

The Review of Digital Transformation and Corporate ESG Performance

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Abstract. China's digital economy is developing rapidly, and digital transformation and corporate ESG responsibility play a crucial role in the process of enterprises achieving sustainable development. By systematically combing the existing relevant research literature, this paper explores the connotation of digital transformation and corporate ESG responsibility and the current research status, thoroughly analyses the impact of digital transformation on enterprises and the factors that affect the performance of corporate ESG responsibility, and further elaborates the relationship between digital transformation and corporate ESG performance. On this basis, this paper proposes possible future research directions to enrich and expand the research related to digital transformation and corporate ESG, so as to help enterprises better carry out digital transformation and fulfil their ESG responsibilities, thereby achieving sustainable and high-quality development.

Keywords: Digital Transformation, Corporate ESG performance, sustainability.

1. Introduction

With the development and application of new-generation digital technologies such as big data, artificial intelligence, and cloud computing, digital technology has become a new engine for economic growth. China's 14th Five-Year Plan systematically outlines digital development for the first time, proposing to drive transformations in production, lifestyle, and governance through digital transformation. The report of the 20th National Congress of the Communist Party of China further emphasized the need to build a "Digital China," vigorously develop the digital economy, and achieve deep integration between the digital and real economies. As a key pillar of the national economy, enterprises should proactively seize digital development opportunities, firmly advance digital transformation, and evolve from industrial-era leaders to pioneers of the digital age. Moreover, China's economic development has shifted to a high-quality growth stage, with key initiatives such as the "dual-carbon" strategy and green development closely tied to sustainability. The report of the 20th Party Congress explicitly states the need to "promote green development and foster harmonious coexistence between humanity and nature." As microeconomic entities integral to the broader economy, enterprises' sustainability capabilities profoundly influence the macro-level green development trajectory. Consequently, corporate ESG (Environmental, Social, and Governance) performance has garnered widespread attention across society.

In summary, as China's economy transitions from the industrial-era model of single-mindedly pursuing high growth to a digital-economy paradigm centered on ESG principles—emphasizing sustainable and high-quality development—whether enterprises actively fulfill their environmental, social, and governance responsibilities becomes pivotal. This commitment not only determines their survival and growth but also directly shapes the quality of China's economic development. Against the backdrop of rapidly advancing digital and low-carbon economies, how enterprises leverage digital transformation to enhance their environmental and social responsibilities is key to achieving sustainable and green corporate development.

Currently, corporate digital transformation is rapidly advancing in China, with many large, medium-sized, and small enterprises beginning to deeply integrate digital technologies such as big data, blockchain, artificial intelligence, and cloud computing into their operations and management. This integration aims to enhance operational efficiency and achieve high-quality development.

Essentially, digital transformation leverages advanced digital tools to improve data fluidity, optimize the allocation of production factors, and ultimately strengthen a company's market competitiveness. While digital transformation facilitates corporate upgrading at the micro level, can it also enhance sustainable development capabilities and align with national policies at the macro level? Existing research primarily confirms the economic impacts of digital transformation—such as fostering innovation, alleviating financing constraints, improving investment efficiency, and boosting financial performance—while its effects on non-economic values, such as social responsibility, remain underexplored. Against this backdrop, examining how corporate digital transformation influences ESG (Environmental, Social, and Governance) performance holds significant implications for promoting high-quality enterprise development and sustainable socio-economic progress.

2. Connotation of Related Concepts

2.1. Corporate Digital Transformation

Morton's groundbreaking study [1] posits that the effective internal implementation of digital technologies inevitably triggers fundamental organizational transformation. This work marked the theoretical starting point for research on digital transformation, particularly in examining how digital technologies drive organizational innovation and change [2]. Subsequently, with the continuous advancement of digital technologies, corporate digital transformation has garnered widespread attention from scholars globally. However, existing research has yet to reach a consensus on the conceptual definition of digital transformation, with scholars offering diverse perspectives. Fitzgerald et al. [3] define it as a process wherein enterprises leverage digital technologies to undertake significant business transformations, including enhancing user experience, streamlining operational models, and creating new business paradigms. Building upon this, Vial [4] employed grounded theory to synthesize the concept, characterizing digital transformation as "a process whereby enterprises utilize combinations of computing, communication, and connectivity technologies to trigger substantial changes in organizational attributes, thereby improving business activities."

Building on these foundations, scholarly understanding of digital transformation has evolved through continued research. Some scholars posit that corporate digital transformation represents a process wherein enterprises leverage cutting-edge digital technologies to assess market conditions and drive comprehensive business upgrades—including enhanced customer experience, improved operational efficiency, and business model innovation [5]—ultimately increasing enterprise value. Olsen [6] conceptualizes it as the integration of digital technologies with business management processes, digitizing key production factors and operational links to optimize workflows and restructure production methods. Essentially, digital transformation constitutes a strategic initiative where enterprises adopt emerging digital technologies to achieve comprehensive digitization across management, production, and sales functions, thereby strengthening competitiveness and securing sustainable advantages. Alternative perspectives characterize digital transformation as a dual-impact process: beginning with digital technologies, products, and platforms, it triggers transformations in individual competencies, organizational governance, and industrial paradigms, generating varying degrees of positive and negative consequences for enterprises.

Thus, while a unified definition of digital transformation remains elusive, scholars generally agree that it fundamentally represents an innovation and transformation process in organizational operations and management, driven by digital technologies such as big data, the Internet of Things, and blockchain.

2.2. Corporate ESG Responsibility

ESG (Environmental, Social, and Governance) was first proposed in 2004 by the United Nations Global Compact in collaboration with the United Nations Environment Programme Finance Initiative. Compared to CSR (Corporate Social Responsibility), ESG encompasses a broader scope and more stringent standards. As a comprehensive corporate sustainability framework that integrates

environmental, social, and governance performance, ESG requires companies to not only pursue economic profits but also prioritize their performance in these three dimensions. In 2006, the United Nations, together with other organizations and institutions, established the Principles for Responsible Investment (PRI), urging investors to pay close attention to corporate ESG performance when making investment decisions. Since then, as international organizations, investment institutions, and other market participants have continuously refined the ESG concept, Western countries have developed relatively mature ESG evaluation systems, and the ESG framework has gained widespread recognition. In contrast, China's ESG development started relatively late. In 2018, the China Securities Regulatory Commission (CSRC) issued the revised Code of Corporate Governance for Listed Companies, which for the first time established a basic framework for ESG information disclosure by Chinese listed firms and explicitly required them to disclose ESG-related information. In 2022, the CSRC further released the Guidelines for Investor Relations Management of Listed Companies (2022), which formally incorporated ESG information into investor communication requirements. With the continuous improvement of relevant regulations, an increasing number of listed companies have voluntarily begun disclosing ESG information. As a result, ESG has gained growing attention in China and has experienced rapid development.

Environmental (E) refers to a company's commitment to environmental protection, striving to minimize ecological damage. It emphasizes the adoption of appropriate environmental measures during production and operations to enhance conservation efforts. Research indicates that robust environmental governance can enhance corporate reputation, strengthen stakeholder engagement, accumulate social capital, and facilitate resource aggregation—all of which contribute to sustainable business growth. Social (S) pertains to how a company's operations impact society. By fulfilling responsibilities to stakeholders—such as employees, customers, and communities—a firm improves its social performance and upholds its societal obligations. Investors increasingly prioritize corporate social responsibility (CSR) metrics when making investment decisions, as proactive CSR initiatives can generate significant long-term economic benefits. Governance (G) encompasses management-related practices, particularly at the executive level. A well-structured governance framework—ranging from high-level decision-making processes to workplace relationships—directly influences corporate value. Studies further reveal that strong governance is a key driver of digital transformation: firms with advanced governance mechanisms (e.g., diversified boards, optimal ownership concentration, and robust shareholder networks) exhibit more mature digital transformation capabilities.

3. State of Research

3.1. Digital Transformation

Existing research primarily focuses on the impact of digital transformation on enterprises. Although current studies are quite extensive, a consensus has yet to be reached. Some scholars believe that digital transformation has positive effects on corporate development. From an entrepreneurial perspective, Nambisan [7] argues that digital technologies help enterprises identify more business opportunities and integrate internal and external entrepreneurial resources, thereby increasing the probability of entrepreneurial success. From a performance improvement perspective, digital transformation in enterprises demonstrates significant advantages in reducing costs and improving operational efficiency, which can greatly enhance corporate performance. From a business model innovation perspective, Li's [8] research found that digital transformation enables enterprises to deploy broader business strategies, thereby promoting business model transformation. From a corporate financing perspective, after undergoing digital transformation, enterprises can not only reduce information asymmetry with external parties but also enhance financial stability, making it easier to send positive signals to the market, which helps alleviate financing constraints. From a corporate innovation perspective, the synergistic effect between digital transformation strategies and digital capabilities can effectively drive the upgrading and innovation of enterprise product-service

systems, thereby improving service quality. From a corporate social responsibility perspective, research has found that digital transformation can not only enhance enterprises' overall innovation capabilities and green innovation capabilities, strengthening their social responsibility awareness, but also promote servitization transformation, encouraging enterprises to assume more social responsibilities.

However, some scholars remain skeptical about the view that digital transformation directly promotes corporate development. Hajli et al. [9] found that during digital transformation, IT investments can have a positive impact on corporate development, but this effect only exists in some enterprises, with many failing to benefit, which proves the existence of the IT productivity paradox. The IT productivity paradox suggests that digital transformation may not directly produce positive effects on corporate development. Existing scholars have identified several key reasons for this phenomenon. During corporate digital transformation, the mismatch between organizational structure, corporate strategy, human resources and digital transformation strategy may be important constraints preventing digital transformation from producing positive effects. Yeow et al. [10] conducted a longitudinal analysis of B2B companies developing B2C digital strategies using the dynamic capability approach. They found that as organizations implement digital strategies, incompatibility emerges between existing contingency strategies and digital strategies, while misalignment between strategies and resources also creates organizational tension. Moreover, during the process of adapting to digital transformation, the mismatch between organizational inertia in corporate management and the advancement of digital technologies means that while digital technologies enhance corporate resource capabilities, they also generate substantial learning costs and derivative management costs. This may lead to the benefits of digital transformation being offset by its costs. From a human resources perspective, the focus is on employees' ability to establish human-machine interaction and collaboration. However, due to employees' insufficient technical capabilities to handle transformation tasks, coupled with the overly rapid introduction of digital technologies, information overload and employee anxiety may occur [11], creating significant challenges for the smooth implementation of digital transformation. Attaran and Attaran [12] further pointed out that the reason organizations fail in transformation is because leaders do not pay sufficient attention, which negatively impacts the company's human resources.

Furthermore, digital transformation has increasingly captured the attention of both academia and practitioners in the fields of sustainable development and smart technologies [13]. In terms of sustainable development, research primarily focuses on: sustainable enterprises that emphasize the integration of new and disruptive technologies [14]; achieving sustainable competitive advantages by combining digital technologies with organizational strategies [15]; and sustainable innovation centered around open innovation theory [16]. Regarding smart technologies (such as smart cities, smart homes, and smart government), prominent themes include: sustainable intelligent manufacturing enabled by digital technologies like the Internet of Things, cloud computing, big data, cyber-physical systems, and artificial intelligence. These disruptive technologies provide unprecedented opportunities for creating and developing value-added products and services [17].

3.2. Determinants of Corporate ESG Performance

Existing research primarily focuses on the antecedents of corporate ESG performance, mainly analyzing and exploring from two broad dimensions: internal factors (including firm size, executive characteristics, corporate governance and strategy) and external factors (including relevant policies and regulatory frameworks, cultural and religious beliefs, marketization process, and regional development levels).

From the perspective of firm size, corporate ESG disclosure performance is significantly influenced by company scale. Compared to smaller enterprises, firms achieving economies of scale demonstrate higher management efficiency and social responsibility fulfillment capacity, consequently improving the quality of ESG disclosures. Regarding executive characteristics, Gao [18] suggests that companies with returnee executives exhibit superior corporate governance and stronger

social responsibility awareness. Executives with extensive overseas experience possess deeper understanding of ESG concepts and investment philosophies, enabling them to apply advanced management approaches to domestic ESG practices, thereby enhancing corporate ESG performance. Additionally, studies show that non-local CEOs [19] and female executives [20] contribute to improved ESG performance as they actively mitigate intergroup bias in leadership roles. From a corporate governance standpoint, board diversity is recognized as a catalyst for better management decisions, innovative strategies, and enhanced social/environmental reporting [21]. Research reveals significant positive correlations between ESG performance and board size, proportion of female directors, and ratio of independent directors [22]. However, the appointment of co-opted directors may undermine long-term ESG policies by potentially weakening governance oversight and monitoring capabilities [23]. Corporate governance approaches also critically impact ESG performance. Wei et al. [24] highlight the adverse effects of corporate corruption on ESG outcomes. Both internal governance mechanisms (institutional investor ownership) and external governance mechanisms (analyst coverage and media attention) serve as effective drivers for ESG improvement [25]. From a strategic perspective, empirical evidence indicates that companies issuing green bonds positively influence their ESG performance [26]. Debt financing has emerged as an active force affecting various dimensions of ESG performance [27].

From the perspective of external policies and regulations, relevant policies and regulatory pressures have been recognized as crucial drivers for promoting sustainable development in environmental, social, and economic domains [28]. Studies emphasize the constraining effect of environmental regulations and specific regulatory measures on corporate environmental protection and ESG disclosure practices [29]. Furthermore, policies such as tax incentives and government subsidies can motivate enterprises to adopt corresponding disclosure measures for public supervision, thereby more proactively and consciously enhancing their social responsibility fulfillment [25]. Regarding informal institutions like culture, cultural background [30] and religious beliefs [31] are considered to play pivotal roles in shaping attitudes and influencing corporate responses to external pressures. This leads to different priorities when reallocating internal resources, ultimately resulting in varying impacts on corporate ESG performance. From the marketization process standpoint, research indicates that higher levels of marketization correspond with more intense competition. When making investment decisions, enterprises in such environments tend to give greater consideration to stakeholder interests based on market risks, emphasizing refined management and sustainable development capabilities. This gradually strengthens ESG disclosure practices and incorporates ESG into overall organizational development strategies. Concerning regional development levels, urban economic growth provides local enterprises with heterogeneous resources. By improving internal information transmission efficiency and optimizing the utilization of existing resources, it enhances green innovation capabilities, promotes ecological and renewable circular processes, consequently enabling enterprises to achieve superior comprehensive ESG performance.

3.3. Digital Transformation and Corporate ESG

3.3.1 The Impact of Digital Transformation on Corporate ESG Performance

Existing research generally acknowledges that digital transformation can enhance corporate ESG performance. Narula et al. [32] highlighted how Industry 4.0 technologies significantly influence ESG standards, drawing academic attention to this phenomenon. Wang et al. [33] demonstrated that digital strategies have a substantial positive impact on improving ESG responsibility performance. Chinese scholars Hao and Zhang [34], examining the effect of digital transformation on corporate ESG performance within China's "dual carbon" context, found that digital transformation possesses strong enabling effects for ESG responsibility fulfillment. They suggested that governments and regulatory bodies should continuously improve incentive policies for corporate digital transformation and develop supporting policies to facilitate ESG performance enhancement, thereby enabling enterprises to advance digital transformation while boosting financial and innovation performance. However, the impact of digital transformation on ESG performance exhibits heterogeneity. State-owned enterprises,

mature companies, and heavily polluting enterprises show greater sensitivity of ESG performance to digital transformation. Some scholars caution that during digital transformation, managers may develop "short-sighted behavior," neglecting long-term environmental protection and social benefits. Research has revealed an "inverted U-shaped" relationship between the degree of digital transformation and ESG performance, uncovering the "double-edged sword" mechanism of how digital transformation affects ESG performance.

3.3.2 The Impact of Corporate ESG Performance on Digital Transformation

The study by Camodeca and Almici [35] emphasizes that during digital transformation, enterprises should adhere to sustainability theory and prioritize ESG performance, as strong ESG performance can facilitate digital transformation while enhancing financial performance, innovation outcomes, and market valuation. Superior ESG performance promotes digital transformation through strengthened internal oversight and improved information transparency, thereby elevating corporate innovation capabilities and market value. At the individual dimension level, research reveals that corporate governance quality serves as a key driver of digital transformation. Shareholder networks alleviate financing constraints, ownership concentration enhances risk tolerance, and board diversity boosts innovation capacity—all contributing to advancing digital transformation. Furthermore, regarding trade credit financing, studies demonstrate that improved ESG performance facilitates access to trade credit financing [36], mitigates financing constraints, supports digital transformation initiatives, and enhances operational efficiency and capital conditions. From the perspective of new retail innovation, grounded in stakeholder theory and sustainability theory, research finds that robust ESG performance helps reshape internal business models and catalyze breakthrough innovations, thereby accelerating digital transformation. Analyzing the causes of "greenwashing" in corporate ESG reports, scholars recommend integrating ESG management strategies into digital transformation frameworks. This data-driven approach enables comprehensive business process improvements, effectively preventing ESG greenwashing while advancing sustainable development.

4. Summary

Against the backdrop of global advocacy for corporate digital transformation and increasing emphasis on ESG performance, this study systematically reviews the research progress on corporate digital transformation and ESG responsibility to achieve sustainable and high-quality development. Through synthesizing existing literature, we summarize the relationship between digital transformation and corporate ESG performance. The findings reveal that digital transformation can enhance corporate ESG performance through mediating mechanisms such as innovation capability, information interaction, media attention, and resource orchestration. However, some scholars argue that this relationship is not strictly linear. Additionally, the study demonstrates that strong ESG performance also exerts a positive influence on digital transformation, creating a mutually reinforcing dynamic between the two.

On this basis, this paper provides new insights for future research directions.

First, we can further explore the impact of digital transformation on different ESG dimensions and their underlying mechanisms. Currently, most studies focus on the overall effect of digital transformation on corporate ESG performance. Future research could employ case studies or longitudinal methods to systematically reveal how digital transformation influences specific ESG dimensions.

Secondly, attention should be paid to the differential impact of digital transformation on ESG performance across industries and national contexts. Variations exist in digital transformation adoption and ESG outcomes among enterprises from different industries and cultural backgrounds. Future studies could conduct cross-industry, cross-country, and cross-cultural comparative research to deeply examine the causes and mechanisms behind these differences.

Additionally, research should focus on the supportive capacity of digital technologies themselves in achieving ESG goals. With the continuous advancement of technologies like artificial intelligence

and big data, digital solutions are becoming increasingly capable of enabling environmental protection, social justice, and good governance. Future studies should particularly investigate the role and potential of digital technologies in facilitating ESG objectives.

Finally, multidimensional research can be constructed to examine how digital transformation and ESG performance jointly affect corporate performance. Existing studies mostly analyze single-dimensional impacts of either digital transformation or ESG performance on firm outcomes. Future research should integrate financial performance, innovation performance, and corporate value to establish a multidimensional framework, helping corporate managers better understand current operational status, predict future development trajectories, and ultimately support sustainable business growth.

In conclusion, the relationship between digital transformation and corporate ESG performance, along with their combined effects on enterprises, represents a complex yet valuable research area. Future studies should delve into specific impact mechanisms from various dimensions to provide more effective guidance for businesses in achieving sustainable development.

References

- [1] Scott Morton M S. The corporation of the 1990s: Information technology and organizational transformation[J]. 1991.
- [2] Nadkarni S, Prügl R. Digital transformation: a review, synthesis and opportunities for future research[J]. *Management Review Quarterly*, 2021, 71: 233-341.
- [3] Fitzgerald M, Kruschwitz N, Bonnet D, et al. Embracing digital technology: A new strategic imperative[J]. *MIT sloan management review*, 2014, 55(2): 1.
- [4] Vial G. Understanding digital transformation: A review and a research agenda[J]. *Managing digital transformation*, 2021: 13-66.
- [5] Gilch P M, Sieweke J. Recruiting digital talent: The strategic role of recruitment in organisations' digital transformation[J]. *German Journal of Human Resource Management*, 2021, 35(1): 53-82.
- [6] Olsen T. Understanding the digital transformation[J]. *Chemical Engineering Progress*, 2020, 116(9): 29-35.
- [7] Nambisan S. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship[J]. *Entrepreneurship theory and practice*, 2017, 41(6): 1029-1055.
- [8] Li F. The digital transformation of business models in the creative industries: A holistic framework and emerging trends[J]. *Technovation*, 2020, 92: 102012.
- [9] Hajli M, Sims J M, Ibragimov V. Information technology (IT) productivity paradox in the 21st century[J]. *International Journal of Productivity and Performance Management*, 2015, 64(4): 457-478.
- [10] Yeow A, Soh C, Hansen R. Aligning with new digital strategy: A dynamic capabilities approach[J]. *The Journal of Strategic Information Systems*, 2018, 27(1): 43-58.
- [11] Cetindamar Kozanoglu D, Abedin B. Understanding the role of employees in digital transformation: conceptualization of digital literacy of employees as a multi-dimensional organizational affordance[J]. *Journal of Enterprise Information Management*, 2021, 34(6): 1649-1672.
- [12] Attaran M, Attaran S. Digital transformation and economic contributions of 5G networks[J]. *International Journal of Enterprise Information Systems (IJEIS)*, 2020, 16(4): 58-79.
- [13] Gökalp E, Martinez V. Digital transformation maturity assessment: development of the digital transformation capability maturity model[J]. *International Journal of Production Research*, 2022, 60(20): 6282-6302.
- [14] Gomez-Trujillo A M, Gonzalez-Perez M A. Digital transformation as a strategy to reach sustainability[J]. *Smart and Sustainable Built Environment*, 2021, 11(4): 1137-1162.
- [15] Kitsios F, Kamariotou M. Artificial intelligence and business strategy towards digital transformation: A research agenda[J]. *Sustainability*, 2021, 13(4): 2025.
- [16] Di Vaio A, Palladino R, Pezzi A, et al. The role of digital innovation in knowledge management systems: A systematic literature review[J]. *Journal of business research*, 2021, 123: 220-231.

- [17] Reis J, Marques P A, Marques P C. Where are smart cities heading? A meta-review and guidelines for future research[J]. *Applied Sciences*, 2022, 12(16): 8328.
- [18] Gao Y. Corporate social performance in China: Evidence from large companies [J]. *Journal of business ethics*, 2009, 89: 23-35.
- [19] Garcia-Blandon J, Argilés-Bosch J M, Ravenda D. Exploring the relationship between CEO characteristics and performance[J]. *Journal of Business Economics and Management*, 2019, 20(6): 1064-1082.
- [20] Meng X, Zhu P. Females' social responsibility: The impact of female executives on ESG performance[J]. *Applied Economics Letters*, 2023: 1-6.
- [21] Kouaib A, Mhiri S, Jarboui A. Board of directors' effectiveness and sustainable performance: The triple bottom line[J]. *The Journal of High Technology Management Research*, 2020, 31(2): 100390.
- [22] Menicucci E, Paolucci G. The influence of Italian board characteristics on environmental, social and governance dimensions[J]. *Management Decision*, 2023, 61(10): 3082-3105.
- [23] Maneenop S, Padungsaksawasdi C, Treepongkaruna S. Co-opted board, environment, social and governance[J]. *Business Strategy and the Environment*, 2024, 33(2): 1161-1172.
- [24] Wei H, Mohd-Rashid R, Ooi C A. Corruption at country and corporate levels: impacts on environmental, social and governance (ESG) performance of Chinese listed firms[J]. *Journal of Money Laundering Control*, 2024, 27(3): 559-578.
- [25] Wang L, Le Q, Peng M, et al. Does central environmental protection inspection improve corporate environmental, social, and governance performance? Evidence from China[J]. *Business Strategy and the Environment*, 2023, 32(6): 2962-2984.
- [26] Zheng J, Jiang Y, Cui Y, et al. Green bond issuance and corporate ESG performance: Steps toward green and low-carbon development[J]. *Research in International Business and Finance*, 2023, 66: 102007.
- [27] Al Amosh H, Khatib S F A, Alkurdi A, et al. Capital structure decisions and environmental, social and governance performance: Insights from Jordan[J]. *Journal of Financial Reporting and Accounting*, 2022.
- [28] Famiyeh S, Opoku R A, Kwarteng A, et al. Driving forces of sustainability in the mining industry: Evidence from a develop** country[J]. *Resources Policy*, 2021, 70: 101910.
- [29] Qiang S, Gang C, Dawei H. Environmental cooperation system, ESG performance and corporate green innovation: Empirical evidence from China[J]. *Frontiers in Psychology*, 2023, 14: 1096419.
- [30] Fu P, Narayan S W, Weber O, et al. Does local Confucian culture affect corporate environmental, social, and governance ratings? Evidence from China[J]. *Sustainability*, 2022, 14(24): 16374.
- [31] Qoyum A, Sakti M R P, Thaker H M T, et al. Does the islamic label indicate good environmental, social, and governance (ESG) performance? Evidence from sharia-compliant firms in Indonesia and Malaysia[J]. *Borsa Istanbul Review*, 2022, 22(2): 306-320.
- [32] Narula S, Puppala H, Kumar A, et al. Applicability of industry 4.0 technologies in the adoption of global reporting initiative standards for achieving sustainability[J]. *Journal of Cleaner Production*, 2021, 305: 127141.
- [33] Wang H, Jiao S, Bu K, et al. Digital transformation and manufacturing companies' ESG responsibility performance[J]. *Finance Research Letters*, 2023, 58: 104370.
- [34] Hao Yuting, Zhang Yonghong. Research on the influence of digital transformation on enterprise ESG performance under the "double carbon" goal [J]. *Journal of Science and Technology Management*, 2022, 24(4): 80-91.
- [35] Camodeca R, Almici A. Digital transformation and convergence toward the 2030 agenda's sustainability development goals: evidence from Italian listed firms[J]. *Sustainability*, 2021, 13(21): 11831.
- [36] Wang Liyue, Yang Liuyong. Corporate ESG performance and trade credit financing: Moderating effect of life cycle [J]. *Borsa Istanbul Review*, 2024, 24(4): 818-827.