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Visualizing supply chain concentration: A systematic scientometric review

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With the increasing complexity of supply chain management, supply chain concentration (SCC) has become a prominent research topic in academia and practice. To clarify the developmental context and research trends within this field, this study utilizes the Web of Science core collection as the data source, selecting 362 English-language publications from 1975 to 2025. CiteSpace 6.2 was employed to conduct a visual bibliometric analysis, systematically examining the social structure, conceptual structure, and intellectual structure of SCC research through co-authorship, co-word, and co-citation analyses. The results indicate rapid growth in SCC research since 2020, with China and the United States being the major contributing countries, and collaborations exhibiting regional characteristics. High-frequency keywords prominently include "customer concentration," "supplier concentration," and "performance," with research themes progressively extending toward frontier topics such as "digital transformation," "green innovation," and "corporate social responsibility." Co-citation analysis identified representative works by authors such as Panos Patatoukas, Dan Dhaliwal, and Murillo Campello, highlighting a shift in research focus from traditional performance perspectives to governance mechanisms and sustainable strategies within a digital context. This study summarizes core literature clusters, evolutionary paths of clusters, and significant citation bursts, revealing interdisciplinary integration and paradigm shifts in SCC research. The paper provides a systematic review of future directions in SCC studies.

1. Introduction

In the context of sustained fluctuations in the global economic environment and intensifying market competition, enterprises face significantly increased external uncertainty, with a rising frequency of supply chain disruptions and unexpected events (Wei et al., 2024). The survival and growth of enterprises increasingly depend on the effective acquisition and control of external resources and are deeply influenced by the behaviors and positions of other participants within the supply chain (Han et al., 2023). In contemporary supply chain networks, various entities exhibit high interdependence and mutual interaction, and strategic decisions and development trajectories of enterprises have long transcended organizational boundaries, becoming increasingly subject to the dynamic relationships among upstream and downstream members of the supply chain (Mondal & Giri, 2022). Against this backdrop, the level of inter-firm cooperation has emerged as a critical factor influencing performance and competitive advantage, rendering supply chain concentration (SCC) an important area of focus for both academia and industry (Jiang et al., 2023).

SCC typically refers to the degree of transactional concentration a company maintains with its customers or suppliers, exerting profound effects on firm performance, innovation capability, and risk management (Cao et al., 2023; Han et al., 2023; Jiang et al., 2024). On one hand, prior research indicates that higher concentration helps firms enhance their bargaining power within the supply chain, reduce transaction and coordination costs, and thus improve overall operational performance (Chang

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et al., 2022; Chen et al., 2023). Additionally, concentrated relationships facilitate the formation of more stable strategic alliances, boosting collaborative efficiency and resource allocation capabilities, achieving economies of scale, and driving firms' sustainable development and long-term growth (Ahsan et al., 2023; Jiang et al., 2024). Once firms establish a solid community of interests with upstream and downstream partners, it becomes easier to share resources, promote collaborative innovation, reduce financial and inventory costs, and simultaneously optimize cash-flow structures, enhancing firms' financing capacity (Sun et al., 2025; Yang et al., 2024).

However, increased SCC can also trigger a series of negative effects. Firstly, high concentration may strengthen the bargaining power of upstream and downstream companies (Kwak & Kim, 2020) and exacerbate information asymmetry (Xu et al., 2023), forcing firms to bear higher transaction (Li et al., 2023) and relationship-maintenance costs (Zhang et al., 2024), thereby squeezing profit margins. Secondly, excessively high concentration can facilitate the chain transmission of financial risks, prompting companies to increase their holdings of liquid assets out of caution, which creates a "crowding-out effect" on R&D investment and thus inhibits firms' innovation capabilities (Afghahi et al., 2024; Yang et al., 2024). Furthermore, firms' excessive dependence on specific customers or suppliers may weaken their market responsiveness (Wei et al., 2024) and (Chi et al., 2025), increasing rigidity in resource allocation and management complexity (Hu et al., 2024; Mao et al., 2023).

In recent years, research perspectives on SCC have continually expanded, accompanied by a trend towards theoretical diversification. Digital transformation, by enhancing responsiveness (Fan et al., 2024) and reducing transaction costs (Li et al., 2023), has effectively moderated the impact path between concentration and performance, becoming a crucial contextual factor influencing SCC (Sun et al., 2025). Furthermore, factors such as government open data (Dai et al., 2025), regulatory transparency and executive myopia have gradually been incorporated into the SCC research framework (Jia et al., 2025), indicating the field's evolution towards more refined and interdisciplinary directions (Hu et al., 2024). Nevertheless, the existing literature lacks a systematic review in terms of research distribution, determination of research topics and understanding of trends (Tabachová et al., 2023). Therefore, to comprehensively understand the developmental trajectory and future directions of this field, it is necessary to employ scientific and systematic methods to quantitatively integrate and visually analyze existing research findings. Against this backdrop, the present study aims to conduct an in-depth bibliometric analysis to systematically review SCC literature, uncover current research landscapes, identify hot trends and existing gaps, and clarify potential future research directions. Specifically, this study addresses the following research questions:

RQ1: What is the social structure of SCC research?
RQ2: What is the conceptual structure in the SCC research field?
RQ3: What is the knowledge structure in the SCC research field?

By answering these questions, this study not only provides academia with a clear understanding of the developmental context and theoretical trends within SCC research but also offers valuable insights for managers in practice, enabling better decision-making to manage the opportunities and risks associated with SCC.

2 Materials and Methods

2.1 Material Collection

This study employs CiteSpace, a bibliometric visualization analysis tool, to conduct a systematic review of the research field concerning SCC. In the data retrieval stage, the Web of Science (WoS) core collection was selected as the primary data source. This platform indexes authoritative journal articles that have undergone rigorous peer review, and its data structure is widely acknowledged internationally for standardization and completeness, making it particularly suitable for bibliometric analyses and knowledge mapping studies (Ding & Yang, 2022). To ensure comprehensive and accurate indexing data, the indexes SCI-EXPANDED, SSCI, and AHCI were selected. In defining SCC, the scope was broadened to include both customer and supplier concentration. Thus, the final search strategy was formulated as follows, TS=("supply chain concentration" OR "supplier concentration" OR "customer concentration" OR "buyer concentration" OR "major supplier" OR "major customer" OR "supplier base concentration" OR "supply chain consolidation"), covering literature published from January 1975 through April 2025, with a retrieval cut-off date of April 10, 2025. The selected document types included only "Articles" and "Review Articles."

After removing duplicate entries, an initial set of 654 journal articles (comprising 635 research articles and 19 review articles) was obtained. Subsequently, further screening was performed, excluding 19 duplicate papers, 270 articles irrelevant to the research topic, and 3 non-English articles. Eventually, 362 valid papers remained for analysis. Fig. 1 illustrates the literature selection and sorting process employed in this study, detailing each research step, including keyword search, database selection, merging, duplicate removal, manual selection, and final article selection.

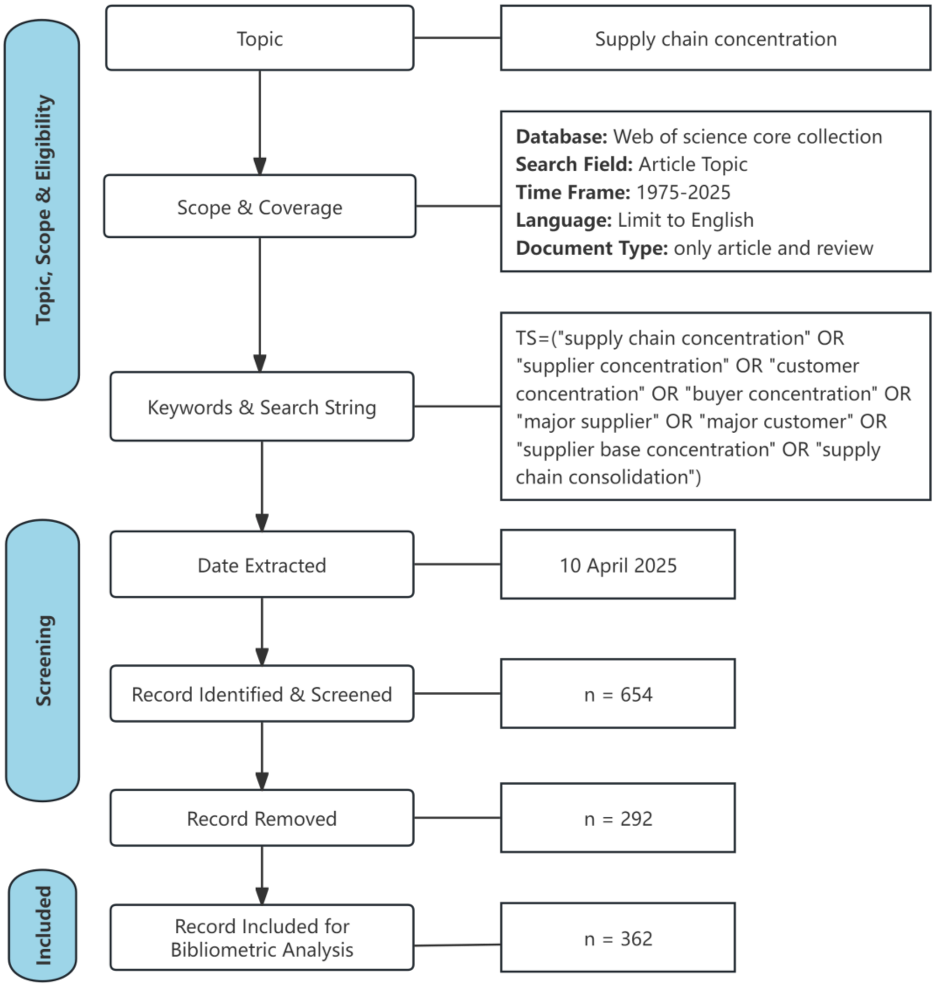

Fig. 1. Flow diagram of the search strategy **Source:** Moher et al. (2009)

The 362 articles analyzed in this study involved 991 authors from 803 institutions across 153 regions. These papers were published in 149 journals, collectively citing 15,605 references from 810 different journals. Fig. 2 presents the annual distribution of publications within the SCC research field, clearly illustrating macro trends and academic attention over time. As depicted in Fig. 2, SCC research exhibited a notable upward trend from 2020 to 2025, with particularly rapid growth observed after 2023, indicating growing scholarly interest in this topic. Specifically, the number of publications reached its peak in 2024, totaling 121 articles. Moreover, the last five years (2021-2025) accounted for 286 articles, representing 79.01% of the total sample (362 articles), further highlighting that research on SCC has entered a stage of rapid development.

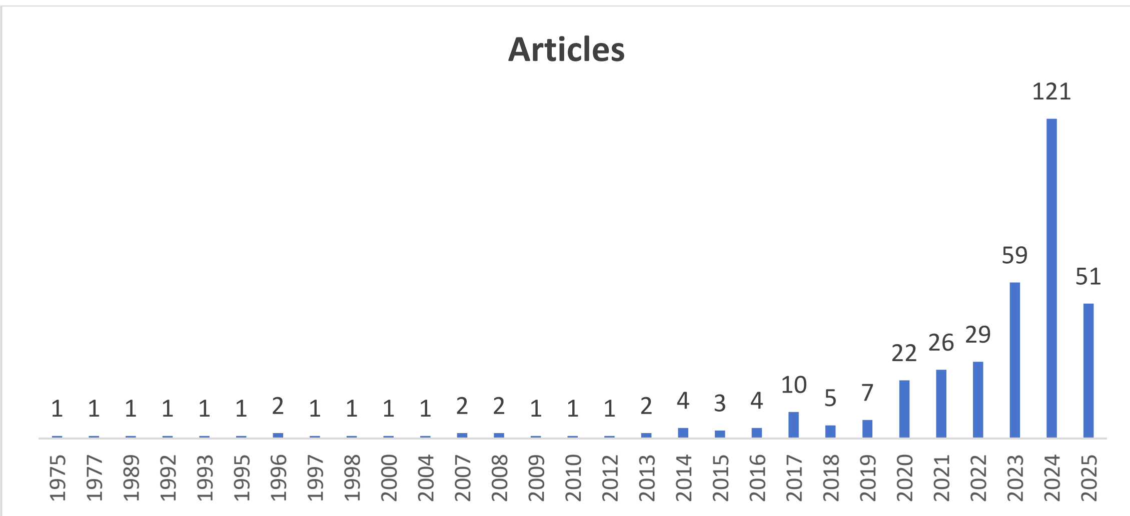

Fig. 2. Distribution of SCC publications.

2.2 Methods

This study applies bibliometric methods, utilizing CiteSpace 6.2 R3 software to construct knowledge maps of the SCC research field, systematically uncovering its knowledge structure and dynamic evolution. Since its establishment by Pritchard (1969), bibliometrics has emerged as an independent discipline widely used in academic literature analysis. By quantitatively analyzing authors, keywords, journals, countries, and citation relationships, bibliometric methods clearly reveal the developmental trajectory and trending topics within specific research domains. In this paper, co-authorship analysis, co-word analysis, and co-citation analysis are comprehensively employed to examine the social structure, conceptual structure, and intellectual structure, respectively.

3 Results

This study employs co-authorship analysis, co-word analysis, and co-citation analysis to reveal the social structure (RQ1), conceptual structure (RQ2), and intellectual structure (RQ3) of the SCC research field.

3.1 Social Structure of SCC Field

This section focuses on the networks of co-authors and their affiliated countries to analyze the social structure of the SCC field.

3.1.1 Co-Authorship Network

To explore the core authors and their collaborative relationships in the field of SCC, this study analyzes 362 related publications. As shown in Fig. 3, the author collaboration network reveals a generally fragmented structure, characterized by several relatively independent research groups. Inter-group cooperation remains limited, indicating that collaborative patterns in this field are still in a developmental stage. Among the prominent nodes, Lujie Chen occupies a central position in the collaboration network, demonstrating significant academic influence and high research productivity, which highlights his leading role in SCC research. Other authors such as Feng Liu, Mingjie Fang, Zhaojun Han, and Kwangtae Park also exhibit large node sizes, indicating substantial output and the formation of stable collaborative relationships. These scholars not only contribute a considerable number of publications but also serve as key nodes in the collaboration network, representing major driving forces in the field.

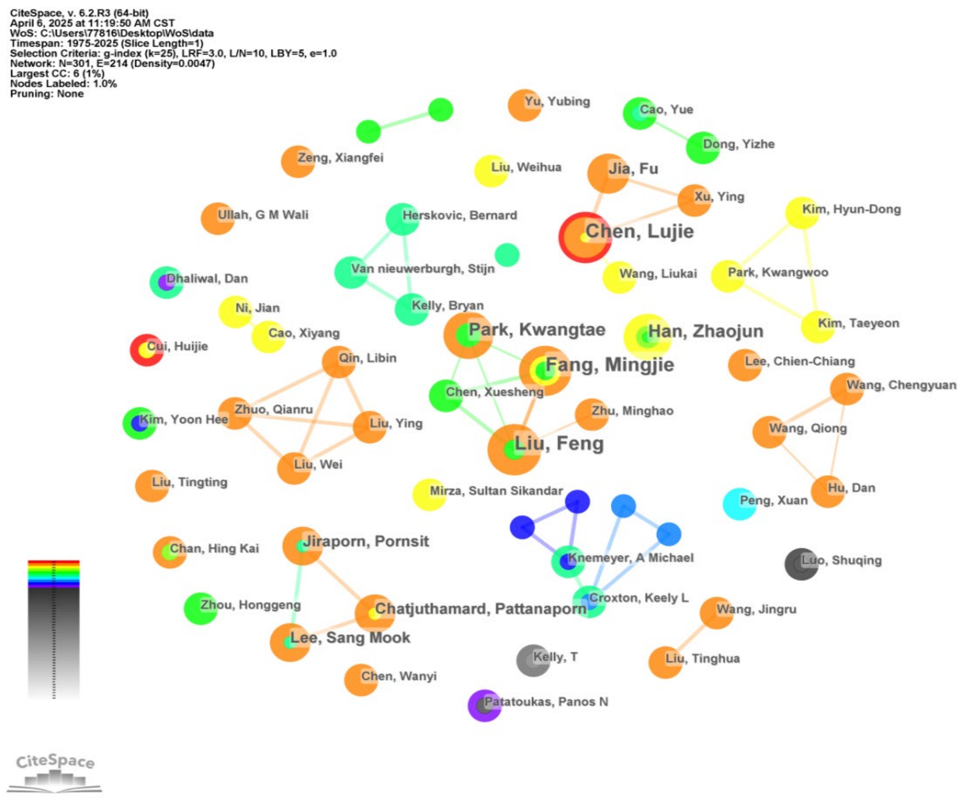

Fig. 3. Co-authorship network.

In terms of author influence, this study identifies the top five most-cited scholars in the SCC field. Lujie Chen, Mingjie Fang, Feng Liu, Zhaojun Han, and Kwangtae Park. These researchers have made substantial contributions to SCC literature and are widely cited, reflecting their representative status in the academic community. Additionally, although Dhaliwal Dan and Patatoukas Panos have only published 2 articles each in this field, their works have received 469 and 529 citations respectively, with exceptionally high average citations per article of 234.5 and 264.5, underscoring their remarkable academic influence and recognized contributions to the literature.

According to Price (1963), in a given academic field, approximately half of the total publications are contributed by a small group of prolific authors. The number of these core authors is roughly equal to the square root of the total number of contributing authors in the field. Based on this principle, this study defines core authors in the SCC field as those who have published two or more articles. A total of 107 core authors were identified, accounting for 67.68% of all publications, exceeding the 50% benchmark suggested by Price. This indicates that a relatively mature research structure dominated by core authors is taking shape in the SCC domain. Table 1 presents the most productive scholars with more than 4 publications.

Table 1
Most important authors in the SCC research field

Author	Documents	Citation	Average Citation/Publication
Feng Liu	8	100	12.50
Mingjie Fang	6	72	12.00
Kwangtae Park	6	80	13.33
Lujie Chen	5	35	7.00
Fu Jia	5	35	7.00
Pornsit Jiraporn	4	81	20.25
Sang mook Lee	4	81	20.25
Haojun Han	4	174	43.50
Hengyuan Wang	4	8	2.00
Hua Zhang	4	30	7.50

3.1.2 Co-Country Network

To explore international collaboration patterns in the SCC field, Co-country network was constructed. Analyzing this network provides valuable insights into the collaborative relationships and academic contributions of various countries engaged in SCC research. As shown in C 4, China possesses the largest node in the network, indicating it is the most prolific contributor in this field. Fig. 5 further reveals that China ranks first with 260 publications, occupying a dominant position in SCC research. However, its betweenness centrality is relatively low at 0.23, suggesting that China's research is primarily domestically driven, and there remains significant potential to enhance cross-national collaborations.

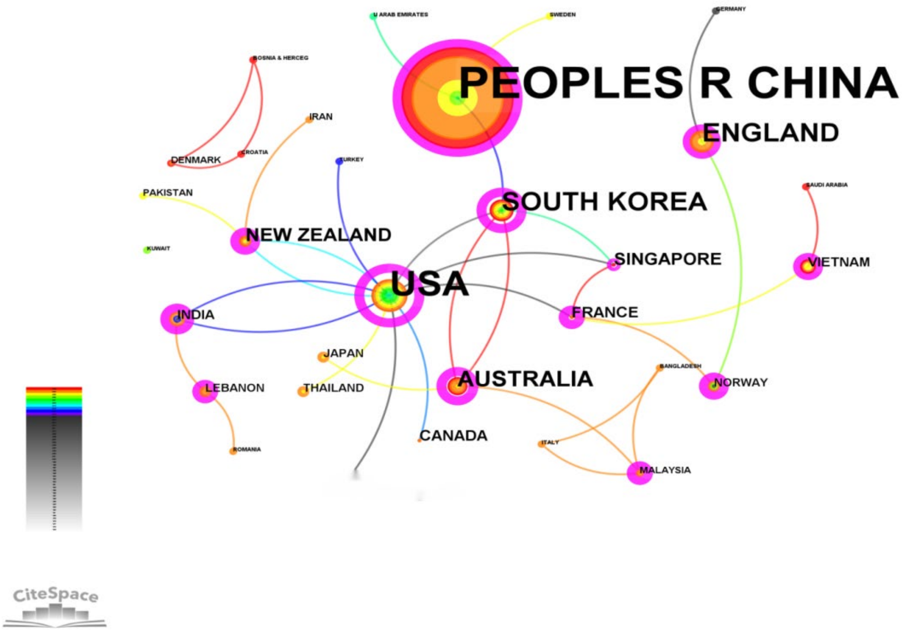

Fig. 4. Co-country network.

The United States follows with 88 publications and exhibits the highest centrality score of 1.04, indicating its pivotal role as a global connector in the SCC research collaboration network. Its broad range of international partnerships highlights its strong influence and integrative capacity within the global academic landscape. The thick edge between China and the United States indicates a high frequency of bilateral collaboration in SCC research. South Korea (centrality = 0.73) and France (centrality = 0.51) also demonstrate strong intermediary roles in the network. Although their publication volumes are relatively lower, their involvement spans a wide range of collaborative projects, underscoring their strategic positions within the global SCC research network.

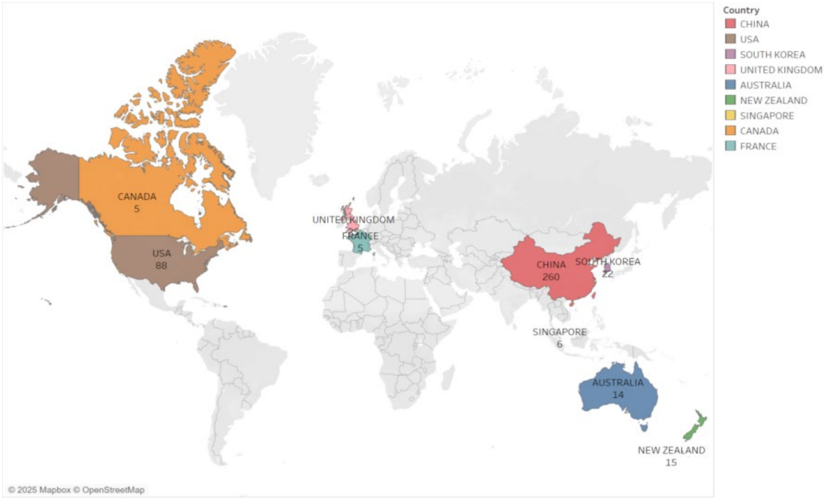

Fig. 5. Geographical distribution of authors in SCC research (1975–2025)

Analysis of the international collaboration network reveals that China holds a significant quantitative advantage in SCC research. However, its global academic influence could be further enhanced by strengthening collaborations with countries that exhibit high betweenness centrality, such as the United States, the United Kingdom, and South Korea. The United States functions as a central hub within the global collaboration network, playing a crucial role in connecting research resources across nations and facilitating academic integration. To promote broader knowledge dissemination and increase scholarly impact, future collaborative efforts among countries should focus not only on publication volume but also on enhancing network centrality, thereby optimizing the flow of information and the influence of joint research initiatives.

3.2 Conceptual Structure of SCC Field

This section employs co-word analysis to uncover the conceptual structure of the SCC research field, aiming to identify the core concepts and emerging research hotspots.

3.2.1 Co-Occurring Keywords Network

Keywords, as core terminologies in academic literature, serve as concise summaries of research themes and substantive content. They are essential tools for revealing the conceptual structure and tracking the evolution of research hotspots within a field (Wang & Lu, 2020). In this study, co-word analysis using CiteSpace was conducted to identify the key topics in SCC research.

As shown in Fig. 6, the keyword co-occurrence network includes only nodes with a frequency of seven or more occurrences. By analyzing both frequency and betweenness centrality, we can effectively identify the most influential keywords and major themes within the SCC field. According to Table 2, the top three most frequently occurring keywords are "customer concentration" (163), "performance" (154), and "supplier concentration" (91), indicating that these are the dominant topics in SCC research. This suggests that SCC is primarily categorized into customer concentration and supplier concentration, and the literature mainly focuses on exploring how SCC affects firm performance. Although the keyword "determinants" appears less frequently (41), it has a very high centrality score of 0.46, highlighting its critical role as a bridge connecting diverse research topics and subfields. In addition, keywords such as "profitability," "cost," "governance," "management," and "capital structure" also show high frequencies and centrality, underscoring the relevance of financial management, corporate governance, and capital allocation in the ongoing development of SCC research.

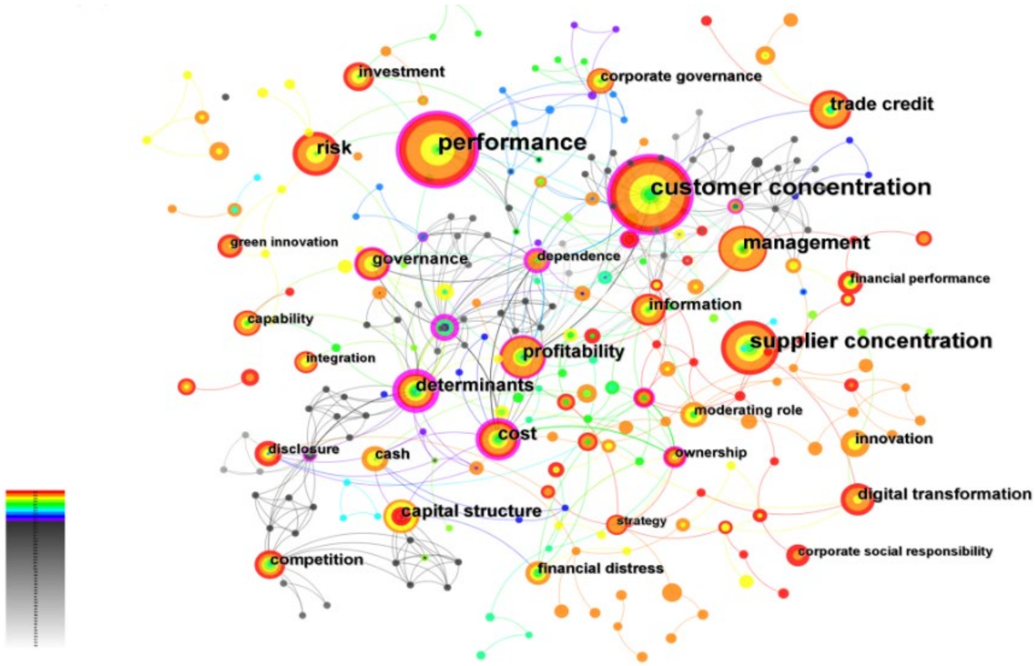

Fig. 6. Co-occurring keywords network.

Moreover, among the emerging research themes, keywords such as *digital transformation*, *green innovation*, *corporate social responsibility (CSR)*, "financial constraints, and "information asymmetry" have shown a noticeable rise in both occurrence frequency and centrality. This trend reflects a significant broadening of SCC research focus–from traditional issues related to financial performance and supply chain management to more cutting-edge topics involving digitalization, environmental sustainability, and corporate accountability. These developments indicate that the field is evolving in response to global economic shifts, technological advancement, and increasing societal expectations placed on businesses.

Table 2 Top 40 keywords with high count or centrality.

No.	Keywords	Count	Centrality	No.	Keywords	Count
1	customer concentration	163	0.29	21	dependence	17
2	performance	154	0.21	22	moderating role	15
3	supplier concentration	91	0.06	23	capability	15
4	management	68	0.08	24	disclosure	15
5	risk	53	0.03	25	green innovation	14
6	profitability	47	0.19	26	financial performance	14
7	cost	43	0.2	27	corporate social responsibility	13
8	trade credit	41	0.05	28	integration	13
9	determinants	41	0.46	29	uncertainty	12
10	capital structure	34	0.08	30	strategy	11
11	information	31	0.06	31	costs	10
12	governance	30	0.1	32	financial constraints	10
13	digital transformation	29	0.06	33	bargaining power	10
14	investment	25	0.04	34	behavior	9
15	competition	24	0.06	35	industry	8
16	cash	21	0.03	36	constraints	8
17	corporate governance	21	0.08	37	technology	8
18	financial distress	20	0.03	38	information asymmetry	8
19	innovation	19	0.01	39	complexity	8
20	ownership	17	0.13	40	benefits	7

Keyword co-occurrence analysis has effectively revealed the core concepts and research hotspots in the field of SCC. It not only serves as an important reference for scholars to quickly understand the current state of research, but also provides clear directional guidance for future academic inquiry.

3.2.2 Keywords Cluster Analysis

Keyword clustering analysis is an effective approach to uncover the thematic distribution and research directions within a given field. In this study, keyword clustering was conducted to further explore the thematic characteristics and the underlying relational structure of the research landscape in the field of SCC. In the clustering map, different colored regions represent distinct thematic clusters, and each cluster label indicates the core concepts of the keywords within that theme. As shown in Fig. 7, the co-word clustering analysis reveals several well-defined thematic clusters in SCC research, including #0 Customer Concentration, #1 State-Owned Enterprises, #2 Information Asymmetry, #3 Digital Transformation, #4 Supply Chain Concentration, #5 Sustainable Growth, #6 Capital Structure, #7 Financing Constraints, #8 Operational Slack, #9 Corporate Environmental Responsibility,#10 Agency Problem, #11 ESG Performance, and #12 Investment Efficiency.

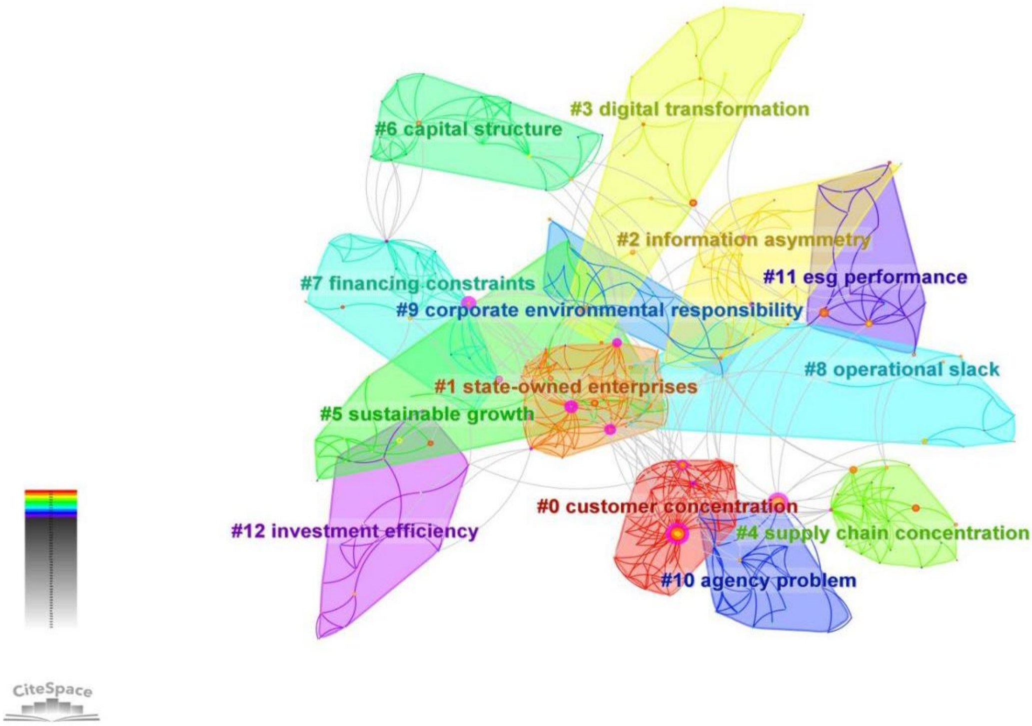

Fig. 7. Co-occurring keywords cluster

The size, density, and structural clarity of each cluster clearly indicate the core topics currently receiving attention in SCC research. Among them, customer concentration, state-owned enterprises, information asymmetry, and digital transformation are relatively large clusters with dense node distributions, suggesting that these themes have held central positions and become stable research hotspots in recent years. In addition, emerging topics such as ESG performance, corporate environmental responsibility, and investment efficiency have gradually entered scholars' research agendas, reflecting a clear trend in SCC research toward sustainable development and responsibility management.

3.2.3 Keyword Timeline Analysis

To further reveal the evolutionary trajectory of keywords in the SCC research field, Fig. 8 presents a keyword timezone map spanning the period from 2015 to 2025. This map visualizes when different keywords first appeared and how they have evolved over time. The size of each node indicates the frequency of a keyword's occurrence in a given year, while the lines connecting nodes represent the continuity and progression of keyword usage across time.

As shown in Fig. 8, research from 2015 to 2017 primarily focused on traditional financial and supply chain management topics, with representative keywords including ***performance***, ***customer concentration***, ***supplier concentration***, ***capital structure***, ***profitability***, and ***trade credit***. Starting in 2018, the scope of research began to expand toward topics such as ***risk***, ***governance***, ***information asymmetry***, and ***bargaining power***, indicating a gradual shift in academic attention toward governance mechanisms and risk control. During the 2020 to 2025 period, the field witnessed the emergence of new concepts such as ***digital transformation***, ***green innovation***, ***CSR***, and ***ESG performance***, reflecting how SCC research is increasingly responding to the challenges of sustainable development, corporate accountability, and the digital economy. In addition, keywords such as ***policy uncertainty*** and ***cost stickiness*** suggest a growing integration of policy-related and globalization dimensions into the SCC discourse, highlighting the dynamic adaptability of supply chain strategies in response to complex external environments.

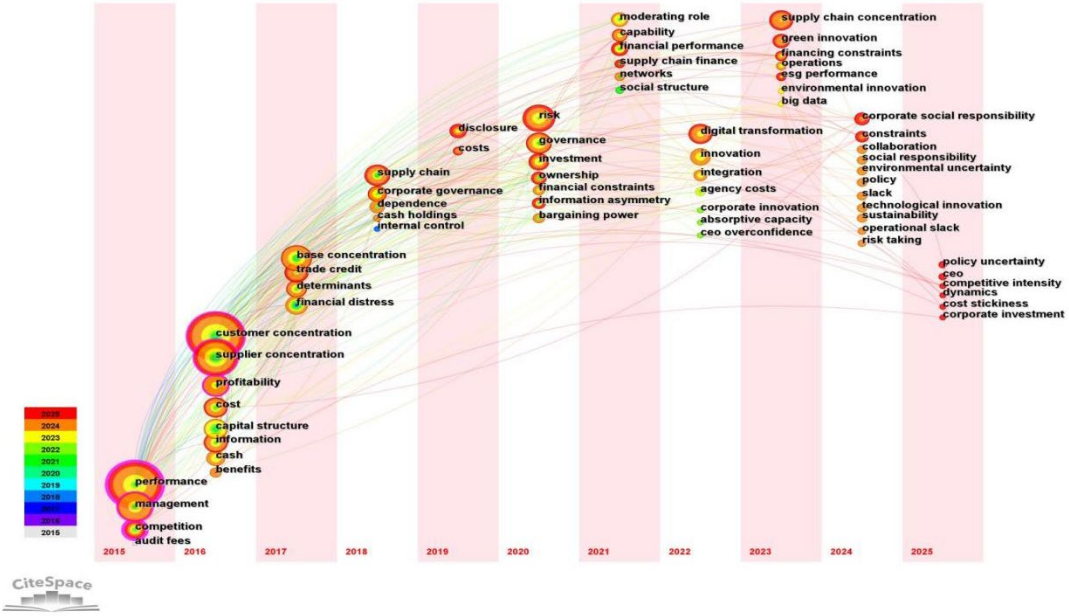

Fig. 8. Co-occurring keywords timeline

Fig. 8 illustrates a clear evolution in research focus—from static evaluations of efficiency to more dynamic explorations of risk governance and adaptive strategies in the context of policy, technology, and globalization. This shift underscores the SCC increasing diversification, interdisciplinary nature, and contemporary relevance.

3.3 Intellectual Structure of SCC Field

In this section, co-citation analysis is applied to reveal the intellectual structure of the SCC research field by examining co-citation authors, journals, and references.

3.3.1 Author Co-Citation Network

This study constructs an author co-citation network map based on 15,605 references in the field of SCC, aiming to systematically analyze the core group of scholars and their academic interrelationships. As shown in Fig. 9, the size of each node in the network represents the citation frequency of the author, while the links between nodes indicate that two authors have been co-cited in the same publication. Moreover, the centrality of a node reflects the author's connective role and importance within the co-citation network.

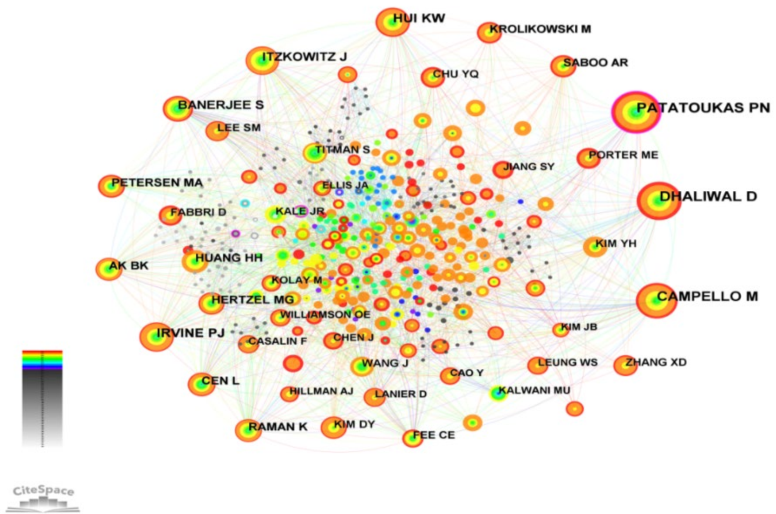

Fig. 9. Author co-citation network

As shown in Fig. 9 and Table 3, the most frequently cited author is Panos Patatoukas with 158 citations and a centrality score of 0.1, reflecting his high recognition and significant influence in the SCC research field. In addition, Dan Dhaliwal (149 citations, centrality 0.08) and Murillo Campello (125 citations, centrality 0.07) also demonstrate outstanding academic contributions and network influence, indicating that their research holds substantial theoretical and practical value in the context of SCC.

It is worth noting that although Kaiwai Hui has a relatively high number of citations (85), his low centrality (0.01) suggests that while his work is widely referenced, it is not closely connected with those of other core authors in the network. In contrast, authors such as Paul Irvine (80 citations, centrality 0.06), Jennifer Itzkowitz (78 citations, centrality 0.05), and Shantanu Banerjee (69 citations, centrality 0.06) exhibit a more balanced combination of citation frequency and centrality, indicating both strong academic recognition and a bridging role within the research network. Additionally, Korcan Ak, with 55 citations and a relatively high centrality score of 0.09, though cited less frequently, plays a notable role as a connector and integrator across different authors and research themes, highlighting the bridging function of his contributions in the SCC research landscape.

Table 3
Top 10 most cited authors

No.	Author	Citation	Centrality
1	Panos Patatoukas	158	0.1
2	Dan Dhaliwal	149	0.08
3	Murillo Campello	125	0.07
4	Kaiwai Hui	85	0.01
5	Paul Irvine	80	0.06
6	Jennifer Itzkowitz	78	0.05
7	Shantanu Banerjee	69	0.06
8	Kartik Raman	57	0.03
9	Korcan Ak	55	0.09
10	Ling Cen	54	0.02

Through author co-citation network analysis, this study effectively identifies the key scholars in the field of SCC and highlights the characteristics of their academic contributions. The results reveal the distribution of influential academic forces within the field and provide insights into the structural landscape of research impact.

3.3.2 Journal Co-Citation Network

In this section, analyze the sources of publications and then identify the most representative co-cited journals in the SCC research field. A total of 15,605 references related to SCC were published across 810 journals, with the top 10 journals listed in Table 4. Based on the statistical results shown in Fig. 10 and Table 4, the study analyzes journals with high citation frequencies and significant academic influence in the SCC field.

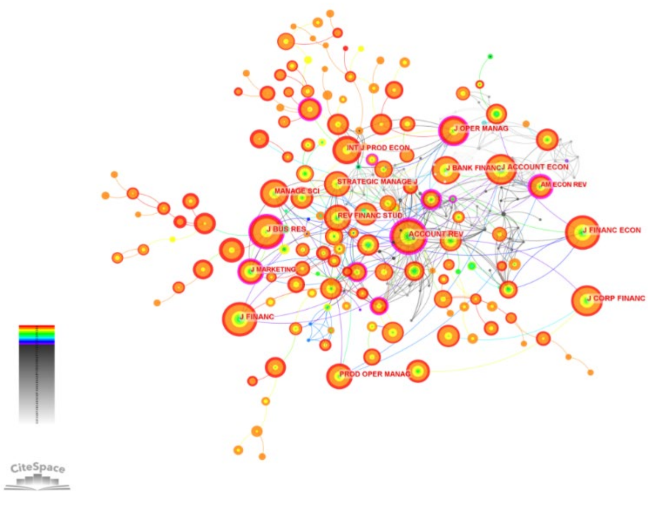

Fig. 10. Journal co-citation network.

The journals located at the center of the network include **The Accounting Review**, **Journal of Financial Economics**, **Journal of Finance**, and **Journal of Business Research**, indicating that these journals are frequently cited and play a central role in the dissemination of knowledge in SCC research. In terms of citation frequency, both **The Accounting Review** and **Journal of Financial Economics** are the most cited journals, with 234 citations each. Notably, **The Accounting Review** exhibits a centrality score of 0.38, significantly higher than that of other journals, reflecting its prominent position and strong academic influence within SCC research. **The Journal of Finance** ranks closely behind with 211 citations, highlighting the widespread application of financial theories in SCC studies. In addition, journals such as **Journal of Business Research (193)**, **Journal of Accounting & Economics (185)**, **Journal of Corporate Finance (178)**, **Management Science (172)**, **Journal of Banking & Finance (153)**, **Strategic Management Journal (152)**, and **Review of Financial Studies (146)** are also among the top-cited respectively. This indicates the multi-dimensional and interdisciplinary influence of finance, management, and strategic research on SCC studies.

It is noteworthy that although the **American Economic Review** received only 123 citations, it achieved a centrality score of 0.26, suggesting its important bridging role between different research domains or academic communities and its strong capacity for cross-disciplinary integration. Furthermore, the **Journal of Operations Management**, with 141 citations and a centrality score of 0.20, highlights the significant influence of operations management theory in SCC research, demonstrating that studies in operations management provide crucial support for understanding SCC.

Table 4
Top 10 journals of SCC

No.	Journal	Citation	Centrality
1	The Accounting Review	234	0.38
2	Journal of Financial Economics	234	0.04
3	Journal of Finance	211	0.01
4	Journal of Business Research	193	0.14
5	Journal of Accounting & Economics	185	0.04
6	Journal of Corporate Finance	178	0.02
7	Management Science	172	0.03
8	Journal of Banking & Finance	153	0.02
9	Strategic Management Journal	152	0.06
10	Review of Financial Studies	146	0.08

The journal co-citation analysis in the field of SCC reveals the significance of multidisciplinary theoretical foundations, including finance, accounting, strategic management, operations management, and economics. This underscores the interdisciplinary and integrative nature of SCC research. The findings provide valuable academic guidance for future researchers in selecting target journals for publication and conducting related studies.

3.3.3 Document Co-Citation Network

When a group of documents is frequently cited together with other documents, the resulting cluster may represent a specific research theme. Compared to other clusters, the members of each cluster are more frequently cited by the same set of references. In this section, co-citation analysis is employed to visualize the landscape of the SCC field and to analyze the underlying knowledge base and research frontiers. To gain deeper insights into the research hotspots and knowledge structure of the SCC field, a clustering analysis was conducted, resulting in 24 clusters**.** These clusters were labeled using Log-Likelihood Ratio (LLR) algorithm by extracting title terms from the citing documents. Fig. 11 presents the co-citation-based clustering network, identifying nine major clusters**,** including, #0 firm innovation, #1 finance performance, #2 environmental performance, #3 corporate social responsibility performance, #4 customer concentration, #5 supplier concentration, #6 digital transformation, #7 firm volatility, #8 trade credit**.**

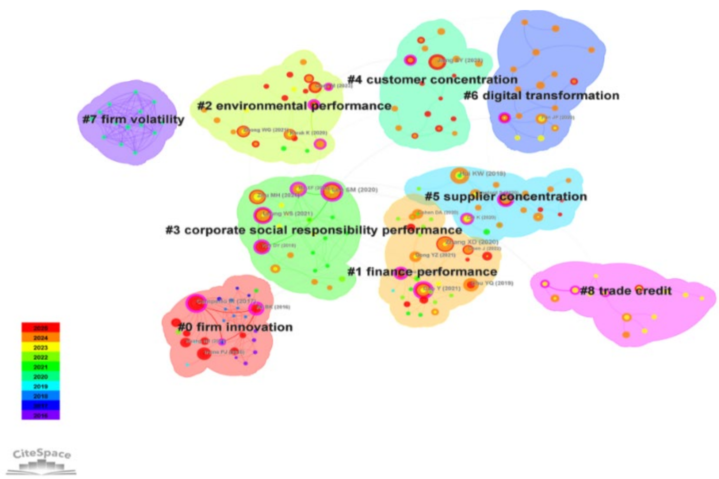

Fig. 11. A landscape view of the co-citation network

Considering the size and activity of the clusters, this study primarily focuses on the following thematic areas. #0 Firm Innovation is the largest and most tightly structured sub-group in the current document co-citation network. Representative studies include, Campello & Gao (2017), which explores how firms adjust their innovation strategies under financial constraints. Irvine et al. (2016), which analyzes the indirect impact of concentration on innovation through the lens of market liquidity. Ak & Patatoukas (2016), which emphasizes the influence path of SCC on firms' R&D intensity. Research in this cluster highlights the positive and negative effects of supply chain structure on innovation outcomes and discusses the heterogeneous mechanisms under different institutional environments and governance levels.

The second major cluster is #1: Finance Performance, which examines how SCC affects corporate financial performance. Core references include, Leung & Sun (2021) and Lee et al. (2020), who investigate the relationship between customer concentration, profit volatility, and financial metrics such as ROA, ROE, and Tobin's Q. Zhu et al. (2021), who introduces multidimensional control variables to enhance the robustness of empirical models. This cluster predominantly employs panel data analysis, emphasizing the nonlinear and heterogeneous effects of concentration.

Cluster #2 focuses on the coupling relationship between SCC and corporate environmental performance. The research emphasizes topics such as green transformation, ESG indicators, and environmental information disclosure. Kwak & Kim (2020) examined the impact of customer concentration on the incentive mechanisms for corporate environmental investment, revealing the dual effects of supply chain dependence in both constraining and promoting environmental behavior. Zhang & Huang (2024) further analyzed the role of digital transformation in enhancing supply chain resilience, highlighting that it can significantly improve a company's ESG performance by reducing SCC. This cluster of studies demonstrates that SCC plays a vital role in advancing enterprises toward "green finance" and "environmentally sustainable governance," reflecting a high degree of policy sensitivity.

Cluster #3 focuses on the intersection of SCC and CSR, reflecting a strong social responsibility orientation. Representative studies include Leung & Sun (2021) and Jiang et al. (2023), which reveal the bidirectional effects of customer and supplier concentration on CSR ratings and corporate reputation. Li et al. (2021), using a sample of A-share listed firms in China, evaluates the contribution of concentration variables to ESG assessments. Research in this cluster often adopts multi-dimensional scoring indices as dependent variables and emphasizes the moderating role of information disclosure quality and transparency.

Clusters #4 and #5 categorize SCC into customer concentration and supplier concentration, respectively, which have become central topics and research hotspots in recent years. Representative works on customer concentration include Hui et al. (2019) and Gao et al. (2021), while supplier concentration is represented by Gu et al. (2022) and Han et al. (2022). In recent literature, many studies have attempted to integrate both customer and supplier concentration into a unified model framework, adopting a holistic view of SCC to conduct coordinated analysis (Chen et al., 2023; Jiang et al., 2024; Wei et al., 2024).

Cluster #6, labeled as digital transformation, explores how supply chain coordination efficiency evolves in the context of digitalization. For instance, Li et al. (2023) investigates collaborative efficiency under a digital background, while Cao et al. (2021) introduces firm IT capabilities as a mediating variable to explain the pathways through which concentration affects performance. This cluster highlights the extension and transformation of SCC research within the context of big data, platform economies, and intelligent manufacturing.

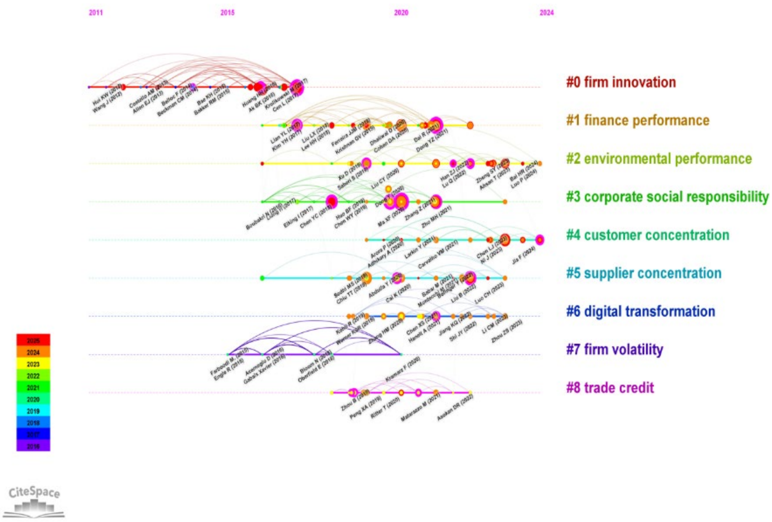

Fig. 12. Co-citation timeline visualization of the 9 clusters.

This study further generates a timeline view to illustrate the origin, evolution, and temporal span of each cluster identified in Fig. 11. The disappearance of a cluster does not necessarily indicate a loss of scholarly interest in that area; rather, it may suggest that researchers are continuing to explore new directions within the field (Chen, 2017). The timeline dimension reveals the developmental trajectory and evolutionary rhythm of each cluster. As shown in Fig. 12, the research themes exhibit a sequential and progressively deepening evolution pattern. #0 firm innovation and #1 finance performance emerged earlier and were particularly active between 2011 and 2016, laying the foundational framework for SCC research. Subsequently, the focus shifted toward more operational and empirically driven topics, such as #4 customer concentration and #5 supplier concentration. Since 2021, #3 CSR performance and #6 digital transformation have appeared with increasing frequency and rapidly rising co-citation counts. This trend reflects a growing academic interest in SCC under the themes of sustainability and technological transformation.

3.3.4. Bursts in the Network of Document Co-Citations

Citation burst is a bibliometric indicator used to identify references that have been cited intensively within a specific time period, reflecting the significant academic impact of those works during that time. By analyzing the strength and duration (begin–end) of citation bursts, one can uncover the developmental trajectory and phased research hotspots within SCC studies (Chen, 2017). Table 5 presents the top 26 references with the strongest citation bursts lasting over 10 years between 2016 and 2025, which can be regarded as key milestones in the evolution of SCC-related research. Dhaliwal et al. (2016), Campello & Gao (2017) and Irvine et al.(2016) represent the stronger citation bursts in the field of SCC research. Dhaliwal et al. (2016) exhibits the strongest citation burst with a strength of 19.88, lasting from 2017 to 2021. This work has become a seminal contribution to SCC research from a financial perspective. Campello & Gao (2017) shows a burst strength of 17.96, extending until 2022. Their study investigates the effect of customer concentration through the lens of loan contract terms, offering empirical support for subsequent research on financing constraints and SCC. Irvine et al.(2016) also demonstrates a notable citation burst (strength 10.31), focusing on the impact of customer base structure on earnings quality and profit stability, highlighting the interconnection between SCC and the quality of financial information.

Table 5
Top 26 references with the strongest citation bursts

Author	Year	Source	Strength	Begin	End	1975-2025
Ak & Patatoukas (2016)	2016	PROD OPER MANAG	8.47	**2016**	2021	
Patatoukas (2012)	2012	ACCOUNT REV	6.56	**2016**	2017	
Itzkowitz (2013)	2013	J CORP FINANC	2.54	**2016**	2018	
Dhaliwal et al. (2016)	2016	J ACCOUNT ECON	19.88	**2017**	2021	
Campello & Gao (2017)	2017	J FINANC ECON	17.96	**2017**	2022	
Irvine et al. (2016)	2016	ACCOUNT REV	10.31	**2017**	2021	
Cen et al. (2016)	2016	REV FINANC	2.92	**2017**	2021	
Kim et al. (2015)	2015	J OPER MANAG	2.62	**2017**	2018	
Huang et al. (2016)	2016	J BANK FINANC	8.19	**2018**	2021	
Saboo et al. (2017)	2017	J MARKETING	6.13	**2019**	2022	
Cen et al. (2018)	2018	J FINANC ECON	5.94	**2020**	2022	
Krolikowski & Yuan (2017)	2017	J BUS RES	5.44	**2020**	2022	
Kolay et al. (2016)	2016	J FINANC QUANT ANAL	3.86	**2020**	2021	
Krishnan et al. (2019)	2019	J MANAG ACOUNT RES	2.95	**2020**	2022	
Fabbri & Klapper (2016)	2016	J CORP FINANC	2.75	**2020**	2021	
Kim & Zhu (2018)	2018	J OPER MANAG	6.28	**2021**	2023	
Schwieterman et al. (2018)	2018	J BUS LOGIST	4.59	**2021**	2023	
Kim (2017)	2017	J SUPPLY CHAIN MANAG	2.74	**2021**	2022	
Hui et al. (2019)	2019	REV ACCOUNT STUD	2.74	**2021**	2025	
Cai & Zhu (2020)	2020	J BANK FINANC	2.64	**2021**	2023	
Chu et al. (2019)	2019	MANAGE SCI	4.35	**2022**	2025	
Zhang et al. (2020)	2020	ECON MODEL	4.18	**2022**	2025	
Dong et al. (2021)	2021	J CORP FINANC	3.68	**2022**	2025	
Lee et al. (2020)	2020	J BUS RES	3.51	**2022**	2025	
Leung & Sun (2021)	2021	PROD OPER MANAG	4.8	**2023**	2025	
Pan et al. (2020)	2020	N AM J ECON FINANC	4.2	**2023**	2025	
Liu et al. (2022)	2022	INT J PROD ECON	3.14	**2023**	2025	
Zhong et al. (2021)	2021	ACAD MANAGE J	2.96	**2023**	2025	
Crawford et al. (2020)	2020	CONTEMP ACCOUNT RES	2.8	**2023**	2025	
Cao et al. (2021)	2021	J FINANC STABIL	2.72	**2023**	2025	

The 26 references with citation bursts constitute the knowledge foundation of the SCC research field. Their high citation rates within specific time windows reflect their profound impact on the academic community. These works not only reveal the direct influence of SCC on corporate financial performance, but also expand the research paradigm, gradually incorporating multidimensional topics such as corporate strategy, capital structure, financial constraints, and sustainable development. Collectively, they have propelled SCC research toward greater systematic depth, interdisciplinary integration, and dynamic evolution.

4 Conclusions and Discussion

4.1 Main Findings and Contributions

As a key indicator for measuring the structural relationships between upstream and downstream partners, SCC has long attracted widespread attention from both academia and industry. In recent years, an increasing number of enterprises have recognized the strategic importance of SCC in performance enhancement, risk control, and strategic management, leading to a surge in both empirical studies and conceptual literature. However, the existing literature lacks a systematic bibliometric review, making it difficult to comprehensively capture the developmental trajectory and evolving trends within the field.

To address this gap, this study conducts a visualized and systematic scientometric review based on 362 articles published in the WoS Collection between 1975 and 2025. By integrating co-authorship analysis, co-word analysis, and co-citation analysis, the study systematically explores and structurally presents the social structure (RQ1), conceptual structure (RQ2), and intellectual structure (RQ3) of SCC research. It identifies core research groups, major research themes, and foundational literature, while uncovering emerging research directions and interdisciplinary integration trends. The goal is to offer researchers and practitioners a comprehensive overview of the field.

Following are the findings and contributions. First, based on co-authorship and country collaboration networks, the social structure of SCC research is revealed. The author network remains relatively fragmented, with limited collaboration, and academic partnerships are mostly regionally concentrated. In terms of international collaboration, China holds a significant quantitative advantage, but its global influence is relatively limited compared to countries like the United States, United Kingdom, and South Korea. The United States serves as a central node in the global collaboration network, playing a critical role in connecting international research resources and promoting academic integration. To enhance global knowledge diffusion and research impact, future cross-country collaborations should place greater emphasis on network centrality.

Second, through the analysis of the keyword co-occurrence network, the conceptual structure of SCC research is mapped. The top five most frequent keywords include customer concentration, performance, and supplier concentration, indicating a strong research focus on the categorization of SCC and its relationship with firm performance. In recent years, emerging keywords such as digital transformation, green innovation, and CSR have gained prominence, suggesting that SCC research is gradually moving toward interdisciplinary integration with topics related to the digital economy and sustainable governance.

Third, by analyzing the co-citation networks of authors, journals, and references, the study uncovers the intellectual structure of the SCC research field. Patatoukas (2012), Dhaliwal et al. (2016), Campello & Gao (2017), Hui et al. (2019) and Irvine et al. (2016) have been frequently co-cited, reflecting their profound influence in explaining the impact of SCC on firm financial performance, innovation capability, financing constraints, and risk management. These works form the intellectual foundation of the SCC research field. The five most influential journals in SCC research are *The Accounting Review, Journal of Financial Economics, Journal of Finance, Journal of Business Research, and Journal of Accounting & Economics*, indicating that SCC research is characterized by strong interdisciplinary integration across finance, accounting, strategic management, operations management, and economics. In addition, we identified the top 26 references with the strongest citation bursts from 1975 to 2025, showing a clear shift in recent years toward more complex topics such as digital transformation, corporate sustainability strategies, and nonlinear moderating mechanisms.

4.2 Limitations and Future Researches

Although this study provides a relatively systematic and multidimensional review of the SCC research field, it still has several limitations that future research may address and improve upon.

First, this study relies solely on the Web of Science Core Collection. While this database is highly authoritative, it may have omitted representative literature indexed in other databases such as Scopus and Google Scholar, potentially introducing sample bias. Second, this review includes only English-language journal articles and review papers, excluding policy reports, conference proceedings, and non-English publications, which may limit the comprehensiveness and international comparability of the findings. Third, despite employing a rigorous search process to construct a representative and comprehensive dataset, some relevant studies that focus on SCC may have been missed if they did not include specific search terms. Fourth, this study primarily adopts a scientometric review approach. Future research may benefit from combining bibliometric methods with traditional systematic literature review techniques to enhance depth and interpretive richness.

Despite these limitations, this study provides a valuable reference for both academic research and practical applications in the SCC domain. Future research can be further deepened in the following three directions. (1) Explore integration mechanisms between SCC and emerging themes such as ESG performance, carbon disclosure, digital platforms, and supply chain resilience to enhance practical relevance. (2) Identify nonlinear relationships and examine moderating effects of governance quality, market competition, and policy uncertainty. (3) Conduct cross-country, cross-industry, and cross-ownership comparative analyses to improve the external validity and theoretical contribution of SCC research.

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