



Article

Corporate Social Responsibility Information Disclosure and Financial Performance: Is Green Technology Innovation a Missing Link?

Liang Li ^{1,2,*}, Yanghong Wang ², Huaping Sun ³ , Huihui Shen ⁴ and Yuen Lin ⁵ 

¹ Research Institute for Environmental and Health, Nanjing University of Information Science and Technology, Nanjing 210044, China

² School of Business, Nanjing University of Information Science and Technology, Nanjing 210044, China; 18252005231@163.com

³ School of Economics and Management, University of Science and Technology Beijing, Beijing 100083, China; shp797@163.com

⁴ Financial Department, Jiangsu University, Zhenjiang 212013, China; 1000004301@ujs.edu.cn

⁵ Quantitative Economy Research Center, Jilin University, Changchun 130012, China; sas@jlu.edu.cn

* Correspondence: llykkljw@hotmail.com

Abstract: Corporate social responsibility information disclosure integrates environmental and social practices to achieve sustainable development. Some studies have pointed out that promoting green technology innovation is essential for energy-intensive firms. Therefore, exploring the relationship between energy-intensive environmental information disclosure and green technology innovation and financial performance is essential. According to the generalized least squares with fixed model analysis results based on energy-intensive industry firms, the research findings are as follows: firstly, the disclosure information of corporate social responsibility has a significant effect on enterprises' ROA. Secondly, there is a positive relationship between the shareholder responsibility score and employee responsibility score of information disclosure with financial performance. Thirdly, there is a significant positive correlation between the environmental responsibility score of CSR information disclosure with green technology innovation. Fourthly, green innovation is mediating in energy-intensive enterprises' CSR information disclosure and financial performance. Lastly, combined with the theoretical and findings, we put forward the management implications and policy suggestions.

Keywords: energy-intensive enterprise; CSR; information disclosure; green technology innovation; financial performance



Citation: Li, L.; Wang, Y.; Sun, H.; Shen, H.; Lin, Y. Corporate Social Responsibility Information Disclosure and Financial Performance: Is Green Technology Innovation a Missing Link? *Sustainability* **2023**, *15*, 11926. <https://doi.org/10.3390/su151511926>

Academic Editors: Linchuan Yang, Baojie He and Junqing Tang

Received: 21 May 2023

Revised: 21 July 2023

Accepted: 25 July 2023

Published: 3 August 2023

Corrected: 7 October 2023



Copyright: © 2023 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Many companies have paid attention to social and environmental responsibility, it has received increasing attention worldwide and is an important way to achieve sustainable development [1,2]. Matten and Moon defined corporate social responsibility as a philosophy of business strategy that promotes sustainable development for all stakeholders. With global warming causing many problems, companies worldwide have faced increasing environmental pressures, while the green consumer demand has continued to rise [3]. The importance of information disclosure of corporate social responsibility has recently become increasingly prominent. It is vital to convey information about a company's CSR activities to stakeholders. Various stakeholders place pressure on companies to increase the transparency of their operations and publish and report on CSR disclosure. In addition, organizations may disclose their CSR to invest in sustainable development, and their results should also be evaluated [4,5].

The sustainability reporting guidelines developed by the global reporting initiative provide a more structured approach for companies to disclose their activities on CSR. Recent trends indicate that more and more organizations are paying more attention to CSR

information disclosure and its associated organizational performance; they also addressed CSR sustainability reports based on international standards. This caused growing concerns about whether adopting CSR disclosure by companies that actively support economically, socially, and environmentally sustainable developments could play a crucial role in creating competitive advantages and strong performances [6–8]. In addition to complying with the relevant laws and regulations, enterprises must abide by social ethics and responsibilities. The regular disclosure of corporate social responsibility-related information has also become one of the requirements of listed companies in China. Fulfilling corporate social responsibility is the expectation and requirement of shareholders, employees, suppliers, customers, environment, society, and other stakeholders of the enterprise, and also an essential factor that cannot be ignored in the business development of an enterprise.

The existing literature disagrees on whether CSR disclosure information contributes to corporate performance. Orlitzky et al. showed that CSR disclosure could enhance financial performance, favoring company investments in CSR disclosure [9]. Clarkson et al. and Plumlee et al. found a positive correlation between environmental disclosure and corporate performance [10,11]. Barth et al. examined the relationship between the reporting quality of mandatory synthesis reporting and the importance of South African firms. Their findings indicate a positive and significant association between firm performance and integrated report quality [12]. Cahan et al. analyzed the relationship between CSR disclosure and firm value using a sample of 676 firms in 21 countries, and the results showed that CSR disclosure had a significantly positive relationship with a stronger national institutional environment [13].

On the other hand, Richardson and Welker found a negative relationship between corporate value and CSR disclosure [14]. Manchiraju and Rajgopal reviewed the implementation of CSR in India. They discovered that mandatory CSR investments had a negative impact on company value [15]. However, Cho et al. and Freedman and Jaggi found no correlation between corporate value and CSR disclosure [16,17]. China's economy has entered the stage of high-quality development since its reform and opening up. As the main body of China's technology innovation system, enterprises play a leading role in technology innovation. Through technological innovation and R&D investment, enterprises can improve their products and processes to expand market shares and obtain excess profits. In recent years, the relationship between technological innovation and corporate social responsibility has become increasingly compact with intelligent and green manufacturing transformations.

Moreover, the existing studies on the impact of CSR information disclosure on corporate performance mainly focus on developed and industrialized economies, for example, a better institutional environment, stronger investor protection, relatively good economic development, and mature financial markets in developed countries. However, there is a lack of attention focusing on China. For Chinese corporations, investor protection is relatively low due to the weak external regulatory environment. It is unclear how the extent of CSR information disclosure relates to green innovation and corporate performance. Thus, there is an urgent need to improve the research on CSR disclosure in emerging markets to adapt to the international standards requiring corporate CSR disclosure. Moreover, industrialization is always accompanied by resource consumption and environmental pollution, which constantly increases the carrying capacity of the ecosystem and poses serious challenges to the sustainable development of human society. How to deal with climate change challenges has aroused the increased attention of countries worldwide [18]. Green technology innovation provides a critical way to solve the problem of excessive resource consumption and serious environmental pollution [19]. Therefore, governments around the world generally promote enterprises to change their behavior towards green innovation and enhance enterprise performance through environmental regulations and environmental information disclosure [8,20–23].

The contributions of this paper are as follows: First, this paper combines CSR and information disclosure to analyze the impact of CSR information disclosure on corporate performance, which extends the existing research focusing on CSR and information disclo-

sure. Second, although the literature suggests that CSR information disclosure can enhance enterprise performance, because of the development of industrialized countries and other developing countries, it is difficult to reflect the status of Chinese-listed companies. The existing literature is inconsistent with the conclusion because the Chinese population and energy structure in development are still different from the developments in industrialized countries; corporate social responsibility information disclosure may also be different from those in industrialized countries. Third, green technological innovation is related to R&D investment, such as green technology, which is gradually included in the environment accounting and green technology innovation management research scope of scholars. Moreover, the corporate social responsibility of information disclosure and green technological innovation has been increasingly important in enterprise environmental management in later years. Therefore, the relationship among corporate social responsibility of information disclosure, green technological innovation, and financial performance is significant considering the situation in China at present.

This study is arranged as follows: the second part proposes the research hypothesis of this paper by combing the theory and literature review. The third part mainly introduces the research method, samplings, and the measurement method of variables. The fourth part is the empirical analysis method, which discusses the regression model, results, and empirical results of the robustness test. The last part presents the main conclusions and suggestions.

2. Theoretical Background and Hypothesis Development

2.1. Corporate Social Responsibility

Oliver Sheldon was the first researcher to propose the concept of corporate social responsibility (CSR) in 1924. Oliver Sheldon proposed that enterprises should pay attention to their economic interests and be responsible for social and environmental damage. Carroll measured CSR from economic, law, ethics, and charity perspectives. Economic responsibility is the initial social responsibility and moral–ethical responsibility is the greatest social responsibility [24]. In general, CSR is “the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large” [25]. CSR can be divided into internal and external responsibilities. Internal responsibility is to pay attention to the interests of employees, ensure product quality, create enterprise value, and maintain sustainable development. External responsibility is fulfilling social responsibility, taking an active part in charity, ethics, economic laws, and regulations required by social development from the perspective of superficial society [20,21]. In the 1980s, the theory of stakeholders was applied to the research of corporate social responsibility, and the survival and development of enterprises were closely related to stakeholders.

Freeman and Reed proposed that a stakeholder is a party interested in a company and can affect the business. The primary stakeholders of an enterprise include investors, employees, consumers, suppliers, the government, etc. [26]. Stakeholders exert a significant influence on the production and operation of an enterprise. In addition to the comprehensive concept of CSR proposed in 1991, corporate social responsibility expresses society’s expectations of enterprises. After the 1990s, more and more scholars gradually combined the stakeholder theory with CSR, including internal stakeholders, such as shareholders and employees, and external stakeholders, such as consumers and governments. Li and Xiao, through the study of the evolution of CSR’s definition, enhanced the enterprise the competitive ability, which in turn improved the profitability of the enterprise, and could, as much as possible, reduce the impact of pollution on society through the process of enterprise development, and argued that this would maximize the enterprise and social values [26]. Lau et al. mentioned that CSR should be viewed from environmental, economic, and social perspectives. They suggested a positive relationship between CSR and manufacturing performance [20]. Yang and Deng, from the perspective of sustainability, proposed that it was difficult for an enterprise to achieve sustainable development, if it only paid attention to its interests while ignoring CSR [27]. Qi et al. quantified CSR and

evaluated its performance from labor practice, economic and environmental governance, human rights, organizational fair operation, consumer rights, and community development perspectives [28].

2.2. Information Disclosure

Information disclosure is a management tool for enterprises to disclose their business information, and the quality of disclosure is related to the degree of understanding of stakeholders of enterprises. Some scholars revealed the influencing factors of research information disclosure, mainly including industry factors, corporate governance factors, corporate performance factors, etc. However, there are few studies on the information disclosure of CSR and financial performance. For example, Bayoud et al. analyzed CSR information disclosure in Libya from 2007 to 2009. The empirical results showed that manufacturing industries were resistant to disclosing environmental information; only 40% of manufacturing companies disclosed environmental information [29]. Gao et al. studied the impact of industry differences on environmental information disclosure based on 154 samples of 33 listed companies in Hong Kong in 1993–1997. The results showed that company size significantly affected environmental information disclosure, and there were significant differences in the environmental information disclosure of companies in different industries. Public utility companies tend to disclose environmental information, while real estate companies are the least willing to disclose environmental information. Financial companies are between the two regarding the amount of environmental information disclosed, and Hong Kong enterprises disclose less information on the environment, energy, and food safety-related CSR [30].

Htay et al. studied financial companies in Malaysia from 1996 to 2005 as samples. They analyzed the positive correlation between independent non-executive directors' proportion and environmental information disclosure quality [31]. Khan et al. found that public ownership, foreign ownership, board independence, and audit committee positively affected CSR information disclosure [32]. Rao and Tilt tested the impact of board composition on CSR performance, and the results showed that board diversity and gender structure were critical influencing factors. Other studies found that corporate governance factors did not impact information disclosure [33]. Wegener et al. studied the influencing factors of information disclosure of 319 Canadian companies against the background of carbon emission projects, and the results showed that there was no significant relationship between the proportion of foreign-affiliated institutions' investments and the level of environmental information disclosure of companies [34].

Some studies also highlighted the influence of external factors, such as macroeconomic and government regulations, on corporate information disclosure. Yet, there are few studies on the impact of CSR information disclosure on green technology innovation and corporate performance. For example, Zhang and Guan, based on 111 heavily polluting companies, investigated the influence of external factors on environmental information disclosure. They found that the level of regional economic development was significantly negatively correlated with corporate environmental information disclosure [35]. Wang enacted the regulation of environmental monitoring numbers as the instrumental variable of a regulation of external pressure; the environmental regulation pressure and relationship between corporate environmental information disclosure level was studied, and the results showed that environmental information disclosure level was affected by government regulation pressure. The higher the regulation intensity, the more companies tend to disclose information about the environment [36].

Shen and Feng conducted the China pollution source regulation information disclosure index to indicate local governments' supervision of corporate environmental information disclosure. The empirical results showed that government regulation was positively correlated with corporate environmental information disclosure [37]. Ye et al. based their study on 323 heavily polluting listed companies and found that the higher the level of external governance, such as the legal level of industry regulations and the level of government

environmental regulations, the higher the quality of corporate environmental information disclosure [38]. Bi et al. conducted an empirical study on the environmental information disclosed in the 2007–2012 annual reports and independent reports of China's heavily polluting industries, respectively exploring the roles of traditional culture and environmental regulation of informal institutions on the disclosure of corporate environmental information. The study found that environmental systems and traditional culture were positively correlated with the level of enterprise environmental information disclosure, while conventional culture and environmental regulation had complementary effects [39]. Ding et al. explored the effect of environmental information disclosure on corporate performance in China [8].

2.3. CSR Disclosure Information and Financial Performance

The existing research shows that implementing environmental responsibility positively impacts corporate financial performance, market returns [40], etc. Kumar and Dua found that the better the environmental management of the enterprise, the greater the enterprise's profitability [41]. Yue and Cai and Yang and Yang found that corporate environmental responsibility was positively related to financial performance [42,43]. Huang and Chen found that enterprises could improve their social reputation, and stakeholders would evaluate enterprises more often by undertaking environmental responsibility practices. The government supports enterprises that perform better in environmental responsibility tasks, and consumers tend to be more satisfied with enterprises that undertake environmental responsibility measures [44]. Klassen and Whybark found that, after an enterprise implemented environmental responsibility management, its market return, stock price, and enterprise value increased [45]. Ghoul et al. found companies with high CSR had lower costs of equity capital and higher enterprise values [46].

However, some studies proposed a different conclusion. Some scholars found that CSR had a negative impact on corporate performance [47]. For example, enterprises need to implement social costs to undertake social responsibility tasks, thus increasing enterprises' liability and negatively affecting their financial performance. Based on the data analysis of listed companies in Mauritius from 2011 to 2014, Neeveditah studied the relationship between environmental management practice and financial performance. Environmental management is divided into six parts: pollution control, waste emission reduction, recycling, energy cutting and utilization, paper reduction, and carbon emission reduction. The results show that the relationship between environmental management and financial performance is insignificant [48]. Brammer et al. found a negative correlation between corporate social performance in environmental protection and stock dividends and returns in the electrical equipment industry [49]. Ansaram explored the relationship between the five areas in corporate social responsibility, such as economic, social, environmental, moral, and legal responsibility and financial performance, among which the social and environmental responsibility dimensions did not affect firm financial performance [50].

Wan and Liu suggested that if enterprises over-fulfilled their environmental responsibilities and expended too much on environmental protection, this would increase the cost and reduce the performance of enterprises [51]. Chen and Ma argued that corporate environmental responsibility had no impact on corporate value, mainly because there were major defects in the disclosure of environmental responsibility information of listed companies, and the correlation of information was not strong [52]. Lankoski's results showed that when enterprises paid attention to environmental responsibility and strengthened environmental information disclosure and environmental protection investments, their visibility and social evaluation improved. The resulting positive effect further enhances the enterprise value. Yet, excessive environmental protection investment increases the cost of enterprises, has a negative effect, and affects the company's performance [53]. However, greater CSR information disclosure can better introduce external social asset investments and stimulate enterprises' green technology innovation activities; therefore, enterprises face fewer fines for environmental violations, thus improving the return on R&D investments

and corporate financial performance. According to Lau et al., a positive relationship exists between corporate social responsibility and corporate performance [21].

Hypothesis 1. *The more excellent CSR information disclosure, the better corporate financial performance; more specifically, CSR information disclosure can significantly promote corporate financial performance.*

2.4. Green Technology Innovation

Green technology innovation can protect the environment, reduce carbon emissions, and realize the coordinated development of the ecological environment economy. Braun and Wield proposed the concept of environmental technology, referring to the innovation of environmental technology that reduced environmental pollution and the consumption of raw materials, natural resources, and energy [54]. Blum-Kusterer and Hussain proposed that implementing green technology innovation could effectively reduce waste and pollutant emissions, reduce the consumption of resources and production costs, and enhance the financial performance of enterprises [55]. Jiao proposed that green technology innovation could create new competitive advantages, improve market performances, and provide technological benefits [56]. Li et al. found that the green technology innovations in energy-intensive enterprises significantly impacted their sustainable performance [22].

Song and Sun proposed that CSR would significantly promote the innovation investments of non-state-owned enterprises [57]. Zhang and Wei found that corporate social responsibility could promote enterprise innovation investments [58]. Jia and Yun found a positive correlation between CSR and innovation [59]. Zhu and Zhang suggested that enterprises should pay more attention to investments in innovation, because innovation means that a company will have more intellectual property rights and patents, improving the company's competitiveness, which is conducive to the long-term development of the company [60]. Li and Liu proposed firms' investments in innovation that can provide more advanced technology, improve the process flow, improve the efficiency of resource utilization, reduce the costs correspondingly, and protect the environment. At the same time, the company can be recognized by the masses, improve its image and reputation, and contribute to society, which is conducive to the coordinated development of the social enterprise environment [61]. Wang and Zhang found that innovation investments had an impact on enterprise performance, and there was a certain lag in innovation investments [62].

Lei and Yang, through the research of listed companies in the Chinese pharmaceutical manufacturing industry, found that fulfilling social responsibility had a significant role in promoting R&D investments and corporate performances. Enterprises actively fulfilling social responsibilities can have a good influence and reputation, establish a good brand image for enterprises, and attract new consumers [63]. Carroll suggested that the CSR performance of an enterprise was good, which had a high impact on enterprises' sustainable developments and could increase enterprises' sustainable development abilities [24]. Kong and Li proposed that enterprises could benefit society. They would have a good reputation and provide economic returns [64]. Bian et al. suggested that the CSRs of enterprises could gain more people's trust, help to obtain investments, reduce operating costs, and thus promote company innovations [65]. Cui and Li indicated that Chinese enterprises' fulfillment of social responsibility could promote their financial performance [66].

This study proposed that CSR can bring long-term benefits to enterprises. It was suggested that CSR information disclosure performance could be divided into employee, customer, shareholder, social, and environmental disclosure. The enterprise provides better technology and treatment of employees and develops more environmentally friendly products and technologies, which will increase green technology innovation. It can improve the core competitiveness of the enterprise in the future and enable the enterprise to achieve a dominant position in the competition with other competitors. The market share can improve the utilization rate of resources, save the company's resources, and help improve the company's performance. Therefore, corporate social responsibility for information

disclosure performance actively promotes green technology innovation, which can increase corporate financial performance [67–73]. Hence, this study proposed Hypothesis 2 as follows:

Hypothesis 2. *The better the CSR information disclosure, the better the enterprise's green technology innovation, which increases corporate financial performance; more specifically, green technology innovation has a mediating effect between CSR information disclosure and financial performance.*

3. Methods

3.1. Research Model

Referring to Li et al.'s and Baron and Kenny research [22,23], this paper established regression models to verify the three hypotheses proposed. First, we analyzed the relationship between CSR information disclosure and ROA. Then, we explored the relationship between CSR information disclosure and green technology innovation. Lastly, the mediating effect of green innovation on CSR information disclosure and financial performance was examined.

$$FP1_{it} = \beta_0 + \beta_{11}CSR_{it} + \sum_j \beta_{i12}controls_{jit} + \sum YEAR + \sum IND + \varepsilon_{it13} \quad (1)$$

$$Eip2_{it} = \beta_0 + \beta_{21}CSR_{it} + \sum_j \beta_{i22}controls_{jit} + \sum YEAR + \sum IND + \varepsilon_{it23} \quad (2)$$

$$FP3_{it} = \beta_0 + \beta_{31}CSR_{it} + \beta_{32}eip_{it} + \sum_j \beta_{i33}controls_{jit} + \sum YEAR + \sum IND + \varepsilon_{it34} \quad (3)$$

According to i , t represents enterprise individual and year, respectively; β_{11} is the influence coefficient: if β_{11} is greater than 0 and statistically significant, then corporate social responsibility plays a role in promoting corporate green technology innovation, controls variables such as the asset-liability ratio, enterprise size, and others. $\sum YEAR$ and $\sum IND$, respectively, represent the fixed effects of year and industry, ε_{it} is a error term.

3.2. Data Sources

The panel empirical data of A-share-listed companies in energy-intensive industries in Shanghai and Shenzhen Stock Exchanges were selected from 2011 to 2016 as the research samples. The identification of energy-intensive industries was mainly based on the guidance on the industry classification of listed companies revised by the China security regulatory commission in 2012, the management list of industry classifications of environmentally verified companies, and the guidance on environmental information disclosure of listed companies formulated by the ministry of environmental protection in 2008, including coal, mining, textile, leather, paper, petrochemical, pharmaceutical, chemical, metallurgy, thermal power, and 16 other energy-intensive industries. At the same time, (1) we excluded ST, *ST companies and others; (2) eliminated the listed companies whose variables were missing; and (3) listed companies with little innovation activities during the sample study period. The result is a balanced panel of 347 listed companies.

3.3. Variable Selection

(1) CSR information disclosure

This study used the social responsibility score of listed companies in China published by Hexun.com to measure the corporate CSR information disclosure expressed by the score. The score was based on the social responsibility report. The financial statements of the listed companies in China, from the five aspects of shareholder responsibility, employee responsibility, suppliers, customer and consumer rights and interests responsibility, environmental responsibility, and public responsibility, were used to systematically evaluate the score of CSR information disclosure, and the final score could be used as a

measurement index of CSR information disclosure. The higher the score, the better the CSR information disclosure.

(2) Corporate financial performance

The net profit for the ratio of total assets was selected as the enterprise's financial performance, because the ROA is the ratio of net profit and total capital balance, which can measure the company's profitability. The higher the ROA, the better the financial performance.

(3) Green technology innovation

The number of granted invention patents reflected the annual scientific and technological R&D achievements of an enterprise, and the technology content value was the highest among the three types of patents, which was a standard indicator used to measure the innovation performance of an enterprise. Therefore, this paper used the number of environmental invention patents granted to measure green technology innovation, expressed by \ln_eip1 .

(4) Control variables

The control factors included return on equity, asset-liability ratio, enterprise size, enterprise ownership, redundant resources, employee education level, capital intensity, and research intensity. The time and year fixed-effect models were used to control it. The main variables in the model are defined in Table 1.

Table 1. Variable definition.

Variable Type	Variable Name	Variable Symbol	Variable Definition
Explained variables	Financial performance	ROA	Net profit/total assets
		ROE	Net profit/net assets
Mediating variable	Enterprise green technology innovation	\ln_eip1	The number of environmental patents granted is logarithmic, plus 1
Explanatory variable	CSR information disclosure	logscore	CSR information disclosure score total, logarithm
Control variables	asset-liability ratio	dRatio	Total liabilities/total assets
	R&D intensity	intensity	Proportion of the sum of scientific research funds and technological development funds in sales revenue
	Ownership of company	ownership	Dummy variable, state-owned enterprise = 1, non-state-owned enterprise = 0
	Slack resource	slack	Current assets/current liabilities
	Labor capital	capital	The proportion of employees with bachelor degree or above in the enterprise
	Capital intensity	capital	Fixed assets/total number of employees

4. Empirical Analysis

4.1. Descriptive Statistical Analysis

This paper used STATA16 software to present descriptive statistics on the selected data, and the descriptive results are shown in Table 2.

Table 2. Descriptive statistics.

Variable	N	Mean	Sd	Min	Max
ROA	2082	0.0500	0.050	−0.250	0.300
logscore	2082	3.220	0.720	−1.430	4.510
ln_eip1	2082	0.200	0.570	0	6.740
ROE	2082	0.080	0.080	−0.990	0.620
dRatio	2082	0.390	0.200	0.0100	0.880
scale	2082	3.320	1.480	−0.800	10.27
intensity	2082	2.740	2.390	0.0100	29.67
ownership	2082	0.430	0.500	0	1
hcapital	2082	0.200	0.120	0	0.930
slack	2082	3.130	6.830	0.0900	190.9
capital	2082	12.90	0.890	10.26	17.31

Table 2 shows the CSR information disclosure of 347 enterprises selected from 2011 to 2016. The enterprise with CSR information disclosure had an average score of 3.22, the minimum score was −1.43, the maximum value was 4.51, and the maximum and minimum weights of enterprise green technology innovation were 6.74 and 0, respectively. This indicates that some enterprises invest more resources in green research development, while others invest less. The maximum and minimum values of the net profit margin of total assets and net profit of net assets of enterprises were −0.25 and 0.300 and −0.99 and 0.620, respectively. There was a gap in the profit status among enterprises, and the overall development level was unbalanced.

4.2. Correlation Test

Table 3 shows the correlations between corporate CSR information disclosure and financial performance. The coefficient between CSR information disclosure and ROA is 0.445, and the correlation level is 0.01, indicating that when CSR information disclosure is performed well, ROA is also performed well; when ROE and ROA are performed well, green technology innovation is also performed well. It also shows that the higher ROA and ROE, the better the corporate performance and green technology innovation.

Table 3. Correlation test.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ROA	1.000										
(2) logscore	0.445 ***	1.000									
(3) ln_eip1	−0.039 *	0.088 ***	1.000								
(4) ROE	0.893 ***	0.465 ***	0.010	1.000							
(5) dRatio	−0.463 ***	−0.155 ***	0.135 ***	−0.220 ***	1.000						
(6) scale	−0.065 ***	0.201 ***	0.376 ***	0.075 ***	0.550 ***	1.000					
(7) intensity	0.111 ***	−0.096 ***	−0.118 ***	0.005	−0.376 ***	−0.450 ***	1.000				
(8) ownership	−0.217 ***	0.059 ***	0.155 ***	−0.118 ***	0.385 ***	0.423 ***	−0.328 ***	1.000			
(9) hcapital	0.238 ***	0.085 ***	0.062 ***	0.187 ***	−0.189 ***	−0.046 **	0.342 ***	0.000	1.000		
(10) slack	0.173 ***	0.049 **	−0.048 **	0.046 **	−0.431 ***	−0.280 ***	0.238 ***	−0.194 ***	0.222 ***	1.000	
(11) capital	−0.294 ***	−0.052 **	0.160 ***	−0.199 ***	0.362 ***	0.342 ***	−0.082 ***	0.215 ***	0.139 ***	−0.137 ***	1.000

Note: $n = 2082$, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.3. Multivariate Analysis

To explore the impacts of CSR information disclosure on green technology innovation and corporate performance, a GLS regression analysis with time and industry fixed-effects models was conducted by using STATA. Column (1) in the table tests the relationship between CSR information disclosure and financial performance, column (2) presents the control variables, and column (3) (4) tests the impact of CSR information disclosure on green technology innovation. In column (5), the CSR values for information disclosure and corporate financial performance were tested. In column (6), the control variables were added, and the regression test results are shown in Table 4:

Table 4. The relationship between CSR information disclosure performance, green innovation, and financial performance.

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	ROA	ROA	ln_eip1	ln_eip1	ROA	ROA
logscore	0.031 *** (0.001)	0.024 *** (0.001)	0.070 *** (0.017)	0.059 *** (0.017)	0.031 *** (0.001)	0.031 *** (0.001)
ln_eip1					−0.007 *** (0.002)	−0.006 *** (0.002)
intensity		0.003 *** (0.006)		0.06 *** (0.003)		0.001 *** (0.000)
ownership		−0.014 *** (0.002)		0.104 *** (0.027)		−0.022 *** (0.002)
hcapital		0.070 *** (0.022)		0.331 *** (0.108)		0.082 *** (0.007)
dRatio		−0.114 *** (0.006)		−0.117 *** (0.002)		
scale		0.006 *** (0.001)		0.018 *** (0.001)		
intensity		−0.000 (0.001)		−0.022 *** (0.006)		
slack		−0.001 * (0.000)		−0.001 (0.002)		
capital		0.056 *** (0.004)		0.081 *** (0.014)		
Constant	−0.050 *** (0.004)	0.002 (0.005)	−0.022 (0.057)	−1.073 *** (0.196)	−0.050 *** (0.004)	−0.046 *** (0.005)
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
N	2082	2082	2082	2082	2082	2082
Adjusted R-squared	0.198	0.381	0.007	0.054	0.209	0.307

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

According to the analysis results, the regression coefficient of CSR information disclosure on corporate financial performance is positive and significant at the 1% level. The multicollinearity test was conducted in this paper, and the results show that the VIF weights of all the variables are less than 5, and there are no multicollinearity issues in this study. Following the addition of the control variables, indicating that the result was robust, the higher the CSR value of the information disclosure level of the enterprise, the better the financial performance, which proved research Hypothesis 1. A high level of CSR of information disclosure among Chinese-listed enterprises can attract shareholders' investments, gain consumer recognition, and increase market sales and the rate of return on investments.

The CSR of information disclosure had a positive impact on corporate green technology innovation. Enterprises that better fulfilled their social responsibilities were more willing to invest in environmental protection technology. However, among the effects of CSR on corporate performance, corporate green technology innovation had a negative impact on corporate performance; possibly, high-investment and high-risk technology development activities will require a high amount of funds, affecting the financial performance for the year. At the same time, listed companies' lack of green patents was also a prominent reason for the result. We tried to test this with a lag of one period; however, the result did not change.

4.4. Additional Test

Moreover, we created a mediating model by using the Sobel test. Table 5 shows the regression results of exploring the mediating effect of green innovation between the CSR of information disclosure with financial performance. Although CSR was not significant for patent results, the Sobel test indicated the presence of a positive mediating effect; however,

model 1 was positive and significant at the 1% level ($\beta = 0.002$, $p < 0.1$), according to the Sobel test analysis that supports Hypothesis 2.

Table 5. The mediating effect of green innovation between the CSR of information disclosure and financial performance.

	ROA (1)	ln_eip1 (2)	ROA (3)
CSR	0.002 * (1.73)	−0.004 (−0.36)	0.002 * (1.75)
ln_eip1			−0.008 *** (−4.69)
Constant	0.126 *** (6.93)	−1.464 *** (−7.17)	0.115 *** (6.32)
Year	YES	YES	YES
Industry	YES	YES	YES
Control	YES	YES	YES
R ²	39.28%	23.35%	39.82%
F-value	1779.82 ***	852.06 ***	1820.68 ***
N	2712	2711	2711
SOBEL	2.300 **		

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

This research of robustness test was analyzed by conducting the new measurement of dependent and independent variables and the mediating variable: the ROA was replaced with ROE as the explained variable, the corporate environmental responsibility score replaced CSR information disclosure as the explanatory variable, and the number of green patent grants was replaced with the number of green patent applications. The regression results after the variable replacements are consistent with the initial results, and the robustness is tested.

4.5. Heterogeneity Analysis

In addition, we used ROA as the explained variable corporate performance by region, enterprise ownership (state-owned = 1, non-state owned = 0), industry (capital intensive if the capital intensity was more or less significant than the sample mean); the heterogeneity effect of CSR information disclosure on enterprise performance was explored. Specific results are shown in the table below (Tables 5 and 6).

Table 6. Results of heterogeneity analysis by regions and companies type differences.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	East	Middle	West	State Owned	Non-State Owned	High-Resource Intensive	Low-Resource Intensive
logscore	0.023 *** (0.002)	0.023 *** (0.003)	0.024 *** (0.003)	0.022 *** (0.002)	0.025 *** (0.002)	0.022 *** (0.001)	0.025 *** (0.003)
ln_eip1	−0.005 *** (0.002)	−0.007 * (0.004)	−0.015 *** (0.004)	−0.005 *** (0.002)	−0.002 (0.003)	−0.006 *** (0.002)	−0.004 (0.004)
dRatio	−0.116 *** (0.008)	−0.131 *** (0.012)	−0.118 *** (0.019)	−0.118 *** (0.011)	−0.118 *** (0.008)	−0.124 *** (0.007)	−0.105 *** (0.011)
scale	0.004 *** (0.001)	0.005 *** (0.002)	0.005 * (0.003)	0.004 *** (0.001)	0.009 *** (0.001)	0.005 *** (0.001)	0.006 *** (0.002)
intensity	−0.000 (0.001)	−0.000 (0.001)	−0.002 ** (0.001)	−0.001 * (0.001)	−0.001 ** (0.000)	−0.000 (0.000)	−0.001 (0.001)
Hcapital	0.062 *** (0.010)	0.010 (0.018)	0.070 *** (0.022)	0.044 *** (0.012)	0.085 *** (0.009)	0.074 *** (0.008)	0.028 (0.032)

Table 6. Cont.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	East	Middle	West	State Owned	Non-State Owned	High-Resource Intensive	Low-Resource Intensive
slack	−0.000 ** (0.000)	−0.001 * (0.000)	−0.000 (0.001)	−0.002 ** (0.001)	−0.000 ** (0.000)	−0.000 ** (0.000)	−0.001 (0.000)
Constant	−0.005 (0.007)	0.007 (0.012)	−0.004 (0.015)	0.004 (0.009)	−0.021 *** (0.007)	−0.005 (0.006)	−0.008 (0.011)
Year FE	YES	YES	YES	YES	YES	YES	YES
N	1266	468	348	900	1182	1414	668
Adjusted R-squared	0.367	0.453	0.392	0.365	0.408	0.435	0.307

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

According to the regression results, CSR information disclosure significantly impacts corporate financial performance compared with non-state-owned enterprises. State-owned enterprises have better green technology innovations and corporate financial performances. Moreover, we used five dimensions as alternative measures of CSR information disclosure. According to the results shown in Table 7, the shareholder responsibility score of CSR information disclosure is positive and significant in model 1 ($\beta = 0.046$, $p < 0.001$), and the employee responsibility score of CSR information disclosure is positive and significant for ROA ($\beta = 0.007$, $p < 0.001$) in model 1; however, the supplier/consumer score for CSR information disclosure is negative and significant for ROA ($\beta = -0.0113$, $p < 0.001$) in model 1. For green patents, the environment responsibility score of CSR information disclosure was positive and significant for green patents. In addition, we found supplier/consumer responsibility score of CSR information disclosure was negative and significant for ROA in models 1 and 3.

Table 7. Results of heterogeneity analysis by different type of CSRs' information disclosure.

Variables	ROA (1)	ln_eip1 (2)	ROA (3)
share	0.046 *** (12.00)	−0.010 (−0.47)	0.045 *** (12.19)
emp	0.007 *** (4.09)	−0.104 *** (−2.89)	0.007 *** (3.76)
sup	−0.013 *** (−3.00)	−0.051 (−0.92)	−0.011 *** (−3.12)
env	0.004 (1.25)	0.094 ** (2.09)	0.003 (1.10)
soc	0.006 (1.48)	0.032 (0.63)	0.004 (1.23)
ln_eip1			−0.006 *** (−5.50)
Constant	0.015 (0.73)	−1.404 *** (−4.93)	0.009 (0.46)
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Control	YES	YES	YES
R ²	61.23%	24.19%	61.31%
N	2486	2485	2485
F-value	69.912 ***	10.023 ***	69.838 ***

Note: *** $p < 0.01$, ** $p < 0.05$, Share: shareholder responsibility score; Emp: employee responsibility score; Sup: supplier/consumer responsibility score; Env: environment score; soc: social responsibility score.

5. Research Conclusions and Implications

5.1. Findings and Discussion

The process of industrialization is always accompanied by resource consumption and environmental pollution, which constantly increases the carrying capacity of the ecosystem and severely challenges the sustainable development of human society. How to deal with

such challenges has attracted the attention of countries worldwide [18]. CSR information disclosure provides a critical way to solve the problem of excessive resource consumption and serious environmental pollution. Chinese enterprises should have more responsibilities and provide more opportunities and challenges. Enterprise development can focus on economic responsibility; but, it should organically combine enterprise innovation and development with enterprise social responsibility to realize the sustainable and coordinated development of enterprise, country, and society. Therefore, this study selected panel data from 347 A-share-listed companies in the past five years. Three models were created for the GLS regression analysis with a fixed-effect model for the relationship between CSR information disclosure, green technology innovation, and corporate financial performance; the following conclusions were drawn through the abovementioned empirical analysis.

First, CSR information disclosure performance played a significant role in promoting ROA. From the results of the empirical analysis, the abovementioned study also showed that corporate social responsibility performance was closely related to the ROA of the enterprise. Suppose the score of corporate social responsibility was good. In that case, the corporate image was improved, the national government provided corresponding encouragement, and consumers trusted the companies, which indirectly improved the performance of the enterprise. Therefore, enterprises with good CSR information disclosure were conducive to developing enterprises. On the other hand, enterprises with good performance for employee responsibility could attract more talent, increase employees' sense of identity and belonging, and improve enterprises' sustainable development ability.

Second, the environment responsibility score of CSR information disclosure was positively correlated with green technology innovation. For energy-intensive enterprises, a better environmental responsibility score of CSR information disclosure improves corporate environmental management and R&D investment, which positively impacts green technology innovation. When the environment responsibility score of CSR information disclosure among energy-intensive firms brings social input capital to the enterprise, it may also promote the growth of the enterprise's green innovation; when the enterprise achieves an environment responsibility score of CSR information disclosure, the in green innovation investment improves, and that enhances the efficiency of resource utilization and improves the enterprise performance.

Third, based on the GLS fixed-effect model analysis results, there is a significant negative correlation between green technology innovation and ROA. According to the view of limited resources, when enterprises invest a lot of human and material resources in research and development, it may affect other aspects of the company. Because the return achieved by research and development investment has a certain lag, it is challenging to transform profits in the short term. Only when the research and development projects of the enterprises present specific achievements can the company's performance be improved. However, according to Sobel's analysis, we found green technology innovation to have a mediating role between the CSR of information disclosure and financial performance. Green research development represents the core competitiveness of enterprises to some extent. Enterprises need to continuously increase green research development, improve their competitiveness, and constantly update their products or services to meet the needs of consumers better and achieve more long-term developments for enterprises.

5.2. Managerial Implications

By exploring the relationship between corporate social responsibility of information disclosure and green innovation and financial performance, enterprises can reasonably use the relationship between the three to improve their financial performance. Based on the abovementioned research conclusions, combined with the enterprise reality at present, the following three aspects were obtained:

First, enterprises should understand the complementary relationship between the CSR of information disclosure and green technology innovation in enterprise development. The CSR of information disclosure and green technology investment is characterized by

long cycles, high capital consumption, and uncertainty of achievement transformation. As a result, many enterprises regard social responsibility fulfillment and technological innovation input as irreconcilable contradictions in the management process and often perform a trade-off between them. From the perspective of enterprise strategic management, research, and development activities help improve the quality of enterprise products and services, meet market demand, and promote the improvement of financial performance through the improvement of profitability.

Second, implementing corporate social responsibility of information disclosure can help achieve the public's trust, learn about the needs of potential consumers, such as the public, and improve the fit between the enterprise's products or production process and the market. In general, green technology investment and corporate social responsibility both have an important impact on financial performance. One aspect should not be treated unilaterally, thereby ignoring the value creation of the other. The strategic decision should be considered from the perspective of the overall development of enterprises, and the benign promoting effects of the two aspects on the development of enterprises should be integrated to enhance the comprehensive strength of enterprises.

Third, it is necessary to promote the performance of the corporate society's responsibility for information disclosure. In management practice, enterprises often regard the fulfillment of social responsibility as a kind of public relations crisis needing to repair the corporate image after it has been damaged rather than a necessary management link that has been important in enterprise management for a long time. Enterprises should improve their awareness of corporate social responsibility implementations. Corporate social responsibility of information disclosure is a kind of responsibility fulfillment for society and the public, but also the publicity of corporate culture and development strategy, which helps to improve the transparency of enterprises subject to public supervision and the promotion of corporate brands, to promote balanced situation between enterprises and society.

Fourth, since the disposable resources of enterprises are limited, they can prioritize fulfilling their internal social responsibilities to improve their financial performance. Enterprises can adopt equity incentives, improved employee treatment, and environmental quality management to obtain green innovation and avoid the negative impact of green technology innovation and financial performance. However, in the long run, companies should also pay attention to external stakeholders and green technology investment, which still play essential roles in improving financial performance. Green technological innovation and transformation, consumer trust, supplier cooperation, social recognition, and environmental quality management are also necessary links that cannot be ignored in the sustainable development of enterprises. Moreover, when the operating income level of enterprises is relatively stable, on the premise of not affecting the operation of enterprises, social responsibility, and green technology investment should be taken into account simultaneously to maximize the improvement effect of financial performance. Moreover, considering the high cost and extended period of green technology investment, enterprises should adjust the intensity of green technology investment in combination with their development characteristics.

5.3. Limitations and Future Recommendations

Considering the importance of improving intensive polluting enterprises' green innovation and firm performance, it is necessary to identify if CSR can promote green innovation and firm performance. Therefore, we studied the effect of CSR information disclosure on green innovation and financial performance. However, this research had several limitations: First, the sample size was insufficient. Due to data availability, this paper selected the patent data of Shanghai–Shenzhen A-share-listed enterprises to measure green technology innovation. However, there are still many unlisted enterprises in China, mainly small- and medium-sized enterprises, which may affect the empirical results' robustness. We also recommend considering CSR in the building industry in developing countries, as

it is crucial to achieving cities carbon neutrality. Second, green technology innovation can be subdivided into green products and technology innovation. Energy saving and emission reduction technologies are part of green technologies, including pollution control and treatment, environmental materials, alternative energy, etc. Green patents mainly reflect innovation output. Different indicators can also be used to measure the innovation activities, such as new energy or clean technology R&D investment, the proportion of new product sales revenue, and the proportion of comprehensive energy consumption and output [74,75]. The different types of environmental regulation should be considered in future study model settings to analyze the heterogeneity of environmental policy and firm's green innovation further, analyze promoting the policy of green and low carbon innovation, and better explore the incentives for CSR information disclosure.

Author Contributions: L.L.: original draft, conceptualization, methodology, data collection, format analysis, writing, supervision. Y.W.: methodology, original draft, writing, review. H.S. (Huaping Sun): methodology, writing—review. H.S. (Huihui Shen): writing—format analysis, review. Y.L.: methodology, writing—review. All authors declare that all authors of this article have given their knowledge and consent to the paper's publication. All authors have read and agreed to the published version of the manuscript.

Funding: This work is supported by the Natural Science Foundation of Jiangsu Province, China (BK20220462) and the Key Program of National Social Science Fund of China (21AZD067), the National Natural Science Foundation of China (72243005).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The original data are available at https://www.researchgate.net/publication/373523638_rawdata_csr (accessed on 6 July 2023).

Acknowledgments: Thanks to the Lau and Cai Professors and coauthors and anonymous reviewers' suggestions during the publications. We also thank Master's student Z.N.W. who contributed to the literature review.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Sullivan, R. An assessment of the climate change policies and performance of large European companies. *Clim. Policy* **2010**, *10*, 38–50. [CrossRef]
2. Sullivan, R.; Gouldson, A. Comparing the climate change actions, targets and performance of UK and US retailers. *Corp. Soc. Responsib. Environ. Manag.* **2016**, *23*, 129–139. [CrossRef]
3. Matten, D.; Moon, J. Corporate social responsibility. *J. Bus. Ethics* **2004**, *54*, 323–337. [CrossRef]
4. Gallardo-Vázquez, D.; Barroso-Méndez, M.J.; Pajuelo-Moreno, M.L.; Sánchez-Meca, J. Corporate social responsibility disclosure and performance: A meta-analytic approach. *Sustainability* **2019**, *11*, 1115. [CrossRef]
5. Sampong, F.; Song, N.; Boahene, K.O.; Wadie, K.A. Disclosure of CSR performance and firm value: New evidence from South Africa on the basis of the GRI guidelines for sustainability disclosure. *Sustainability* **2018**, *10*, 4518. [CrossRef]
6. Torugsa, N.A.; O' Donohue, W.; Hecker, R. Capabilities, proactive CSR and financial performance in SMEs: Empirical evidence from an Australian manufacturing industry sector. *J. Bus. Ethics* **2012**, *109*, 483–500. [CrossRef]
7. Wang, S.; Wang, H.; Wang, J.; Yang, F. Does environmental information disclosure contribute to improve firm financial performance? An examination of the underlying mechanism. *Sci. Total Environ.* **2020**, *714*, 136855. [CrossRef]
8. Ding, X.; Ye, L.; Yang, Y.; Efimova, O.; Steblyanskaya, A.; Zhang, J. The Impact Mechanism of Environmental Information Disclosure on Corporate Sustainability Performance—Micro-Evidence from China. *Sustainability* **2022**, *14*, 12366. [CrossRef]
9. Orlitzky, M.; Schmidt, F.L.; Rynes, S.L. Corporate social and financial performance: A meta-analysis. *Organ. Stud.* **2003**, *24*, 403–441. [CrossRef]
10. Clarkson, P.M.; Fang, X.; Li, Y.; Richardson, G. The relevance of environmental disclosures: Are such disclosures incrementally informative? *J. Account. Public Policy* **2013**, *32*, 410–431. [CrossRef]
11. Plumlee, M.; Brown, D.; Hayes, R.M.; Marshall, R.S. Voluntary environmental disclosure quality and firm value: Further evidence. *J. Account. Public Policy* **2015**, *34*, 336–361. [CrossRef]
12. Barth, M.E.; Cahan, S.F.; Chen, L.; Venter, E.R. *The Economic Consequences Associated with Integrated Report Quality: Early Evidence from a Mandatory Setting*; Unpublished Working Paper; University of Pretoria: Pretoria, South Africa, 2016; pp. 1–45.

13. Cahan, S.F.; De Villiers, C.; Jeter, D.C.; Naiker, V.; Van Staden, C.J. Are CSR disclosures value relevant? Cross-country evidence. *Eur. Account. Rev.* **2016**, *25*, 579–611. [\[CrossRef\]](#)
14. Richardson, A.J.; Welker, M. Social disclosure, financial disclosure and the cost of equity capital. *Account. Organ. Soc.* **2001**, *26*, 597–616. [\[CrossRef\]](#)
15. Manchiraju, H.; Rajgopal, S. Does Corporate Social Responsibility (CSR) Create Shareholder Value? *Exogenous Shock-Based Evidence from the Indian Companies Act 2013*. Available online: <https://business.columbia.edu/faculty/research/does-corporate-social-responsibility-csr-create-shareholder-value-exogenous-shock> (accessed on 20 May 2023).
16. Cho, C.H.; Guidry, R.P.; Hageman, A.M.; Patten, D.M. Do actions speak louder than words? An empirical investigation of corporate environmental reputation. *Account. Organ. Soc.* **2012**, *37*, 14–25. [\[CrossRef\]](#)
17. Freedman, M.; Jaggi, B. An analysis of the association between pollution disclosure and economic performance. *Account. Audit. Account. J.* **1988**, *1*, 43–58. [\[CrossRef\]](#)
18. Perrow, C. Organisations and global warming. In *Routledge Handbook of Climate Change and Society*; Routledge: Abingdon, UK, 2010; pp. 89–107.
19. Machiba, T. Eco-innovation for enabling resource efficiency and green growth: Development of an analytical framework and preliminary analysis of industry and policy practices. In *International Economics of Resource Efficiency: Eco-Innovation Policies for a Green Economy*; Physica: Heidelberg, Germany, 2011; pp. 371–394.
20. Lau, A.K.; Lee, P.K.; Cheng, T.C.E. An empirical taxonomy of corporate social responsibility in China's manufacturing industries. *J. Clean. Prod.* **2018**, *188*, 322–338. [\[CrossRef\]](#)
21. Lau, A.K.; Lee, S.H.; Jung, S. The role of the institutional environment in the relationship between CSR and operational performance: An empirical study in Korean manufacturing industries. *Sustainability* **2018**, *10*, 834. [\[CrossRef\]](#)
22. Li, L.; Msaad, H.; Sun, H.; Tan, M.X.; Lu, Y.; Lau, A.K. Green innovation and business sustainability: New evidence from energy intensive industry in China. *Int. J. Environ. Res. Public Health* **2020**, *17*, 7826. [\[CrossRef\]](#)
23. Baron, R.M.; Kenny, D.A. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 1173. [\[CrossRef\]](#)
24. Carroll, A.B. A three-dimensional conceptual model of corporate performance. *Acad. Manag. Rev.* **1979**, *4*, 497–505. [\[CrossRef\]](#)
25. Bayoud, N.S.; Kavanagh, M.; Slaughter, G. Factors influencing levels of corporate social responsibility disclosure Libyan firms: A mixed study. *Int. J. Econ. Financ.* **2012**, *4*, 13–29. [\[CrossRef\]](#)
26. Freeman, R.E.; Reed, D.L. Stockholders and stakeholders: A new perspective on corporate governance. *Calif. Manag. Rev.* **1983**, *25*, 88–106. [\[CrossRef\]](#)
27. Li, W.; Xiao, H. Exploring the concept of corporate social responsibility. *Econ. Manag.* **2008**, *30*, 177–185.
28. Yang, H.; Deng, Q. Research on the Social responsibility and Performance of State-owned Enterprises from the perspective of Sustainable Growth. *J. Zhongnan Univ. Econ. Law* **2011**, *1*, 120–127.
29. Qi, L.; Li, T.; Shang, K. Dimension Determination and Scale Development of Corporate Social Responsibility—Based on an empirical study of Chinese enterprises. *Manag. Rev.* **2017**, *29*, 143–152.
30. Gao, S.S.; Heravi, S.; Xiao, J.Z. Determinants of corporate social and environmental reporting in Hong Kong: A research note. *Account. Forum* **2005**, *29*, 233–242. [\[CrossRef\]](#)
31. Htay, S.N.N.; Rashid, H.M.A.; Adnan, M.A.; Meera, A.K.M. Impact of corporate governance on social and environmental information disclosure of Malaysian listed banks: Panel data analysis. *Asian J. Financ. Account.* **2012**, *4*, 1–24. [\[CrossRef\]](#)
32. Khan, A.; Muttakin, M.B.; Siddiqui, J. Corporate governance and corporate social responsibility disclosures: Evidence from an emerging economy. *J. Bus. Ethics* **2013**, *114*, 207–223. [\[CrossRef\]](#)
33. Rao, K.; Tilt, C. Board composition and corporate social responsibility: The role of diversity, gender, strategy and decision making. *J. Bus. Ethics* **2016**, *138*, 327–347. [\[CrossRef\]](#)
34. Wegener, M.; Elayan, F.A.; Felton, S.; Li, J. Factors influencing corporate environmental disclosures. *Account. Perspect.* **2013**, *12*, 53–73. [\[CrossRef\]](#)
35. Zhang, Y.; Guan, M. An empirical study on the external factors influencing corporate environmental information disclosure. *China Popul. Resour. Environ.* **2009**, *19*, 103–106.
36. Wang, J.M. Correlation between environmental information disclosure, industry differences and external institutional pressure: Empirical evidence from Shanghai Listed Companies' environmental information disclosure. *Account. Res.* **2008**, *6*, 54–62.
37. Shen, H.; Feng, J. Public opinion supervision, government supervision and corporate environmental information disclosure. *Account. Res.* **2012**, *2*, 72–78.
38. Ye, C.; Wang, Z.; Wu, J.; Li, H. External governance, environmental information disclosure and equity financing costs. *Nankai Manag. Rev.* **2015**, *18*, 12.
39. Bi, Q.; Gu, L.; Zhang, J. Traditional culture, environmental system and corporate environmental information disclosure. *Account. Res.* **2015**, *3*, 12–19.
40. Brooks, C.; Oikonomou, I. The effects of environmental, social and governance disclosures and performance on firm value: A review of the literature in accounting and finance. *Br. Account. Rev.* **2018**, *50*, 1–15. [\[CrossRef\]](#)
41. Kumar, S.; Dua, P. Environmental management practices and financial performance: Evidence from large listed Indian enterprises. *J. Environ. Plan. Manag.* **2022**, *65*, 37–61. [\[CrossRef\]](#)

42. Yue, J.; Cai, Y. An empirical analysis of corporate environmental responsibility and financial performance. *J. Financ. Econ.* **2015**, *8*, 137–139.
43. Yang, W.; Yang, S. An empirical study on the relationship between corporate social responsibility and financial performance in Chinese context: A comparative analysis of large, small and medium-sized listed companies. *Chin. J. Manag. Sci.* **2016**, *24*, 143–150.
44. Huang, R.; Chen, X. Research on the relationship between environmental responsibility and financial performance of industrial enterprises. *Bus. Manag.* **2017**, *5*, 118–120.
45. Klassen, R.D.; McLaughlin, C.P. The impact of environmental management on firm performance. *Manag. Sci.* **1996**, *42*, 1199–1214. [\[CrossRef\]](#)
46. El Ghouli, S.; Guedhami, O.; Kwok, C.C.; Mishra, D.R. Does corporate social responsibility affect the cost of capital? *J. Bank. Financ.* **2011**, *35*, 2388–2406. [\[CrossRef\]](#)
47. Schaltegger, S.; Synnestvedt, T. The link between ‘green’ and economic success: Environmental management as the crucial trigger between environmental and economic performance. *J. Environ. Manag.* **2002**, *65*, 339–346.
48. Neeveditah, P.M.; Karishma, A.; Devi, R.N. Environmental management systems and financial performance: The case of listed companies in Mauritius. *Theor. Econ. Lett.* **2017**, *7*, 2054–2069. [\[CrossRef\]](#)
49. Brammer, S.; Millington, A. Does it pay to be different? An analysis of the relationship between corporate social and financial performance. *Strateg. Manag. J.* **2008**, *29*, 1325–1343. [\[CrossRef\]](#)
50. Ansaram, K.; Pariag-Maraye, N. Modelling the Impact of Responsibility Levels on Corporate Financial Performance: The Case of Top 100 Firms in Mauritius. *Bus. Econ. Res.* **2018**, *8*, 118–138. [\[CrossRef\]](#)
51. Wan, S.; Liu, Z. Institutional background, Corporate Value and Social responsibility cost: Empirical evidence from CSI 300 listed companies. *Nankai Manag. Rev.* **2013**, *1*, 83–91.
52. Chen, Y.Q.; Ma, L.L. An empirical analysis of market reaction of social responsibility accounting information of Chinese listed companies. *Account. Res.* **2005**, *11*, 76–81.
53. Lankoski, L. Determinants of Environmental Profit: An Analysis of the Firm-Level Relationship between Environmental Performance and Economic Performance. Ph.D. Dissertation, Helsinki University of Technology, Espoo, Finland, 2000.
54. Braun, E.; Wiold, D. Regulation as a means for the social control of technology. *Technol. Anal. Strateg. Manag.* **1994**, *6*, 259–272. [\[CrossRef\]](#)
55. Blum-Kusterer, M.; Hussain, S.S. Innovation and corporate sustainability: An investigation into the process of change in the pharmaceuticals industry. *Bus. Strategy Environ.* **2001**, *10*, 300–316. [\[CrossRef\]](#)
56. Jiao, C. Analysis on enterprise green technology innovation. *Sci. Technol. Prog. Countermeas.* **2001**, *18*, 73–74.
57. Song, Y.; Sun, X. Corporate Social responsibility and R&D investment: Based on analysis of Annual report text. *Chongqing Soc. Sci.* **2020**, *6*, 80–96.
58. Zhang, X.; Wei, H. Corporate Social Responsibility, technological innovation and corporate Performance. *Stat. Decis.* **2021**, *37*, 157–161.
59. Jia, H.; Yun, K. Research on the impact of R&D input on corporate social responsibility. *J. Shanghai Lixin Univ. Account. Financ.* **2021**, *33*, 87–98.
60. Zhu, Y.; Zhang, M. An empirical study on human capital, R&D investment and corporate performance of enterprise management team. *Account. Res.* **2013**, *11*, 45–52.
61. Li, W.; Liu, Y. Technological innovation, Corporate Social responsibility and corporate competitiveness: An Empirical analysis based on Listed company data. *Sci. Sci. Manag. Sci. Technol.* **2017**, *38*, 154–165.
62. Wang, Z.; Zhang, Y. Research on the relationship between R&D investment and financial performance. *Prices China* **2022**, *2*, 4.
63. Lei, Z.; Yang, R. An empirical study on R&D investment and financial performance of pharmaceutical manufacturing enterprises: The moderating role of social responsibility. *Bus. Manag.* **2022**, *1*, 108–114.
64. Kong, Y.; Li, J. Correlation between Corporate Social responsibility and financial performance: A Case study of Shanghai A-share manufacturing Industry. *J. Financ. Account.* **2010**, *15*, 14–16.
65. Bian, J.; Cai, Y.; Zhang, L. An Empirical study on CSR Investment Efficiency of listed companies in food manufacturing Industry: Based on DEA-Malmquist Model. *Financ. Financ.* **2015**, *1*, 80–85.
66. Cui, Y.G.; Li, B. Corporate Social responsibility performance, R&D investment and financial performance: Based on empirical evidence of Chinese main Board listed companies. *J. Guizhou Univ. Financ. Econ.* **2018**, *2*, 60–69.
67. Guo, W.; Yang, J.; Li, D. The moderating effect of resource redundancy and environmental uncertainty on the impact of firm relationship on firm performance. *Sci. Sci. Technol. Manag.* **2020**, *41*, 116–132.
68. Sial, M.S.; Zheng, C.; Cherian, J.; Gulzar, M.A.; Thu, P.A.; Khan, T.; Khuong, N.V. Does corporate social responsibility mediate the relation between boardroom gender diversity and firm performance of Chinese listed companies? *Sustainability* **2018**, *10*, 3591. [\[CrossRef\]](#)
69. Adams, C.; Zutshi, A. Corporate social responsibility: Why business should act responsibly and be accountable. *Aust. Account. Rev.* **2004**, *14*, 31–39. [\[CrossRef\]](#)
70. Yang, Y.; Lau, A.K.; Lee, P.K.; Cheng, T.C.E. The performance implication of corporate social responsibility in matched Chinese small and medium-sized buyers and suppliers. *Int. J. Prod. Econ.* **2020**, *230*, 107796. [\[CrossRef\]](#)

71. Williams, O.F. CSR: Will it change the world? Hope for the future: An emerging logic in business practice. *J. Corp. Citizsh.* **2014**, *53*, 9–26. [[CrossRef](#)]
72. Margolis, J.D.; Elfenbein, H.A.; Walsh, J.P. Does It Pay to be Good. . . and Does It Matter? A Meta-Analysis of the Relationship between Corporate Social and Financial Performance. 2009. Available online: <https://ssrn.com/abstract=1866371> (accessed on 20 May 2023).
73. Malen, J. Motivating and enabling firm innovation effort: Integrating penrosian and behavioral theory perspectives on slack resources. *Hitotsubashi J. Commer. Manag.* **2015**, *49*, 37–54.
74. Tariq, G.; Sun, H.; Ali, I.; Pasha, A.A.; Khan, M.S.; Rahman, M.M.; Mohamed, A.; Shah, Q. Influence of green technology, green energy consumption, energy efficiency, trade, economic development and FDI on climate change in South Asia. *Sci. Rep.* **2022**, *12*, 16376. [[CrossRef](#)]
75. Liu, F.; Sim, J.Y.; Kofi Edziah, B.; Sun, H.; Sarkodie, S.A.; Adom, P.K. Machinery import, R&D spillover, and energy efficiency. *J. Environ. Plan. Manag.* **2023**, 1–22. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.