

Research Hotspots and Frontier Trends of ESG Information Disclosure in China: A Visual Analysis Based on CiteSpace

Zhengguang Hu, Lijie Zhang

School of Economics and Management, Shaanxi University of Science and Technology, Xi'an, China

Email: 1747212625@qq.com

How to cite this paper: Hu, Z. G., & Zhang, L. J. (2025). Research Hotspots and Frontier Trends of ESG Information Disclosure in China: A Visual Analysis Based on CiteSpace. *Open Journal of Business and Management*, 13, 1762-1783.

<https://doi.org/10.4236/ojbm.2025.133091>

Received: March 19, 2025

Accepted: May 11, 2025

Published: May 14, 2025

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Abstract

This study employs bibliometric methods to systematically analyze the research progress of ESG information disclosure in China from 2006 to 2025 using core journal literature from the CNKI database. Visual knowledge maps of publication trends, co-cited literature, core authors, institutional collaboration networks, research hotspots, and frontier trends are constructed using CiteSpace 6.2.6 software. The findings reveal that ESG information disclosure research in China has experienced a staged growth of “exploration-development-outbreak.” The research scholars exhibit a “small core-large periphery” structure, characterized by scattered cooperation and collaboration barriers. Universities dominate the research landscape, but cross-institutional and industry-university collaborations are significantly insufficient. Research hotspots revolve around the core hub of “information disclosure,” forming clusters such as social responsibility, corporate value, and green innovation. The research trajectory reflects a cycle of “policy guidance-practice trial-theory iteration.” The research frontier focuses on green technology innovation and digital governance under the dual carbon goals, expanding the research perspective from individual enterprises to industrial ecosystems and institutional environments. This study aims to provide a systematic cognitive framework for the ESG information disclosure field and offer theoretical references for enterprises to optimize disclosure strategies and regulators to improve policies.

Keywords

CiteSpace, ESG Information Disclosure, Bibliometrics, Knowledge Graph, Visual Analysis

1. Introduction

In the context of accelerating global sustainable development agendas, Environ-

mental, Social, and Governance (ESG) information disclosure has evolved from a voluntary corporate practice to a core institutional arrangement in global capital markets. As a core component of corporate non-financial information disclosure, ESG information disclosure, while enhancing market efficiency and strengthening internal and external corporate oversight (Geng & Zhu, 2025), provides a basis for investors' decision-making, guides enterprises to fulfill their social responsibilities, balances the interests of multiple stakeholders, and facilitates the achievement of high-quality development and the enhancement of sustainable competitiveness. Unlike the Western "market-driven" ESG system, China's ESG disclosure presents distinctive "policy-driven" characteristics. In terms of institutional embeddedness, ESG disclosure is deeply tied to the performance assessment of state-owned enterprises and the evaluation of local government performance. In terms of policy iteration, it is reflected in the policy evolution from the 2016 "Guiding Opinions on Building a Green Financial System" to the "dual-carbon" target by 2020, forming a dynamic cycle of "policy piloting-practice feedback-standardization". The complexity of governance is reflected in the need to simultaneously address the challenges of government-enterprise relations, ownership differences, and digital transformation under the socialist market economy, including the co-existence of "greenwashing" behavior by state-owned enterprises and the lack of incentives for disclosure by private firms (Yin et al., 2025; Li et al., 2015; Wang et al., 2015). Although China's ESG disclosure has made significant progress, it still faces multiple challenges, such as multiple government departments and systems, low disclosure rate, inconsistent standards, and incomplete content (Zhu, 2024), and there is an urgent need to transform ESG disclosure from "scale expansion" to "quality improvement". Although academia has conducted multi-dimensional research on the impact mechanisms and economic consequences of ESG information disclosure, existing literature mainly focuses on single issues or static analyses, lacking systematic integration of the knowledge system and exploration of dynamic evolution laws. Methodologically, it relies on traditional regression analysis, lacking a structured cognitive framework based on big data and knowledge graphs.

Based on this, this study relies on the CiteSpace bibliometric tool to construct a visual knowledge map to explore the research hotspots, evolution and frontier trends in the field of ESG information in China. It analyzes publication volume, co-cited literature, core authors, and institutional collaboration networks, identifies core themes through keyword co-occurrence analysis, and tracks the dynamic evolution of research hotspots using keyword cluster timelines. A framework of "theory-driven practice feedback-policy iteration" is constructed to explore the transformation path from "system transplantation" to "local innovation" and frontier trends. Based on the limitations of CiteSpace in digging out the theoretical roots and analyzing the inner mechanisms and drivers, this study systematically compiles the main research theories, drivers, inner mechanisms and economic consequences in this field. This study aims to provide a systematic cognitive framework for the ESG information disclosure field and theoretic-

cal references for enterprises to optimize disclosure strategies and regulators to improve policies.

2. Research Design

2.1. Research Methods and Data Sources

CiteSpace visual analysis presents research authors, institutions, and keywords in a discipline through knowledge maps (Chen et al., 2015). This study uses CNKI as the data source, with keywords such as “ESG information disclosure” and “social responsibility disclosure”. Data retrieval spans from January 1, 2006, to March 10, 2025, with source categories including PKU Core Journals, CSSCI (including expanded versions), and SCI journals. A total of 361 valid documents are retained after screening.

2.2. Research Process

This study follows standardized bibliometric procedures. Raw data is exported in RefWorks format during data collection and standardized using CiteSpace 6.2.6 software. Non-research literature such as book reviews and conference notices are manually excluded, and titles, abstracts, and keywords are screened for thematic relevance. Synonymous keywords are merged, and non-substantive keywords are removed. The time span is set from 2006 to 2025, with a time slice of 1. Network nodes are set as authors, institutions, and keywords for visual and collaboration network analysis, generating visual maps to intuitively display productive authors, institutions, research hotspots, and frontier trends.

3. Publication Trends of ESG Information Disclosure in China

3.1. Analysis of Publication Volume

The number of publications based on the time distribution can reflect the development of the research field from a macro perspective. From 2006 to 2025, the research on ESG information disclosure in China has gone through a cycle from germination and accumulation to rapid expansion, and the publication situation is shown in **Figure 1**. From 2006 to 2011, the research in this field was in the exploratory period, with a low annual average number of publications, and was still in the stage of conceptual introduction and theoretical foundation. From 2012 to 2021, with the deepening of green finance policy and capital market reform, the annual publication volume climbed to 10 - 20 papers, with a total of 177 papers published, with obvious fluctuations, but the overall growth is not large, and is in a steady development stage. After 2022, under the dual driving force of the “dual carbon” target and the new mandatory disclosure rules of exchanges, the research will enter an explosive growth stage. It is worth noting that the data drop in 2025 is mainly due to the publication cycle of academic journals, delays in the inclusion of databases and time constraints in downloading data, but the actual research fever has not decreased.

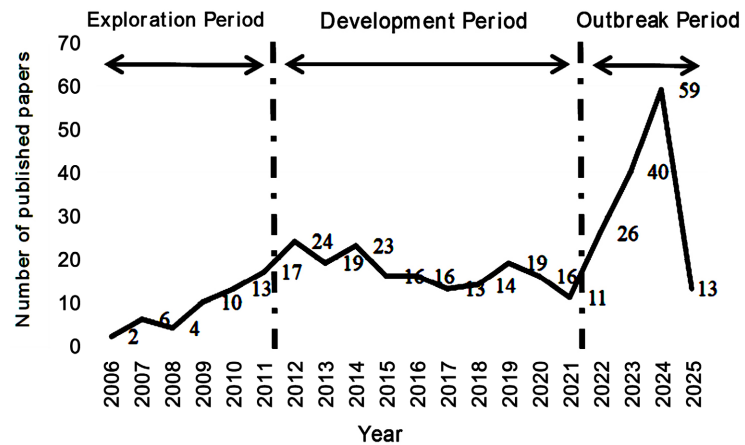


Figure 1. Line graph of published literature on ESG information disclosure in China, 2006-2025.

3.2. Co-Cited Literature Analysis

Due to CiteSpace's limitation in analyzing CNKI co-citations, CNKI's bibliometric tool is used to count co-citation frequencies of the 361 documents. The top 5 co-cited papers are listed in **Table 1**. The study published by Tian Lihui's team in 2017 in *Management World* tops the list with 679 citations, which creatively puts forward the paper "mask effect hypothesis", which confirms that the mandatory social responsibility disclosure policy may exacerbate the risk of stock price crash triggered by intensified information asymmetry through double difference model, providing a new perspective for the assessment of policy effect. In the same period, Tan Xue in *Industrial Economics Research* reveals the positive correlation between the intensity of industry competition and the quality of corporate social responsibility disclosure through signaling theory, which provides micro evidence for the motivational differences in non-financial information disclosure in the process of marketization. In 2017, Li Zhibin et al. published in *Accounting Research* based on the institutional context in China, revealing the quality of social responsibility disclosure of internal control as an institutional governance tool to enhance path. Compared with the earlier studies focusing on institutional pressure, the ESG value creation study by Xu Guanghua's team and Li Zhibin's exploration of media monitoring published in *Accounting Letters* in 2022 marks the transition of the research paradigm to "economic consequences-governance synergy", echoing the interactive influence of multiple governance subjects in the digital era. The Interactive Impact of Multiple Governance Subjects in the Digital Era.

Table 1. Top 5 co-cited Chinese literature.

Rank	Title	Journal	Year	Authors	Co-citations
1	The "Masking Effect" of Social Responsibility Disclosure and the Risk of Listed Company Crash: A DID-PSM Analysis of Chinese Stock Markets	Journal of Management World	2017	Tian et al.	679

Continued

2	Industry Competition, Ownership and Disclose of Corporate Society Responsibility Information: Based on Signaling Theory	Industrial Economics Research	2017	Tan	468
3	Does ESG Information Disclosure Increase Enterprise Value?	Communication of Finance and Accounting	2022	Xu et al.	464
4	Internal Control, Nature of Property Right and Social Responsibility Information Disclosure: Evidence from Chinese Listed Companies	Accounting Research	2017	Li et al.	414
5	ESG Information Disclosure, Media Supervision and Corporate Financing Constraints	Scientific Decision Making	2022	Li et al.	400

4. Core Authors and Research Institutions

4.1. Core Authors

The research scholar collaboration network map can visually present the cooperative relationships among scholars. This study reveals the research scholars in the field of ESG information disclosure through the scholar collaboration network map, as shown in **Figure 2**. **Table 2** lists the top 10 productive authors. Based on the visual analysis of the 284 scholars' cooperative relationship, the study found that Yin Hong, Wu Danhong and Lai Yan constitute a small research core, whose node size and connectivity density are higher than that of other scholars, and although they have a certain degree of academic influence, they have not yet formed a large-scale research, and they mainly rely on the individual strength of the core authors. The research scholars present the characteristic of "small core-large periphery", compared with the gathering of research scholars in the core circle, the peripheral small-scale research scholars are more dispersed, which reflects that the research in the field of ESG information disclosure is still more dispersed and there is the problem of collaboration barriers.

Table 2. Top 10 researchers and scholars in terms of ESG information disclosure postings.

Author	Frequency	Year	Author	Frequency	Year
Yin Hong	7	2015	Du Jian	3	2015
Wu Danhong	5	2014	Liu Weiwei	2	2024
Lai Yan	4	2020	Ji Li	2	2014
Xu Guanghua	3	2014	Wu Xun	2	2016
Xu Xuegao	3	2014	Jiang Yunyan	2	2018

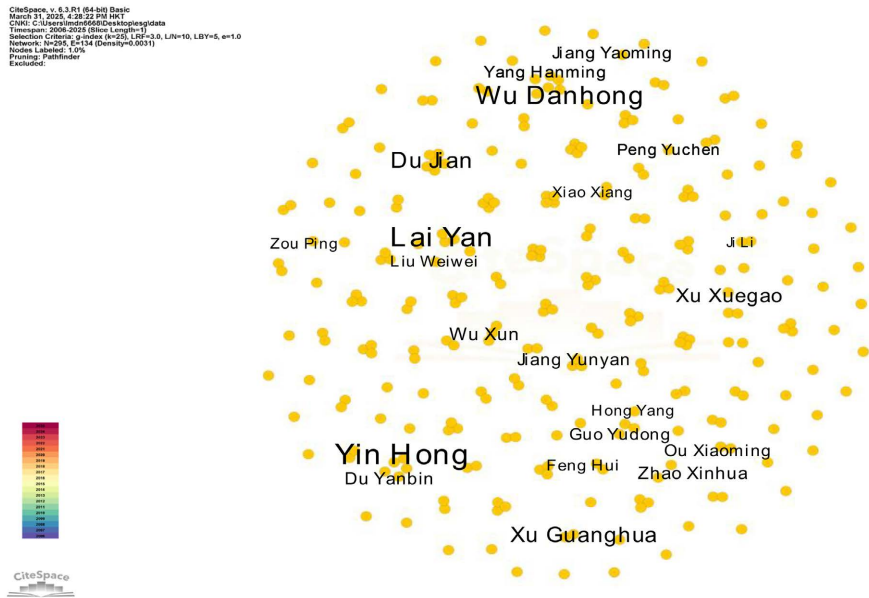


Figure 2. Collaborative network mapping of scholars in ESG information disclosure research.

4.2. Research Institutions

The institutional research collaboration map can visually present the cooperative relationships among research institutions. The collaboration status of institutions publishing in the field of ESG information disclosure in this study is shown in **Figure 3**. Universities dominate the research in this field, with the School of Accounting at Zhongnan University of Economics and Law, the School of Economics and Management at Beijing Jiaotong University, the College of Engineering and Technology at Chengdu University of Technology, the School of Accounting at Lanzhou University of Finance and Economics, and the School of Accounting at Nanjing University of Finance and Economics being the top five institutions with high publication volumes. The institutional collaboration network exhibits a “high-yield island” characteristic. Apart from universities, only a few enterprises such as Shanghai Lixin Ruisi and China Everbright Bank have engaged in joint research with academic institutions. Industry-academia collaboration remains particularly weak, and the transformation of theoretical achievements into industrial practice has yet to be fully realized. The top ten institutions in terms of the number of publications in the field of ESG information disclosure are shown in **Table 3**.

Table 3. Top 10 issuers of ESG information disclosure.

Institution	Frequency	Year	Institution	Frequency	Year
Zhongnan University of Economics and Law, School of Accounting	10	2010	Nanjing University of Finance and Economics, School of Accounting	5	2013

Continued

Beijing Jiaotong University, School of Economics and Management	7	2010	Southwest Jiaotong University, School of Economics and Management	5	2009
Chengdu University of Technology, College of Engineering and Technology	6	2015	Heilongjiang Bayi Agricultural University, School of Accounting	5	2013
Lanzhou University of Finance and Economics, School of Accounting	5	2011	Central South University, School of Business	4	2009
Nanjing University of Science and Technology, School of Economics and Management	5	2014	Renmin University of China, School of Business	4	2012

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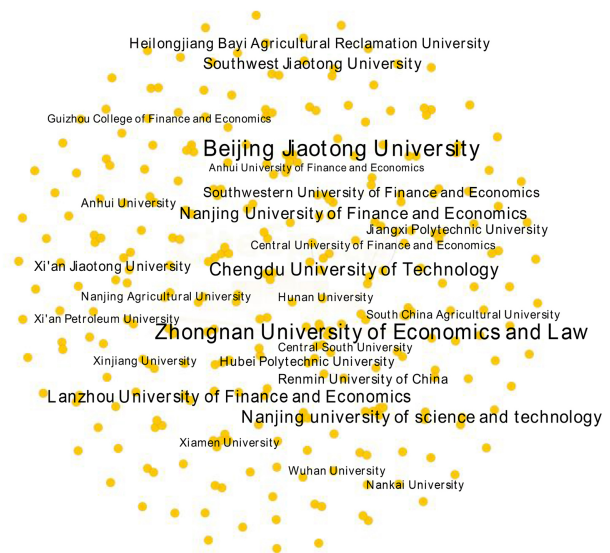
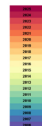


Figure 3. Mapping of institutional research collaborations in the field of ESG information disclosure.

5. Analysis of Research Hotspots of ESG Information Disclosure

5.1. Keyword Co-Occurrence Network

The frequency of keywords and the density of links between nodes show the research heat and relevance of the field. This study uses the keywords as the knowledge unit to construct the co-occurrence relationship network, as shown in Figure 4. A total of 283 effective keywords are included in the study, forming 384 co-occurrence lines, and some high-frequency keywords are shown in Table 4. “Information disclosure” as a key node has a frequency of up to 127 times, with a medi-

ational centrality of 0.69, which shows a large node size and high mediational centrality in the co-occurrence network, i.e., corporate information disclosure behavior is the core research topic in this field. Disclosure behavior is the core research topic in this field, indicating that it is the pivotal position in the whole knowledge network architecture and the key to connecting other research points. The frequency of “social responsibility” is 43 times, and the mediational centrality is 0.43, which reflects that academics attach great importance to the topic of corporate social responsibility disclosure.

Table 4. Information on selected high-frequency keywords.

Keyword	Frequency	Betweenness Centrality	Keyword	Frequency	Betweenness Centrality
Information disclosure	127	0.69	Cohort effect	6	0.03
Social responsibility	43	0.43	Private enterprises	6	0.02
Listed companies	20	0.07	State-owned enterprises	6	0.09
Financing constraints	17	0.1	Mandatory disclosure	5	0.07
Corporate governance	15	0.1	Political connection	5	0.03
Nature of property rights	13	0.1	Green innovation	5	0.02
Media attention	9	0.08	Cost of capital	4	0.04
Influencing factors	7	0.06	Agency cost	3	0.03
Corporate value	6	0.03	Institutional pressure	3	0.04

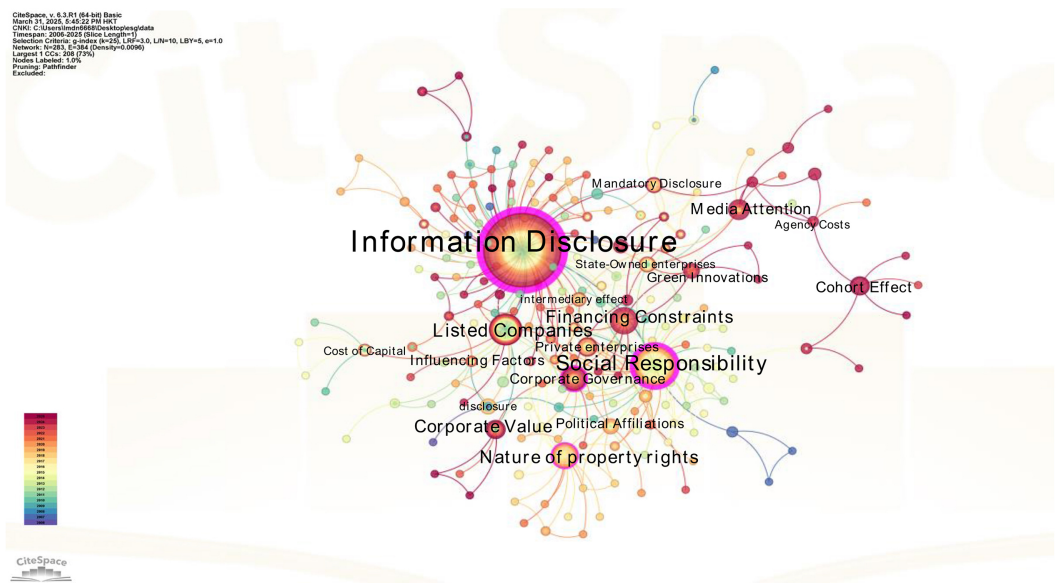


Figure 4. ESG information disclosure keyword map.

Analyzing from the perspective of co-occurrence of keywords, there is an association between “financing constraints”, “corporate governance”, “nature of property rights” and the core theme “information disclosure”. “Existing research focuses on the interactions between information disclosure and corporate financing mechanisms, governance structure models, property rights attributes, and other aspects. For example, how the ESG information disclosure behavior of corporations reacts to their financing constraints and corporate governance effectiveness. Keywords such as “media attention” and “influencing factors” further expand the scope of the study to include the power of external monitoring and the analysis of multiple factors affecting disclosure. Keywords such as “cohort effect,” “private enterprises,” and “state-owned enterprises” appear on the periphery of the core keywords but are connected to other nodes, and are emerging or relatively minor research directions at present. Directions, such as whether there is heterogeneity in the way different ownership firms approach ESG information disclosure. The low frequency and weak centrality of keywords such as “green innovation” and “cost of capital” indicate that they have received limited attention and relevance in the knowledge network. As the concept of sustainable development continues to gain popularity around the world, it is expected that more studies will explore the potential link between “green innovation” and disclosure in the future.

5.2. Keyword Clustering Mapping Analysis

Keyword clustering visually represents the structural characteristics of key nodes and their significant connections, summarizing the core themes of the research (Huang et al., 2013). The study obtained a total of 9 clusters by Log-Likelihood Ratio (LLR), as shown in Figure 5. The clustering modularity value $Q = 0.8402 > 0.3$ indicates that the differentiation and independence between clusters are significant; the average profile value $S = 0.9762 > 0.7$ indicates that the keywords match the clusters where they are located extremely well, and the clustering results are significant and credible (Chen et al., 2015).

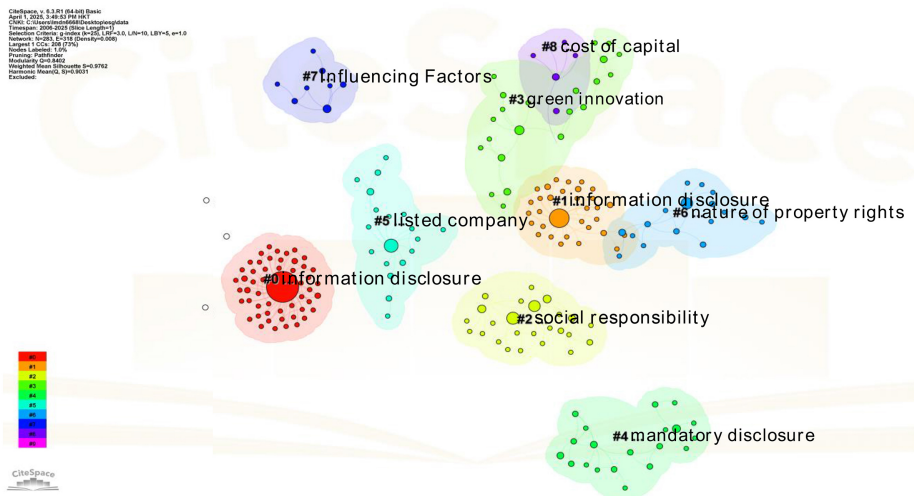


Figure 5. ESG information disclosure keyword clustering.

In **Figure 5**, the larger the network nodes are, the higher the frequency of keywords, and the thicker the lines between nodes are, the stronger the degree of association between different keywords. Based on the co-occurrence and frequency of keywords, nine cluster labels are obtained, and the top hotspots are “social responsibility”, “corporate value”, “green innovation”, “mandatory disclosure”, “listed company”, and so on. The top hotspots are “social responsibility”, “corporate value”, “green innovation”, “mandatory disclosure” and “listed company”. According to the keyword clustering map, the research hotspots in this field are mainly reflected in the following aspects:

Firstly, #1 social responsibility, the topic contains a total of 32 keywords such as sustainable development, responsible investment and collaborative governance. The study found that CSR disclosure needs to be reconstructed in terms of mandatory norms, disclosure indicators and procedural rules (Zheng, 2021). The impact of digital intelligence technology on the quality of ESG information disclosure presents a double-edged sword effect that may be used by companies to implement ESG rinsing behaviors as well as empowering stakeholder monitoring (Yin et al., 2025). The study emphasizes that ESG system construction needs to be integrated with the Chinese context and localized through the integration of party leadership and stakeholder governance mechanisms (Zhang et al., 2023). In addition, external factors such as digital transformation and co-institutionalization have a significant impact on CSR performance, with moderate digital transformation enhancing ESG performance through green technology innovation and information disclosure quality (Kuang et al., 2025), while co-institutionalization may weaken the incentive for ESG investment due to market monopoly (Lei et al., 2023).

Secondly, #2 corporate value, the topic contains a total of 25 keywords such as financing constraints, information transparency and market attention. It is found that ESG performance and information disclosure have a positive promotion effect on corporate value (Xu et al., 2022) and are more significant in non-state-owned enterprises, small-scale enterprises and non-polluting industries (Zhang et al., 2019; Zhang & Bao, 2023), and the specific mechanism of action includes paths such as alleviating financing constraints, enhancing market attention, and enhancing information transparency (Wang et al., 2022). The relationship between ESG and corporate value presents dynamic changes, and there may be a cost effect in the short term and value appreciation in the long term (Wang, 2022). External factors such as institutional investor preferences and economic policy uncertainty can moderate the value effect of ESG (Bai et al., 2022).

Thirdly, #3 green innovation, the topic contains a total of 22 keywords such as ESG ratings, information transparency and green finance. It is found that ESG ratings and information disclosure can promote corporate green innovation (Ba et al., 2025; Shi et al., 2024; Li et al., 2022), and its mechanism of action is mainly reflected in alleviating financing constraints, reinforcing external supervision, and enhancing information transparency (Huang et al., 2024). In particular, the innovation-driven role of ESG is more prominent when the industry is highly compet-

Based on the time evolution mapping of keyword clustering in the field of ESG information disclosure, this study breaks through the traditional unidimensional analysis paradigm and constructs a three-dimensional framework of “theory-driven-practice-feedback-policy iteration” to deconstruct the knowledge network in the field, as shown in **Table 5**, and divides the evolution into three progressive cycles following the stage characteristics of the construction of the ESG system in China. Following the stage characteristics of China’s ESG institutional construction, the evolution is divided into three progressive cycles.

Table 5. Three stages of ESG information disclosure research in China.

Dimension	Year	Keywords	Associative Logic	Relevant Literature
Theoretical driver dimension	2012	Legitimacy	Explains how enterprises selectively disclose ESG information to obtain legitimacy.	Song et al., 2012
	2014	Institutional Theory	Analyzes the driving force of policy pressure and legitimacy mechanisms on disclosure behavior.	Wu et al., 2014
	2016	Mediating Effect	Verifies the mediating role of ESG disclosure in corporate value or risk.	Zhou et al., 2016
	2021	Agency Cost	Explores how ESG disclosure mitigates conflicts of interest between owners and management.	Yang et al., 2021
	2024	Signaling Theory	Investigates how ESG disclosure conveys signals about corporate quality.	Wang et al., 2024
Practical feedback dimension	2011	Disclosure Rate	Proportion of ESG reports published by statistical companies.	Kong et al., 2011
	2013	Disclosure Quality	Evaluates the completeness and accuracy of corporate ESG data.	Yang et al., 2013
	2021	Green Innovation	Documents firms’ green technology R&D efforts to meet ESG requirements.	Hou et al., 2021
	2023	Greenwashing	Identifies firms’ use of vague or selective disclosure to avoid accountability.	Li et al., 2023
	2024	Compliance Costs	Calculates additional audit and data collection costs under mandatory disclosure reforms.	Xiong et al., 2024
Policy iteration dimension	2008	Voluntary Disclosure	Enterprises independently decide whether to disclose ESG information.	Zhang et al., 2008

Continued

2016	Mandatory Disclosure	Shifts from voluntary to mandatory disclosure requirements.	Huo et al., 2016
2023	Dual Carbon Goals	Dual Carbon Policy Forces Companies to Disclose Climate-Related Metrics.	Li et al., 2023
2024	International Comparison	Improvement of local standards with reference to international frameworks.	Yang et al., 2024
2024	Capital market	Enhanced ESG information disclosure linked to financing.	Hu et al., 2024

1) In the embryonic exploration period from 2006 to 2015, the policy level was oriented to guide enterprises to “voluntary disclosure”, and mandatory constraints had not yet been formed, and corporate ESG practices were characterized by fragmentation, with only sporadic disclosure of social responsibility and other contents. At this time, the theoretical research focuses on the “legitimacy” of corporate disclosure behavior and “motivation” analysis, trying to answer the basic proposition of “why enterprises choose to disclose”.

2) During the period of standardization from 2016 to 2020, the focus of the policy has shifted to “mandatory pilot”, which pushes some listed companies to disclose ESG reports, and the disclosure rate of enterprises has increased significantly and the content tends to be systematized. Theoretical research has also deepened, with scholars introducing “institutional theory” to explain the impact of policy on corporate behavior, and exploring the internal path of ESG information disclosure on corporate value through the “mediation effect” model.

3) During the period of deepening and perfecting from 2021 to 2024, the policy will enter the stage of “standardization”, clarifying the content, format and forensic requirements of ESG information disclosure, and focusing on the management of the phenomenon of “greenwash” in order to guarantee the authenticity of disclosure in practice. Authenticity. The theoretical level is characterized by interdisciplinary integration. On the one hand, the theory of “signaling” is used to deconstruct the strategic logic of enterprises releasing quality signals to the capital market through ESG information disclosure. On the other hand, scholars from the perspective of “game theory” have begun to draw the behavioral equilibrium among enterprises, regulators and investors in the disclosure game, revealing how the checks and balances of multiple interests drive the dynamic evolution of the ESG ecosystem.

The three phases of China’s ESG information disclosure research show a cycle of “policy traction-practice trial and error-theory iteration” rather than the traditional linear extension. Policy tools have shifted from flexible guidance to rigid regulation, forcing corporate disclosure behavior to evolve from “passive compliance” to “active optimization”. Practical issues such as greenwashing and data distortion in corporate practices have spurred academic theoretical research, while

academic achievements have in turn optimized government policies through channels like government projects, forming a dynamic closed loop of “policy-driven practice trials—practice issues driving theoretical innovations—academic consensus feeding policy iterations”. This reflects the evolutionary path of emerging systems from “framework transplantation” to “local reconstruction”.

Aiming at the limitations of CiteSpace in digging out the theoretical roots and analyzing the inner mechanisms and driving factors, this study adopts the supplementary path of qualitative research. On the one hand, we systematically sort out the main research theories of ESG disclosure, structurally present the core theories such as institutional theory and signaling theory, and clarify the explanatory logic of the theories on the practice of ESG disclosure, as shown in **Table 6**; on the other hand, we construct an analytical framework of drivers, internal mechanisms, and economic consequences to demonstrate the role of the internal and external drivers on the behavior of ESG disclosure by enterprises, and at the same time, analyze the role of mechanisms such as reducing information asymmetry to the reduction of corporate risk and the improvement of long-term competitiveness. At the same time, it analyzes the transmission path of mechanisms such as reducing information asymmetry to economic consequences such as corporate risk reduction and long-term competitiveness enhancement, so as to make up for the inadequacy of quantitative tools in the analysis of complex mechanisms, as shown in **Figure 7**.

Table 6. Main research theories on ESG disclosure.

Theoretical Foundation	Core Arguments	Disclosure Types	Relevant Literature
Information Asymmetry Theory	In market transactions, information distribution between buyers and sellers is uneven, leading to adverse selection and moral hazard.	ESG comprehensive information disclosure	Jiang et al., 2024; Duan et al., 2024
Legitimacy Theory	Organizations must obtain legitimacy through behaviors compliant with social norms.	Social responsibility information disclosure	Huang et al., 2023; Xu et al., 2022
Signal Theory	High-quality entities differentiate themselves from low-quality ones by sending credible signals, which must satisfy the cost-differentiation condition.	Corporate governance information disclosure	Li et al., 2024; Guo et al., 2023
Institutional Theory	Organizational behavior is constrained by the institutional environment, converging to external expectations through coercive isomorphism, mimetic isomorphism, and normative isomorphism.	Social responsibility information disclosure	Huang et al., 2023; Bi et al., 2015

Continued

Reputation Theory	Corporate reputation, as the collective perception of stakeholders toward its identity and behavior, directly influences its resource acquisition capability.	Social responsibility information disclosure	Wang et al., 2022; Duan et al., 2024
Principal-Agent Theory	The goal conflict between shareholders and management generates agency costs, which require mitigation through supervision and incentive-compatibility mechanisms.	Corporate governance information disclosure	Li et al., 2022
Stakeholder Theory	Enterprises should balance the demands of diverse stakeholders (e.g., shareholders, employees, and communities) to achieve long-term value.	ESG comprehensive information disclosure	Wang et al., 2023; Bai et al., 2022
Sustainable Development Theory	Development should satisfy contemporary needs without compromising the rights and interests of future generations, emphasizing the balance among environmental, social, and economic dimensions.	Environmental information disclosure	Xiao et al., 2020; Huang et al., 2021

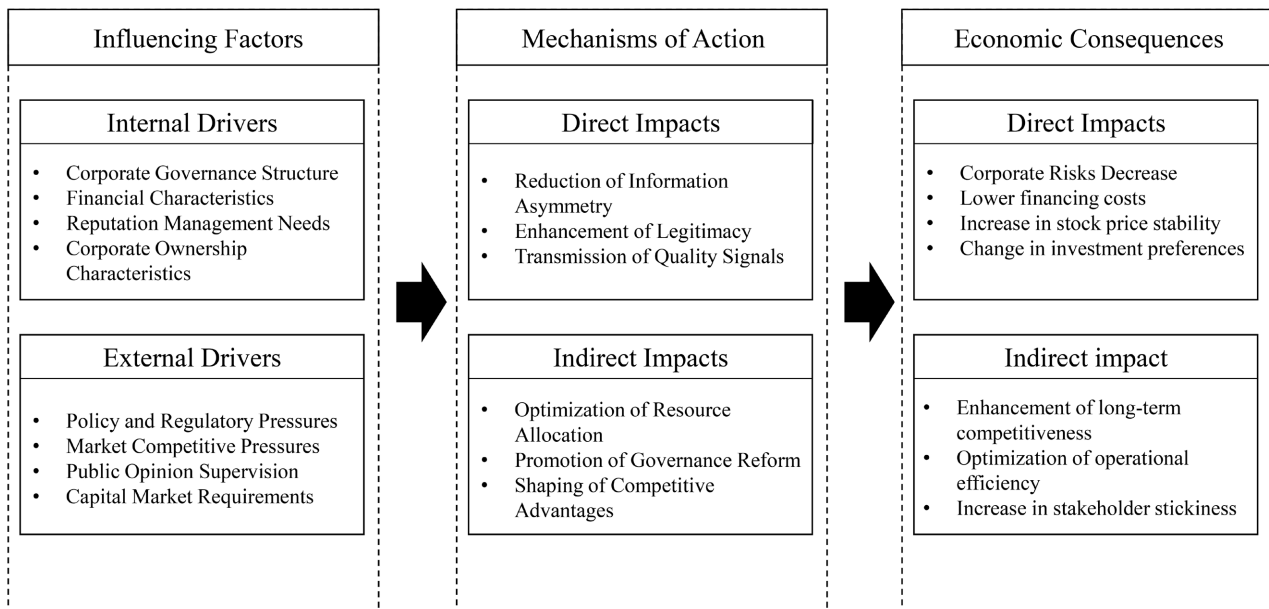


Figure 7. ESG disclosure influencing factors, mechanisms and economic consequences.

6. Analysis of Frontier Trends in ESG Information Disclosure Research

In this study, keywords in the field of ESG information disclosure in China from

2006 to 2025 were mapped by CiteSpace's emergence detection function, as shown in **Table 7**. In the keyword emergence map, "Strength" is the emergence intensity, reflecting the frequency of keyword emergence, and the greater the emergence intensity, the more it can represent the research frontiers in the field. The "Begin" and "End" indicate the starting and ending years of the keyword becoming a hotspot.

Table 7. Keyword emergence mapping of ESG information disclosure in China, 2006-2025.

Institutions	Year	Strength	Begin	End
Discourse	2006	1.81	2006	2009
Information disclosure	2006	1.46	2006	2008
Listed companies	2008	3.54	2008	2013
Reporting	2009	1.26	2009	2010
Relevance	2009	1.18	2009	2011
Centralized enterprises	2010	1.23	2010	2011
Market reaction	2011	1.37	2011	2014
Social responsibility	2007	3.69	2012	2016
Corporate property rights	2012	1.12	2012	2013
Institutional theory	2014	1.71	2014	2015
Big data	2014	1.09	2014	2019
Firm characteristics	2015	1.14	2015	2016
Capital structure	2015	1.14	2015	2016
Nature of property rights	2014	3.76	2016	2021
Compulsory disclosure	2016	1.77	2016	2019
Intermediary effects	2016	1.49	2016	2018
Institutional isomorphism	2016	1.18	2016	2017
Political affiliation	2013	1.3	2018	2020
Nature of the industry	2018	1.07	2018	2020
Distance of power	2019	1.17	2019	2020
Financing constraints	2012	2.23	2020	2025
Green innovations	2021	1.97	2021	2025
Agency costs	2021	1.18	2021	2025
Media attention	2013	1.83	2022	2025
Cohort effects	2023	2.87	2023	2025

In terms of emergence intensity, "nature of property rights" tops the list of high-intensity keywords, indicating that research in this field has long focused on the

heterogeneity of ESG information disclosure between state-owned enterprises and private enterprises, and the emergence of “social responsibility” indicates that this keyword is a hot topic of academic focus, while “cohort effect” reveals that industry-leading enterprises influence the level and quality of ESG information disclosure of their peers. The emergence of “social responsibility” indicates that this keyword is a hot topic of academic focus, and the “cohort effect” reveals that ESG information disclosure of industry-leading enterprises influences the level and quality of disclosure in the same industry. Among the low- and medium-intensity keywords, “institutional theory” and “mandatory disclosure” emphasize the rigidity of policies at different times, while “media attention” and “agency costs” appear prominently. The keywords “media attention” and “agency costs” highlight the interaction between external monitoring and internal governance of firms.

In terms of the temporal distribution of emergent words, in the early ESG information disclosure research from 2006 to 2011, keywords such as “disclosure”, “information disclosure”, “listed company”, “report”, “relevance”, etc. emerge, representing that ESG information disclosure research at this stage is in the basic exploration period, focusing on the connotation of information disclosure and the subject and correlation. “report”, “relevance” and other keywords emerge, representing that ESG information disclosure research at this stage is in the basic exploration period, focusing on the connotation of disclosure, the subject and the correlation relationship. In the 2012-2019 mid-term research, the research direction of this field is gradually diversified. Keywords such as “social responsibility”, “institutional theory”, “nature of property rights” and “big data” emerge prominently, indicating that the research began to introduce new theories and technical means to analyze the impact of the nature of property rights on disclosure behavior, focusing on the economic consequences and social effects of disclosure quality, and transitioning the research from the initial basic exploration to empirical analysis. 2020-2025 Two major cutting-edge trends have emerged in recent studies. One is how ESG disclosure can crack the financing constraints and low-carbon transition challenges with the deep integration of green technology innovation and capital market. Keywords such as “financing constraints” and “green innovation” are highlighted, revealing the exploration of the relationship between ESG disclosure and capital market and low-carbon transformation. In the field of green technological innovation, enterprises face the challenges of high R&D investment and long cycle, especially when the gap between frontier technologies is large, weak technology and lack of knowledge will limit the environmental regulation on the green technological innovation of enterprises (You et al., 2022), but the dual-carbon policy support and the market’s favor of green enterprises bring opportunities (Zhu, 2018; Wang et al., 2019). Second, how ESG disclosure can cope with the new challenges of external supervision and collaborative governance in the context of digitalization. Keywords such as “media attention” and “cohort effect” have emerged prominently, reflecting the exploration of ESG disclosure by external supervision such as the media and the capital market, as well as behav-

ioral mimicry among firms in the digital era (Zhai et al., 2022; Ba et al., 2023; Li et al., 2023), fits the contextual needs of the current sustainable development and digital era. On the one hand, media and big data technologies have made external monitoring more accurate, but data security and privacy protection issues are highlighted. On the other hand, the “cohort effect” among enterprises has led to the standardization of disclosure practices, but how to use digital technology to enhance the efficiency and transparency of disclosure, and to realize the synergistic governance from the individual enterprise to the industrial ecosystem has become a direction that needs to be explored urgently.

From the point of view of the research duration of the emergent words, the emergence of keywords in ESG information disclosure research is characterized by both persistence and emergence. The keywords “listed companies” and “nature of property rights” as long-term persistent keywords appear throughout the period of foundation construction and theoretical deepening of the research in this field, respectively; the former lays down the main body of disclosure analysis, and the latter reveals the deep-seated impact of property rights system on the disclosure strategies of state-owned enterprises and private enterprises. The former establishes the main body of disclosure analysis, and the latter reveals the deep-rooted influence of property right system on the disclosure strategies of SOEs and private enterprises. The emergence of the short-term emerging themes of “cohort effect” and “green innovation” responds positively to the needs of the times. The “cohort effect” faces the dual dilemma of data barriers and lack of standardization in the context of digital governance, and how to break through to achieve more efficient collaborative disclosure in the industry has become a major challenge. In order to realize “green innovation” in the context of low-carbon transition and overcome the difficulty of technology commercialization, how to build a bridge between green innovation and corporate value through disclosure mechanism, and realize a virtuous circle of mutual benefits between the two remains to be solved.

7. Research Conclusion and Limitations

7.1. Research Conclusion

In this study, 361 representative literatures related to ESG information disclosure in China Knowledge Network from 2006 to 2025 were used as sample data, and CiteSpace software was applied to visualize and analyze the knowledge graph, mainly obtaining the following research conclusions:

First, from 2006 to 2025, the number of ESG information disclosure-related articles has gone through the stepwise growth of “exploration period-development period-outbreak period”, reflecting the urgent concern of academia for ESG practice. Secondly, the cooperation network of research scholars is characterized by a “small core-large periphery” structure, with Yin Hong, Wu Danhong, and Lai Yan as the core research scholars in this field with a certain degree of academic influence, but the field has not yet carried out large-scale research, mainly relying on

the individual strength of the core author team. Third, the research institutions are dominated by universities such as the School of Accounting of Zhongnan University of Economics and Law and the School of Economics and Management of Beijing Jiaotong University, and the density of inter-institutional cooperation is relatively low, there is a potential space for the integration of academic resources, and the transformation of theoretical achievements into industrial practice has not yet been opened. Fourth, China's ESG information disclosure research hotspot focuses on the core pivot of "disclosure", connecting "social responsibility", "financing constraints" and "green innovation". "Green Innovation" and other topics, form a dynamic closed loop of "policy first pulling practice trial and error-practice problems forcing theoretical innovation-academic consensus feeding policy iteration". Fifth, the research focus of the research frontiers in this field has evolved to "green innovation and digital governance driven by dual-carbon goals", which is mainly embodied in the synergy between green technology R&D and disclosure quality, the reconstruction of enterprise behavior by digital monitoring mechanism, and the study of cohort effect under the perspective of industrial ecology, which not only responds to the dual needs of policy regulation and technological innovation but also highlights the research perspectives. This not only responds to the dual demands of policy regulation and technological innovation but also highlights the dynamic shift of the research perspective from individual enterprises to the institutional environment and industrial ecology.

7.2. Research Limitations

This study only focuses on China's ESG disclosure situation and analyzes the CNKI database, which is a single source of data. Although it fits the development characteristics of China's policy-driven ESG disclosure, there are inevitable limitations in the data coverage, and it fails to incorporate the relevant literature on ESG disclosure in international databases such as Web of Science. In the future, we can combine multiple databases to expand the cross-country comparative perspective. This study utilizes the CiteSpace software system to reveal the evolution of knowledge in the field of ESG information disclosure. Although the theoretical foundations are systematically sorted out through qualitative analysis, and a framework for analyzing the drivers, internal mechanisms, and economic consequences is constructed, the analysis of the differences in the application of the theory and the paths of the mechanisms still needs to be further deepened.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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