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A study of external and internal factors influencing sustainable performance in Chinese technology-based SMEs

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Abstract

Purpose: There is a dearth of research on the determinants of sustainable performance in Chinese technology-based SMEs. The primary objective of this study is to examine the internal and external resources that act as critical, independent variables in guiding and motivating sustainable development in technology-based SMEs.

Design/methodology/approach: We gathered data from senior leaders or managers of Chinese technology-based SMEs using an online "questionnaire star." Multiple linear regression analysis, a quantitative research method, examined the study's hypotheses. This article uses SPSS 27.0 and AMOS 26.0 software for empirical analysis.

Findings: The empirical analysis shows that the long-term viability of Chinese technology-based SMEs is greatly affected by a number of outside factors, such as pressure from stakeholders, the use of a green innovation strategy, and following environmental rules. Green intellectual capital, green human resource management, green supply chain integration, green transformational leadership, and employee green behavior all have a significant impact on the sustainable performance of China's technology-based SMEs.

Practical implications: This study offers a thorough overview of the external and internal factors that impact the long-term success of Chinese technology-based SMEs. The results

provide useful insights for policymakers on measures to improve the sustainable performance of technology-based SMEs in China.
Originality/value: To create a comprehensive plan to assist the long-term growth of Chinese technology-based SMEs, the government can use this study as a valuable resource. This study confirms the effects of several internal and external factors on sustainable performance through empirical analysis. The findings have significant theoretical and practical implications for enhancing Chinese technology-based SMEs in a sustainable way.

Keywords: Sustainable Performance, Chinese Technological-based SMEs, External and Internal Factors

Introduction

Technology-based SMEs are critical to implementing green innovation development strategies, economic transformation, and upgrading (Peng et al., 2021), which are knowledge-intensive businesses that rely on technical and scientific staff for R&D and possess exclusive intellectual property rights for the fundamental technology used in the production of advanced goods and services (Zhou & Dai, 2023). Research indicates that technology-based SMEs in China account for 80% of new product creation and 65% of all patents (Wang & Esperança, 2023). Consequently, the growth of technology-based SMEs in China has become a significant driver of social and economic advancement (Peng et al., 2021). Previous studies on performance have primarily focused on large-scale manufacturing, resource-based, and service industries, but there are few studies on technology-based SMEs, especially in developing countries.

In the dual-carbon backdrop, businesses should select a route toward green, low-carbon, and sustainable development (Mousa & Othman, 2020). These days, sustainability is many companies' primary business goal and strategy (Hernita et al., 2021). Sustainable development has already become a hotspots of technology management (Yubo et al., 2023). The existing literature primarily concentrates on the environmental aspect of SNP, leaving a gap that warrants further investigation into the social and economic dimensions of SNP. However, COVID-19 outbreaks severely hampered the ability of technology-based SMEs to survive. This is primarily evident in the decline in these SMEs' capacity for development, operations, profitability, and debt servicing (Zou et al., 2023). The existing literature primarily concentrates on the environmental aspect of SNP, leaving a gap that warrants further investigation into the social and economic dimensions of SNP. Therefore, from theoretical and practical perspectives, studying the sustainable growth of Chinese technology-based SMEs is essential.

Green intellectual capital (GIC) can enhance a company's environmental and economic performance, as well as have a beneficial impact on sustainable performance, according to prior research (Wang & Juo, 2021; Chawewong & Naipinit, 2023). Nisar et al. (2021) have demonstrated that environmentally friendly HRM techniques indirectly positively impact environmental performance. It is possible to reduce the pressure on technology-based SMEs to sustain their operations through external measures such as tax reduction, financial assistance, and credit support, as well as internal actions such as reputation management, digital transformation, and internal control (Zou et al., 2023). Diverse internal and external resources significantly impact SMEs' sustainable development (Prashar, 2019). Previous research has

suggested only a few variables influencing SMEs' sustainable performance (SNP). Numerous research studies have examined the internal and external aspects of sustainability in light of its growing importance (Ardiet et al., 2021). While some of these studies (Lu et al., 2022) have examined external influences, others (Scarpellini et al., 2020) have examined internal factors. Previous studies focused on only 1–3 factors for sustainable performance, whereas this study integrates both internal and external factors to examine sustainable performance across a total of 9 factors. This was never seen in previous research. Based on the above considerations, this research examines how external and internal factors affect the sustainable performance of Chinese technology-based SMEs.

Literature Review

Establishing sustainability as a core value necessitates focusing on numerous approaches (Mousa & Othman, 2020). The broader notion of sustainability, which encompasses social, economic, and environmental aspects, intricately links to sustainable performance (SNP) (Yusliza et al., 2020). Therefore, the concept of SNP gives rise to conflicts among the three criteria categories, as Mahmood and Nasir (2023) identified. However, it is worth mentioning that the majority of existing literature primarily concentrates on the environmental aspect of SNP, leaving a gap that warrants further investigation into the social and economic dimensions of SNP (Yusliza et al., 2020; Tanveer et al., 2023). The purpose of this research is to enhance understanding of the strategic planning landscape by examining the interplay of three components from the perspective of technology-based SMEs in China, a developing nation (Mahmood & Nasir, 2023).

To achieve sustainable growth, the Chinese government has adopted the strategic objectives of "carbon peak" and "carbon neutrality" (Hu & Li, 2022). As an environmental strategy, green innovation strategy (GIS) assists companies in reducing the environmental consequences arising from their production and operational activities (Sun & Sun, 2021). We need more research to evaluate the impact of the green innovation strategy on China's technology-based SMEs. However, more research is required to ascertain the influence of China's green innovation plan on technology-based SMEs. The concept of stakeholder pressure (ST) pertains to the capacity and impact that stakeholders possess in shaping a company's decision-making processes (Yunus et al., 2020). Guoyou et al. (2013) found a positive correlation between ST and SNP. Stakeholder demands have extensively influenced firms' adoption of green practices (Jazairy & von Haartman, 2020). Consequently, there is a requirement for sustainable solutions that enable efficient interaction with stakeholders. (Singh et al., 2021).

Establishing environmental regulations (ER) to obtain several benefits is possible. The possibility of strict environmental laws to improve energy efficiency and reduce the use of fossil fuels is one such benefit (Ali et al., 2020; Javed et al., 2022). Furthermore, these rules can encourage the uptake and application of green energy, while also acting as a preventative measure against any unfavorable environmental effects linked to economic expansion (Ma et al., 2021). Moreover, resource-rich nations that have put strict environmental restrictions in place may find that globalization helps to promote sustainable development and lessen the ecological burden (Xiaoman et al., 2021; Ahmed et al., 2021; Hussain et al., 2022; Zheng et al., 2021). However, we need to empirically study whether environmental protection regulations

can promote the performance improvement of technology-based SMEs.

Many countries use government subsidies (GS) in this area and work with businesses, public research institutes, and consumers to strengthen these partnerships in order to achieve the global goal of sustainable development by 2030. Song et al. (2022) suggest that corporations can utilize smart devices to mitigate product redundancy in the design process, particularly when additional subsidies are accessible.

GIC, as defined by Mahmood and Nasir (2023), encompasses the combined knowledge, abilities, and talents of individuals inside an organization. This collective expertise is vital for the organization's ability to create and efficiently handle sustainable value. The success of an organization's environmental sustainability initiatives depends on how it strategically applies green-related knowledge in different ways (Yusliza et al., 2020a). The notion of GIC highlights the importance of a company's intellectual resources in dealing with environmental challenges as part of their regular economic operations (Mohua & Yusoff, 2023).

Environmental management's human resource management component is known as GHRM (Chaudhary, 2019). In order to organize HRM practices, researchers have recently begun to see the utilization of GHRM (Global Human Resource Management) in enterprises as a novel area of study in environmental management research (Ansari et al., 2020). Firms must set green organizational goals to enhance their employees' environmentally friendly attitudes and behaviors, effectively implementing a sustainable environmental plan (Awwad Al-Shammari et al., 2022). Ghouri et al. (2020) state that GHRM can promote the adoption of eco-friendly practices by fostering a supportive culture and building capacities (Ansari et al., 2020).

In a previous study, Singh et al. (2020) introduced the notion of green transformational leadership (GTL) as a leadership approach that focuses on guiding employees towards achieving the organization's environmental goals by providing them with a distinct vision, inspiration, motivation, and support for their personal growth and development (Singh et al., 2020). The implementation of GTL programs has incentivized employees to gain new information (Le & Lei, 2018; Han et al., 2016). Furthermore, GTL programs effectively engage employees in green processes and product innovation activities, enabling firms to introduce eco-friendly products and services into the market (Kumar et al., 2020). The degree to which suppliers and manufacturers engage in strategic collaboration and coordinate the management of internal activities to minimize environmental effects is known as green supply chain integration, or GSCI (Sun & Sun, 2021). Several academics have acknowledged the significance of GSCI and explored its effects on performance (Han & Huo, 2020). An organization can enhance its environmental performance and accomplish its strategic goals by aligning its environmental strategy with the GSCI process (Wang & Feng, 2023).

Employee green behavior (EGB) refers to the strategic approach that companies adopt to enhance their environmental performance and achieve sustainability goals (Chaudhary, 2019). Tian et al. (2020) propose that individuals' pro-environmental attitudes and corresponding actions contribute to EGB. Governments need help to effectively address sustainability concerns, necessitating organizations' collaboration alongside government agencies (Deslatte & Swann, 2019; Tanveer et al., 2023). Zacher et al. (2023) discuss the evaluation of EGB based on its impact on these objectives. To show that green behavior is something that happens at many levels, including the actions of individuals, groups, organizations, and institutions (Tang

et al., 2023) Tang, Wang, and Zhang created an ecosystem model of EGB.

Hypothesis Development

1. Green innovation strategy

Previous research has demonstrated that adopting a strategic orientation inside firms facilitates innovation and enhances their ability to promptly adapt to market dynamics and fulfill client demands (Sun & Sun, 2021). This, in turn, can increase an enterprise's cash flow and business performance. Implementing a proactive environmental strategy can mitigate the environmental burden, bolster competitive advantage, and boost corporate performance by effectively utilizing tangible and intangible resources within the organization (Soewarno et al., 2019). Zhou and Dai (2023) have highlighted the potential of Geographic Information Systems to enable firms to capitalize on environmentally friendly prospects by employing innovative methods and production processes, enhancing their SNP. Drawing on the aforementioned data, this study proposes the following hypothesis:

H1: GIS has a positive impact on Chinese technology-based SMEs' sustainable performance.

2. Stakeholders Pressure

Several academic studies have shed light on this issue by analyzing the influence of stakeholder demands on the adoption of environmental practices (Shi & Tsai, 2022; Yunus et al., 2020) or environmental performance (Krasodomska & Zarzycka, 2021), using manufacturing samples as the basis for their research. According to Shi and Tsai (2022), prior studies have indicated a positive correlation between a firm's level of dependence on a particular stakeholder group and the corresponding group's power. People widely recognize the influence of ST on adopting sustainable management practices as a significant driver (Haleem et al., 2022). Based on the aforementioned data, the present study proposes the following hypothesis:

H2: SP has a positive impact on sustainable performance of Chinese technology-based SMEs.

3. Environmental regulations

Intending to improve environmental quality and upend the traditional paradigm for economic growth, the Chinese government is steadily increasing its efforts in environmental preservation. The Chinese government implements environmental governance to foster improved and rapid economic development (Shen et al., 2017). Xie et al. (2017) observed a link between environmental restrictions and businesses shifting to jurisdictions with laxer legislation. Nonetheless, the Chinese application of environmental regulations successfully reduces pollution both nationally and locally. This study's hypothesis is based on an analysis by Zhang et al. (2019).

H3: ER has a positive impact on Chinese technology-based SMEs.

4. Government subsidy

According to Doh and Kim's (2014) research, a critical strategy for cultivating solid social ties in the modern networked economy is for governments to provide financial support to encourage innovation among SMEs in specific areas. Conversely, some experts have proposed that the

government ought to provide subsidies to mitigate the financial constraints that technology-based SMEs have when making investments (Colombo et al., 2013). By splitting the cost with the government, these subsidies help reduce the risk of R&D failure while also easing the financial burden of capital expenditure necessary for creating innovative technical ventures (Yang et al., 2021). The current investigation proposes the following hypothesis based on the previously provided facts:
H4: GS has a positive impact on Chinese technology-based SMEs' sustainable performance.

5. Green intellectual capital
The concept of GIC encompasses a variety of elements, including non-physical resources and intangible assets that lack monetary worth. These components enhance value creation by developing practical capabilities (Yusliza et al., 2020). The significant surge in environmentalism has been instrumental in cultivating GIC (Jirakraisiri et al., 2021). Furthermore, Haldorai et al., 2022, place a significant emphasis on the future performance aspect of sustainability, comparatively giving less consideration to current performance. Scholars Munawar et al., 2022; Yusliza et al., 2020 have recognized the understanding of GIC as a valuable tool for effectively tackling complex sustainability issues. As a result, we propose the following hypothesis:
H5: GIC has a positive impact on Chinese technology-based SMEs' sustainable performance.

6. Green human resource management
In recent years, businesses have begun seeking ecologically sustainable business operations and management methods, with environmental protection and sustainability emerging as essential corporate goals (Tirno et al., 2023). According to Iftikhar et al. (2022), GHRM has become a practice within organizations to improve enterprises' environmental consequences, particularly their performance (Qasim et al., 2021). Additionally, GHRM improves environmental performance and allows staff members to participate in business environmental sustainability efforts (Iftikhar et al., 2022). Consequently, we formulated the following hypothesis:
H6: GHRM has a positive impact on Chinese technology-based SMEs' sustainable performance.

7. Green supply chain integration
Han (2019) has recognized a favorable association between GSCI and social and economic performance. Data from a survey of Chinese firms (Wong et al., 2020) has demonstrated that encouraging green product and process innovation can improve environmental performance and cut expenses. Thus, we came up with the following hypothesis:
H7: GSCI has a positive impact on Chinese technology-based SMEs' sustainable performance.

8. Green Transformational Leadership
Furthermore, studies have demonstrated that GTL initiatives enhance a firm's environmental performance (Li et al., 2020). The correlation between GTL and corporate performance has become increasingly important, especially for organizations that aim to enhance their processes

and products through innovation in order to obtain a competitive advantage and achieve superior performance (Çop et al., 2021). Kusi et al.'s (2021) research reveals that GTL (gas-to-liquid) technology positively impacts environmental outcomes and individual sustainability actions. As stated by Rizvi and Garg (2021), adopting a green persona or attitude by a leader can foster the development of green habits and culture among employees. Additionally, GTL has taken the lead in implementing environmentally friendly strategies aimed at attaining sustainable results, such as the promotion of SNP (Kusi et al., 2021). Consequently, we propose the following hypothesis:
H8: GTL has a positive impact on Chinese technology-based SMEs' sustainable performance.

9. Employee green behavior
The study of employee EGB expands the domain of sustainability management beyond the organizational level to include the individual level, recognizing employees' active role in promoting sustainability (Ones & Dilchert, 2012; Tang et al., 2023). The application of EGB, in conjunction with innovation and GIC, has contributed to sustainable results (Benevene et al., 2021; Yusliza et al., 2020). Suganthi (2019) and Khan et al. (2023) have suggested that further investigation into green practices is necessary to improve the performance of enterprises (Nawaz Khan, 2023; Suganthi, 2019). Huang et al. (2023) recommend that organizations prioritize the development of EGB to enhance their environmental performance. Hence, engaging in a comprehensive examination of EGB is imperative to elucidate its favorable consequences and assess its efficacy in promoting sustainability (Mahmood & Nasir, 2023). Thus, we put forth the subsequent hypothesis:
H9: EGB has a positive impact on Chinese technology-based SMEs' sustainable performance.

Methods

1. Variables
The independent variables encompass external and internal factors that can influence the sustainable performance of Chinese technology-based SMEs. External factors include GIS, SP, ER, and GS. Conversely, the internal aspects encompass GIC, GHRM, GSCI, GTL, and EGB. The dependent variables in this study pertain to the sustainable performance of Chinese technology-based SEMs. Figure 1 illustrates the variable model.

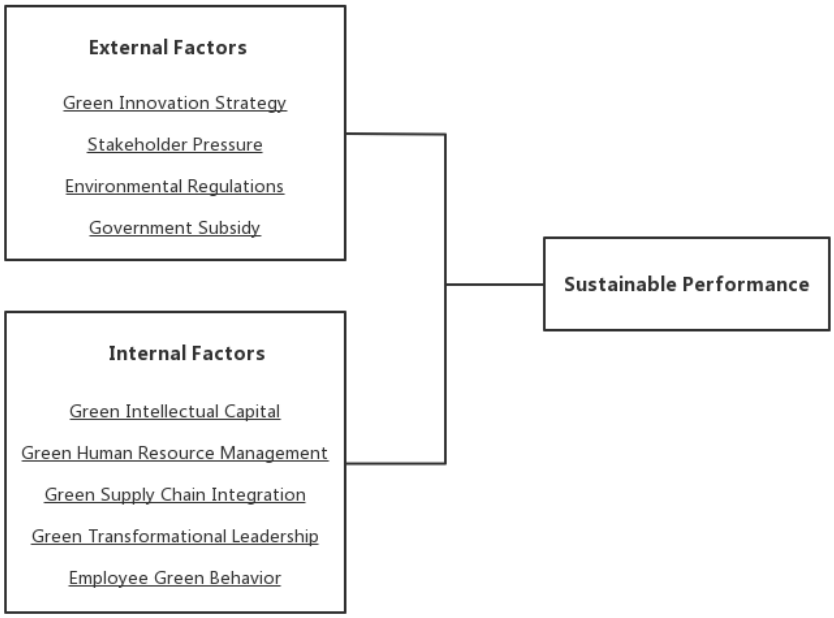

Figure 1: The research model

2. Questionnaire design

We conducted a comprehensive literature analysis and conducted interviews with Chinese technology-based SMEs to develop a questionnaire. The questionnaire's purpose was to investigate the impact of external and internal factors on these enterprises' long-term success. Before the questionnaire's final version, we tested it on a small sample of Chinese SMEs in the technology sector. We then revised the questionnaire based on the comments and recommendations we received from these businesses.

To acquire the data, we used techniques for snowball random sampling. We chose all units equally, making it the most effective way to obtain firsthand information. Despite this, the website "Questionnaire Star" distributed 258 surveys to senior executives or managers of Chinese SMEs using both offline and online technology. We distributed these questionnaires to CEOs, managers, directors, and departments in charge of environmental protection in production and operations, as they possess firsthand, in-depth knowledge of green practices, the current state of businesses, and the long-term performance of industries. Out of the 258 questionnaires mailed, 221 respondents returned them. Several questionnaires were challenging, and some interviewees raised doubts, necessitating their completion. As a result, 212 completed surveys were eventually considered valuable for further study. We selected the following items from the existing literature: GIS (Wasiq et al., 2023); SP (Sarkis et al., 2010); ER (López-Gamero, Molina-Azorín, & Claver-Cortés 2010); GS (Shao & Chen, 2022); GIC (Chen, 2008); GHRM (Shah & Soomro, 2022); GSCI (Wong, Wong, & Boon-itt, 2020); GTL (Chen & Chang, 2013); EGB (Bissing-Olson et al., 2013); SNP (Wiklund & Shepherd, 2005). Table 1 provides the details of the constructs and items.

Table 1 Measures of constructs

Constructs	Indicator	Mean	SD	LF
Green Innovation Strategy (GIS)	GIS1	3.865	0.868	0.748
	GIS2	3.536	0.823	0.767
	GIS3	3.723	0.919	0.816
Stakeholder Pressure (SP)	SP1	3.428	0.784	0.808
	SP2	3.259	0.791	0.762
	SP3	3.764	0.829	0.797
	SP4	3.571	0.837	0.818
	SP5	3.473	0.798	0.734
Environmental Regulations (ER)	ER1	3.654	0.905	0.892
	ER2	3.521	0.817	0.784
Government Subsidy (GS)	GS1	3.589	0.832	0.816
	GS2	3.294	0.781	0.803
	GS3:	3.612	0.827	0.819
Green Intellectual Capital (GIC)	GIC1	3.654	0.846	0.822
	GIC2	3.306	0.916	0.865
	GIC3	3.478	0.923	0.876
Green Human Resource Management (GHRM)	GHRM1	3.291	0.825	0.813
	GHRM2	3.823	0.812	0.772
	GHRM3	3.723	0.772	0.769
	GHRM4	3.653	0.756	0.821
	GHRM5	3.247	0.905	0.816
	GHRM6	3.376	0.908	0.835
	GHRM7	3.564	0.815	0.786
Green Supply Chain Integration (GSCI)	GSCI1	3.603	0.793	0.728
	GSCI2	3.736	0.907	0.867
	GSCI3	3.213	0.827	0.842
Green Transformational Leadership (GTL)	GTL1	3.697	0.895	0.829
	GTL2	3.621	0.789	0.818
	GTL3	3.609	0.802	0.837
	GTL4	3.567	0.809	0.791
	GTL5	3.389	0.916	0.853
	GTL6	3.456	0.742	0.812
Employee Green Behavior (EGB)	EGB1	3.672	0.763	0.738
	EGB2	3.643	0.731	0.792
Sustainable Performance	SNP1	3.697	0.828	0.897
	SNP2	3.563	0.851	0.832
	SNP3	3.624	0.876	0.782
	SNP4	3.671	0.902	0.896
	SNP5	3.526	0.903	0.816

(SNP)	SNP6	3.701	0.897	0.792
	SNP7	3.618	0.878	0.764
	SNP8	3.654	0.909	0.852
	SNP9	3.583	0.825	0.786

Note: SD: Standard Deviation, LF: Loading Factors.

Findings

The study utilized SPSS 27.0 and AMOS 26.0 to examine the respondent's characteristics, the connection between constructs, and descriptive statistics such as mean and standard deviation. We tested the hypothesis by assessing the validity and reliability of the observed variables using AMOS 26.0.

1.Reliability and validity analysis

This study evaluated the internal consistency of each concept using Cronbach's alpha. All of the results for the average variance extracted (AVE), which is a measure used to assess the correctness of the data, exceed the threshold of 0.5. The consistency or uniformity of the measuring objects or constructs has an impact on reliability. This study evaluated the internal consistency of each construct using Cronbach's alpha (CA). Each structure's consistency or dependability varied from 0.786 to 0.912, as indicated in Table 2. Every research construct demonstrates internal consistency, surpassing the suggested cutoff of 0.70.

The current investigation analyzed both convergent and discriminant validity to ensure validity. For convergent validity, the loadings of all relevant items must exceed 0.6, and the AVE and CR must be greater than 0.6 and 0.5, respectively. Table 4 indicates that the CR value exceeds the recommended range of 0.854 to 0.926, and the AVE values for all the constructs range from 0.625 to 0.851. Thus, the results of the research constructs indicate that they possess convergent validity. We compared the square root of the AVE for each construct to the correlations with the adjacent components to assess the discriminant validity.

Table 2 Reliability and Validity testing

Variables	**CA**	**CR**	**AVE**
Green Innovation Strategy (GIS)	0.836	0.916	0.708
Stakeholder Pressure (SP)	0.852	0.903	0.689
Environmental Regulations (ER)	0.848	0.884	0.836
Government Subsidy (GS)	0.875	0.879	0.851
Green Intellectual Capital (GIC)	0.863	0.856	0.682
Green Human Resource Management (GHRM)	0.798	0.882	0.625
Green Supply Chain Integration (GSCI)	0.912	0.915	0.808
Green Transformational Leadership (GTL)	0.814	0.918	0.736
Employee Green Behavior (EGB)	0.916	0.926	0.758
Sustainable Performance (SNP)	0.786	0.854	0.712

2.Regression analysis

We analyze potential correlations between variables. The decentralized nature of the data prevents multicollinearity. The decentralized data undergoes a VIF test, revealing an average well below the critical value of 5. Thus, multicollinearity is absent. We examined the relationship between influencing factors and the sustainable performance of Chinese technology-based SMEs using a multiple linear regression analysis. Table 3 displays the standardized regression coefficients and the accompanying t-test findings.

Table 3 Regression analysis of external factors influencing sustainable performance

	Unstandardised coefficient		**Standardised coefficient**			
	B	**Std. Error**	**Beta**	**t-Statistic**	**Prob**	**VIF**
Variable	3.37E-18	0.095		0.000	1.000	1.000
GIS	0.378	0.094	0.378	4.235	0.000	1.180
ER	0.265	0.094	0.265	3.235	0.009	1.383
SP	0.180	0.094	0.180	1.927	0.041	1.316
F			6.365			
R^2			0.389			
Adjusted R^2			0.324			
Durbin-Watson			1.921			

The regression equation incorporates three independent variables, determined to be statistically significant after multiple iterations, based on the findings in Table 3. These variables are the green innovation strategy ($p < 0.01$), environmental regulations ($p < 0.01$), and stakeholder pressure ($p < 0.05$). We found that all three variables significantly influence the sustainable performance of Chinese technology-based SMEs. Therefore, we confirmed the validity of H1, H2, and H3. Unfortunately, H4 is not supported.

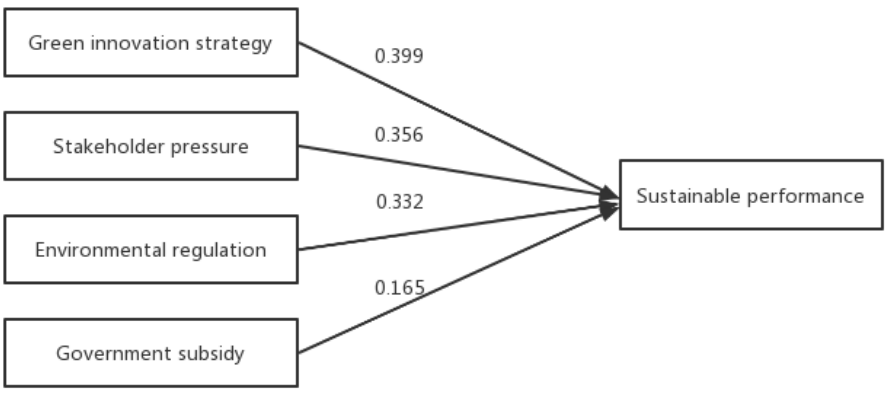

Figure 2: Effect of external factors influencing on sustainable performance.

The regression analysis findings (Figure 2) support the views of certain academics who contend that GIS, SNP, and ER have a significant impact on the SNP of Chinese technology-based SMEs.

Table 4 Regression analysis of internal factors influencing sustainable performance

	Unstandardised coefficient		**Standardised coefficient**			
	B	**Std. Error**	**Beta**	**t-Statistic**	**Prob**	**VIF**
Variable	1.67E-16	0.095		0.000	1.000	1.000
GIC	0.326	0.095	0.326	3.936	0.001	1.000
GTL	0.314	0.095	0.314	3.562	0.001	1.000
EGB	0.308	0.095	0.308	3.487	0.002	1.000
GHRM	0.286	0.095	0.286	3.341	0.005	1.000
GSCI	0.237	0.094	0.237	2.569	0.032	1.000
F			6.776			
R^2			0.357			
Adjusted R^2			0.335			
Durbin-Watson			1.822			

Table 4 indicates that following iterations, the regression equation retained four independent variables: green intellectual capital ($p < 0.01$), green transformational leadership ($p < 0.01$), employee green behavior ($p < 0.01$), green human resource management ($p < 0.01$), and green supply chain integration ($p < 0.05$). All of these variables demonstrated a statistically significant impact on the sustainable performance of technology-based SMEs in China. Therefore, H5, H6, H7, H8, and H9 are confirmed.

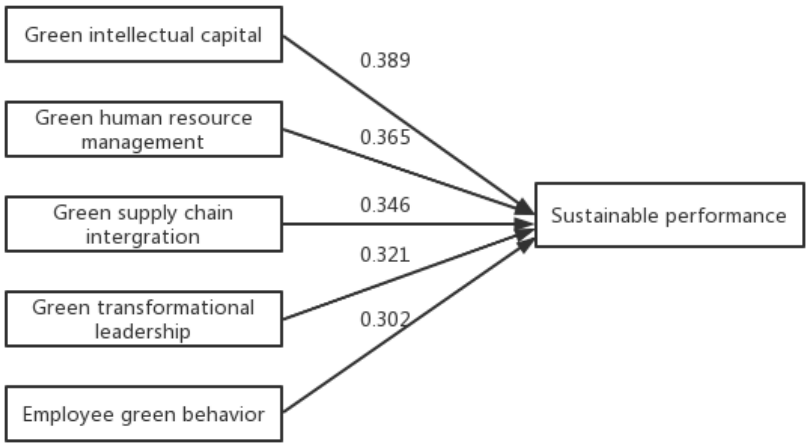

Figure 3: Effect of internal factors influencing on sustainable performance

The results presented in Figure 3 demonstrate that GIC, GHRM, GSCI, GTL, and EGB significantly enhance the SNP of Chinese technology-based SMEs. However, the SNP of Chinese technology-based SMEs is relatively unaffected by GS. In summary, Table 5 shows that 8 hypotheses received support, while 1 hypothesis received no support.

Table 5 The summary of the Hypotheses Tested

Hypothesis	Relationship	Result
H1	GIS has a positive impact on SNP.	Supported
H2	SP has a positive impact on SNP.	Supported
H3	ER has a positive impact on SNP.	Supported
H4	GS has a positive impact on SNP.	Not supported
H5	GIC has a positive impact on SNP.	Supported
H6	GHRM has a positive impact on SNP.	Supported
H7	GSCI has a positive impact on SNP.	Supported
H8	GTL has a positive impact on SNP.	Supported
H9	EGB has a positive impact on SNP.	Supported

Discussion and Conclusion

Based on the above findings, we can conclude that GIS, SNP, ER, GIC, GHRM, GSCI, GTL, and EGB have a significant impact on the SNP of Chinese technology-based SMEs. Therefore, to ensure the successful implementation of GIS, Chinese technology-based SMEs should make the most of government resources and design a variety of implementable strategies. In order to better understand and manage stakeholders' expectations and improve the SNP of Chinese technology-based SMEs, it also exhorts managers and leaders to develop and apply stakeholder integration capabilities. Further enhancements are necessary to ensure accountability in the decision-making process and the allocation of funds for environmental rules. It would be advantageous to start media-based environmental awareness initiatives to raise public understanding of SNP and resource conservation. In the near term, GS has the potential to improve SNP. GS, however, has the potential to stifle businesses' long-term innovative spirit, which is detrimental to the growth of SNP. Chinese technology-based SMEs should, therefore, fully utilize GS. However, they should maintain their independence. Businesses still need to encourage the growth of SNP through innovative green technology.

Managers looking to implement an environmental strategy should consider GIC as an integrating tool for internal factors. Therefore, there is a greater chance that a company's green intangible resources will help it achieve the superior SNP that Chinese technology-based SMEs strive for. Using the GHRM measuring tool may lead to its recognition as a critical component of the sustainable growth model in Chinese technology-based SMEs. SNP can also be made better by showing how GHRM can help create a resource, like knowledgeable, skilled, and motivated employees. Based on these results, GHRM procedures need to be turned into environmental plans. We also advise supply chain managers to tackle GSCI in a synthetic manner. Furthermore, based on our research, an organization should use GTL to develop and implement resources and policies that support workers' green motivations and skills, as well as

allow them to participate in environmental management initiatives that improve the SNP of Chinese technology-based SMEs. Regularly informing employees about the organization's green initiatives fosters a positive employee perception of Chinese technology-based SMEs' green policies.

Theoretical Implications

This article combines various internal and external resources of the enterprise, taking Chinese technology-based SMEs as the research object, investigates the factors that affect businesses' ability to obtain sustainable performance, and creatively combines various green strategies and green resources to enrich enterprise management theory. At the same time, it enriches both the natural-resource-based view theory and the diffusion of eco-innovations theory.

Practical and Social Implications

This study thoroughly summarizes the internal and external factors influencing the long-term success of Chinese technology-based SMEs in the country's technology sector. Regarding tactics to improve the long-term performance of Chinese technology-based SMEs, the findings provide policymakers with insightful information. Managers and executives of Chinese technology-based SMEs should logically use stakeholder pressure in management practices and implement a green innovation strategy to address external factors. The government should create strict environmental regulations and provide the necessary financial assistance. In addition, managers and executives of Chinese technology-based SMEs should actively build green intellectual capital, implement green resource management, and incorporate green supply chain integration into their corporate management strategy. To promote environmentally friendly behavior among employees, managers and other leaders should adopt green transformational leadership. In summary, managers and governments in China eventually support the development of China's economy by enhancing the sustainable performance of technology-based SMEs through the abovementioned strategies.

Limitations and Suggestions for Future Research

Despite the significant theoretical and managerial contributions, this research possesses certain constraints that may offer potential avenues for future investigation. Firstly, this study selected Chinese technology-based SMEs to verify the internal and external factors that affect their SNP without considering other industries, such as manufacturing, resource-based enterprises, and service industries, which have certain limitations in industry selection. Furthermore, this study examines the influence of many internal and external factors on the success of SMEs in the Chinese technology sector, which may need to be more comprehensive and may overlook some factors. Further research has the potential to incorporate additional factors into the impact of SNP analysis. Thirdly, the sample data for this study consisted of 212 valid questionnaires collected by Chinese technology-based SME managers. Future research can select more sample data for empirical analysis.

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