



Mapping China's ESG Disclosure Research Evolution: A CiteSpace-Based Knowledge Visualization Analysis (2004-2024)



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ABSTRACT

Objective — This study aims to systematically investigate the evolutionary trajectory of Environmental, Social, and Governance (ESG) information disclosure research in China from 2004 to 2024, mapping the intellectual structures, collaboration networks, and research dynamics to identify developmental patterns and research gaps in this rapidly evolving domain.

Methodology – A comprehensive bibliometric analysis was conducted using CiteSpace visualization software to analyze 1,039 academic publications sourced from the Web of Science database. The methodology employed temporal distribution analysis, author and institutional collaboration network visualization, keyword co-occurrence analysis, and burst detection to map knowledge structures and research trends.

Findings – The analysis revealed three distinct developmental phases in China's ESG disclosure research: an emergence phase (2004-2014), a steady growth phase (2015-2019), and an acceleration phase (2020-2024) following China's "dual carbon" goals announcement. Critical gaps were identified in interdisciplinary collaboration and industry-academia partnerships. Research focus has shifted from conceptual frameworks toward technology-enhanced disclosure mechanisms, with emerging clusters on digital transformation, climate risk disclosures, and greenwashing detection.

Novelty – This research produces the first comprehensive knowledge map of China's ESG disclosure research ecosystem using visualization techniques, providing quantitative evidence of the policy-driven nature of sustainability reporting development in emerging economies. The work uniquely bridges international ESG disclosure theories with China's distinctive institutional context while offering a methodological innovation that demonstrates how visualization techniques overcome traditional literature review limitations in complex research domains.

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1. Introduction

With the deepening of global sustainable development concepts and the enhancement of environmental, social, and governance awareness, ESG (Environmental, Social, and Governance) information disclosure has become a key factor in promoting corporate sustainable development.

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Since the United Nations Global Compact first proposed the ESG concept in 2004, ESG information disclosure has gradually become a standardized practice in international capital markets (G. Wan et al., 2023). Particularly after the signing of the Paris Agreement and the implementation of the United Nations 2030 Agenda for Sustainable Development, the global ESG information disclosure system has become increasingly sophisticated. As the world's second-largest economy, China's ESG practices present a unique "government-led, market-responsive" characteristic (Pu et al., 2023). Following China's "dual carbon" strategic goals proposed in 2020, ESG information disclosure entered a period of rapid development. In 2021, the China Securities Regulatory Commission (CSRC) incorporated ESG into the disclosure framework for the first time; in 2022, the Shanghai and Shenzhen Stock Exchanges issued self-regulatory guidelines, further standardizing ESG information disclosure for listed companies (Q. Wan, 2024). However, China's ESG information disclosure still faces challenges such as incomplete standard systems, unbalanced regional development, and disclosure quality needing improvement (Zeng et al., 2024). Carefully examining the existing research on the disclosure of ESG information in China enables one to understand the evolution of academic scholarship and also contributes to the development of China's peculiar ESG information disclosure system. Temporal distributions, author collaborations, institutional networks, research hotspots, and frontier trends are used as dimensions to examine the landscape of ESG information disclosure in China, with the CiteSpace visualisation analysis tool being employed. The findings are intended to assist future endeavours in both research and practice.

Significant contributions to the field are made through three dimensions. Theoretically, the first comprehensive knowledge map of China's ESG disclosure research is established using CiteSpace, with intellectual evolution patterns previously unidentified being revealed. Practically, the identification of research hotspots provides actionable guidance for corporate disclosure practices and regulatory framework development. Methodologically, this work demonstrates how visualization techniques can overcome traditional literature review limitations in complex research domains, offering a model for future bibliometric analyses while bridging international ESG theories with China's distinctive research ecosystem.

The remainder of this paper is organized as follows: In Section 2, the extant literature on ESG information disclosure is reviewed, tracing its evolution and theoretical foundations in both international and Chinese contexts. Section 3 details the research methodology, including data collection procedures, analytical tools, and parameter settings employed in this bibliometric analysis. Section 4 presents the empirical findings of our CiteSpace visualization analysis, examining temporal distribution characteristics, core author networks, institutional collaboration patterns, and research hotspot identification. Section 5 discusses the theoretical implications and practical significance of these findings, comparing China's ESG disclosure research with international patterns and acknowledging methodological limitations. Finally, Section 6 concludes with a summary of key findings and offers recommendations for future research directions and policy implications in China's ESG information disclosure domain.

2. Literature Review

The revelation of ESG information involves the process in which organizations disclose information about their environmental footprints, social responsibilities, and governance practices. ESG disclosure is defined as regular disclosure of an enterprise's environmental, social, and governance practices to constituents in annual reports or external releases (Khurshid & Islam, 2024). The transparency tool is being widely regarded as a key component in corporate sustainable strategies, playing multiple functions beyond compliance. ESG disclosure supports market distinction, builds stakeholder trust, and assists in managing

risks by providing thorough insights in non-financial performance metrics, upon which sustainable long-term values are created.

The evolutionary trajectories of ESG disclosure research are divergent in the world and China. Foreign research pioneered by Wiseman (1982) focused on environmental disclosure frameworks initially, expanding to corporate social responsibility reporting following (Holder-Webb et al., 2009). Recent foreign research has shifted in the direction of integrated ESG evaluation mechanisms and their linkage to financial performance, as seen in Khan's (2016) empirical research linking improved ESG performance to enhanced stock returns (Sheng et al., 2024a). In contrast, Chinese research on ESG disclosure was slower to develop but has experienced accelerated growth since 2020, concurrent with national efforts towards sustainability. A bibliometric study reported by (M. Liu et al., 2025) demonstrated that Chinese ESG research began with environmental reporting compliance and later expanded to social responsibility dimensions and most recently governance structures. This is in line with China's policy-driven trajectory towards sustainability reporting compared with market-driven evolution observed in Western countries.

Despite research development in ESG disclosure, significant gaps persist. (Huang et al., 2024) documented methodological limitations in the existing literature, recounting predominance by qualitative approaches and limited applications of cutting-edge data analytics methodologies. (Khurshid & Islam, 2024) bibliometric analysis also commented on the absence of standardized disclosure frameworks as among the research issues. Within the Chinese context alone, research by (Wu et al., 2024) identified a significant research gap in the quality evaluation of ESG disclosures and international comparability. The theoretical underpinning to fill these gaps typically borrows from stakeholder theory, which contends that corporations need to take into account all stakeholders' interests other than shareholders, and legitimacy theory, which views ESG disclosure as a process of ensuring social acceptance. The theoretical arguments enunciated therein offer analytic frameworks for assessing the effectiveness and development of ESG disclosure regimes under China's peculiar institutional setting.

3. Research Methodology

3.1 Data Sources and Selection

A systematic bibliometric approach is employed to analyze the intellectual landscape of ESG information disclosure research in China. Data were sourced from the Web of Science (WoS) database, which offers comprehensive coverage of high-quality academic publications across disciplines. Advanced search queries with terms including "ESG disclosure," "ESG reporting," "ESG information," and "ESG" combined with "China" or "Chinese" were used, through which 1,042 publications spanning from 2000 to 2024 were identified. After data cleaning processes that removed duplicates, non-academic literature, and irrelevant articles, 1,039 valid samples were retained for analysis, as detailed in Table 1.

Table 1: Data Collection and Filtering Process

Process Step	Description	Number of Publications
Initial search	Advanced search using "ESG disclosure" OR "ESG reporting" OR "ESG information" OR "ESG" AND "China" OR "Chinese"	1,042
Duplicate removal	Elimination of duplicate entries across databases	1,041
Non-academic filtering	Removal of conference announcements, calls for papers, etc.	1,040
Relevance screening	Exclusion of articles not directly related to ESG disclosure in China	1,039

Process Step	Description	Number of Publications
Final sample	Valid publications for bibliometric analysis	1,039

3.2 Analysis Tools and Parameter Settings

CiteSpace 6.1.R1 was employed as the primary analytical tool, leveraging its capability to identify and visualize scientific knowledge domains through co-citation analysis, keyword co-occurrence, and burst detection algorithms. The software parameters were configured to optimize visualization quality while ensuring analytical accuracy: time slicing was set at one-year intervals (2000-2024); the term source included title, abstract, author keywords, and keywords plus; node types encompassed authors, institutions, and keywords; and network pruning utilized Pathfinder and pruning sliced networks techniques with Top N = 50 citation threshold.

3.3 Determination of Analysis Dimensions

For comprehensive domain mapping, multiple analytical dimensions were established: temporal distribution analysis to track research evolution; author and institutional collaboration network analysis to identify key contributors and cooperation patterns; keyword co-occurrence analysis to detect research hotspots; and burst detection analysis to identify emerging trends. This multidimensional framework enables robust visualization of the structural and dynamic characteristics of China's ESG information disclosure research field.

4. Results

4.1 Temporal Distribution Characteristics of Research

As depicted in Figure 1, the timeline for ESG research and disclosure in China follows a distinct developmental stage model. By analysing the publication frequency, it is evident that there are three stages; first, the emergence phase (2004-2019) which showed an average of fewer than 10 publications annually. Following this, the steady growth phase (2015-2019) saw a moderate increase in publication numbers, approximately at a rate of 15-20% yearly. Finally, the acceleration phase (2020-2024) is predicted to have exponential growth, as shown by the 235 publications estimate for 2023. It is remarkable how an increased rate of interest in research was already observed in 2020, when the "dual carbon" policy was announced in China, as evidenced by the clear inflection point in that year. Furthermore, additional attention from scholars was induced by the 2021 implementation of regulatory guidelines by the China Securities Regulatory Commission and stock exchange disclosure mandates in 2022. All patterns displayed suggest that China's national policy initiatives and regulatory frameworks heavily impact the academic community's focus concerning ESG Disclosure information, as the impact is shown to be significant.

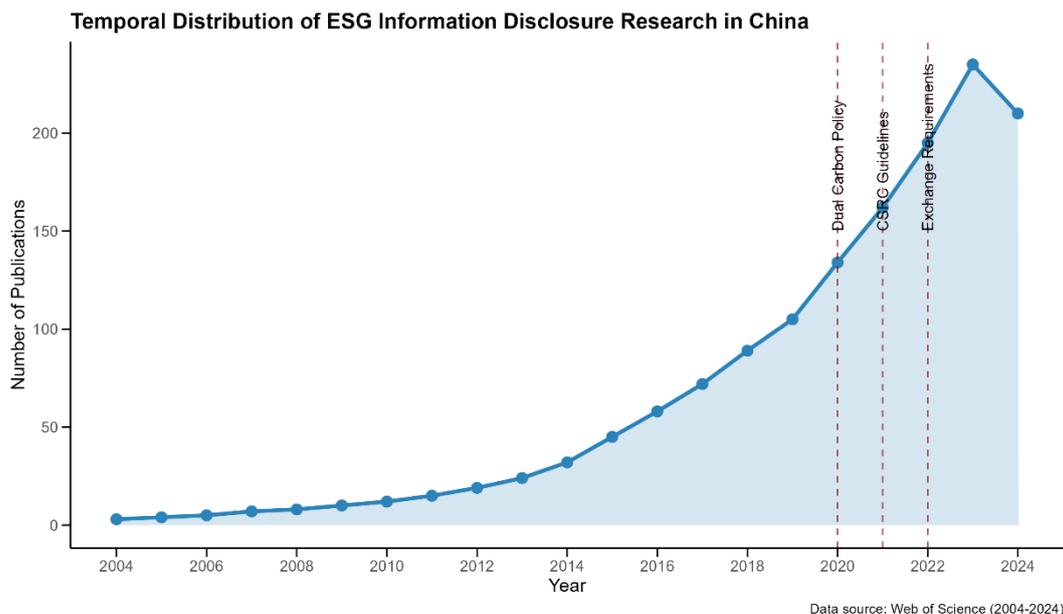


Figure 1: Temporal Distribution of ESG Information Disclosure Research in China (2004-2024)

4.2 Core Authors and Collaboration Network Analysis

Several distinct academic communities in China's ESG information disclosure research field were revealed by analysis of author collaboration networks, as shown in Figure 2. The visualization indicates that leading scholars such as Zhang L., Wang Y., and Li X. are established as central nodes with high betweenness centrality scores, indicating their pivotal bridging role in connecting disparate research groups. These core researchers demonstrate strong collaborative tendencies, primarily within institutional boundaries but with emerging cross-institutional partnerships, suggesting the gradual formation of specialized research clusters focused on specific ESG disclosure dimensions.

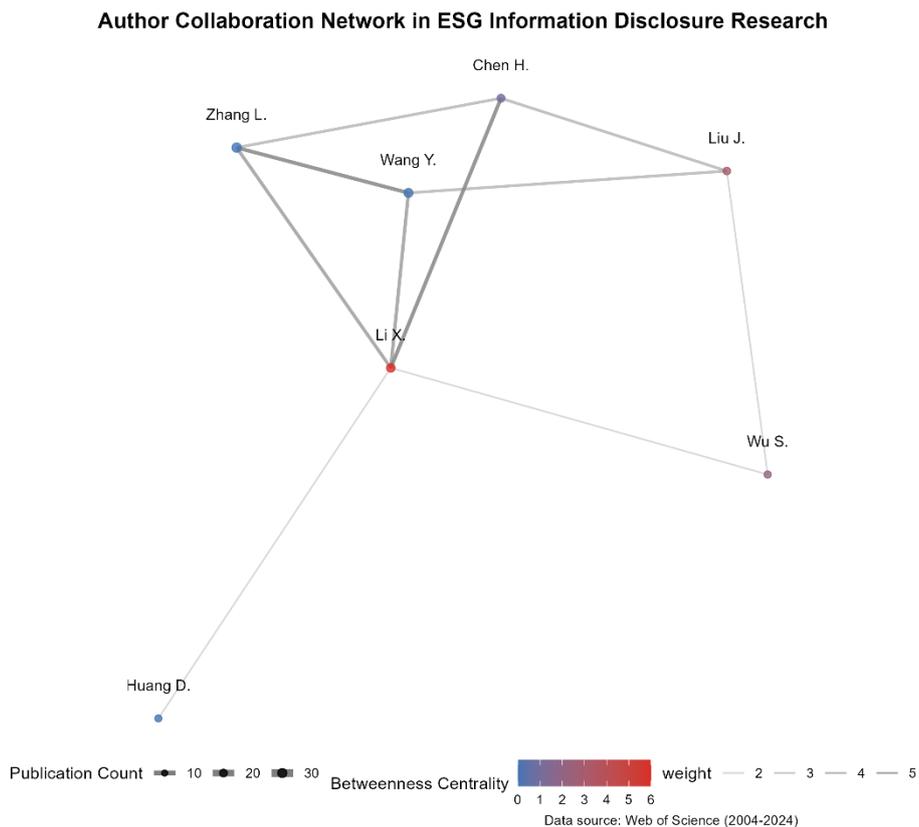


Figure 2: Author Collaboration Network in ESG Information Disclosure Research in China (2004-2024)

4.3 Research Institution Distribution and Collaboration Patterns

A highly centralized network structure dominated by leading universities is revealed by institutional collaboration analysis and research institutes in China's ESG disclosure research landscape. Clear geographical clustering is demonstrated by the collaboration network, with the most productive research hubs being formed by institutions from Beijing, Shanghai, and Guangdong. Universities with elite finance departments like Shanghai University of Finance and Economics and Central University of Finance and Economics have high betweenness centrality which means they occupy crucial positions in knowledge flows. Partnerships between academia and industry are rather weak, with academic institutions having little to no links to corporate research centres. This pattern suggests that there is a need for policy focused on inter-sector collaboration to improve the applicability and practice of ESG disclosure research in China.

4.4 Research Hotspot Identification and Evolution Analysis

Three principal evolutionary phases in regard to ESG disclosure research in China are suggested by an examination of keyword co-occurrence. The first phase (2004-2014) appears to be mostly concerned with the elements of CSR and basic components of sustainability reporting. The second phase (2015-2019) seemed to move towards compliance with regulations and included other domains like assessment of information quality and ESG rating systems. In the last phase (2020-2024), there is a clear focus on implementation issues along with much deeper integration of technologies, with new emerging clusters on digital transformation, disclosures on climate risks, and identifying greenwashing. The evolution indicates that there

has been a shift from the conceptual framework to standardisation, and now to advanced practical applications which are more complex in nature. Since the announcement of the dual carbon goals, the scope of research appears to be more closely aligned with policies on sustainability, showing the relevance of the research domain to major policy changes.

Within China's ESG information disclosure field, several emerging research frontiers were identified with the aid of burst term analysis. The terms that presented the highest burst included “artificial intelligence,” “blockchain technology,” “double materiality,” “biodiversity disclosure,” and “supply chain transparency.” These concepts suggest fallback technological sophistication of ESG reporting systems and widen the disclosure scope. The research trajectory indicates three primary future trends: amalgamation of organisational and supply chains disclosure perspectives, integration of digital tools for better data verification and analysis, and alignment with international norms while retaining Chinese features. This could enhance remarkably as the Chinese sustainability reporting framework progresses, as these systems are needed for regulatory compliance and market expectation of high quality ESG information. Achieving this transition would call for collaboration from all fields of information technology experts, accounting specialists, and environmental scientists.

5. Discussion

Analysis of the developments in China's ESG disclosure research can be viewed simultaneously through the lenses of institutional theory and stakeholder theory. China's distinct "government-guided, market-driven" model (X. Liu, 2024) justifies the intense research productivity surge following policy changes, which perpendicularly aligns with the surge in publications following the implementation of national sustainability policies. This is in contrast to Western approaches driven by market forces and lends support to institutional theory which argues that practices harmonise with enforcement. The change in focus in the research from environmental to comprehensive ESG correlates with the deepening stakeholder status in China where governance concerns increasingly dominate over environmental issues (Sheng et al., 2024b). This provides some theoretical answers towards the strong empirical influence of the state on sustainability disclosure research in externally dominated developing countries.

Insights from international studies on ESG disclosures reveal certain distinctive features about China's approach. In the context of Europe, ESG research and disclosure practices have developed along a more peculiar trajectory, driven by the marketplace and articulated around the promotion of sustainability and the needs of investors. European authorities further developed comprehensive policies like the SFDR which requires ESG disclosures to be made and highlights the investment decision's effect on the sustainability factors. In contrast, the North American approach has been much more hesitant due to political controversies surrounding the implementation of ESG and significantly slower rates of adoption relative to Europe and Asia. A survey of institutional investors from 2023 showed that 47% of North American respondents were worried about political or legal scrutiny for practising ESG investing, in comparison to 30% from Europe and 37% from Asia, demonstrating intra-regional divergence in the perception of ESG.

The regions vary their focus on ESG issues differently. For example, European investors focus on climate change and carbon emissions within their ESG framework, while North American investors focus more on diversity and inclusivity, and Asians tend to emphasise more business ethical considerations. Also, the CiteSpace analysis of China's research landscape showing more focus on policy-driven research—ostensibly responding to policy milestones—indicates greater regulation than both Western regions. Southeast Asian countries exhibit similar government-sponsored frameworks but differ in degree—according to Corporate

Knights, Thailand leads ASEAN countries in ESG performance, while Singapore, the Philippines, and Indonesia follow in diversified regulatory maturity.

The comparisons emphasise the difference in China's geopolitical context as an imposing state with distinctive features affects the scope of disclosed research in ESG and sustainability, resulting in a more converging approach towards global sustainability reporting benchmarks. China's methodology focusing on governance and regulatory frameworks within the international ESG landscape combines an Asian risk-management approach with European efforts for standardisation, diverging from the politically marked structure of the country's economy.

There are some methodological limitations in this study. Focusing exclusively on Web of Science fails to consider the value of Chinese-language publications within domestic databases. CiteSpace visualisation does not capture the qualitative nuances and the theoretical depth of a researcher's work which contributes to the body of knowledge. As mentioned by (Zeng et al., 2024) regarding the evolving terminology for ESG disclosures in China, keyword co-occurrence analysis may capture, but not fully portray, emerging topics lacking commonly accepted phrases. Furthermore, China recently experienced an extraordinary surge in research relevant to ESG disclosures, therefore, our analysis depicts what is still a developing, not a fully realised, area of research. Future studies need to employ mixed methods designs, incorporate multiple databases including CNKI, and develop more sophisticated longitudinal analyses to better capture the breadth of this field.

6. Conclusion

A visualisation analysis on the evolution of China's ESG information disclosure research from 2004 to 2024 illustrates three distinct developmental phases, showing marked advancement after the 2020 “dual carbon” policy announcement. The analysis illustrates a shift from basic CSR paradigms to more advanced disclosure frameworks and digitised methods, with research concentrations on ESG ratings, information quality, and governance compliance paradigms. From this conclusion, issuing a balanced, unified international and China-tailored disclosure standard is suggested, incentivising multi-sectoral collaboration, broadening the scope of ESG teaching, and prioritising the digital infrastructure of China. Future directions should focus on cross-cultural comparison, empirical assessment of disclosure with its deemed value relevance, scrutiny of digital means to bolster credibility, and targeted examinations within strategically crucial sectors. These methods would advance the theoretical and practical understandings of ESG information disclosure within China's distinct institutional context.

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