	49
6	Oughton et al., (2019)	Stochastic Counterfactual Risk Analysis for the Vulnerability Assessment of Cyber-Physical Attacks on Electricity Distribution Infrastructure Networks	2019	Risk Analysis	47
7	Radanliev et al., (2021)	The ethics of shared Covid-19 risks: an epistemological framework for ethical health technology assessment of risk in vaccine supply chain infrastructures	2021	Health and Technology	42
8	Lee & Ham, (2021)	Probabilistic framework for assessing the vulnerability of power distribution infrastructures under extreme wind conditions	2021	Sustainable Cities and Society	41
9	Nocera et al., (2024)	Risk analysis of supply chains: The role of supporting structures and infrastructure	2024	Reliability Engineering and System Safety	41
10	Lenderink et al., (2022)	Procurement and innovation risk management: How a public client managed to realize a radical green innovation in a civil engineering project	2022	Journal of Purchasing and Supply Management	40

Which Countries Rank Among the Top Ten Based on Their Number of Publications?

Table 4 and **Figure 3** show the publication documents by countries. The country-wise publication distribution reveals a highly concentrated research landscape dominated by developed economies, with the United States leading with 23 publications (22.77%), followed by China (14; 13.86%) and the United Kingdom (11; 10.89%). This dominance reflects the strong research infrastructure, higher funding availability, and advanced academic-industry collaboration networks in these countries, which enable sustained output in complex interdisciplinary fields such as supply chain risk in construction. The leadership of the United States and the United Kingdom can also be attributed to their early development of construction management and risk analysis frameworks, which continue to influence global research directions. China's strong position is linked to its massive construction sector and rapid urbanization, which have intensified academic interest in supply chain resilience, risk mitigation, and infrastructure management within its domestic context. Recent studies also highlight China's increasing focus on integrating advanced analytics and digital technologies into construction supply chain risk assessment, further strengthening its publication output.

In contrast, countries such as Italy (7; 6.93%), Iran (5; 4.95%), India (4; 3.96%), Malaysia (4; 3.96%), Portugal (4; 3.96%), the Netherlands (3; 2.97%), and Indonesia (2; 1.98%) show moderate to low contributions, indicating that research activity in this domain is more fragmented and emerging in these regions. These differences can be explained by variations in research funding intensity, maturity of construction industry research ecosystems, and access to international collaboration networks. European countries like Italy, Portugal, and the Netherlands contribute steadily due to strong engineering traditions and EU-supported research frameworks, but their outputs remain lower due to specialization in narrower thematic areas rather than broad-scale bibliometric production. Meanwhile, developing countries such as Malaysia, India, and Indonesia are increasingly contributing as their construction sectors expand and exposure to global supply chain vulnerabilities increases, although limitations in research funding and publication capacity still constrain output. Overall, the distribution confirms a typical core-periphery structure in bibliometric studies, where a small group of developed nations dominates knowledge production while emerging economies gradually integrate into the global research network, driven by industrial growth, digital transformation, and increasing awareness of supply chain risk exposure.

Table 4: Documents By Countries

Country	No of publication	Percentage
United States	23	22.77
China	14	13.86
United Kingdom	11	10.89
Italy	7	6.93
Iran	5	4.95
India	4	3.96
Malaysia	4	3.96
Portugal	4	3.96
Netherlands	3	2.97
Indonesia	2	1.98

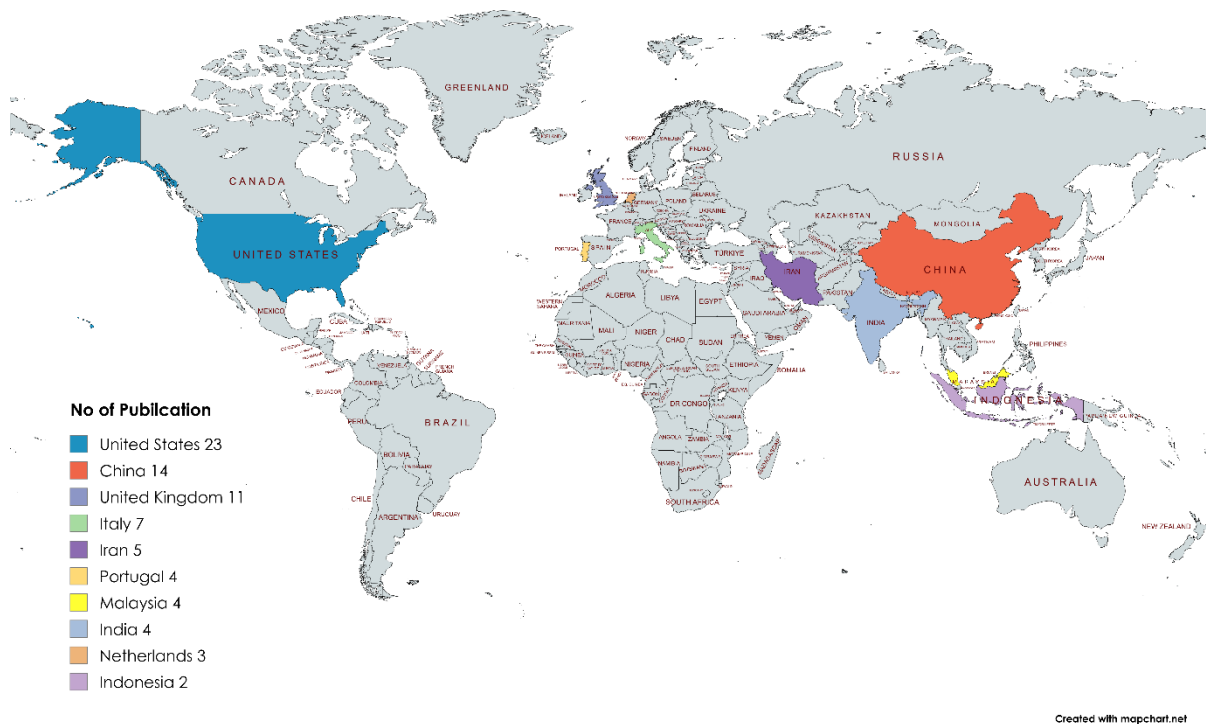


Figure 3: Documents by Countries

Which Keywords Are Most Frequently Associated with Research in This Area?

The co-occurrence analysis of author keywords using VOSviewer was conducted to identify the conceptual structure and thematic relationships within the research field of supply chain risks in the construction industry shown in Figure 4. In bibliometric studies, co-occurrence analysis examines how frequently specific keywords appear together within the same publications, thereby revealing the dominant research themes, conceptual linkages, and emerging knowledge domains. The visualization map generated through VOSviewer represents keywords as nodes, where node size indicates the frequency of occurrence, while the connecting lines and total link strength reflect the degree of association between keywords. In this study, the full counting method was employed, meaning that each occurrence of a keyword within a document was counted equally regardless of the number of co-authors or terms present. A minimum occurrence threshold of five was applied to ensure that only significant and recurring keywords were included in the analysis. Out of a total of 221 identified keywords, only 8 satisfied the threshold requirement, indicating that the research domain remains relatively specialized with limited thematic concentration. Furthermore, the minimum cluster size was set to one, enabling the software to retain all eligible keywords and generate three thematic clusters representing interconnected areas of research focus.

The findings demonstrate that “construction industry” recorded the highest occurrence (11 occurrences) while “supply chain management” exhibited the strongest total link strength (9), suggesting that supply chain management functions as the central integrative concept connecting multiple research themes within the field. Keywords such as “critical infrastructure,” “vulnerability,” and “supply chain risk” indicate that the literature strongly emphasizes infrastructure resilience, disruption exposure, and risk mitigation strategies in construction supply chains. Meanwhile, the presence of “uncertainty quantification” reflects

the growing application of analytical and probabilistic approaches for evaluating complex supply chain disruptions, whereas “sustainability” signifies the increasing integration of environmental and long-term resilience considerations into construction risk management studies. The generation of three clusters further suggests that the field has evolved into several interconnected thematic streams, encompassing infrastructure vulnerability assessment, strategic supply chain risk management, and sustainability-oriented resilience research. Collectively, these findings contribute significantly to the body of knowledge by clarifying the intellectual structure of the research domain, identifying core thematic priorities, and highlighting the transition of the field from traditional operational risk perspectives toward more integrated, technology-driven, and sustainability-focused supply chain resilience frameworks within the construction industry.

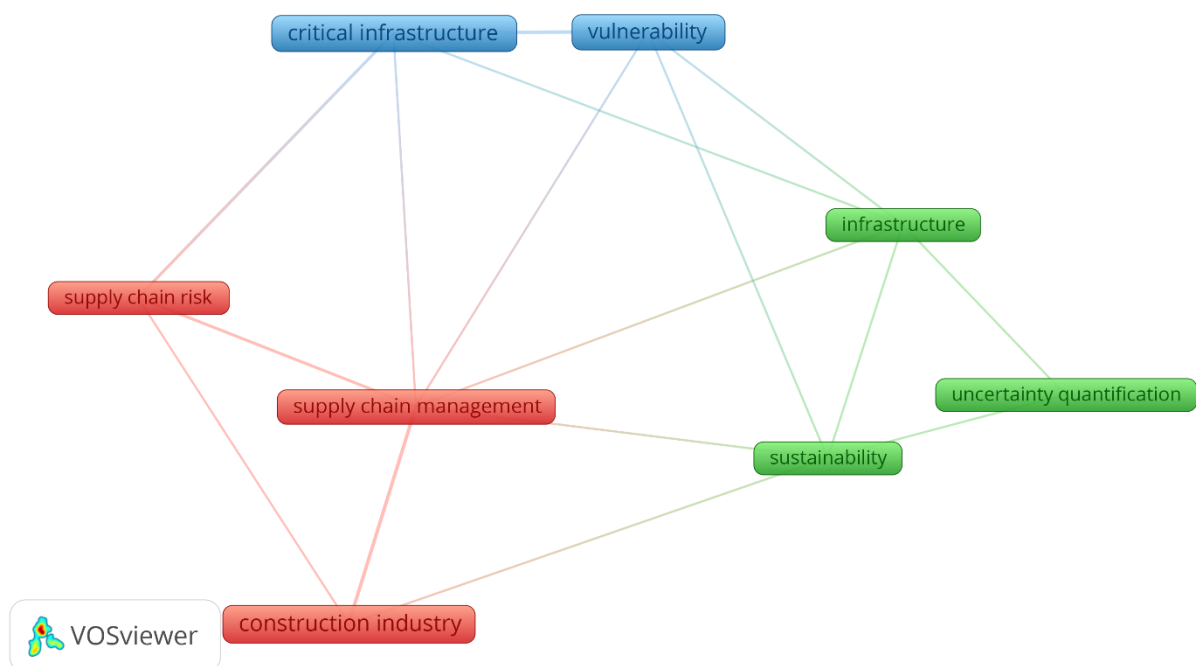


Figure 4: Network Visualization Map of Author Keywords' Co-Occurrence

Conclusion

The purpose of this bibliometric study was to systematically examine the development, intellectual structure, and emerging research patterns related to supply chain risks in the construction industry. The analysis was conducted using 76 publications indexed in the Scopus database between 2000 and May 2026. The findings demonstrate that research activity in this field remained relatively limited during the early years but experienced substantial growth after 2019, indicating increasing academic and industrial concern regarding supply chain disruptions, infrastructure vulnerability, and project resilience. The analysis further revealed that the United States, China, and the United Kingdom were the most influential contributors in terms of publication output, reflecting the strong research capabilities and industrial relevance of these countries within construction and supply chain management studies. Citation analysis showed that highly influential publications were largely associated with infrastructure resilience, risk assessment methodologies, sustainability, and multi-hazard disruption management. In addition, keyword co-occurrence analysis identified “supply chain

management,” “critical infrastructure,” “vulnerability,” and “sustainability” as dominant thematic areas, suggesting that the field has gradually shifted toward integrated and technology-oriented approaches for managing construction supply chain risks. The visualization mapping also confirmed the existence of interconnected research clusters focusing on infrastructure resilience, strategic risk management, and uncertainty assessment.

This study contributes to the existing body of knowledge by providing a comprehensive overview of the research evolution and thematic structure of supply chain risk studies within the construction sector. The findings offer useful insights for researchers, policymakers, and industry practitioners by highlighting the growing importance of resilient supply chain strategies, digital risk assessment tools, and sustainable infrastructure management practices. The study also demonstrates the usefulness of bibliometric analysis in identifying influential research themes, collaboration patterns, and future research directions within an expanding interdisciplinary domain. Nevertheless, several limitations remain. The analysis was restricted to English-language journal articles indexed in the Scopus database, which may exclude relevant publications from other databases, conference proceedings, or non-English sources. Furthermore, the relatively small dataset indicates that the field is still developing and may not yet represent the full global research landscape. Future studies may extend the analysis by incorporating additional databases, longitudinal comparative studies, advanced scientometric techniques, and deeper investigations into emerging technologies such as artificial intelligence, blockchain, and digital twin systems in construction supply chain risk management. Overall, the findings confirm that bibliometric analysis serves as an effective approach for understanding the evolution and knowledge structure of supply chain risk research in the construction industry while supporting future scholarly advancement and practical decision-making in this increasingly critical field.

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