sciendo

Moderating Environmental Leadership on Corporate Social Responsibility and Green Innovation of SMEs Performance

Takyi Kwabena NSIAH
Tomas Bata University in Zlin, Czech Republic
takyi@utb.cz

Miloslava CHOVANCOVÁ
Tomas Bata University in Zlin, Czech Republic
chovancova@utb.cz

Attor CLEOPHAS
Tomas Bata University in Zlin, Czech Republic
attor@utb.cz

Comfort Adebi ASAMOAH
Tomas Bata University in Zlin, Czech Republic
asamoah@utb.cz

Abstract. The contribution and knowledge of environmental leadership has been questioned on how they aid institutions in their CSR and innovative thinking. The purpose of the investigation was to explore the role of Small and Medium Scale enterprises in emerging nation on how corporate social responsibility (CSR) and green process innovation (GRNI) can help enterprises to achieve environmental (ENVP) and financial performance (FINP). For the analysis of the indicators data was collected from SMEs in the manufacturing sectors of Ghana through questionnaire of 215 participants. The "SmartPLS 3" model was employed to analyze the affiliation between the investigated indicators. The findings demonstrated that CSR had a material impact on ENVP but not on FINP and GRNI. However, GRNI had a favorable and material affiliation with ENVP and FINP of SME's. On exploring the moderating effect of environmental leadership (ENVL) had a favorable affiliation between CSR and green process innovation.

The research made a significant contribution to the green theory and practically to researchers and practitioners in manufacturing and other industries who are serious about implementing environmental sustainability and are seeking for a suitable method are anticipated to benefit from this study. It provides a generic approach to implementing CSR that links SME owners and managers, green technologies, green practices, and process management.

Keywords: Corporate social responsibility, green process innovation, environmental performance, financial performance, Environmental leadership.

Introduction

Corporate social responsibility (CSR) has emerged as a crucial strategic component for small businesses in developing nations (Achi et al., 2022; Tiep et al., 2021; Zou et al., 2021). Intriguingly, small- and medium-sized business (SME's) owners believe they are personally responsible for their communities and employees and take philanthropic actions to improve the efficiency of their enterprises (Bodlaj & Čater, 2019a; Owotemu, 2021; Rehman et al., 2022; Zulkiffli et al., 2022a). It has been suggested that CSR can be used as a tool to increase the agility of SME processes and boost corporate goals in developing regions. Performance improvement is among these results (Kraus et al., 2020a; Sánchez-Infante Hernández et al., 2020), as a result, the academic and

DOI: 10.2478/picbe-2023-0093
© 2023 T. K. Nsiah; M. Chovancová; A. Cleophas; C. A. Asamoah, published by Sciendo.
This work is licensed under the Creative Commons Attribution 4.0 License.

professional community never stop trying to explain how CSR affects SME's performance (Eua-anant et al., 2011; Klewitz & Hansen, 2014; Nassani et al., 2022a; Ricci et al., 2020). However, the results of earlier studies on CSR are still erratic and do not adequately describe the mechanisms through which CSR influences SME performance (Achi et al., 2022; Zaborek, 2014).

According to studies, intervening mechanisms may help to explain how businesses can perform better as a result of using CSR strategies (Abbas, 2020; Adomako & Nguyen, 2020; Shahzad et al., 2020). This suggests that CSR needs unique interaction pathways to transfer its influence on enterprises' performance, although such knowledge is still unexplored in the literature that is now available (Hernández-Linares et al., 2021; Tiep et al., 2021; Zaborek, 2014). Furthermore, prior research indicates that the setting in which CSR is practiced may influence organizations' commitment in CSR and its relationship to their performance (Nassani et al., 2022b; Padilla-Lozano & Collazzo, 2022; Sánchez-Infante Hernández et al., 2020; Yuan & Cao, 2022; Zou et al., 2021). The previous work continues to urge academics to investigate the boundary conditions of the CSR-performance coupling while considering the context-dependent nature of CSR and potential differences in social expectations (Adomako & Nguyen, 2020; Fani et al., 2022; Rehman et al., 2022; Xiao & Su, 2022).

Furthermore, investigations still lack a thorough theoretical analysis of the potential confounding factors that can affect the relationship between CSR and SME's success. Additionally, relatively little evidence comes from underdeveloped nations; most previous conclusions on CSR are based on studies from affluent economies in Europe and North America. Further research is needed because it is doubtful that there is a general affiliation between CSR and corporate performance that is impervious to outside factors. There are therefore requests for researchers to look at how CSR affects business operations in the context of developing economies. According to academics who frequently assert that environmental factors influence CSR (Aftab, Abid, et al., 2022; Jiang et al., 2020; Kraus et al., 2020b; Rui & Lu, 2021), SMEs' CSR initiatives "tend to be formed out of necessity in the developing world" (Rehman et al., 2022).

Therefore, the foundation of our analysis is the claim that, in the setting of a significant emerging economy, green process innovation serves as a mediating mechanism in the relationship between CSR and SME efficiency and that environmental leadership (EL) serves as a moderating condition. We view CSR and green innovation processes as capabilities businesses use to balance and align the perceived unpredictable changes in their environments to improve their business outcomes, drawing on the dynamic capabilities concept. Thus, our work adds three crucial pieces of knowledge to the body of knowledge. First, we reply to persistent requests for further study on CSR in the contexts of emerging economies (Achi et al., 2022; Brenner & Hartl, 2021; Eua-anant et al., 2011; Zaborek, 2014; Zulkiffli et al., 2022b). Considering the ways in which CSR affects SME performance (Nassani et al., 2022a), we show how CSR may have a beneficial impact on SME performance when it is channeled through green process innovation. Second, by demonstrating the contingent role of environmental leadership on the indirect nexus between CSR and SME performance via green process innovation, our study adds to the body of existing CSR literature (Aftab, Sarwar, Amin, & Kiran, 2022; Biedenkopf et al., 2019; Xu et al., 2018), providing new knowledge about how and when CSR can predict SME performance. Finally, we build on earlier research by evaluating our research approach in the setting of SMEs operating in Ghana, a less-studied emerging country. Our research contributes to enlarging the empirical research on the link between CSR and corporate performance, providing a more balanced view of CSR, which has so far only been studied in developed nations.

The remainder of our essay is organized as follows. We begin by outlining the study's theoretical foundation and hypotheses. We next go over the research techniques and provide the findings. We conclude by discussing the significance of our results for the operations of SMEs and making recommendations for potential future studies in this area.

Literature review

Theoretical synopsis

Green Theory and Green performance

With the advent of the industrial transformation, the manufacturing industry's use of natural resources to manufacture goods and make a profit has skyrocketed. This has resulted in a scarcity of natural resources, particularly for future generations, and a significant modification of the natural environment, including global warming (Saunila et al., 2018). In light of this challenge, the United Nations Global Compact (UNGC) has mandated that all corporations worldwide implement eco-friendly policies and green practices (UNGC, 2018).

The ecologists have also urged enterprises, particularly those in the manufacturing sector, to incorporate green thinking and corporate social responsibility activities into their operations because they have a material impact not only on the economic efficiency of the organization, but also on environmental factors (Dentoni et al., 2016). Green theory is a modern interdisciplinary way of thinking that focuses on the rights of humans, governance in institutions, community responsibility and ecology concern (Eckersley 2010). Regional, national, and worldwide environmental sustainability is the objective of the green theory. CGP illustrates the connection between a company's activities and the environment, with its conceptual origins in green philosophy (Yacob et al., 2019). It gives vital evidence about an organization's procedures and compliance with environmental standards, demonstrating the efficacy and efficiency of environmental initiatives. According to (Haldorai et al., 2022), in order to become a green enterprise, a company must transform its operations into environmentally friendly activities by instituting fundamental reforms in product/service operational procedures. Particularly manufacturing companies alter the conventional understanding of the product lifecycle from resource acquisition through product creation, distribution, consumption, and recycling. According to (Hernández-Linares et al., 2021), businesses committed to sustainable practices have a significant opportunity to attract additional customers. (Nsiah et al., 2022) research on management innovation and enterprise efficiency demonstrated that to achieve environmentally progress firms must integrate products and services that are green. Enterprises that disclose their corporate social responsibility are able to stay out of negative news.

Corporate social responsibility and green innovation nexus

CSR is acknowledged to be important to businesses, it is not yet apparent how or when CSR may help SMEs succeed. In Malaysia, (Kraus et al., 2020a) explored the affiliation that exits between CSR and environmental performance of 297 manufacturing enterprises. The findings from the article indicated that green innovation had a favorable affiliation between the two indicators under research. Again, (Padilla-Lozano & Collazzo, 2022) employing green innovation as an interplay mediating variable for the nexus between CSR and competitiveness of manufacturing enterprises in Ecuador. They concluded that enterprises that want to be environmentally friendly and achieve competitive success should adopt green innovation. In Slovenia, (Bodlaj & Čater, 2019a) investigated how SME's can create innovativeness through environmental turbulence and perceived significance of innovation. From the data of 373 SME's, the analysis demonstrated that

combinedly market and technology turbulence directly link to innovativeness of SME's. In the search for green innovation (Li et al., 2022) gathered 198 manufacturing enterprises in China and explored the mediating effect of green control. Employing information processing, RBV, and transaction cost theory, the findings indicate that in the search for green product innovation management must strategically consider supervision and control of knowledge. Moderating enterprise size on the affiliation between CSR and economics efficiency of Spanish SME's (Sánchez-Infante Hernández et al., 2020) concluded that big enterprises that engage in social, economic, and environmental CSR will be able to appreciate their environmental efficiency.

Green innovation, environmental, and financial efficiency nexus

Green innovation (GI) is defined as the application of eco-friendly technology in manufacturing processes to create goods and services with little to no negative environmental impact. The environment is now under pressure of rising depreciation with the main contributor been human activities. (Rehman et al., 2022) explored the manufacturing and construction sector of Malaysia by sampling 377 top management through a questionnaire collection method. The research seeks to investigate environmental sustainability and CSR affiliation with environmental performance of MSE's. The results indicate that environmental sustainability had a direct link with green capability. However, CSR had no nexus with environmental performance. On the investigation of 154 Brazilian enterprises (Bacinello et al., 2019) adopted the RBV model to explore how CSR and innovation linked to enterprise efficiency. The findings show that CSR had a material affiliation with sustainable innovation. Again, both had a favorable relation with enterprise efficiency. By surveying 424 manufacturing enterprises in China and employing a regression model to analyze the connection between CSR and green innovation (Yuan & Cao, 2022). The findings indicate that CSR had a material effect on green product and green process innovation. (Achi et al., 2022) investigated MSME's in Sub-Sarah Africa by exploring CSR and green process innovation. Through the regression model analysis CSR had a direct link to enterprise green process innovation.

Moderating effect of environmental leadership

The issues of leadership and their awareness of the environment is still not clear. Especially, in the SME's sector of developing regions. Enterprises in the developing regions are faced with ecological challenges which require the contribution of upper-level management concern. Top management environmental leadership is how to integrate the plans of the institution in line with the environment. (Rui & Lu, 2021) selected 278 enterprises in China and employed the hierarchical analysis to explore shareholder pressure, corporate environmental ethics, and green innovation. The results exhibited that leadership moderate the affiliation between stakeholder pressure and corporate environmental ethics. Research in North Italy (Aftab, Sarwar, Amin, & Kiran, 2022) on SMEs by sampling a total of 202 employees working in the manufacturing sectors for the period 2019-2020. The findings indicated that CSR plays a critical role in the job performance of employees. Environmental deterioration and the contribution of environmental leadership was investigated in China by (Jiang et al., 2020). The results indicated that leadership has a significant role to achieving low emission in China and the development of innovation ability and innovation resources. During the Covid-19 period (Akram et al., 2022) research on the Pakistan leather industry by gathering data on 205 respondents. The PLS-SEM was used to analyze the affiliation between green transformational leadership and environmental efficiency. The results exhibited that green transformational leadership had a material effect on environmental progress.

Conceptual framework

To investigate the affiliation between the variables and test the link associated with each indicator, we developed a concept from literary gaps as demonstrated below.

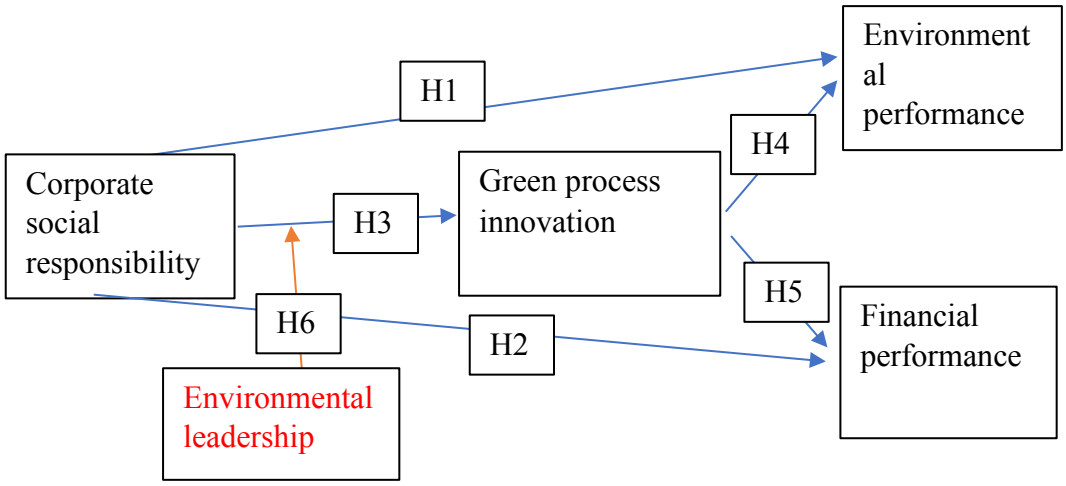


Figure 1. Conceptual framework

Research method

In this quantitative study, the owners of Ghanaian small and medium-sized businesses (SMEs) were contacted between October and November 2022. It was a deductive method based on the post-positivism research philosophy that measured the impact of independent factors on dependent variables. Considering the vast number of SMEs, a convenience sample was utilized since it was feasible for the researcher to reach respondents, and because it is the most prevalent sampling method (70). First, we conducted ten in-depth interviews with SMEs managers from diverse industries to gain a better understanding of how managers define and measure green innovation. In the second step, we carried out an Internet survey among SME's firms from various industries with at least three employees. In all a total of 480 questionnaires was distributed across the various sixteen regions in Ghana to key management and employees. A reminder was sent in two weeks intervals with a follow up on questionnaires that needed explanations to the respondents, a total of 215 was the final sample questionnaires. The surveys received were screened for missing data or outliers. All items reflecting research variables were evaluated using a five-point Likert scale. Since the same respondent provided data on all exogenous and endogenous variables simultaneously, common method bias (CMB) may have affected the results. The CMB value suggested by Kock (2015) was used to check for collinearity among the variables. All the variables were less than 3.3 indicating that CMB was not present in the data collected.

Measurement of instruments

The questionnaire survey was employed for data gathering in the present investigation. This study's questionnaire had a total of 26 questions organized into five sections. The first component of the questionnaire addressed the respondents' demographics, while the other four sections addressed the study's independent, moderating, and dependent factors.

It includes age, gender, level of education, and the organization's age. The second portion of the questionnaire was a 6-item measure of corporate social responsibility (Kraus et al., 2020a;

Padilla-Lozano & Collazzo, 2022), and five items each for environmental leadership, green process innovation (Bodlaj & Čater, 2019a; Li et al., 2022; Rehman et al., 2021), environmental and financial performance (Aftab, Sarwar, et al., 2022; Aftab, Veneziani, et al., 2022; Brenner & Hartl, 2021).

Demographics Details

First, the respondents' demographic information was examined using frequency and percentage. Males and females were grouped based on the gender replies. The overall number of responders included 121 men and 94 women. As regards age, the largest proportion of respondents were aged 31 and older (92), those aged 26–30 (64) and those aged 21–25 (54). The replies revealed that 32 respondents held a Ph.D. or other advanced degree, whereas the greatest number of respondents (131) held a master's degree, followed by a bachelor's degree (52 respondents). On the responses to years of enterprise operation; less than 1 year (11), 1-2 years (59), 2-5(91), and above 5 years (54). Again, firms with the number of employees 5-10 was the highest with 108, 10 -20 employees accounting for 72, and 20 and 15 for less than 5 and greater than 20 employees respectively. Finally, the SMEs are grouped into food processing, textile and furniture, paper and printing, medicine, metal, and equipment.

Data analysis

This part of the article demonstrates the analytical procedures employed. The Smart-PLS version 3 was utilized to test the conceptual model developed in fig 1. As per (Hair et al., 2020) it is the corroborated method to test measurement and structural model. The validity and reliability of the construct threshold for Cronbach, composite, average variance extract can be tested. The version indicates the model fit and the path affiliation between the constructs.

Corroborate the reliability model.

The reliability of the test is examined using Cronbach's Alpha or a composite reliability index, while concurrently determining if observed variables measure the same idea, so removing non-conforming variables. An appropriate scale has observed variables with total correlation coefficients larger than or equal to 0.3 and Cronbach's Alpha values greater than or equal to 0.6. The following equation is used to compute Cronbach's Alpha:

$$Cronbach's\ \alpha = \frac{K.r}{[1 + (K-1).r]}$$

To avoid inconsistency in the scale, two tests was carried out on Cronbach's Alpha and composite reliability (CR). This was to help achieve the reliabilities of indicators which can be applied to test for the model analysis. The CR formula is calculated as exhibited below:

$$Composite\ Reliability\ \ p_c = \frac{\left(\sum_{k=1}^{k} \quad l_k\right)^2}{\left(\sum_{k=1}^{k} \quad l_k\right)^2 + \sum_{k-1}^{k} \quad var(e_k)}$$

Convergent validity

Investigation on the validity measurements show that employing average variance extract and the outer loading is appropriate to check the convergence (Ab Hamid et al., 2017; Hair et al., 2020). This is calculated as.

$$AVE\ = \frac{\sum_{k=1}^{k} \quad l_k^2}{K}$$

With latent indicator outer loading greater than 0.7 implies that the variables convergence is valid to be employed in the assessment of the developed model. As depicted in table 2, all indicators were above 0.7 proposed value.

Reliability and validity synopsis

The article employed four tests to check the reflective indicator's reliability in terms of the loading with a minimum value of 0.628 and maximum of 0.888. as indicated by (Hair et al., 2020) the least loading should not be below 0.50, indicating that there are no issues with loadings of the constructs. Again, the CR values for the model variables were higher than 0.60 which meet the internal consistency test. A value of 0.95 is considered an issue with the model, all the model constructs were between 0.8 - 0.90. Similarly, the AVE values should be above 0.50 (Hair et al., 2020). The investigation results exhibited that; no issue of AVE is of concern in the model reliability check.
On testing for the validity, the research employed three critical steps, Fornell-Larcker, Heterotriat-Monotrait, and the variance inflation factor. As indicated in table 2 and 3, all the three meet the threshold criteria for the validity test.

Table 1. Measurement model

Dimensions	Proxy	Loading	Composite reliability	RHO_A	Cronbach's alpha	Average variance extracted (AVE)	VIF
Green process innovation			0.899	0.863	0.859	0.640	
	GRNI 1	0.792					2.007
	GRNI 2	0.811					2.211
	GRNI 3	0.746					1.662
	GRNI4	0.862					2.634
	GRNI 5	0.786					1.935
Corporate Social Responsibility			0.893	0.855	0.850	0.627	
	CSR 1	0.778					1.826
	CSR 2	0.767					1.832
	CSR 3	0.718					1.831
	CSR 4	0.883					2.021
	CSR 5	0.803					2.908
Environmental performance			0.900	0.864	0.861	0.643	
	ENVP 1	0.814					2.067
	ENVP 2	0.841					2.237
	ENVP 3	0.779					1.877
	ENVP 4	0.794					1.944
	ENVP 5	0.779					1.819

Dimensions	Proxy	Loading	Composite reliability	RHO_A	Cronbach's alpha	Average variance extracted (AVE)	VIF
Financial performance			0.908	0.888	0.873	0.663	
	FINP 1	0.888					2.386
	FINP 2	0.818					2.720
	FINP 3	0.796					2.226
	FINP 4	0.722					1.835
	FINP 5	0.838					2.549
Environmental Leadership			0.827	0.743	0.739	0.631	
	ENVL 1	0.683					1.358
	ENVL 2	0.726					1.587
	ENVL 3	0.623					1.479
	ENVL 4	0.746					2.239
	ENVL 5	0.713					2.148

Source: Author's analysis.

Table 2 validity synopsis

Fornell-Larcker criterion					
Construct	**1**	**2**	**3**	**4**	**5**
CSR	**0.792**				
ENVL	0.655	**0.699**			
ENVP	0.620	0.676	**0.802**		
FINP	0.477	0.696	0.726	**0.815**	
GRNI	0.594	0.682	0.718	0.598	**0.800**
Heterotrait-Monotrait (HTMT)	**1**	**2**	**3**	**4**	**5**
CSR					
ENVL	0.828				
ENVP	0.719	0.954			
FINP	0.546	0.832	0.826		
GRNI	0.687	0.859	0.833	0.667	

Source: Author's analysis

Model fit synopsis

The research tested for the model fitness with difference criteria as each method has its effect on the finding results of the hypothesis developed. As demonstrated in table 3, all the model quality checks were achieved.

Table 3 model fit synopsis

Goodness of fit calculation	**NFI**	**CFI**	**RMSEA**	**SRMR**
decision value	>0.9	>0.9	<0.08	<0.08
Outcome value	0.931	0.924	0.031	0.0280
	R squares	**Q squares**		
Constructs	R2	Q2		
Environmental performance	0.582	0.318		
Financial performance	0.381	0.209		
Green process innovation	0.589	0.287		

Source: Author's analysis

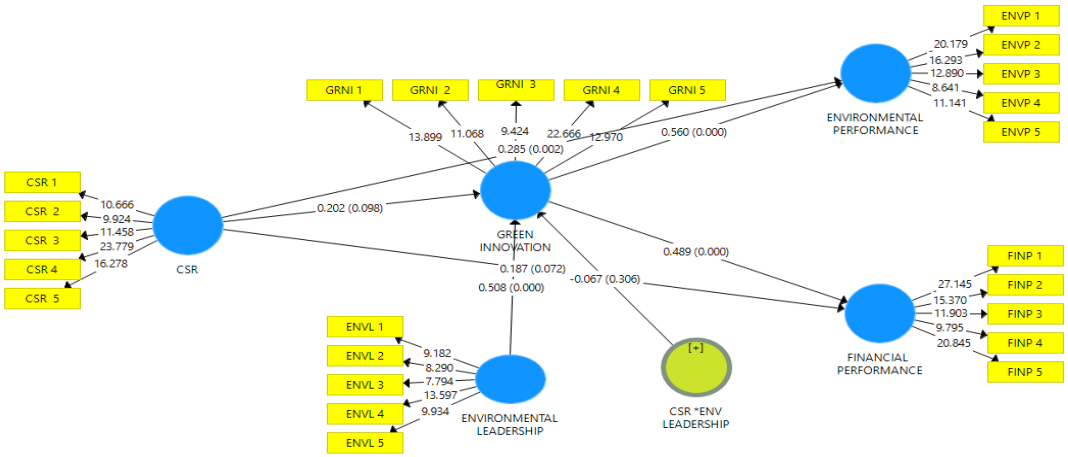


Figure 2. Initial PLS algorithm

Structural assessment model

The structural model included several tests such as estimating path coefficient and their significance by bootstrapping a sample of 5000. As exhibited in table 4 and figure 3, the results indicates that GRNI had a favorable material link with FINP (Coeff 0.489, t statis 5.340, prob= 0.00). Similarly, GRNI had a positive affiliation with ENVP (Coeff 0.560, t statis 7.194, prob= 0.00). Again, as depicted CSR had an immaterial nexus with GRNI (Coeff 0.202, t statis 1.660, prob= 0.098). With CSR link to FINP (Coeff 0.187, t statis 1.804, prob= 0.072). however, with ENVP it had a favorable affiliation (Coeff 0.285, t statis 3.112, prob= 0.002). Finally, we tested for the moderating association impact of CSR*ENVL – GRNI. The findings demonstrated that ENVL had an inverse immaterial moderating effect (Coeff -0.067, t statis 1.025, prob= 0.306).

In the next step we tested for the indirect effect of the model developed. The mediating effect between CSR – GRNI-ENVP and CSR – GRNI-FINP indicates that GRNI neither moderate between CSR and ENVP (Coeff 0.113, t statis 1.667, prob 0.096) nor CSR and FINP (Coeff 0.099, t statis 1.344, prob 0.180). However, with GRNI as a mediating association had a significant favorable nexus between ENVL - ENVP (Coeff 0.248, t statis 3.604, prob 0.000), and ENVL – FINP (Coeff 0.038, t statis 3.215, prob 0.001).

Table 4 Structural assessment model

Path	Coeff	t-value	Prob	Decision
CSR->ENVP	0.285	3.112	0.002	**H2- accepted**
CSR->FINP	0.187	1.804	0.072	**H1- rejected**
CSR->GRNI	0.202	1.660	0.098	**H3- rejected**
GRNI ->FINP	0.489	5.340	0.000	**H4-accepted**
GRNI->ENVP	0.560	7.194	0.000	**H5- accepted**
ENVL->GRNI	0.508	4.274	0.000	
CSR*ENVL->GRNI	-0.067	1.025	0.306	**H6- accepted**
Indirect effects				
CSR->GRNI->ENVP	0.113	1.667		0.096
CSR->GRNI->FINP	0.099	1.344		0.180
ENVL->GRNI->FINP	0.248	3.604		0.000
ENVL->GRNI->ENVP	0.284	3.215		0.001
CSR*ENVL->GRNI->ENVP	-0.038	1.003		0.316
CSR*ENVL->GRNI->FINP	-0.033	0.960		0.337

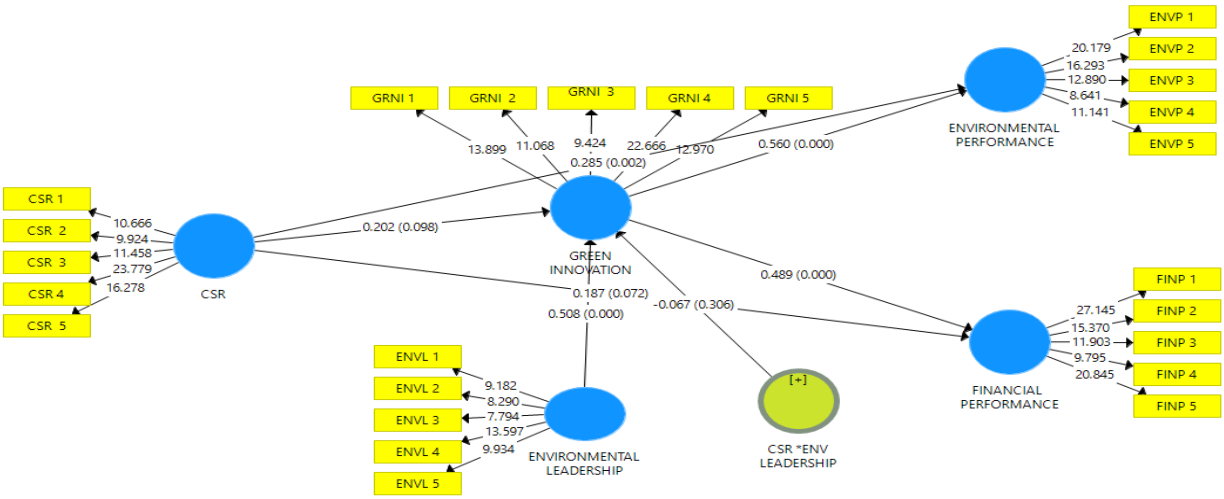


Figure 3. Final bootstrapping

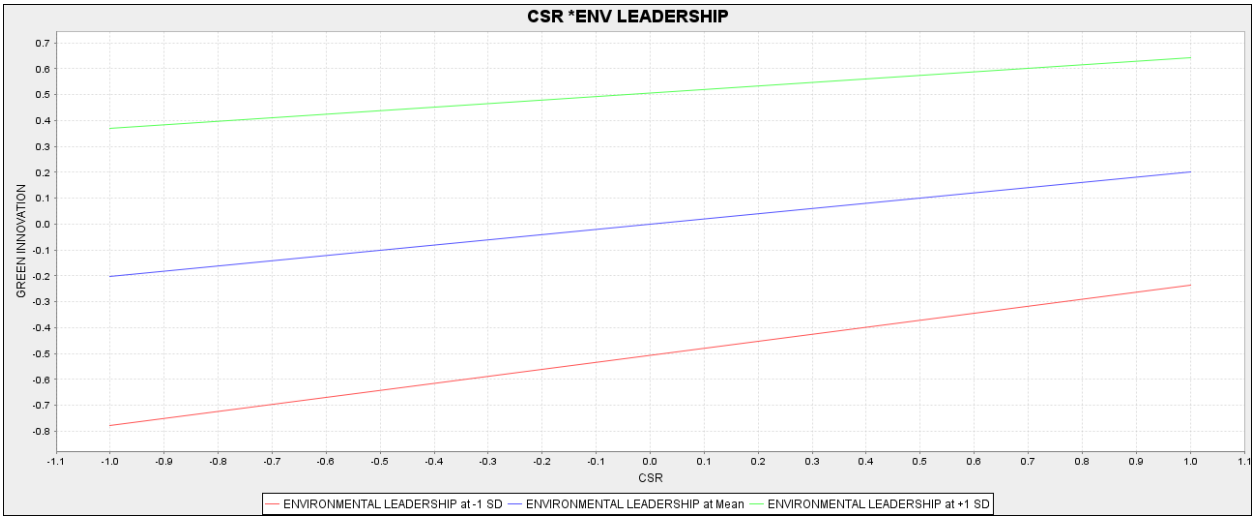


Figure 4. Moderating effects

Discussion

This research seeks to explore the interplay that exists between CSR, green innovation, and performance of SME's. Previous literary investigations have looked at how CSR can impact enterprises performance (Kraus et al., 2020a; Sánchez-Infante Hernández et al., 2020). Similarly, the affiliation and the significance of green innovation and performance has been researched (Aftab, Abid, Sarwar, et al., 2022; Wayan Edi Arsawan et al., 2021a; Zulkiffli et al., 2022b). This investigation filled gaps in literary work with the introduction of environmental leadership as a moderating indicator on the nexus between CSR and GNRI.

As exhibited in table 5 and figure 3, the results indicate green process innovation had a material on both ENVP and FINP. These findings support and expand the literary works of (Albort-Morant et al., 2016; Bodlaj & Čater, 2019b; Wayan Edi Arsawan et al., 2021b). Again, on testing the affiliation between CSR, ENVP, and FINP the investigation produced an immaterial effect of CSR on both ENVP and FINP of SME's. The results are not in support of similar research in Ecuador on a sample of 325 SME's (Padilla-Lozano & Collazzo, 2022). Which concluded that CSR impact on the performance of SME's.

The next step was to test the moderating effect of ENVL on the association between CSR and GRNI. AS produced in table 5, leadership had an inverse moderating connection on the affiliation between CSR and GRNI. In the work of (Nsiah et al., 2022) research work in South Africa, their findings shows that management had a favorable effect on GRNI leading to a significant financial efficiency. The results have revealed that ENVL in the SME's sector do not participate in CSR activities that will lead to GRNI.

Finally, indirect path effects were tested to revealed weather GRNI serves as a mediating nexus between CSR, ENVP and FINP. The results exhibited in table 5 has shown that GRNI does not serve as a mediating variable. However, (Aftab, Abid, Cucari, et al., 2022) investigation in 410 manufacturing enterprises in Pakistan has shown that GRNI mediated the affiliation of green human management and environmental efficiency.

Conclusion and policy

The purpose of the investigation was to explore the interplay role of CSR on the association between green innovation, environmental and financial performance of SME's. The most polluting manufacturing enterprises was selected for the research. For the analysis of the indicators data was collected from SMEs in the manufacturing sectors of Ghana through questionnaire of 215 participants. To test the suggested hypotheses, we employed the "Smart PLS 3" approach. There were six hypothesis that was developed to achieve the purpose of the investigation on nexus between CSR, GRNI, ENVL, ENVP, and FINP. The investigation results shows that CSR has a positive and a material affiliation with ENVP (H1) but not on FINP (H2) of SME's. The reason been that SME's contribution for development of CSR is capital intensive which affect their profit as many of these SME's are small in nature. Again, CSR association on GRNI was tested and the finding indicates that CSR has no effect on GRNI (H3). SMSs in the manufacturing areas of Ghana engage in CSR because of stakeholder's pressure on lessening pollution. However, GRNI had a favorable material affiliation with ENVP (H4) and FINP (H5). The findings have exhibited that SME's that engages in innovation practices are able to achieve both environmental and financial efficiency. Finally, ENVL had a favorable association with GRNI. When it was moderated on the link between CSR and GRNI the results demonstrated an inverse affiliation.

Synopsis for research and theory

Our study's findings have three major implications for the advancement of theory. First, our investigation contributes to the advancement of green theory and green performance by shedding light on the reasons for GRNI and environmental performance in companies. Based on the findings of this experiment, we argue that corporate social responsibility is a strategic resource that businesses could utilize to impact green innovation and environmental performance. While applying green theory and green performance, we believe that leadership is a vital organizational resource that should be valued alongside all others. Similarly, our study proposes and develops the green theory by proposing that businesses should design and apply green innovation techniques in order to decrease waste and enhance green innovation and environmental efficiency. Consequently, our research blends green theory and green efficiency to demonstrate why and how leaders and GENI practices enhance green innovation and enterprise green performance. Second, leadership is an important factor in CSR and green innovation practice decision-making. As scholarly research has demonstrated the existence of a positive correlation, we recommend that the enterprise's leadership cultivate their green competencies in order to attain environmental and financial efficiency. Thirdly, we discovered that both green innovation and environmental leadership approaches impact the environmental performance of businesses. As a result, we propose that SME's embrace GRNI practices through eco-friendly production procedures. Our research reveals performance of small and medium-sized enterprises is not only based on CSR, green innovation, or environmental leadership, but rather on a mixture of these characteristics.

Practical implications

Our report provides numerous critical recommendations to leaders and managers on how to implement GRNI and leverage it for improved ENVP in order to outperform competitors in the marketplace. First, enterprises that are engage in CSR create a form of good brand to stakeholders, who are increasingly demanding and pressuring businesses to green all of their processes and products. According to the findings of our study, businesses should highlight and promote the green leadership traits required for implementing green innovation strategies. Next, enterprises should make substantial investment in GRNI methods as it is a channel to environmental management effort in pollution depreciation. Again, we propose that GRNI techniques require a culture of development and a flat organizational structure in order to preserve a competitive edge. Thirdly, our research indicates that environmental financial success is contingent on the quality of green processes. There is cost affiliated with GRNI, however, we recommend that management consider the long-term significance of GRNI. We provide several implications for institutional leaders, stakeholders, and policy makers on the why enterprises should integrate CSR, GRNI, and ENVL to accomplish ENVP and FINP.

Limitations and directions for future research

We explain the limits of our work with recommendations for further research. First, we limited the applicability of our investigation to SMEs by conducting this research in Ghana's manufacturing sector SMEs. We propose that future study expands our conceptual examination strategy to SMEs in Ghana's non-manufacturing sector. Second, this study did not utilize green products, one of the green innovation constructs, to determine its mediated or direct relationship with SME's efficiency. In light of this, we recommend that future study should improve our research framework to incorporate green products as an indication of green innovation. Thirdly, this investigation explored the moderating nexus between environmental leadership and CSR and GRNI. For a fuller

understanding of creating, executing, and sustaining proactive environmental plans, we propose that future research on small and medium-sized enterprises in Ghana explore how environmental leadership might affect both ENVP and FINP.

Reference

Ab Hamid, M. R., Sami, W., & Mohmad Sidek, M. H. (2017). Discriminant Validity Assessment: Use of Fornell & Larcker criterion versus HTMT Criterion. *Journal of Physics: Conference Series*, *890*(1). https://doi.org/10.1088/1742-6596/890/1/012163

Abbas, J. (2020). Impact of total quality management on corporate green performance through the mediating role of corporate social responsibility. *Journal of Cleaner Production*, *242*. https://doi.org/10.1016/j.jclepro.2019.118458

Achi, A., Adeola, O., & Achi, F. C. (2022). CSR and green process innovation as antecedents of micro, small, and medium enterprise performance: Moderating role of perceived environmental volatility. *Journal of Business Research*, *139*, 771–781. https://doi.org/10.1016/j.jbusres.2021.10.016

Adomako, S., & Nguyen, N. P. (2020). Interfirm collaboration and corporate social responsibility expenditure in turbulent environments: The moderating role of entrepreneurial orientation. *Corporate Social Responsibility and Environmental Management*, *27*(6), 2668–2678. https://doi.org/10.1002/csr.1991

Aftab, J., Abid, N., Cucari, N., & Savastano, M. (2022). Green human resource management and environmental performance: The role of green innovation and environmental strategy in a developing country. *Business Strategy and the Environment*. https://doi.org/10.1002/bse.3219

Aftab, J., Abid, N., Sarwar, H., & Veneziani, M. (2022). Environmental ethics, green innovation, and sustainable performance: Exploring the role of environmental leadership and environmental strategy. *Journal of Cleaner Production*, *378*. https://doi.org/10.1016/j.jclepro.2022.134639

Aftab, J., Sarwar, H., Amin, A., & Kiran, A. (2022). Does CSR mediate the nexus of ethical leadership and employee's job performance? Evidence from North Italy SMEs. *Social Responsibility Journal*, *18*(1), 154–177. https://doi.org/10.1108/SRJ-09-2020-0393

Aftab, J., Veneziani, M., Sarwar, H., & Ishaq, M. I. (2022). Organizational ambidexterity, firm performance, and sustainable development: Mediating role of entrepreneurial orientation in Pakistani SMEs. *Journal of Cleaner Production*, *367*. https://doi.org/10.1016/j.jclepro.2022.132956

Akram, K., Saeed, A., Bresciani, S., Rehman, S. U., & Ferraris, A. (2022). Factors affecting environmental performance during the covid-19 period in the leather industry: a moderated-mediation approach. *Journal of Competitiveness*, *14*(1), 5–22. https://doi.org/10.7441/joc.2022.01.01

Albort-Morant, G., Leal-Millán, A., & Cepeda-Carrión, G. (2016). The antecedents of green innovation performance: A model of learning and capabilities. *Journal of Business Research*, *69*(11), 4912–4917. https://doi.org/10.1016/j.jbusres.2016.04.052

Bacinello, E., Tontini, G., … A. A.-S. R. and, & 2020, undefined. (2019). Influence of maturity on corporate social responsibility and sustainable innovation in business performance. *Wiley Online Library*, *27*(2), 749–759. https://doi.org/10.1002/csr.1841

Biedenkopf, K., van Eynde, S., & Bachus, K. (2019). Environmental, climate and social leadership of small enterprises: Fairphone's step-by-step approach. *Environmental Politics*, *28*(1), 43–63. https://doi.org/10.1080/09644016.2019.1521927

Bodlaj, M., & Čater, B. (2019a). The Impact of Environmental Turbulence on the Perceived Importance of Innovation and Innovativeness in SMEs. *Journal of Small Business Management*, *57*(S2), 417–435. https://doi.org/10.1111/jsbm.12482

Bodlaj, M., & Čater, B. (2019b). The Impact of Environmental Turbulence on the Perceived Importance of Innovation and Innovativeness in SMEs. *Journal of Small Business Management*, *57*(S2), 417–435. https://doi.org/10.1111/jsbm.12482

Brenner, B., & Hartl, B. (2021). The perceived relationship between digitalization and ecological, economic, and social sustainability. *Journal of Cleaner Production*, *315*, 128128. https://doi.org/10.1016/j.jclepro.2021.128128

Dentoni, D., Bitzer, V., & Pascucci, S. (2016). Cross-Sector Partnerships and the Co-creation of Dynamic Capabilities for Stakeholder Orientation. *Journal of Business Ethics*, *135*(1), 35–53. https://doi.org/10.1007/s10551-015-2728-8

Eua-anant, P., Ayuwat, D., & Promphakping, B. (2011). Relations Between Positive Impacts Of CSR, External Support, CSR Knowledge And The Degree Of CSR Practices In Thai Small And Medium Enterprises. *International Business & Economics Research Journal (IBER)*, *10*(11), 17. https://doi.org/10.19030/iber.v10i11.6401

Fani, V., Mazzoli, V., & Acuti, D. (2022). 'I wanna be sustainable, but I don't wanna show it!': The effect of sustainability cues on young adult consumers' preferences. *Business Strategy and the Environment*. https://doi.org/10.1002/bse.3303

Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*, 101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

Haldorai, K., Kim, W. G., & Garcia, R. L. F. (2022). Top management green commitment and green intellectual capital as enablers of hotel environmental performance: The mediating role of green human resource management. *Tourism Management*, *88*. https://doi.org/10.1016/j.tourman.2021.104431

Hernández-Linares, R., Kellermanns, F. W., & López-Fernández, M. C. (2021). Dynamic capabilities and SME performance: The moderating effect of market orientation. *Journal of Small Business Management*, *59*(1), 162–195. https://doi.org/10.1111/jsbm.12474

Jiang, Y., Asante, D., Zhang, J., & Cao, M. (2020). The effects of environmental factors on low-carbon innovation strategy: A study of the executive environmental leadership in China. *Journal of Cleaner Production*, *266*. https://doi.org/10.1016/j.jclepro.2020.121998

Klewitz, J., & Hansen, E. G. (2014). Sustainability-oriented innovation of SMEs: A systematic review. In *Journal of Cleaner Production* (Vol. 65, pp. 57–75). https://doi.org/ 10.1016/j.jclepro.2013.07.017

Kraus, S., Rehman, S. U., & García, F. J. S. (2020a). Corporate social responsibility and environmental performance: The mediating role of environmental strategy and green innovation. *Technological Forecasting and Social Change*, *160*. https://doi.org/10.1016/j.techfore.2020.120262

Li, Y., Zheng, W., & Zhao, Y. (2022). How Does Green Search Promote Green Innovation? The Mediating Role of Green Control. In *Sustainability (Switzerland)* (Vol. 14, Issue 16). MDPI. https://doi.org/10.3390/su141610210

Nassani, A. A., Yousaf, Z., Radulescu, M., & Haffar, M. (2022a). Environmental Performance through Environmental Resources Conservation Efforts: Does Corporate Social Responsibility Authenticity Act as Mediator? *Sustainability (Switzerland)*, *14*(4). https://doi.org/10.3390/su14042330

Nsiah, T. K., Danso, R. A., Charles, O., & Raphael, M. K. (2022). Management Innovation, Green Product Innovation, Green Process Innovation Influence On Financial Performance. A Study Of South African Manufacturing Firms. In *Technology, and Organizational Behavior (IJBTOB)* (Vol. 2, Issue 4). https://ijbtob.org

Owotemu, A. (2021). *Adoption of Alternative Energy as a Cost Reduction Strategy for SME's in Nigeria Sustainable Infrastructure and Green Finance View project*. https://www.researchgate.net/publication/353177270

Padilla-Lozano, C. P., & Collazzo, P. (2022). Corporate social responsibility, green innovation and competitiveness – causality in manufacturing. *Competitiveness Review*, *32*(7), 21–39. https://doi.org/10.1108/CR-12-2020-0160

Rehman, S. U., Bresciani, S., Yahiaoui, D., & Giacosa, E. (2022). Environmental sustainability orientation and corporate social responsibility influence on environmental performance of small and medium enterprises: The mediating effect of green capability. *Corporate Social Responsibility and Environmental Management*. https://doi.org/10.1002/csr.2293

Rehman, S. U., Kraus, S., Shah, S. A., Khanin, D., & Mahto, R. v. (2021). Analyzing the relationship between green innovation and environmental performance in large manufacturing firms. *Technological Forecasting and Social Change*, *163*. https://doi.org/10.1016/j.techfore.2020.120481

Ricci, F., Scafarto, V., Ferri, S., & Tron, A. (2020). Value relevance of digitalization: The moderating role of corporate sustainability. An empirical study of Italian listed companies. *Journal of Cleaner Production*, *276*. https://doi.org/10.1016/j.jclepro.2020.123282

Rui, Z., & Lu, Y. (2021). Stakeholder pressure, corporate environmental ethics and green innovation. *Asian Journal of Technology Innovation*, *29*(1), 70–86. https://doi.org/10.1080/19761597.2020.1783563

Sánchez-Infante Hernández, J. P., Yañez-Araque, B., & Moreno-García, J. (2020). Moderating effect of firm size on the influence of corporate social responsibility in the economic performance of micro-, small- and medium-sized enterprises. *Technological Forecasting and Social Change*, *151*. https://doi.org/10.1016/j.techfore.2019.119774

Saunila, M., Ukko, J., & Rantala, T. (2018). Sustainability as a driver of green innovation investment and exploitation. *Journal of Cleaner Production*, *179*, 631–641. https://doi.org/10.1016/j.jclepro.2017.11.211

Shahzad, M., Qu, Y., Javed, S. A., Zafar, A. U., & Rehman, S. U. (2020). Relation of environment sustainability to CSR and green innovation: A case of Pakistani manufacturing industry. *Journal of Cleaner Production*, *253*. https://doi.org/10.1016/j.jclepro.2019.119938

Tiep, L. T., Huan, N. Q., & Hong, T. T. T. (2021). Effects of corporate social responsibility on SMEs' performance in emerging market. *Cogent Business and Management*, *8*(1). https://doi.org/10.1080/23311975.2021.1878978

Wayan Edi Arsawan, I., Koval, V., Duginets, G., Kalinin, O., & Korostova, I. (2021a). The impact of green innovation on environmental performance of SMEs in an emerging economy. *E3S Web of Conferences*, *255*. https://doi.org/10.1051/e3sconf/202125501012

Xiao, D., & Su, J. (2022). Role of Technological Innovation in Achieving Social and Environmental Sustainability: Mediating Roles of Organizational Innovation and Digital

Entrepreneurship. *Frontiers in Public Health*, *10*, 850172. https://doi.org/10.3389/fpubh.2022.850172

Xu, X., Zeng, S., & Chen, H. (2018). Signaling good by doing good: How does environmental corporate social responsibility affect international expansion? *Business Strategy and the Environment*, *27*(7), 946–959. https://doi.org/10.1002/bse.2044

Yacob, P., Wong, L. S., & Khor, S. C. (2019). An empirical investigation of green initiatives and environmental sustainability for manufacturing SMEs. *Journal of Manufacturing Technology Management*, *30*(1), 2–25. https://doi.org/10.1108/JMTM-08-2017-0153

Yuan, B., & Cao, X. (2022). Do corporate social responsibility practices contribute to green innovation? The mediating role of green dynamic capability. *Technology in Society*, *68*. https://doi.org/10.1016/j.techsoc.2022.101868

Zaborek, P. (2014). CSR and Financial Performance: The Case of Polish Small and Medium Manufacturers. *International Journal of Management and Economics*, *43*(1), 53–73. https://doi.org/10.1515/ijme-2015-0003

Zou, Z., Liu, Y., Ahmad, N., Sial, M. S., Badulescu, A., Zia-Ud-din, M., & Badulescu, D. (2021). What prompts small and medium enterprises to implement CSR? A qualitative insight from an emerging economy. *Sustainability (Switzerland)*, *13*(2), 1–16. https://doi.org/10.3390/su13020952

Zulkiffli, S. N. 'Atikah, Zaidi, N. F. Z., Padlee, S. F., & Sukri, N. K. A. (2022a). Eco-Innovation Capabilities and Sustainable Business Performance during the COVID-19 Pandemic. *Sustainability (Switzerland)*, *14*(13). https://doi.org/10.3390/su14137525

Zulkiffli, S. N. 'Atikah, Zaidi, N. F. Z., Padlee, S. F., & Sukri, N. K. A. (2022b). Eco-Innovation Capabilities and Sustainable Business Performance during the COVID-19 Pandemic. *Sustainability (Switzerland)*, *14*(13). https://doi.org/10.3390/su14137525

Appendix 1: Variable of measurement

Variables	**Measurements**
Green process	Use of resources raw material
	Renewable technology
	Green production system
	Environmental efficiency
	Environmental guidance
Financial performance	Our firm has decreased energy consumption costs.
	Our company has increased capacity utilization.
	Our firm has reduced the cost of garbage disposal.
	Our firm has lowered the expenses associated with environmental mishaps.
	Our enterprise has improved in profit
Environmental performance	Our company has obtained significant environmental certifications.
	Our organization's environmental performance has increased on average during the previous five years.
	Our organization's usage of resources such as water, electricity, and gas has dropped during the past three years.
	Our organization's environmental compliance has improved.

Variables	Measurements
	Our company complies with environmental rules (i.e., carbon dioxide emissions, waste disposal).
Corporate social responsibility	Our company participates in efforts designed to safeguard and enhance the environmental quality.
	Our company implements specialized initiatives to minimize environmental effect.
	Our firm target sustainable growth which considers the future generations
	Our company has long supported non-governmental groups operating in troubled regions.
	Our company contributes to campaigns and initiatives that advance the social welfare.
	The firm endeavors to assure its continued existence and long-term profitability.
	The organization gives its employees workplace safety.
Environmental leadership	The low-carbon notion is cited by executives as the organization's vision.
	Executives are accountable for low-carbon education.
	Executives provide incentives for low-carbon management.
	Executives integrates environmental programs, methods, or objectives into its culture
	There is a budget for environmental protection at the executive level.