

How Environmental Performance Enhances Corporate Sustainability Performance: The Mediating Role of Green Accounting Information Disclosure

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Abstract

Corporate sustainability has become a strategic priority for firms facing increasing environmental challenges and stakeholder expectations. Although previous studies have confirmed that environmental performance contributes to corporate sustainability performance, limited attention has been paid to the underlying mechanism through which environmental performance enhances sustainability outcomes. This study addresses this research gap by examining the mediating role of green accounting information disclosure (GAID) in the relationship between environmental performance (ENV) and corporate sustainability performance (CSP). Using panel data from 6,154 firm-year observations of Chinese ChiNext-listed companies during 2015 – 2024, this study employs panel regression and mediation analysis to test the proposed relationships. The empirical results indicate that environmental performance significantly improves corporate sustainability performance. In addition, environmental performance positively influences the quality of green accounting information disclosure, while GAID has a significant positive effect on corporate sustainability performance. The mediation analysis further demonstrates that GAID partially mediates the relationship between environmental performance and corporate sustainability performance. The findings contribute to the growing literature on corporate sustainability by explaining how environmental performance is translated into sustainability outcomes through green accounting information disclosure, while also providing practical implications for sustainability governance in emerging economies.

Keywords: Environmental performance; Corporate sustainability performance; Green accounting information disclosure; Triple Bottom Line; Signaling Theory

1. INTRODUCTION

Corporate sustainability has become a central strategic concern as firms face increasing environmental pressure, stakeholder scrutiny, and regulatory expectations. In recent years, environmental, social, and governance (ESG) practices have shifted from voluntary corporate initiatives to important indicators of long-term competitiveness and sustainable value creation (Broadstock et al., 2021; Khan, 2022; Tjahjadi et al., 2021). Firms are increasingly expected not only to generate financial returns but also to reduce environmental impacts, strengthen governance quality, and create broader social value (Dyllick & Hockerts, 2002; Khaled et al., 2021). In emerging markets such as China, this issue has become even more important because environmental governance, green transformation, and sustainability disclosure are closely connected with national development strategies and capital market reforms (Ding et al., 2022; Ren et al., 2020). Under this context, corporate sustainability performance (CSP) has become a key measure for evaluating whether firms can achieve balanced economic, environmental, and social outcomes (Elkington, 1997; Tjahjadi et al., 2021).

Among the factors that shape corporate sustainability performance, environmental performance has received increasing academic attention. Environmental performance reflects a firm's ability to reduce pollution, improve resource efficiency, adopt cleaner production practices, and respond effectively to environmental regulations (Doan & Sassen, 2020; Li et al., 2022; Ren et al., 2020). Existing studies suggest that stronger environmental performance can enhance firm value, reduce environmental risk, improve stakeholder confidence, and support sustainable competitive advantage (Broadstock et al., 2021; Duan et al., 2023; Khairredine et al., 2024). In addition, firms with better environmental performance are more likely to strengthen green innovation and improve long-term sustainability outcomes (Feng et al., 2024; Li et al., 2022; Xu et al., 2024). However, although previous studies have provided evidence on the direct relationship between environmental performance and firm outcomes, relatively less attention has been paid to the mechanism through which environmental performance is transformed into broader corporate sustainability performance.

Green accounting information disclosure (GAID) may provide an important explanation for this mechanism. Environmental performance itself may not be fully recognized by investors, regulators, and other stakeholders unless firms disclose relevant environmental information in a transparent and credible manner (Doan & Sassen, 2020; Fan et al., 2024). High-quality environmental disclosure can reduce information asymmetry, improve corporate transparency, and enable external stakeholders to evaluate firms' environmental responsibility more effectively (Ding et al., 2022; Fan et al., 2024; Ye et al., 2023). Prior studies show that environmental information disclosure is associated with corporate performance, green innovation, and sustainable development outcomes (Ding et al., 2022; Feng et al., 2024; Li et al., 2022; Xu et al., 2024). Nevertheless, most existing research examines environmental disclosure as an independent governance practice, while limited empirical evidence explains whether GAID serves as a mediating channel between environmental performance and CSP. This gap is important because firms with superior environmental performance may need disclosure mechanisms to convert internal environmental achievements into externally recognized sustainability outcomes.

The theoretical logic of this study is grounded in the Triple Bottom Line (TBL) framework and Signaling Theory. The TBL framework emphasizes that firms should pursue economic, environmental, and social objectives simultaneously rather than treating sustainability as a purely financial or environmental issue (Elkington, 1997; Dyllick & Hockerts, 2002; Slaper & Hall, 2011). From this perspective, environmental performance is an essential component of corporate sustainability because it reflects firms' ability to balance environmental responsibility with long-term value creation (Tjahjadi et al., 2021). Signaling Theory further suggests that firms disclose credible information to reduce information asymmetry and communicate their quality, capability, and future prospects to external stakeholders (Spence, 1973; Connelly et al., 2011). Therefore, firms with stronger environmental performance are expected to have stronger incentives to disclose green accounting information, thereby signaling their sustainability commitment and improving external recognition.

China's ChiNext market provides an appropriate empirical setting for examining this relationship. ChiNext-listed firms are generally growth-oriented and innovation-driven, but they also face increasing pressure to improve ESG performance, environmental governance, and disclosure quality. As China's capital market continues to emphasize sustainability-oriented regulation and environmental transparency, firms are increasingly required to demonstrate both substantive environmental performance and credible disclosure practices (Ding et al., 2022; Fan et al., 2024; Ren et al., 2020). Using panel data from Chinese ChiNext-listed firms during 2015–2024, this study examines whether environmental performance enhances CSP and whether GAID mediates this relationship. By focusing on ChiNext firms, this study provides evidence from an emerging market context where environmental governance, disclosure regulation, and sustainability transformation are rapidly developing.

This study contributes to the literature in three ways. First, it shifts the research focus from whether environmental performance affects CSP to how environmental performance enhances CSP through a disclosure-based mechanism. This helps clarify the transmission process between environmental performance and sustainability outcomes. Second, this study extends the application of the TBL framework and Signaling Theory by identifying GAID as a mediating mechanism that links internal environmental achievements with externally recognized sustainability performance (Connelly et al., 2011; Tjahjadi et al., 2021). Third, this study provides empirical evidence from Chinese ChiNext-listed firms, enriching the literature on corporate sustainability in emerging capital markets. The findings also offer practical implications for managers seeking to improve sustainability performance through environmental governance and for policymakers aiming to strengthen environmental information disclosure systems.

2.LITERATURE REVIEW

2.1Theoretical Framework

The theoretical framework of this study is established by integrating the Triple Bottom Line (TBL) framework and Signaling Theory to explain how environmental performance enhances corporate sustainability performance through green accounting information

disclosure (GAID). While the TBL framework provides the fundamental logic for understanding the role of environmental responsibility in sustainable development, Signaling Theory explains how firms communicate their environmental achievements to external stakeholders through information disclosure. The integration of these two theories offers a comprehensive explanation of both the internal sustainability mechanism and the external information transmission process underlying corporate sustainability performance (Connelly et al., 2011; Tjahjadi et al., 2021; Khaled et al., 2021).

The Triple Bottom Line framework, first proposed by Elkington (1997), argues that corporate success should be evaluated from three interrelated dimensions, namely economic prosperity, environmental stewardship, and social responsibility, rather than relying solely on financial performance. This perspective has become one of the most influential theoretical foundations in corporate sustainability research because it emphasizes the balanced creation of long-term value across multiple stakeholders (Dyllick & Hockerts, 2002; Slaper & Hall, 2011). Recent sustainability studies further argue that environmental performance has evolved from a compliance-oriented activity into a strategic capability that enhances firms' resilience, operational efficiency, and sustainable competitiveness (Tjahjadi et al., 2021; Broadstock et al., 2021; Khaled et al., 2021). Consequently, firms that continuously improve environmental performance are expected to achieve superior corporate sustainability performance by simultaneously generating economic, environmental, and social benefits (Khairredine et al., 2024; Duan et al., 2023).

Although the TBL framework explains why environmental performance is essential for sustainable development, it does not fully explain how environmental achievements are recognized by external stakeholders. In practice, environmental performance often reflects internal management capabilities that are not directly observable by investors, regulators, customers, or other stakeholders. Consequently, superior environmental performance does not automatically translate into enhanced corporate sustainability performance unless firms effectively communicate their environmental achievements to the market (Doan & Sassen, 2020; Ding et al., 2022; Liu et al., 2024). This limitation highlights the need for an additional theoretical perspective capable of explaining the information transmission process between environmental performance and sustainability outcomes.

Signaling Theory provides such an explanation. Originally proposed by Spence (1973) and further developed by Connelly et al. (2011), Signaling Theory argues that organizations voluntarily disclose credible information to reduce information asymmetry and convey their underlying quality to external stakeholders. In the context of environmental management, firms with superior environmental performance possess stronger incentives to disclose comprehensive environmental information because such disclosure serves as a credible signal of environmental responsibility, governance capability, and long-term sustainability commitment (Connelly et al., 2011; Doan & Sassen, 2020). Recent empirical studies consistently suggest that high-quality environmental disclosure improves corporate transparency, enhances stakeholder confidence, strengthens corporate legitimacy, and ultimately contributes to superior

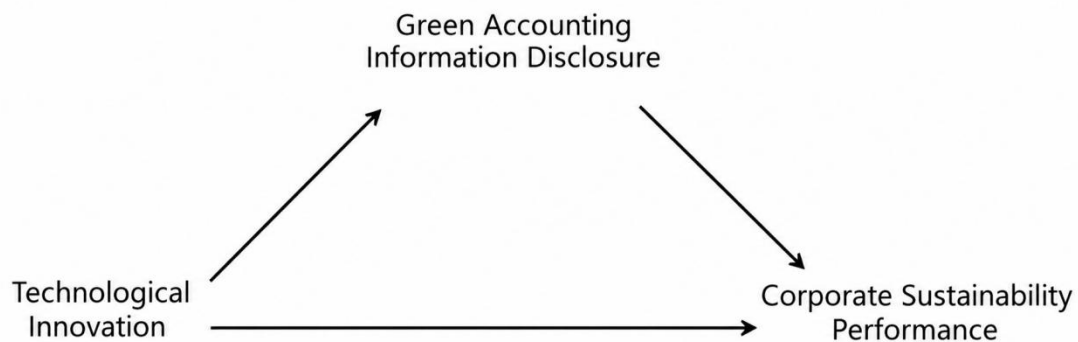
organizational performance (Ding et al., 2022; Fan et al., 2024; Ye et al., 2023; Zhou et al., 2023).

Green accounting information disclosure represents one of the most important signaling mechanisms through which firms communicate environmental performance to external stakeholders. Compared with traditional financial reporting, GAID systematically reports firms' environmental investments, pollution control activities, resource utilization, carbon reduction initiatives, and other sustainability-related information, thereby improving the credibility and comparability of environmental information (Ren et al., 2020; Ding et al., 2022). High-quality environmental disclosure not only reduces information asymmetry but also encourages firms to establish standardized environmental management systems and strengthen internal environmental governance (Li et al., 2022; Feng et al., 2024). Moreover, transparent environmental disclosure enhances stakeholder trust, facilitates access to financial resources, and improves firms' reputation, thereby promoting sustainable value creation (Fan et al., 2024; Xu et al., 2024; Khairreddine et al., 2024). Existing evidence also indicates that firms with more transparent environmental disclosure are more likely to achieve better environmental performance and stronger long-term competitiveness (Doan & Sassen, 2020; Liu et al., 2024).

By integrating the TBL framework and Signaling Theory, this study proposes that environmental performance contributes to corporate sustainability performance through both direct and indirect pathways. From the TBL perspective, environmental performance directly enhances sustainability by improving firms' environmental, economic, and social outcomes (Elkington, 1997; Dyllick & Hockerts, 2002; Tjahjadi et al., 2021). From the Signaling Theory perspective, firms with superior environmental performance are more likely to disclose high-quality green accounting information, thereby reducing information asymmetry, strengthening stakeholder recognition, and enhancing corporate sustainability performance (Spence, 1973; Connelly et al., 2011; Ding et al., 2022; Fan et al., 2024). Therefore, green accounting information disclosure is expected to serve as a critical transmission mechanism linking environmental performance and corporate sustainability performance. Based on this integrated theoretical framework, the following sections develop the research hypotheses concerning the relationships among environmental performance, green accounting information disclosure, and corporate sustainability performance.

Figure 1

Research Framework



2.2 Environmental Performance and Corporate Sustainability Performance

Environmental performance has become an increasingly important determinant of corporate sustainability performance as firms face growing environmental challenges, stricter regulatory requirements, and heightened stakeholder expectations. Rather than being regarded merely as an environmental compliance indicator, environmental performance is now widely recognized as a strategic organizational capability that supports long-term sustainable development. Firms with superior environmental performance are generally more capable of reducing resource consumption, minimizing environmental risks, improving production efficiency, and strengthening corporate reputation, thereby creating competitive advantages that extend beyond traditional financial outcomes (Broadstock et al., 2021; Khaled et al., 2021; Khaireddine et al., 2024). Consequently, improving environmental performance has become an essential pathway through which firms pursue sustainable value creation under increasingly complex institutional and market environments (Tjahjadi et al., 2021; Duan et al., 2023).

From the perspective of the Triple Bottom Line (TBL) framework, environmental performance represents one of the three fundamental dimensions of corporate sustainability. The TBL framework argues that sustainable corporate development depends on firms' ability to simultaneously achieve economic prosperity, environmental stewardship, and social responsibility (Elkington, 1997; Dyllick & Hockerts, 2002). Environmental performance therefore contributes not only to ecological protection but also to operational efficiency, innovation capability, and long-term competitiveness, ultimately enhancing overall corporate sustainability performance (Slaper & Hall, 2011; Tjahjadi et al., 2021). Recent empirical studies further confirm that firms actively engaging in environmental management practices are more likely to improve organizational resilience, optimize resource allocation, and strengthen stakeholder relationships, thereby generating sustainable competitive advantages that support long-term corporate performance (Broadstock et al., 2021; Zhou et al., 2023).

A growing body of empirical research has documented a positive relationship between environmental performance and various dimensions of firm performance. Studies have shown that firms with stronger environmental performance tend to experience higher operational efficiency, improved financial performance, enhanced corporate reputation, and greater market valuation (Broadstock et al., 2021; Duan et al., 2023; Cheng et al., 2024). Environmental performance also encourages firms to adopt cleaner production

technologies, improve energy efficiency, and reduce environmental compliance costs, all of which contribute to sustainable organizational development (Ren et al., 2020; Feng et al., 2024). Furthermore, effective environmental management strengthens firms' innovation capability by stimulating green technological development and encouraging continuous organizational learning, thereby improving both environmental and economic outcomes (Li et al., 2022; Feng et al., 2024; Xu et al., 2024).

Recent studies have also emphasized that environmental performance generates significant intangible benefits that are closely associated with corporate sustainability. Firms demonstrating superior environmental performance are more likely to establish positive relationships with governments, investors, customers, and other stakeholders because environmental responsibility is increasingly regarded as an important indicator of corporate legitimacy and sustainable governance (Doan & Sassen, 2020; Ding et al., 2022). Better environmental performance enhances corporate reputation, reduces information asymmetry, and increases stakeholder confidence, thereby facilitating access to external financing, improving investment efficiency, and supporting sustainable growth (Fan et al., 2024; Liu et al., 2024; Zhou et al., 2023). These indirect benefits suggest that environmental performance contributes to corporate sustainability not only through operational improvements but also through stronger stakeholder recognition and enhanced institutional legitimacy.

Despite the growing consensus regarding the positive influence of environmental performance on corporate outcomes, several limitations remain in the existing literature. First, many previous studies primarily employ financial performance, firm value, or ESG ratings as dependent variables, while relatively limited attention has been devoted to corporate sustainability performance as a comprehensive outcome integrating economic, environmental, and social dimensions (Khaled et al., 2021; Tjahjadi et al., 2021). Second, although environmental performance has been shown to improve corporate performance, the underlying transmission mechanism remains insufficiently explored. Existing studies mainly focus on direct relationships and pay relatively little attention to how environmental performance is transformed into broader sustainability outcomes through internal governance mechanisms or external information communication (Doan & Sassen, 2020; Ding et al., 2022; Fan et al., 2024). This limitation indicates that further research is required to explain the process through which environmental performance enhances corporate sustainability performance.

Based on the above theoretical arguments and empirical evidence, this study argues that firms with superior environmental performance are more capable of integrating environmental responsibility into corporate strategy, improving operational efficiency, strengthening stakeholder trust, and creating long-term sustainable value. Accordingly, environmental performance is expected to exert a positive influence on corporate sustainability performance. Therefore, the following hypothesis is proposed:

H1: Environmental performance has a positive effect on corporate sustainability performance.

2.3 Environmental Performance and Green Accounting Information Disclosure

Green accounting information disclosure (GAID) has become an increasingly important component of corporate sustainability governance because it enables firms to

communicate environmental responsibility, resource utilization, and sustainability initiatives to external stakeholders. As environmental regulations become more stringent and investors pay greater attention to corporate environmental practices, firms are expected not only to achieve superior environmental performance but also to disclose environmental information in a transparent, comprehensive, and credible manner (Ren et al., 2020; Ding et al., 2022). High-quality green accounting information disclosure reduces information asymmetry, enhances corporate transparency, and facilitates more informed stakeholder decision-making, thereby becoming an essential element of sustainable corporate governance (Fan et al., 2024; Xu et al., 2024).

Existing studies suggest that environmental performance provides an important foundation for environmental information disclosure. Firms with stronger environmental performance generally possess more comprehensive environmental management systems, standardized environmental monitoring procedures, and more reliable environmental data, which improve their capability to disclose high-quality environmental information (Doan & Sassen, 2020; Li et al., 2022). In addition, organizations that actively implement pollution control, resource conservation, and green production practices are more likely to voluntarily disclose environmental achievements in order to demonstrate their environmental commitment and differentiate themselves from competitors (Ren et al., 2020; Feng et al., 2024). Consequently, superior environmental performance not only reflects substantive environmental responsibility but also increases firms' willingness and ability to provide transparent environmental disclosures.

From the perspective of Signaling Theory, environmental information disclosure serves as an effective communication mechanism through which firms convey otherwise unobservable environmental capabilities to external stakeholders. Because environmental performance largely reflects internal management practices that cannot be directly assessed by investors, creditors, regulators, or customers, firms with superior environmental performance have stronger incentives to voluntarily disclose credible environmental information to reduce information asymmetry and strengthen market confidence (Spence, 1973; Connelly et al., 2011). High-quality disclosure functions as a positive market signal that communicates firms' environmental responsibility, governance quality, and long-term sustainability strategy, thereby improving corporate legitimacy and stakeholder trust (Doan & Sassen, 2020; Ding et al., 2022; Fan et al., 2024). Accordingly, firms that perform better environmentally are expected to disclose more extensive and more reliable green accounting information.

Recent empirical evidence generally supports this theoretical argument. Ding et al. (2022) demonstrate that higher-quality environmental information disclosure significantly enhances firms' sustainability performance by improving environmental transparency and governance efficiency. Li et al. (2022) further report that firms with stronger environmental management capabilities are more likely to disclose environmental information that supports green technological innovation and sustainable development. Similarly, Xu et al. (2024) show that environmental information disclosure facilitates green transformation by encouraging firms to establish standardized environmental governance systems and continuously improve

environmental management practices. Feng et al. (2024) also find that transparent environmental disclosure stimulates green innovation by reducing uncertainty regarding firms' environmental commitment and increasing stakeholder confidence. Collectively, these studies indicate that firms with superior environmental performance possess stronger incentives and greater capacity to disclose high-quality environmental information.

Despite these advances, several limitations remain in the existing literature. First, previous studies have primarily examined the economic consequences of environmental information disclosure, including firm value, financial performance, financing constraints, and green innovation, while relatively limited attention has been devoted to the determinants of disclosure quality itself (Fan et al., 2024; Liu et al., 2024). Second, many empirical studies treat environmental disclosure as an independent governance practice without explicitly considering environmental performance as its antecedent. As a result, the causal relationship between substantive environmental performance and disclosure quality remains insufficiently explored. Third, although environmental performance and environmental disclosure are frequently examined separately, relatively few studies have incorporated both variables into an integrated analytical framework capable of explaining how firms translate environmental achievements into sustainable corporate outcomes (Doan & Sassen, 2020; Ding et al., 2022). These limitations suggest that further investigation is required to clarify whether superior environmental performance promotes higher-quality green accounting information disclosure.

Building upon the above theoretical arguments and empirical evidence, this study argues that firms exhibiting stronger environmental performance are more likely to establish effective environmental governance systems, accumulate reliable environmental information, and voluntarily disclose such information to external stakeholders in order to enhance corporate credibility and demonstrate sustainability commitment. Consequently, superior environmental performance is expected to improve the quality of green accounting information disclosure. Therefore, the following hypothesis is proposed:

H2: Environmental performance has a positive effect on green accounting information disclosure.

2.4 Green Accounting Information Disclosure and Corporate Sustainability Performance

Green accounting information disclosure (GAID) has become an essential component of corporate sustainability governance because it improves the transparency of environmental activities and facilitates communication between firms and external stakeholders. As sustainability reporting continues to evolve from voluntary disclosure toward a strategic governance practice, the quality of environmental information disclosure has attracted increasing attention from regulators, investors, and the academic community (Ding et al., 2022; Fan et al., 2024). Rather than serving merely as a reporting requirement, GAID provides stakeholders with credible information regarding firms' environmental strategies, pollution control efforts, resource utilization, and long-term sustainability commitment. Consequently, high-quality environmental

disclosure is increasingly regarded as an important driver of corporate sustainability performance (Ye et al., 2023; Xu et al., 2024).

From the perspective of Signaling Theory, environmental information disclosure functions as an effective mechanism for reducing information asymmetry between firms and external stakeholders. Since many environmental management activities are difficult for investors and regulators to observe directly, firms disclose green accounting information to communicate their environmental capabilities, governance quality, and sustainability commitment (Spence, 1973; Connelly et al., 2011). Transparent and reliable environmental disclosure enhances stakeholders' confidence in corporate environmental responsibility, thereby improving corporate reputation, strengthening investor trust, and increasing market recognition (Doan & Sassen, 2020; Ding et al., 2022). As stakeholders become more confident in firms' sustainability practices, organizations are more likely to obtain financial support, strengthen strategic partnerships, and improve their long-term sustainability performance (Fan et al., 2024; Zhou et al., 2023).

The Triple Bottom Line (TBL) framework also provides theoretical support for the relationship between GAID and corporate sustainability performance. The TBL framework emphasizes that sustainable development requires firms to balance economic, environmental, and social objectives simultaneously (Elkington, 1997; Dyllick & Hockerts, 2002). High-quality green accounting information disclosure enables firms to systematically communicate their achievements across these three dimensions, thereby improving accountability and promoting responsible decision-making (Slaper & Hall, 2011; Tjahjadi et al., 2021). Furthermore, the disclosure process itself encourages firms to establish standardized environmental management systems, strengthen internal governance, and continuously monitor environmental performance. Consequently, environmental disclosure not only reflects existing sustainability performance but also promotes continuous improvements in corporate sustainability management (Ren et al., 2020; Xu et al., 2024).

A growing number of empirical studies have reported a positive association between environmental information disclosure and various measures of corporate performance. Ding et al. (2022) demonstrate that high-quality environmental information disclosure significantly enhances corporate sustainability performance by improving environmental governance and reducing information asymmetry. Fan et al. (2024) further find that firms with more transparent environmental disclosure exhibit superior financial performance because disclosure strengthens market confidence and improves resource allocation efficiency. Similarly, Ye et al. (2023) report that comprehensive environmental disclosure contributes to better corporate performance by enhancing organizational transparency and stakeholder engagement. In addition, Xu et al. (2024) show that environmental disclosure facilitates green transformation and sustainable development through the continuous improvement of environmental governance practices. These findings collectively suggest that green accounting information disclosure generates both governance benefits and economic benefits, thereby supporting long-term corporate sustainability.

Although previous studies have established that environmental information disclosure contributes to corporate performance, several research gaps remain. First, many existing studies primarily focus on financial performance, firm value, or market performance, whereas relatively fewer studies examine corporate sustainability performance as a multidimensional outcome encompassing economic, environmental, and social performance (Khaled et al., 2021; Tjahjadi et al., 2021). Second, the majority of previous research considers environmental disclosure as an independent explanatory variable while paying limited attention to its role within broader sustainability mechanisms. In particular, relatively few studies investigate whether green accounting information disclosure functions as a transmission mechanism linking firms' environmental performance to corporate sustainability performance (Doan & Sassen, 2020; Ding et al., 2022; Fan et al., 2024). Addressing this issue is important because environmental disclosure may represent the critical channel through which firms transform internal environmental achievements into externally recognized sustainability outcomes.

Based on the above theoretical arguments and empirical evidence, this study argues that firms providing higher-quality green accounting information disclosure are more capable of improving transparency, strengthening stakeholder trust, enhancing environmental governance, and promoting sustainable value creation. Consequently, green accounting information disclosure is expected to exert a positive influence on corporate sustainability performance. Therefore, the following hypothesis is proposed:

H3: Green accounting information disclosure has a positive effect on corporate sustainability performance.

2.5 The Mediating Role of Green Accounting Information Disclosure

The preceding sections establish that environmental performance is positively associated with corporate sustainability performance and that environmental performance also promotes higher-quality green accounting information disclosure. In addition, green accounting information disclosure contributes positively to corporate sustainability performance by improving corporate transparency, strengthening stakeholder confidence, and enhancing environmental governance. These findings suggest that green accounting information disclosure is not merely an independent governance practice but may function as an important transmission mechanism linking environmental performance to corporate sustainability performance. Understanding this mediating process is essential because superior environmental performance does not automatically generate sustainable competitive advantages unless environmental achievements are effectively communicated to external stakeholders (Doan & Sassen, 2020; Ding et al., 2022; Fan et al., 2024).

From the perspective of the Triple Bottom Line (TBL) framework, environmental performance constitutes one of the core dimensions of corporate sustainability. However, achieving superior environmental performance alone may be insufficient to maximize sustainability outcomes if stakeholders are unable to observe or evaluate firms' environmental achievements. High-quality green accounting information disclosure enables firms to systematically communicate their environmental management practices, resource utilization efficiency, pollution reduction initiatives, and sustainability strategies, thereby facilitating the realization of economic, environmental, and social value simultaneously (Elkington, 1997; Dyllick & Hockerts, 2002; Slaper & Hall, 2011; Tjahjadi et al., 2021). Consequently, green accounting information disclosure strengthens the contribution of environmental performance to corporate sustainability by improving organizational transparency and reinforcing environmental accountability. Signaling Theory further provides a complementary explanation for the mediating mechanism. Because environmental management activities are largely internal and difficult for external stakeholders to observe directly, firms with superior environmental performance face incentives to disclose credible environmental information to signal their environmental capability and long-term sustainability commitment (Spence, 1973; Connelly et al., 2011). Green accounting information disclosure therefore serves as a credible market signal that reduces information asymmetry and enables investors, regulators, creditors, and other stakeholders to distinguish environmentally responsible firms from their competitors (Doan & Sassen, 2020; Ding et al., 2022). As environmental information becomes more transparent and reliable, stakeholders are more likely to recognize firms' sustainability efforts, resulting in improved corporate reputation, stronger stakeholder relationships, and enhanced corporate sustainability performance (Fan et al., 2024; Ye et al., 2023; Zhou et al., 2023).

Recent empirical evidence also supports the existence of this transmission mechanism. Previous studies indicate that firms with superior environmental performance generally disclose higher-quality environmental information because they possess more standardized environmental management systems and stronger incentives to demonstrate environmental responsibility (Ren et al., 2020; Li et al., 2022). At the same time, transparent environmental disclosure has been found to improve corporate governance, facilitate green innovation, strengthen stakeholder trust, and promote sustainable corporate development (Ding et al., 2022; Feng et al., 2024; Xu et al., 2024). Collectively, these findings imply that green accounting information disclosure enables firms to convert internal environmental achievements into externally recognized sustainability outcomes, thereby strengthening the overall effect of environmental performance on corporate sustainability performance.

Despite these advances, relatively limited research has explicitly examined the mediating role of green accounting information disclosure in the relationship between environmental performance and corporate sustainability performance. Existing studies have largely focused on either the direct effect of environmental performance on firm outcomes or the independent influence of environmental disclosure on organizational performance, while the integrated transmission mechanism linking these three constructs remains insufficiently explored, particularly in the context of emerging capital markets (Doan & Sassen, 2020; Ding et al., 2022; Fan et al., 2024). Given China's increasing emphasis on environmental governance and sustainability disclosure, examining this mediation mechanism provides important theoretical and practical insights into how firms transform substantive environmental performance into comprehensive sustainability outcomes.

Based on the above theoretical arguments and empirical evidence, this study proposes that environmental performance enhances the quality of green accounting information disclosure, which subsequently improves corporate sustainability performance. Accordingly, green accounting information disclosure is expected to partially mediate the relationship between environmental performance and corporate sustainability performance. Therefore, the following hypothesis is proposed:

H4: Green accounting information disclosure mediates the relationship between environmental performance and corporate sustainability performance.

3. METHODS

3.1. Sample Selection and Data Sources

The sample of this study consists of firms listed on the ChiNext Market of the Shenzhen Stock Exchange during the period from 2015 to 2024. The ChiNext Market is characterized by a high concentration of innovation-oriented and growth-stage enterprises, making it an appropriate empirical setting for examining the relationship between environmental performance and corporate sustainability performance (CSP). Compared with firms listed on China's Main Board, ChiNext firms generally exhibit stronger innovation capabilities, greater environmental investment, and higher sustainability disclosure requirements, providing an ideal context for investigating the role of green accounting information disclosure in sustainable corporate development.

The sample period from 2015 to 2024 was selected because it reflects a relatively mature stage of environmental governance and sustainability reporting in China. During this period, environmental regulations and ESG-related disclosure practices became increasingly standardized, substantially improving the consistency and comparability of environmental information across listed firms. Consequently, the selected period provides a suitable context for examining the dynamic relationships among environmental performance, green accounting information disclosure, and corporate sustainability performance.

Following previous studies, several screening procedures were applied to ensure the quality and reliability of the sample. First, firms with missing financial, environmental, or ESG-related information were excluded. Second, firms designated as ST or *ST were removed because their abnormal financial conditions may bias empirical estimates. Third, financial firms were excluded due to their distinctive regulatory environment, financial structure, and accounting practices. Finally, all continuous variables were winsorized at the 1st and 99th percentiles to mitigate the influence of extreme observations, consistent with common practice in corporate finance and sustainability research.

After applying these screening procedures, the final sample consists of 6,154 firm-year observations.

The empirical data were primarily obtained from the China Stock Market and Accounting Research (CSMAR) database, one of the most widely used databases for empirical research on Chinese listed companies. Corporate sustainability performance (CSP) was measured using the ESG comprehensive score provided by CSMAR. Environmental performance (ENV) was proxied by the natural logarithm of the number of green patent applications, reflecting firms' environmental innovation capability and environmental management performance. Green accounting information disclosure (GAID) was manually collected from annual reports, environmental reports, and sustainability reports using a disclosure index developed based on established studies. All control variables were constructed from firm-level financial data obtained from the CSMAR database to ensure the consistency and reliability of the empirical analysis.

Table 1. Variable Definitions and Measurements

Variable	Symbol	Measurement	Supporting Literature
Corporate Sustainability Performance	CSP	ESG comprehensive score obtained from CSMAR	Broadstock et al. (2021); Tjahjadi et al. (2021)

Environmental Performance	ENV	$\ln (1 + \text{Green Patent Applications})$	Li et al. (2022); Feng et al. (2024)
Green Accounting Information Disclosure	GAID	Environmental disclosure index based on annual, environmental, and sustainability reports	Ding et al. (2022); Fan et al. (2024)
Firm Size	FS	$\ln (\text{Total Assets})$	Broadstock et al. (2021)
Firm Age	AGE	$\ln (\text{Years Since Listing})$	Fan et al. (2024)
Financial Leverage	LEV	Total Liabilities / Total Assets	Broadstock et al. (2021)

3.3 Model Specification

To test the proposed hypotheses, this study employs fixed-effects panel regression models to examine the relationships among environmental performance (ENV), green accounting information disclosure (GAID), and corporate sustainability performance (CSP). Robust standard errors are employed to address potential heteroscedasticity. The mediating role of green accounting information disclosure is further examined using the three-step procedure proposed by Baron and Kenny (1986).

The baseline regression model is specified as follows:

$$CSP_{i,t} = \alpha_0 + \alpha_1 ENV_{i,t} + \sum_k \beta_k Control_{k,i,t} + \mu_i + \varepsilon_{i,t} \quad (1)$$

To examine the mediating effect of green accounting information disclosure, the following models are estimated:

$$GAID_{i,t} = \beta_0 + \beta_1 ENV_{i,t} + \sum_k \theta_k Control_{k,i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

$$CSP_{i,t} = \gamma_0 + \gamma_1 GAID_{i,t} + \sum_k \gamma_k Control_{k,i,t} + \mu_i + \varepsilon_{i,t} \quad (3)$$

$$CSP_{i,t} = \delta_0 + \delta_1 ENV_{i,t} + \delta_2 GAID_{i,t} + \sum_k \delta_k Control_{k,i,t} + \mu_i + \varepsilon_{i,t} \quad (4)$$

where CSP denotes corporate sustainability performance, ENV represents environmental performance, GAID refers to green accounting information disclosure, and Control includes firm size (FS), firm age (AGE), and financial leverage (LEV). The detailed definitions and measurements of all variables are presented in Table 1.

4.RESULTS AND DISCUSSION

Table 2 presents the descriptive statistics of the variables used in this study based on a sample of 6,154 firm-year observations from firms listed on the ChiNext Market during the period from 2015 to 2024.

The mean value of corporate sustainability performance (CSP) is 72.992, with a standard deviation of 4.778, indicating that the sampled firms generally exhibit a relatively high level of sustainability performance while showing moderate variation across observations. The minimum and maximum values range from 56.350 to 85.700, suggesting considerable differences in sustainability performance among firms.

The mean value of environmental performance (ENV) is 0.429, with a standard deviation of 0.752. The values range from 0 to 3.829, indicating substantial variation in firms' environmental performance, as measured by the natural logarithm of one plus the number of green patent applications. This variation suggests considerable differences in firms' environmental management and green innovation activities.

The mean value of green accounting information disclosure (GAID) is 1.906, with a standard deviation of 0.867. The disclosure score ranges from 0 to 3.871, indicating noticeable heterogeneity in the quality of green accounting information disclosure across the sampled firms.

Regarding the control variables, firm size (FS) has a mean value of 21.647, with a standard deviation of 0.881, indicating moderate variation in firm size. Firm age (AGE) has a mean value of 1.539, with a standard deviation of 0.783, while financial leverage (LEV) has a mean value of 0.355 and a standard deviation of 0.187. These statistics suggest sufficient variation in firm characteristics to support the subsequent empirical analysis.

Overall, the descriptive statistics indicate that the variables exhibit reasonable distributions and adequate cross-sectional variation, providing a sound basis for the subsequent correlation analysis, fixed-effects regression analysis, robustness tests, and mediation analysis.

Table 2. Descriptive statistics of the main variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
CSP	6,154	72.992	4.778	56.35	85.7
ENV	6,154	0.429	0.752	0	3.829
GAID	6,154	1.906	0.867	0	3.871
FS	6,154	21.647	0.881	19.797	26.299
AGE	6,154	1.539	0.783	0	2.708
LEV	6,154	0.355	0.187	0.054	0.933

4.2 Correlation Analysis

Table 3 reports the Pearson correlation matrix of the variables used in this study. As expected, environmental performance (ENV) is positively and significantly correlated with corporate sustainability performance (CSP) ($r = 0.161$, $p < 0.01$), providing preliminary evidence that firms with stronger environmental performance tend to exhibit higher levels of corporate sustainability performance.

Similarly, green accounting information disclosure (GAID) is positively and significantly correlated with CSP ($r = 0.206$, $p < 0.01$), indicating that firms with higher-quality environmental disclosure generally achieve better sustainability performance. In addition, ENV is positively associated with GAID ($r = 0.068$, $p < 0.01$), suggesting that firms with better environmental performance are more likely to disclose environmental information in a transparent and comprehensive manner.

Regarding the control variables, firm size (FS) is positively correlated with both CSP and GAID, whereas firm age (AGE) and financial leverage (LEV) exhibit generally negative associations with CSP. These correlations are broadly consistent with previous studies and provide preliminary support for including these firm characteristics as control variables in the subsequent regression models.

More importantly, the pairwise correlations among the explanatory variables remain relatively low. The highest correlation coefficient is 0.390, observed between firm size (FS) and financial leverage (LEV), which is substantially below the commonly accepted threshold of 0.80. Therefore, the correlation matrix does not indicate the presence of serious multicollinearity. This preliminary conclusion is further verified by the variance inflation factor (VIF) test reported in the following section.

Table 3. Correlation Matrix.

Variables	CSP	ENV	GAID	FS	AGE	LEV
CSP	1					
ENV	0.161***	1				
GAID	0.206***	0.068***	1			
FS	0.136***	0.281***	0.239***	1		
AGE	-0.126***	0.012	0.066***	0.364***	1	
LEV	-0.203***	0.221***	0.029**	0.390***	0.242***	1

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3 Multicollinearity Test

Before estimating the regression models, multicollinearity among the explanatory variables was examined using the variance inflation factor (VIF). Following previous empirical studies, VIF values below 10 (or the more conservative threshold of 5) indicate that multicollinearity is unlikely to pose a serious concern in regression analysis.

Table 4 reports the VIF results for all explanatory variables. The VIF values range from 1.07 to 1.46, with a mean VIF of 1.21. Specifically, firm size (FS) has the highest VIF value (1.46), followed by financial leverage (LEV) (1.23), firm age (AGE) (1.18), environmental performance (ENV) (1.12), and green accounting information disclosure (GAID) (1.07).

The corresponding tolerance values range from 0.686 to 0.938, all of which are well above the commonly accepted threshold of 0.10.

Overall, the VIF results indicate that multicollinearity is not a concern in this study. Therefore, the explanatory variables can be included simultaneously in the regression models without causing substantial estimation bias, providing a reliable basis for the subsequent regression and mediation analyses.

Table 4. Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
FS	1.46	0.686
LEV	1.23	0.816
AGE	1.18	0.844
ENV	1.12	0.894
GAID	1.07	0.938
Mean VIF	1.21	—

4.4 Regression Results and Main Effect Analysis

Table 5 presents the baseline regression results examining the relationship between environmental performance (ENV) and corporate sustainability performance (CSP). The empirical results indicate that environmental performance has a positive and statistically significant effect on corporate sustainability performance.

Specifically, the coefficient of ENV is 0.301 and is statistically significant at the 1% level ($\beta = 0.301$, $p < 0.01$), indicating that firms with better environmental performance tend to achieve higher levels of corporate sustainability performance. This finding provides preliminary empirical support for Hypothesis 1, suggesting that environmental performance is an important determinant of corporate sustainability performance.

Regarding the control variables, firm size (FS) exhibits a positive and statistically significant association with CSP ($\beta = 2.233$, $p < 0.01$), whereas firm age (AGE) ($\beta = -1.238$, $p < 0.01$) and financial leverage (LEV) ($\beta = -6.841$, $p < 0.01$) are negatively associated with CSP. These results indicate that firm characteristics play an important role in explaining differences in corporate sustainability performance and therefore should be controlled for in the empirical analysis.

The regression model demonstrates satisfactory explanatory power, with an R^2 of 0.515 and an adjusted R^2 of 0.406. In addition, the overall model is statistically significant ($F = 71.683$, $p < 0.01$), indicating that the model provides a good fit to the observed data.

Overall, the regression results demonstrate that environmental performance is positively associated with corporate sustainability performance, thereby providing empirical support for Hypothesis 1.

Table 5. Baseline Regression Results

Variables	CSP
ENV	0.301*** (0.107)
FS	2.233*** (0.179)
AGE	-1.238*** (0.123)
LEV	-6.841*** (0.658)

_cons	28.854*** (3.719)
N	6154
R ²	0.515
Adj. R ²	0.406
F	71.683

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors are reported in parentheses.

4.5 Robustness Check

To examine the robustness of the baseline results, this study replaces the dependent variable with Tobin's Q and re-estimates the baseline regression model. Tobin's Q is a widely used market-based measure of firm performance and is frequently adopted in robustness analyses to verify the stability of empirical findings.

The regression results are reported in Table 6. The coefficient of environmental performance (ENV) remains positive and statistically significant ($\beta = 0.049$, $p < 0.05$), indicating that the positive relationship between environmental performance and the dependent variable persists after replacing the baseline measure. Although the estimated coefficient is smaller than that reported in the baseline regression, its sign and statistical significance remain unchanged, suggesting that the main findings are robust.

Regarding the control variables, firm size (FS) is negatively associated with Tobin's Q ($\beta = -0.842$, $p < 0.01$), whereas firm age (AGE) has a positive and statistically significant effect ($\beta = 0.354$, $p < 0.01$). Financial leverage (LEV) remains negatively associated with Tobin's Q ($\beta = -0.267$, $p < 0.05$). These results do not alter the main conclusion of this study.

Overall, the robustness test confirms that the positive relationship between environmental performance and corporate performance remains statistically significant after replacing the dependent variable with Tobin's Q. Therefore, the baseline findings are robust and are not sensitive to the alternative measurement of the dependent variable.

Table 6. Robustness Check Results.

Variables	Tobin's Q
ENV	0.049** (0.024)
FS	-0.842*** (0.056)
AGE	0.354*** (0.036)
LEV	-0.267** (0.135)
_cons	19.920*** (1.166)
N	6154
R ²	0.617
Adj. R ²	0.531
F	62.70

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors are reported in parentheses..

4.6 Mediation Analysis

To examine the mediating role of green accounting information disclosure (GAID) in the relationship between environmental performance (ENV) and corporate sustainability performance (CSP), this study adopts the three-step mediation procedure proposed by Baron and Kenny (1986). The regression results are presented in Table 7.

Model (1) reports the baseline regression results, showing that environmental performance (ENV) has a positive and statistically significant effect on corporate sustainability performance (CSP) ($\beta = 0.301$, $p < 0.01$). This result provides empirical support for Hypothesis 1, indicating that firms with better environmental performance generally exhibit higher levels of corporate sustainability performance.

Model (2) examines the effect of environmental performance on green accounting information disclosure (GAID). The coefficient of ENV is positive and statistically significant ($\beta = 0.050$, $p < 0.01$), supporting Hypothesis 2. The result indicates that firms with superior environmental performance are more likely to disclose higher-quality green accounting information.

Model (3) incorporates both ENV and GAID into the regression model. The coefficient of GAID is positive and statistically significant ($\beta = 0.790$, $p < 0.01$), providing support for Hypothesis 3. Meanwhile, the coefficient of ENV remains positive and statistically significant but decreases from 0.301 to 0.262 after the inclusion of GAID. According to the mediation procedure proposed by Baron and Kenny (1986), this result indicates that green accounting information disclosure partially mediates the relationship between environmental performance and corporate sustainability performance, thereby providing empirical support for Hypothesis 4.

Overall, the mediation analysis demonstrates that environmental performance influences corporate sustainability performance through both direct and indirect pathways. The results suggest that green accounting information disclosure serves as an important transmission mechanism linking environmental performance and corporate sustainability performance. Collectively, the empirical findings provide support for Hypotheses 1–4 and confirm the existence of a partial mediating effect of green accounting information disclosure.

Table 7. Mediation Analysis Results

Variables	(1) CSP	(2) GAID	(3) CSP
ENV	0.301*** (0.107)	0.050*** (0.018)	0.262** (0.107)
GAID			0.790*** (0.095)
FS	2.233*** (0.179)	0.352*** (0.032)	1.955*** (0.182)
AGE	-1.238*** (0.123)	0.186*** (0.023)	-1.385*** (0.124)
LEV	-6.841*** (0.658)	0.180* (0.109)	-6.983*** (0.652)

_cons	28.854*** (3.719)	-6.089*** (0.661)	33.662*** (3.760)
N	6154	6154	6154
R ²	0.515	0.588	0.523
Adj. R ²	0.406	0.496	0.416
F	71.684	129.850	71.005

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors are reported in parentheses..

5.CONCLUSION

5.1Research Findings

This study investigates the relationship between environmental performance and corporate sustainability performance and further examines the mediating role of green accounting information disclosure (GAID) using panel data from Chinese ChiNext-listed firms during the period from 2015 to 2024. Based on the empirical analysis, four major findings are obtained.

First, environmental performance has a positive and statistically significant effect on corporate sustainability performance. The empirical results indicate that firms with superior environmental performance generally achieve higher levels of sustainability performance, highlighting the strategic importance of environmental management in promoting sustainable corporate development.

Second, environmental performance positively influences green accounting information disclosure. Firms with better environmental performance tend to provide more transparent and comprehensive environmental information, suggesting that substantive environmental practices are accompanied by higher-quality disclosure.

Third, green accounting information disclosure has a significant positive effect on corporate sustainability performance. Firms with higher levels of environmental disclosure generally exhibit better sustainability performance, indicating that transparent environmental reporting plays an important role in supporting sustainable corporate development.

Finally, the mediation analysis confirms that green accounting information disclosure partially mediates the relationship between environmental performance and corporate sustainability performance. Specifically, environmental performance enhances corporate sustainability performance not only directly but also indirectly through improving the quality of green accounting information disclosure. These findings demonstrate that green accounting information disclosure serves as an important transmission mechanism linking environmental performance with corporate sustainability performance.

5.2 Theoretical Contributions

This study makes three important theoretical contributions to the literature on corporate sustainability.

First, this study extends the application of the Triple Bottom Line (TBL) framework by demonstrating that environmental performance is not only an environmental outcome but also a strategic antecedent of corporate sustainability performance. The findings provide empirical evidence that environmental management contributes to sustainable

value creation by simultaneously supporting economic, environmental, and social performance, thereby enriching the application of the TBL framework in corporate sustainability research.

Second, this study enriches Signaling Theory by identifying green accounting information disclosure (GAID) as a partial mediating mechanism linking environmental performance and corporate sustainability performance. By revealing how firms transform substantive environmental achievements into externally recognized sustainability outcomes through environmental disclosure, this study provides a more comprehensive explanation of the information transmission process underlying corporate sustainability.

Third, this study contributes to the growing body of sustainability research in emerging economies by providing empirical evidence from China's ChiNext market. As one of China's most innovation-oriented capital markets, the ChiNext market offers a unique institutional context for examining the interaction between environmental performance, information disclosure, and corporate sustainability performance. The findings therefore enhance the applicability of the TBL framework and Signaling Theory within emerging market settings and provide additional evidence for cross-country sustainability research.

5.3 Practical Implications

The findings of this study provide several practical implications for corporate managers, policymakers, and investors.

First, corporate managers should regard environmental performance as a strategic component of long-term sustainable development rather than merely a compliance requirement. The empirical results indicate that improving environmental performance enhances corporate sustainability performance. Therefore, firms should strengthen environmental management, increase investment in green technologies, improve resource efficiency, and integrate environmental objectives into corporate strategic planning to achieve sustainable competitive advantages.

Second, firms should improve the quality and transparency of green accounting information disclosure. High-quality environmental disclosure not only reflects firms' environmental achievements but also contributes to better sustainability performance by enhancing corporate transparency and reducing information asymmetry. Establishing standardized environmental accounting systems and adopting consistent disclosure practices can improve the credibility and comparability of sustainability information, thereby strengthening stakeholder confidence.

Third, policymakers and investors should jointly promote sustainable corporate development. Policymakers should continue to improve environmental governance and disclosure regulations by establishing clearer reporting standards and encouraging high-quality environmental information disclosure through appropriate policy incentives. Meanwhile, investors should incorporate environmental performance and green accounting information disclosure into investment evaluation and decision-making processes, as these indicators provide valuable information regarding firms' sustainability capability and long-term development potential.

5.4 Limitations and Recommendations for Future Research

Despite its contributions, this study has several limitations that provide opportunities for future research.

First, this study employs a quantitative research design based on panel data, which is effective in identifying statistical relationships but may not fully capture the managerial decision-making processes underlying environmental performance and green accounting information disclosure. Future research could adopt mixed-method approaches, such as case studies or interviews, to provide a deeper understanding of how firms integrate environmental management with sustainability strategies.

Second, the sample is limited to firms listed on China's ChiNext Market during the period from 2015 to 2024. Although this market provides an appropriate context for examining innovation-oriented firms, the findings may not be directly generalizable to firms operating in other industries, capital markets, or institutional environments. Future studies could extend the analysis to different countries or compare firms across developed and emerging economies.

Third, this study measures corporate sustainability performance using ESG-based indicators and environmental performance using green patent applications. Although these measures are widely adopted in the literature, they may not fully capture the multidimensional nature of sustainability and environmental performance. Future research could employ alternative measures or construct more comprehensive indicators to further validate the robustness and generalizability of the findings.

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