Economic Research-Ekonomska Istraživanja

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rero20

The impact of ecological innovation and corporate social responsibilities on the sustainable development: Moderating role of environmental ethics

Tran Thi Hai Yen, Wing-Keung Wong, Mohammed Hasan Ali Al-Abyadh, Iskandar Muda, Felix Julca-Guerrero, Sanil S Hishan & Md. Monirul Islam

To cite this article: Tran Thi Hai Yen, Wing-Keung Wong, Mohammed Hasan Ali Al-Abyadh, Iskandar Muda, Felix Julca-Guerrero, Sanil S Hishan & Md. Monirul Islam (2023) The impact of ecological innovation and corporate social responsibilities on the sustainable development: Moderating role of environmental ethics, Economic Research-Ekonomska Istraživanja, 36:3, 2153260, DOI: 10.1080/1331677X.2022.2153260

To link to this article: https://doi.org/10.1080/1331677X.2022.2153260

Published online: 28 Dec 2022.

ECONOMIC RESEARCH-EKONOMSKA ISTRAŽIVANJA
2023, VOL. 36, NO. 3, 2153260
https://doi.org/10.1080/1331677X.2022.2153260

The impact of ecological innovation and corporate social responsibilities on the sustainable development: Moderating role of environmental ethics

Tran Thi Hai Yen[a], Wing-Keung Wong[b,c,d], Mohammed Hasan Ali Al-Abyadh[e,f], Iskandar Muda[g,h], Felix Julca-Guerrero[i], Sanil S Hishan[j] and Md. Monirul Islam[k]

[a]National Academy of Public Administration, Hanoi, Vietnam; [b]Department of Finance, Fintech & Blockchain Research Center, and Big Data Research Center, Asia University, Taichung, Taiwan; [c]Department of Medical Research, China Medical University Hospital, Taichung, Taiwan; [d]Department of Economics and Finance, The Hang Seng University of Hong Kong, Taichung, Taiwan; [e]College of Education, Prince Sattam bin Abdulaziz University, Alkharj, Saudi Arabia; [f]College of Education, Thamar University, Thamar, Yemen; [g]Department of Doctoral Program, Faculty Economic and Business, Universitas Sumatera Utara, Medan, Indonesia; [h]University of Sumatera Utara, Medan, Indonesia; [i]Universidad Nacional Santiago Antunez de Mayolo, Huaraz, Peru; [j]Azman Hashim International Business School, Universiti Teknologi Malaysia, Kuala lumpur, Malaysia; [k]Department of Business Administration, Shahjalal University of Science & Technology, Sylhet, Bangladesh

ABSTRACT

In light of the economic volatility and the environmentally conscious state, academics must pay close attention to the issue of sustainable development. Therefore, this research analyzes how social responsibility, corporate governance, and ecological innovation have affected the Chinese coal industry's sustainable development. This study investigates the moderating role of environmental ethics among the nexus of social responsibilities, environmental responsibilities, and sustainable development due to its growing importance for sustainability in the coal industry in China. The study used survey questionnaires to collect primary data from the coal industry employees. The research has applied the structural equation model to examine the association among the variables and test the hypotheses through Smart PLS software. The results revealed that social and environmental responsibilities and ecological innovation have a positive while corporate governance has a negative association with the sustainable development of the coal industry in China. The findings also revealed that environmental ethics significantly moderate among social responsibilities, environmental responsibilities, and sustainable development of the coal industry in China. This study guides policymakers in establishing policies related to sustainable development by improving their social and environmental-related responsibilities and adopting ecological innovation.

ARTICLE HISTORY
Received 2 July 2022
Accepted 26 November 2022

KEYWORDS
Social responsibilities; corporate governance; environmental responsibilities; ecological innovation; sustainable development

JEL CODES
M14; G30; K32; Q57

CONTACT Tran Thi Hai Yen tranthihaiyen.tm@gmail.com

1. Introduction

Globalization has increased the energy demand since the world is energy-dependent. Every aspect of human life is associated with energy usage. More particularly, the world's business community depends on energy (Li et al., 2022). As energy demand rises, this rising demand has increased global energy production pressure. Coal energy is the oldest and most well-known option. One could say that China is the factory of the globe. The production process would grind to a halt without the availability of energy. Chinese power system relies heavily on coal power to achieve flexible peaking. Nearly half (43.2%) of China's total carbon emissions originate from coal-fired electricity generation. China has reduced the share of coal in its total installed capacity from 56% in 2015 to 49% in 2020 thanks to the completion of about 162 GW of CPUs elasticity modification for 314 coal plants, improvements to the regulatory capacity of 45.06 GW, and the elimination of backward capacity of more than 20 GW during the '13th Five-Year Plan' period (Li et al., 2022).Thus, during the forecast period of 2022–2027, the Chinese coal market is predicted to grow by more than 5%. The COVID-19 outbreak in the first quarter of 2020 had a mild influence on the Chinese coal market, with demand increasing by 0.3 percent compared to 2019 (Rahman et al., 2020).

Furthermore, coal utilization has decreased because of mandatory lockdowns around the country. Factors such as growing electricity generation and consumption and increased investments in coal-fired power plants are expected to boost the market over the projected period (Rjoub et al., 2021). However, over the predicted period, the development of the Chinese coal industry is anticipated to be constrained by growing demand for renewable energy sources and growing ecological concerns about global warming and greenhouse gas emissions (Voss & Rafaty, 2022). China's comprehensive plan to develop new coal-fired facilities will likely strengthen the power-generating segment's dominance (Magazzino et al., 2021). Growth in the Chinese coal industry is anticipated to be hampered by increasing worries about global warming, rising demand for renewable energy, and stricter regulations on greenhouse gas emissions.

Although the sector expresses good indicators, some environmental-related concerns restrain the market. Likewise, (1) China's demand for energy has risen dramatically as a result of the country's exceptional economic expansion, as well as factors such as rapid industrialization and urbanization, (2) In recent years, this has necessitated the use of coal to create energy, the rate of expansion has slowed due to increased environmental worries about pollution and greenhouse gas emissions from coal-fired power plants, as well as China's massive steel output, (3) from 68 percent in 2012 to about 57 percent in 2020, coal's proportion of overall energy consumption has decreased (Wang & Song, 2021). During the projection period, this decline is likely to continue. The Chinese power industry is pushing for a capacity target in the next five-year plan that would allow for the construction of up to 200 new coal-fired power plants by 2025; (4) China's energy balance is continuing to transition toward cleaner sources, with coal's proportion falling to 57 percent in 2020 from 58 percent in 2019; (5) coal usage has decreased from roughly 68 percent in the last decade to 57 percent in 2020, thanks to the fast deployment of renewable energy generation

and the increased use of natural gas; 6) the decline in the growth rate of coal consumption owing to environmental restrictions and the increasing renewable share is likely to stifle market expansion throughout the forecast period (Lin et al., 2018). Since coal is a vital source of energy production, the present study will investigate this industry in this study.

In light of this, the United Nations developed sustainable development goals (SDGs) to implement such measures that lessen the threat of an environmental catastrophe that would otherwise be present. Programs for sustainable development (SD) emphasize using sustainable financial models for long-term objectives. The idea of the green economy and investment, as a synthesis of the economy, environment, and society, particularly in the 21st century, has emerged as a key driver of growth in the modern era under the SDGs. Though much has been done on the issue of sustainable development, there are still some open questions that the current research will attempt to answer, such as (1) whether or not the fast rise in global competitiveness has elevated sustainable development to the status of an essential topic. As a result, despite its importance, this subject has not yet realized its full potential in China, where further research into various elements is still necessary, (2) while Dantas et al. (2021) looked into the link between the circular economy, industry 4.0, and sustainable development, the current study will focus on sustainable development from the perspective of China's citizens and will use a newly collected data set to examine the topic from a Chinese point of view, (3) the model consists of sustainable development, social responsibilities, environmental responsibilities, corporate governance and environmental ethics not tested before in China perspective with fresh data set in recent time, (4) Thacker et al. (2019), worked on the sustainable development infrastructure, whereas the present study will check the sustainable development from responsibilities i.e. social and environmental responsibilities and corporate governance point view in China by selecting the fresh data set, (5) Polasky et al. (2019), check the relationship between economics and sustainable development, whereas the present study will check the employed the environmental ethics as moderator with sustainable development in China, (6) Leal Filho et al. (2020), checked the effect of Covid in UN settled sustainable development goals, whereas the present study will check sustainable development by employing moderation effect in China by selecting the current data set.

The significance of the study lies in the fact that (1) it will highlight the significance of sustainable development for the betterment of world economies, (2) it will help Chinese development-related professionals to revamp their policies regarding the roadmap to achieve sustainable development to support the country economy, and (3) it will also help researchers explore more aspects of sustainable development with an eye toward their significance for the world economy. Following the presentation of an introduction, the following section of the investigation focuses on the formulation of hypotheses. The third part of the study will spotlight the methodology applied and analyze its validity. The fourth and final sections will discuss the investigation results and findings. On the other hand, the last portion will present the consequences of the study, as well as its conclusion and future suggestions.

2. Literature review and hypotheses development

The term 'business sustainability' describes a company's efforts to improve its social relations with stakeholders while minimizing negative impacts on the environment and the health of its customers. Stability in the economy, society, and environment is essential for any nation and can be achieved through various channels. These gatherings can only succeed if governments adopt policies that promote long-term stability through development. As a whole, social duties entail many massive factors for the long-term success of the company and the nation. In this context: Ashrafi et al. (2018) analyzed the impacts and integration of corporate social responsibility toward sustainable development goals in the corporate sectors and other businesses. The values and ethics in social responsibilities are taken into consideration which is important for sustainable development (Chen & Sriphon, 2022). It is the responsibility of companies and organizations to be aware of society's standards, operations, and values. This awareness includes the social concerns and responsibilities that ensure positive, sustainable development. In furtherance, Bello (2020) assessed the goals of sustainable development that can be achieved by properly employing a corporate social responsibility structure. The social responsibilities include ethical, legal, philanthropic, and economic social responsibility that impacts sustainable development. Many academic papers and studies have attempted to shed light on the positive impact of CSR on specific aspects of the efficiency firms use to maximize their financial success. CSR entails a company learning more about the hopes and dreams of its backers and then adapting its plans, objectives, and priorities accordingly. Integrating CSR into daily operations is a must for every company serious about long-term profitability and social responsibility. Proper social concerns and attributions are given to the companies and organizations that help them lead toward sustainable development. Every firm is subject to the terms and circumstances of government laws and regulations set out. These guidelines outline the operational hierarchy of every company seeking to improve its results and performance in a competitive market. Additionally, Ngai et al. (2018) examined the relationship between corporate social responsibility and the factors associated with business stability that contributes to sustainable development goals. It is not only important that social responsibility concerns the sustainable development of businesses but also important to develop feasible benefits for society. It is also important for organizations to maintain the social responsibility that motivates society's well-being and lessens the negative impacts. Usually, social responsibility is induced in organizations to maintain the societal importance and the social environment among consumers for sustainable development. Thus, the hypothesis derived from the above debate is as under:

H1: Social responsibilities significantly influence sustainable development.

Compliance with the environment positively benefits businesses that are realized through environmentally and socially responsible behavior. Even though environmental responsibility is also considered a legal duty to the organizations that affect businesses from various aspects. In this context: Kalumba et al. (2017) discussed the industrial and organizational zones and initiatives of the legal environment that contribute a prominent portion toward sustainable industrial development. Sustainable

development is not only dependent on organizational behaviors and operations, but environmental responsibilities insert a vital role. Especially the responsibilities associated with the environment must be fulfilled in the organizations because of their association with consumers and employees (Ibnou-Laaroussi et al., 2020; Li et al., 2022). Moreover, Ahmed (2019) enumerated the efficacy and role of environmental responsibilities and governance, including corresponding elements that achieve sustainable development goals. Numerous hazardous substances in the environment negatively impact sustainable development in a country. Even though these substances have properly complied in the organizations bring enormous benefits to the performance and outcome. Properly adopting and developing policies for environmental responsibilities are important for significant sustainable development. Forgoing in view: Safshekan et al. (2020) narrated the behaviors of environmental responsibilities that are insights toward developing sustainable destinations for consumers. The performance of overall businesses and organizations is dependent on the maintainability of environmental responsibilities. Significant maintenance and management of the environment bring prominent change in the sustainable development of the organization. It is dependent on the legislative and operational environment that highlights the negative issues for sustainable development (Ramzan, 2021). Therefore, the potential remedy and prevention of negative elements in the environmental responsibilities of businesses could be beneficial for effective, sustainable development. Thus, the hypothesis derived from the above debate is as under:

H2: Environmental responsibilities significantly influence sustainable development.

Every business is regulated under the terms and conditions prescribed by government policies and rules. These rules indicate the operational hierarchy of any business operating for better outcomes and performance in the competitive market. In this context: Michael and Goo (2021) assessed the values of corporate governance inorganizations that are important in enhancing performance and sustainable development goals. A combination of processes and legal obligations must be fulfilled among the rules and policies of the business. These conditions are primary obligations for any business working for profits and sustainable development. Further, Mueller (2018) examined the mechanisms of corporate governance and its concerns for mergers and management that helps in attaining sustainable development. Huge internal and external elements influence the benefits of interest in the organization and the stakeholders. Even though the management, government regulators, suppliers, customers, and shareholders are also dependent on the corporate governance structure. These structures are positive development of government and businesses by obeying the rules and regulations of the desired business practices. Moreover, Lehn (2018) established the relationship between survival, agility, and corporate governance, which are the dimensions in the governance of organizations to proceed toward sustainable development. Corporate governance is usually important for organizations to streamline the operations and stakes of shareholders. When the interest is mutually associated with the organization, some practices are positively introduced to attain sustainable development goals. Forgoing in view: Degai and Petrov (2021) discussed the agenda of sustainable development goals with the critic of corporate governance that provides feasible policies for the organizations. Shareholders in the organizations

properly insert the elements of corporate governance that influence sustainable development. In organizations, corporate governance is considered an appropriate hierarchy that helps in attaining the goals of sustainable development. Thus, the hypothesis derived from the above debate is as under:

H3: Corporate governance significantly influences sustainable development.

Businesses involve various approaches to enhance performance as well as outcomes. Therefore, innovation and technology have inserted various positive measures that boost organizational performance in many sectors. Even though sustainable development goals are easily achieved by introducing innovation in the organizations. In this context: Kobarg et al. (2020) investigated the collaborating effects of ecological innovation in organizations that positively captures the market for sustainable development. Ecological innovation is considered a vital approach for the business organization that promotes a more sustainable environment. Not only among the products but also in the management, ecological innovation has been vitally introducing effective policies to enhance organizational competitiveness. Further, Ludwig and Macnaghten (2020) explored the knowledge of traditional ecological innovation that governs significant changes to benefit sustainable development goals. The life cycle of products in organizations has also been improved with the induction of an ecological environment. This has led ecological innovation toward boosting competitiveness and performance along with sustainable development. Moreover, Shahidullah et al. (2020) elaborated on the community's wellbeing and ecosystem changes with ecological innovation enhancing the sustainable development goals. Numerous technologies and innovative implications in organizations provide everlasting benefits to the country's economic conditions. Ecological innovation promotes innovation in an organization and helps in environmental sustainability. Additionally, Khoshnevis Yazdi et al. (2017) examined the importance of ecological innovation and economics for organizations to achieve sustainable development goals. This involves the actions and decision-making elements that are associated with innovation and technological advancements. These advancements have positively influenced the sustainable development of the organization and country. A positive role is also attributed to the organizations to insert ecological innovation that helps in attaining sustainable development. Thus, the hypothesis derived from the above debate is as under:

H4: Ecological innovation significantly influences sustainable development.

The organizations indicate the important responsibilities, policies, and objectives for sustainable development. These elements are important for organizations to develop efficacious measures to help attain sustainable development goals. Among the social responsibilities and sustainable development, the role of organizations is inevitable. In this context: Gola (2017) investigated the role of environmental ethics that formally introduces a friendly social environment for educational management in asserting positive, sustainable development goals. The organizations are inducing the role of environmental ethics that prominently helps develop social responsibilities. The history of business involves the concepts of corporate social responsibility that lead businesses toward sustainable development (Moslehpour et al., 2021). In furtherance, Chilufya et al. (2019) explored the development and sustainability among the

communities and tourists through the significant implication of corporate social responsibility. Corporate social responsibility and strategic planning in the management raise the business operations. The business strategies include the social concerns that are more conscious toward the communities and societies outside the business. Moreover, Ferguson et al. (2021) enumerated the perspectives of environmental ethics that are important for developing social concerns in attaining sustainable development goals. Environmental ethics play an important role in moderating the effect on social responsibilities and sustainable development. Environmental ethics involves various factors that indicate the conceptual foundation of social policies and attributes. Additionally, Rui and Lu (2021) examined the relationship between green innovation, corporate environmental ethics and stakeholder pressure that is compulsory for the achievement of sustainable development goals. Environmental ethics involves various concrete issues that are important for developing social responsibilities. These issues are when resolved and provided positive measures help in the sustainable development. The ethical measures also indicate the organizational activities that are associated with the social responsibilities. These social responsibilities are the important obligation of the organization that concretely moves toward sustainable development. Thus, the hypothesis derived from the above debate is as under:

H5: Environmental ethics significantly acts as a moderator in the nexus of social responsibilities and sustainable development.

The success of a business is also dependent on environmental aspects, whether external or internal. Both aspects must be maintained and operated according to the complying conditions of organizations. In this context: Smith and Greer (2017) narrated the environmental history of the world with ethical factors that unite businesses and help develop a feasible environment for sustainable development. These factors are usually more important in influencing organizational performance and disrupting sustainable development. Among these factors, environmental ethics contribute a significant proportion toward environmental responsibilities. This leads to sustainable development by maintaining the organization's factors and elements of environmental standards. Furthermore, Langnel et al. (2021) assessed the importance of environmental responsibilities associated with operationalization and degradation impacting sustainable development goals. Environmental ethics are developed by the employees and managers for the consumers by providing a feasible environment. Many environmental ethics factors proceed with management's actions for sustainable development. These factors are more important for sustainable development in the organization and outside the organization. Similarly, Liengpunsakul (2021) analyzed artificial intelligence and its association with the environmental responsibilities in organizations that are prominent in achieving sustainable development. Developing effective policies and ethics among competitors, partners, and consumers could be maintained and sustained. Nicolaides (2017)also explored the relationship between environmental sustainability, eco-centric business, and ethical practices that proposes boosting environment for sustainable development. Environmental factors involve numerous elements like political, competitive, technological, and ethical factors that are more persistent in sustainable development. These factors positively impact sustainable development and introduce feasible standards with the help of environmental ethics. A friendly

environment is the best development measure in the organization that motivates the employees to achieve fast, sustainable development goals. Thus, the hypothesis derived from the above debate is as under:

H6: Environmental ethics significantly acts as a moderator in the nexus of environmental responsibilities and sustainable development.

3. Research methods

The article examines the impact of social and environmental responsibilities, corporate governance, and ecological innovation on sustainable development and also examines the moderating role of environmental ethics among the nexus of social responsibilities, environmental responsibilities, and sustainable development of the coal industry in China. The study used survey questionnaires to collect primary data from the coal industry employees. The items of variables have been extracted from previous studies; environmental responsibilities have four items taken from Yue et al. (2020); social responsibilities also have four items extracted from Cha and Jo (2019); corporate governance has five items taken from Khan et al. (2019), ecological innovation has six items taken from Yurdakul and Kazan (2020), environmental ethics has four items, and sustainable development also has four items taken from Singh et al. (2019). These items are given in Table 1.

The study has selected the employees based on purposive sampling and only those with enough knowledge about CSR responsibilities. The surveys were sent to them by personal visits and also by mail. The researchers have sent about 530 surveys and received only 290, representing around 54.72 percent response rate. Study period is from March 2022 to May 2022. We employed SmartPLS, as it is an effective tool that deals with complex models and operates with large and small data sets (Ringle et al., 2015). The researchers have used four predictors such as social responsibilities (SR), environmental responsibilities (ER), corporate governance (CG), and ecological innovation (EI). In addition, the study has also used one moderating variable, such as environmental ethics (EE), and also used a dependent variable, such as sustainable development. These variables are given in Figure 1.

4. Research findings

Data analysis was performed using SmartPLS 3.2.8 and IBM SPSS 24 using partial least squares structural equation modeling (PLS-SEM). Predicting and studying exogenous variables are typical applications of this technique. It serves the needs of both the metric and the framework model. Therefore, PLS-SEM seems to be the best prediction-oriented strategy for this investigation. Convergent validity was the first criterion examined. The results indicated that the factor loadings are larger than 0.50 and exposed valid content validity. In addition, the findings exposed that the average variance extracted (AVE) values are higher than 0.50 and indicated valid convergent validity. Finally, the results also revealed that the composite reliability (CR) and Alpha values are higher than 0.70 and exposed significant reliability. These values are shown in Table 2.

Table 1. Items of the variables.

Items	Statements	Sources
Environmental Responsibilities		
ER1	'My organization's actions impact the health of the environment'.	(Yue et al., 2020)
ER2	'I have the power to protect the environment'.	
ER3	'I can learn how to improve the environment'.	
ER4	'I will work to make my surrounding environment a better place'.	
Social Responsibilities		
SR1	'My organization encourages collaboration of business with the regional community and other institutions'.	(Cha & Jo, 2019)
SR2	'My organization sponsors sports and cultural events'.	
SR3	'My organization encourages charity services supporting regional communities'.	
SR4	'My organization gives back to society'.	
Corporate Governance		
CG1	'Smaller board enhances organizational performance and achieves SDGs'.	(Khan et al., 2019)
CG2	'Independent committees would focus on improving the company competitiveness, performance, and SDGs'.	
CG3	'Most board meetings have been relevant to the organization's mandate to achieve SDGs'.	
CG4	'All stakeholders have been involved in the achievement of SDGs'.	
CG5	'Executive directors are better placed in handling the affairs of the organization to achieve the SDGs'.	
Ecological Innovation		
EI1	'Our business uses an environmental management and audit system'.	(Yurdakul & Kazan, 2020)
EI2	'Our business cooperates with businesses in the supply chain to avoid environmental damage'.	
EI3	'Our business makes high R&D investments to reduce environmental impacts'.	
EI4	'Our business has ISO14001 environmental standard'.	
EI5	'The raw material suppliers of our business have the ISO14001 environmental standard'.	
EI6	'Our business has a separate department for environmental protection'.	
Environmental Ethics		
EE1	'My organization has clear and concrete environmental policies'.	(Singh et al., 2019)
EE2	'My organization has clear and concrete environmental investment and procurement policies'.	
EE3	'My organization has integrated a clear and concrete environmental vision and mission in its marketing events'.	
EE4	'My organization has a clear and concrete environmental vision and mission integrated into its organizational culture'.	
Sustainable Development		
SD1	'Environmental activities followed by my institute have significantly improved product/process quality'.	(Singh et al., 2019)
SD2	'Environmental activities followed by my institute have significantly improved the reputation of my company'.	
SD3	'Environmental activities followed by my institute have significantly improved selling products/services'.	
SD4	'Environmental activities followed by my institute have significantly reduced overall costs'.	

Source: Author's source.

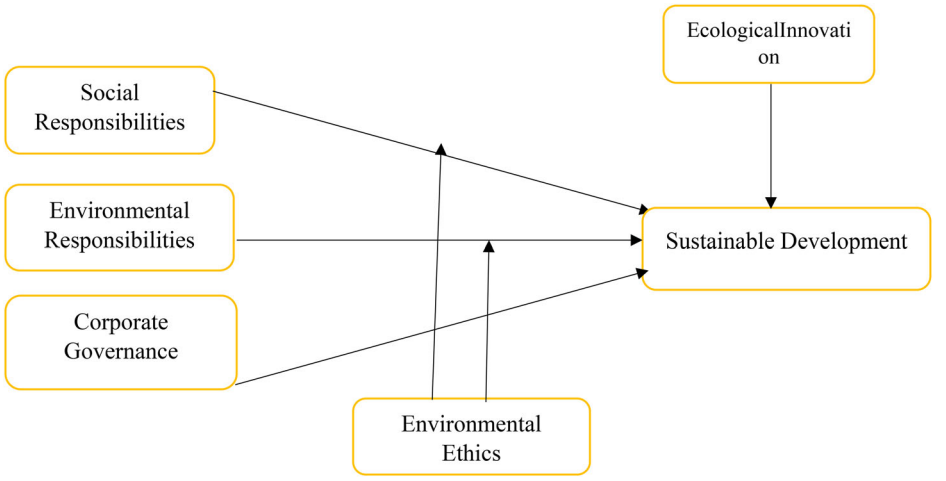

Figure 1. Theoretical model.
Source: Author's source.

Table 2. Convergent validity.

Constructs	Items	Loadings	Alpha	CR	AVE
Corporate Governance	CG1	0.774	0.804	0.834	0.511
	CG2	0.730			
	CG3	0.764			
	CG4	0.866			
	CG5	0.874			
Environmental Ethics	EE1	0.895	0.997	0.998	0.791
	EE2	0.897			
	EE3	0.896			
	EE4	0.894			
Ecological Innovation	EI1	0.851	0.917	0.938	0.751
	EI2	0.883			
	EI3	0.876			
	EI5	0.822			
	EI6	0.899			
Environmental Responsibilities	ER1	0.934	0.959	0.970	0.891
	ER2	0.952			
	ER3	0.938			
	ER4	0.953			
Sustainable Development	SD1	0.772	0.807	0.874	0.636
	SD2	0.843			
	SD3	0.815			
	SD4	0.847			
Social Responsibilities	SR1	0.800	0.812	0.877	0.640
	SR2	0.765			
	SR3	0.820			
	SR4	0.813			

Source: Author's source.

The results section also shows the discriminant validity with the help of Fornell–Larcker (Fornell & Larcker, 1981). It reveals that the first figure in the column is bigger than the rest of the figures and exposes valid discriminant validity. These values are shown in Table 3.

The results section also shows the discriminant validity with the help of cross-loadings and reveals that the values exposed to the association with the variable itself are

Table 3. Fornell–Larcker criteria.

	CG	EE	EI	ER	SD	SR
CG	0.715					
EE	0.430	0.889				
EI	0.626	0.329	0.866			
ER	0.684	0.464	0.391	0.943		
SD	0.409	0.415	0.371	0.437	0.797	
SR	0.506	0.752	0.431	0.471	0.460	0.801

Source: Author's source.

Table 4. Cross-loadings.

	CG	EE	EI	ER	SD	SR
CG1	**0.774**	0.184	0.641	0.264	0.142	0.260
CG2	**0.730**	0.153	0.686	0.301	0.161	0.251
CG3	**0.764**	0.135	0.612	0.265	0.137	0.283
CG4	**0.866**	0.435	0.381	0.941	0.393	0.448
CG5	**0.874**	0.419	0.405	0.864	0.419	0.471
EE1	0.426	**0.895**	0.326	0.460	0.408	0.746
EE2	0.428	**0.897**	0.327	0.461	0.418	0.750
EE3	0.427	**0.896**	0.328	0.466	0.420	0.741
EE4	0.432	**0.894**	0.328	0.463	0.408	0.759
EI1	0.532	0.246	**0.851**	0.340	0.325	0.312
EI2	0.547	0.298	**0.883**	0.326	0.348	0.395
EI3	0.527	0.262	**0.876**	0.318	0.326	0.380
EI5	0.555	0.305	**0.822**	0.363	0.283	0.400
EI6	0.555	0.317	**0.899**	0.353	0.321	0.384
ER1	0.864	0.431	0.387	**0.934**	0.383	0.449
ER2	0.806	0.439	0.355	**0.952**	0.434	0.439
ER3	0.869	0.440	0.383	**0.938**	0.395	0.454
ER4	0.806	0.443	0.356	**0.953**	0.435	0.440
SD1	0.296	0.226	0.213	0.338	**0.772**	0.259
SD2	0.320	0.317	0.333	0.311	**0.843**	0.365
SD3	0.282	0.337	0.286	0.307	**0.815**	0.348
SD4	0.392	0.413	0.335	0.426	**0.847**	0.461
SR1	0.403	0.634	0.332	0.373	0.368	**0.800**
SR2	0.340	0.486	0.338	0.291	0.338	**0.765**
SR3	0.423	0.599	0.358	0.383	0.358	**0.820**
SR4	0.446	0.673	0.351	0.448	0.403	**0.813**

Source: Author's source.

Table 5. Heterotrait–Monotrait ratio.

	CG	EE	EI	ER	SD	SR
CG						
EE	0.396					
EI	0.849	0.345				
ER	0.803	0.475	0.420			
SD	0.412	0.453	0.425	0.492		
SR	0.564	0.831	0.500	0.530	0.554	

Source: Author's source.

bigger than those that exposed the association with other variables and exposed valid discriminant validity. These values are shown in Table 4.

The results section also shows the discriminant validity with the help of the Heterotrait–Monotrait (HTMT) ratio. It reveals that the values are lesser than 0.90 and expose valid discriminant validity. These values are shown in Table 5.

Figure 2 shows the structural model assessment, and Figure 3 shows the moderation analysis. Further results revealed that social and environmental responsibilities and ecological innovation have a positive while corporate governance has a negative

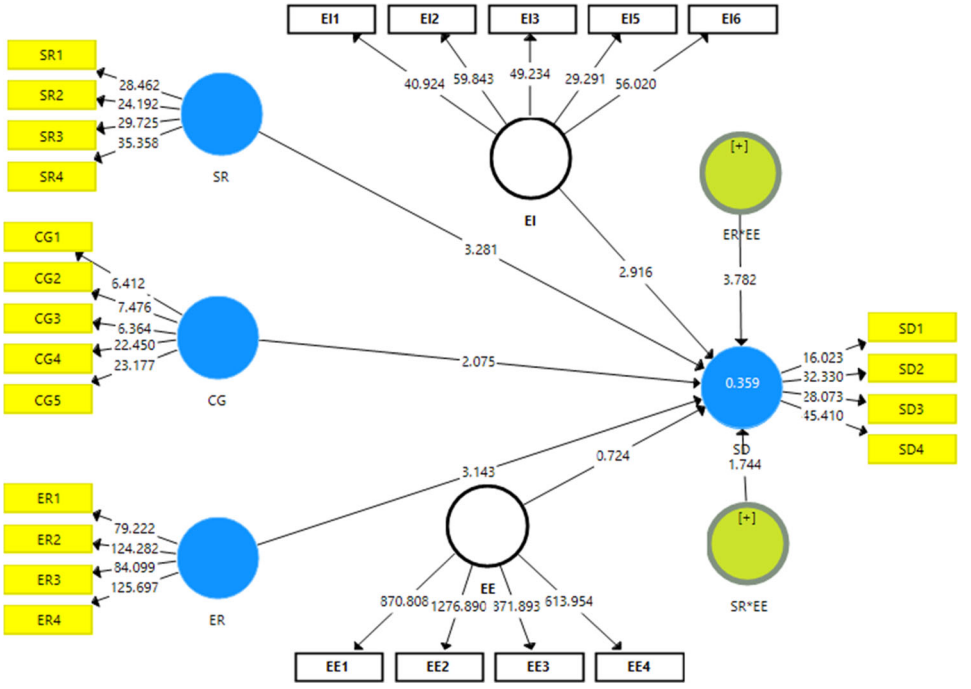

Figure 2. Structural model assessment.
Source: Author's source.

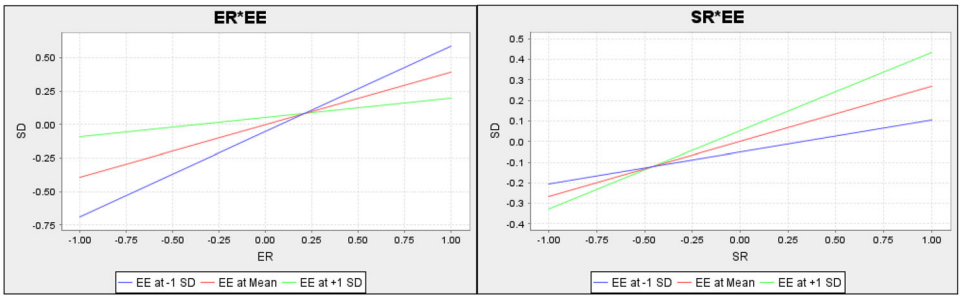

Figure 3. Moderation analysis.
Source: Author's source.

association with sustainable development of the coal industry in China and accept H1, H2, H3, and H4. The findings also revealed that the environmental ethics significantly moderate among social responsibilities, environmental responsibilities, and sustainable development of the coal industry in China and accept H5 and H6.These values are shown in Table 6.

5. Discussions

The results revealed that social responsibilities have a positive impact on sustainable development. These results are supported by Ye et al. (2020), which examine the fulfillment of social responsibilities and their contribution to sustainable development.

Table 6. Path analysis.

Relationships	Beta	Standard Deviation	T Statistics	P Values
CG -> SD	−0.319	0.154	2.075	0.020
EI -> SD	0.300	0.103	2.916	0.002
ER -> SD	0.391	0.124	3.143	0.001
ER*EE -> SD	−0.247	0.065	3.782	0.000
SR -> SD	0.269	0.082	3.281	0.001
SR*EE -> SD	0.112	0.064	1.744	0.042

Source: Author's source.

This study reveals that a business firm must also consider its social responsibilities towards the stakeholders apart from its basic objective of earning profits. The firms which have included in their policies that they keep a check on the influences of their activities on the stakeholders' welfare and try to protect the stakeholders' benefits can have their support and sustainable development. These results are supported by Luetz and Walid (2019), that if firms pay attention to generating earnings at the current time, they can have higher economic performance, but this performance cannot be sustainable if the firms do not succeed in winning stakeholders' trust and support. And can only be possible if firms meet their social responsibilities and take care of the interest of stakeholders. So, sustainable development is linked to social responsibilities.

The findings indicated that fulfilling environmental responsibilities have a beneficial effect on the process of sustainable development. These results are in line with Liczmańska-Kopcewicz et al. (2019), which highlights that the basic objective of business firms is to make profits through higher earnings, but the undertakings of business practices are linked to the environment and resources associated with an environment. The practices performed by individual business units impart influence the environment and natural resources. When these firms have the sense that they must have responsibilities toward the environment and make regulations to minimize the environmental impacts of their practices, they create sustainability in firms and the country's development. So, the undertaking of environmental responsibilities positively contributes to sustainable development. These results also agree with Anser et al. (2018), which state that when individual business firms on their own feel their environmental responsibilities from the policies to use clean energy alternatives, clean resources, ecologically friendly raw materials, and effectively manage wastes, a clean environment can be assured. This clean environment guarantees human survival, human capital development, and natural resource abundance, which all contribute to a sustainable country's development.

The results showed that corporate governance hurts sustainable development. These results are supported by Martínez-Ferrero and García-Meca (2020), which examine the corporate governance impacts on firms and a country's development. This study implies that the present economic development of a country and sustainability in this development depends upon the working of individual firms. Suppose the firms follow corporate governance principles like transparency, responsibility, accountability, and fair dealings. In that case, they try to keep their practices as they could reduce the negative points that can affect the environmental quality and the stakeholders' interests. Still, this situation does not exist in the coal industry in China.

Hence, the three pillars of sustainable development are social, environmental, and economical. These results are supported by Gangi et al. (2019), which highlight that self-regulation and disclosure of the practices in which firms are involved are the two rules of corporate governance. When business firms abide by these two rules of corporate governance, the firms make higher social and environmental performance and, thus, contribute to sustainable economic development, but this situation does not exist in the coal industry in China.

The results revealed that environmental ethics mediate between social responsibilities and sustainable development. These results are in line with Mishra (2021), which shows that when the organizational personnel has environmental ethics, they give central importance to humans and significance to living creatures and natural resources. So, they are not inclined just to earn money but to protect stakeholders' interests by not damaging the environment and the natural resources, which are essential for humans to carry out their social and economic activities. Consequently, the fulfillment of social responsibilities adds to sustainable development. These results are also in line with Estrada-Vidal et al. (2020), which reveals that in firms where environmental ethics are adopted, social responsibilities include arranging a comfortable work environment for the employees, maintaining the quality of products for consumers, and protecting the health of the stakeholders with a clean environment, are possible to be fulfilled. In the case of environmental ethics, improved environmental performance, as well as social performance, contributes to sustainable development.

The results revealed that environmental ethics play a moderating role between environmental responsibilities and sustainable development. These results are in line with Xia et al. (2018), which shows that when the organizational personnel has environmental ethics, they all try to form their actions in such a way as to protect the environment from pollution. In such a situation, it becomes easy to motivate them to cooperate in the fulfillment of environmental responsibilities like an overview of firm environmental impacts, following environmental regulations, reducing wastes, encouraging recycling, conservation of the environment and natural resources, etc. When people have environmental ethics and the environmental responsibilities are effectively fulfilled, firms make sustainable development. The results showed that ecological innovation has a positive impact on sustainable development. These results are supported by Lee et al. (2018), which examine the ecologically friendly innovation role in achieving sustainable development. The study claims that customers always want innovation and is concerned with firms' performance, products, and services. Ecological-friendly innovation like the adoption of new technologies, tools, techniques, and resources require minimum energy, help to produce such products and services as do not have negative impacts on the environment and health of the users, and causes minimum toxic wastes. With improved environmental resilience and preservation of natural resources, sustainable development can be achieved.

5.1. Implications

The current study has both theoretical and practical implications. This work has great theoretical significance for its contribution to ecological-friendly literature. This

study examines the influences of CSR dimensions like social and environmental responsibilities and corporate governance on achieving sustainable development. The previous studies have addressed social, environmental, and corporate governance in separate research surveys to achieve sustainable development. The present study makes a literary distinction for analyzing social responsibilities, environmental responsibilities, and corporate governance impacts on achieving sustainable development in one research. Additions to the literature include examining ecological innovation, the function of CSR practices in bringing about sustainable development, and balancing environmental ethics among social responsibility, environmental duty, and the promotion of long-term sustainability. Given that sustainable development, which is founded on a nation's three pillars of social development, environmental protection, and economic welfare, is the primary issue of this research, it is of significant relevance in all economies. This research guides policymakers as they work to construct policies connected to sustainable development. These policies aim to help policymakers improve their social and environmental obligations as well as implement innovative ecological practices. This study is a guideline for economists and general business firms on how they can contribute to sustainable development on both firm-level and country levels. Such policies must be formulated and implemented as they can force individual firms to be conscious of their social & environmental responsibilities and meet them to achieve sustainable development. Moreover, economists and ecological regulators must encourage firms to implement corporate governance with all principles and rules to achieve sustainable development.

6. Conclusion

The current study aimed to explore the influences of social responsibilities, environmental responsibilities, corporate governance, and ecological innovation on achieving sustainable development. Its objective is also to examine the role of environmental ethics in the relationship between social obligations, environmental responsibilities, and the achievement of sustainable development. Questionnaires were distributed to China for the collection of data on social responsibilities, environmental responsibilities, corporate governance, ecological innovation, environmental ethics, and sustainable development. The results showed a positive relationship between social responsibilities, environmental responsibilities, corporate governance, ecological innovation, and sustainable development. The results revealed that sustainable development could be achieved when the firms feel their social responsibilities and implement the practices to ensure the stakeholders' interests. The firms that carry on self-regulation to fulfill environmental responsibilities reduce the environmental impacts of their practices and make high environmental performance, contributing to sustainable development. The implementation of corporate governance with its principles of transparency, accountability, fairness, and responsibility and the adoption of ecological innovations enhance the firm's social and environmental performance and economic performance, leading to sustainable development. The results also revealed that environmental ethics help meet social and environmental responsibilities and

achieve sustainable development. Hence, the relationship between social responsibilities, environmental responsibilities, and sustainable development gets improved.

6.1. Limitations

The present study is exposed to several limitations. It is recommended that scholars remove these limitations with effective literary skills and present a better study in the same line. The study examines only the role of social responsibilities, environmental responsibilities, and corporate governance in achieving sustainable development. The role of government inspection, green financial development, and human capital development in achieving sustainable economic development is utterly ignored. This limits the scope of the study, and therefore, it is recommended that future authors begin research to assess these factors in achieving sustainable development. This study examines the moderating role of environmental ethics between social responsibilities, environmental responsibilities, and achieving sustainable development. The consciousness of social and environmental responsibilities can develop environmental ethics in individuals, leading to sustainable development. So, in the future, it is better to use the same variable as a mediator between these factors.

Acknowledgements

The second author would like to thank Robert B. Miller and Howard E. Thompson for their continuous guidance and encouragement and thank Asia University, China Medical University Hospital, The Hang Seng University of Hong Kong, Research Grants Council (RGC) of Hong Kong (project numbers 12502814 and 12500915), and the Ministry of Science and Technology (MOST, Project Numbers 106-2410-H-468-002 and 107-2410-H-468-002-MY3), Taiwan for their support in this research.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Tran Thi Hai Yen http://orcid.org/0000-0002-1337-9641
Mohammed Hasan Ali Al-Abyadh http://orcid.org/0000-0002-8964-6670
Iskandar Muda http://orcid.org/0000-0001-6478-9934
Felix Julca-Guerrero http://orcid.org/0000-0001-5637-5440

References

Ahmed, B. (2019). Environmental governance and sustainable development in Bangladesh: Millennium development goals and sustainable development goals. *Asia Pacific Journal of Public Administration*, *41*(4), 237–245. https://doi.org/10.1080/23276665.2019.1698930

Anser, M. K., Zhang, Z., & Kanwal, L. (2018). Moderating effect of innovation on corporate social responsibility and firm performance in realm of sustainable development. *Corporate Social Responsibility and Environmental Management*, *25*(5), 799–806. https://doi.org/10.1002/csr.1495

Ashrafi, M., Adams, M., Walker, T. R., & Magnan, G. (2018). How corporate social responsibility can be integrated into corporate sustainability: A theoretical review of their relationships. *International Journal of Sustainable Development & World Ecology*, *25*(8), 672–682. https://doi.org/10.1080/13504509.2018.1471628

Bello, I. (2020). Sustainable development goals (SDGs) for education in Nigeria: An examination of Etisalat corporate social responsibility in Nigeria's post-basic education sector. *International Journal of Lifelong Education*, *39*(5–6), 562–575. https://doi.org/10.1080/02601370.2020.1836051

Cha, J.-B., & Jo, M.-N. (2019). The effect of the corporate social responsibility of franchise coffee shops on corporate image and behavioral intention. *Sustainability*, *11*(23), 6849. https://doi.org/10.3390/su11236849

Chen, J. K., & Sriphon, T. (2022). The relationships among authentic leadership, social exchange relationships, and trust in organizations during COVID-19 pandemic. *Advances in Decision Sciences*, *26*(1), 31–68.

Chilufya, A., Hughes, E., & Scheyvens, R. (2019). Tourists and community development: Corporate social responsibility or tourist social responsibility? *Journal of Sustainable Tourism*, *27*(10), 1513–1529. https://doi.org/10.1080/09669582.2019.1643871

Dantas, T. E., De-Souza, E. D., Destro, I. R., Hammes, G., Rodriguez, C. M. T., & Soares, S. R. (2021). How the combination of Circular Economy and Industry 4.0 can contribute towards achieving the Sustainable Development Goals. *Sustainable Production and Consumption, 26*, 213–227.

Degai, T. S., & Petrov, A. N. (2021). Rethinking Arctic sustainable development agenda through indigenizing UN sustainable development goals. *International Journal of Sustainable Development & World Ecology*, *28*(6), 518–523. https://doi.org/10.1080/13504509.2020.1868608

Estrada-Vidal, L. I., Olmos-Gómez, M. d. C., López-Cordero, R., & Ruiz-Garzón, F. (2020). The differences across future teachers regarding attitudes on social responsibility for sustainable development. *International Journal of Environmental Research and Public Health*, *17*(15), 5323–5338. https://doi.org/10.3390/ijerph17155323

Ferguson, T., Roofe, C., & Cook, L. D. (2021). Teachers' perspectives on sustainable development: The implications for education for sustainable development. *Environmental Education Research*, *27*(9), 1–17. https://doi.org/10.1080/13504622.2021.1921113

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research, 18*(3), 382–388.

Gangi, F., Meles, A., D'Angelo, E., & Daniele, L. M. (2019). Sustainable development and corporate governance in the financial system: Are environmentally friendly banks less risky? *Corporate Social Responsibility and Environmental Management*, *26*(3), 529–547. https://doi.org/10.1002/csr.1699

Gola, B. (2017). Is formal environmental education friendly to nature? Environmental ethics in science textbooks for primary school pupils in Poland. *Ethics and Education*, *12*(3), 320–336. https://doi.org/10.1080/17449642.2017.1343619

Ibnou-Laaroussi, S., Rjoub, H., & Wong, W.-K. (2020). Sustainability of green tourism among international tourists and its influence on the achievement of green environment: Evidence from North Cyprus. *Sustainability*, *12*(14), 5698. https://doi.org/10.3390/su12145698

Kalumba, A. M., Olwoch, J. M., Van Aardt, I., Botai, J. O., & deW Rautenbach, C. J. (2017). Industrial development zone and South African environmental legal initiatives post-1994: A quest for sustainable industrial development. *Journal of Environmental Planning and Management*, *60*(3), 462–481. https://doi.org/10.1080/09640568.2016.1160828

Khan, S. N., Hussain, R. I., Maqbool, M. Q., Ali, E. I. E., & Numan, M. (2019). The mediating role of innovation between corporate governance and organizational performance: Moderating role of innovative culture in Pakistan textile sector. *Cogent Business & Management*, *4*(2), 1–23.

Khoshnevis Yazdi, S., Shakouri, B., Salehi, H., & Fashandi, A. (2017). Sustainable development and ecological economics. *Energy Sources, Part B: Economics, Planning, and Policy*, *12*(8), 740–748. https://doi.org/10.1080/15567249.2017.1296506

Kobarg, S., Stumpf-Wollersheim, J., Schlägel, C., & Welpe, I. M. (2020). Green together? The effects of companies' innovation collaboration with different partner types on ecological process and product innovation. *Industry and Innovation*, *27*(9), 953–990. https://doi.org/10.1080/13662716.2020.1713733

Langnel, Z., Amegavi, G. B., & Agomor, K. S. (2021). Environmental degradation and female economic inclusion in sub-Saharan Africa: Effort towards sustainable development goal 5. *Development Southern Africa*, *38*(5), 717–730. https://doi.org/10.1080/0376835X.2020.1870933

Leal Filho, W., Brandli, L. L., Lange Salvia, A., Rayman-Bacchus, L., & Platje, J. (2020). COVID-19 and the UN sustainable development goals: Threat to solidarity or an opportunity? *Sustainability*, *12*(13), 5343. https://doi.org/10.3390/su12135343

Lee, C.-H., Wu, K.-J., & Tseng, M.-L. (2018). Resource management practice through eco-innovation toward sustainable development using qualitative information and quantitative data. *Journal of Cleaner Production*, *202*, 120–129. https://doi.org/10.1016/j.jclepro.2018.08.058

Lehn, K. (2018). Corporate governance, agility, and survival. *International Journal of the Economics of Business*, *25*(1), 65–72. https://doi.org/10.1080/13571516.2017.1396661

Li, Y., Wong, W.-K., Yang, M. J., Wu, Y.-C., & Nguyen, T.-T. (2022). Modeling the linkage between vertical contracts and strategic environmental policy: Energy price marketization level and strategic choice for China. *Energies*, *15*(13), 4509. https://doi.org/10.3390/en15134509

Liczmańska-Kopcewicz, K., Mizera, K., & Pypłacz, P. (2019). Corporate social responsibility and sustainable development for creating value for FMCG sector enterprises. *Sustainability*, *11*(20), 5808–5869. https://doi.org/10.3390/su11205808

Liengpunsakul, S. (2021). Artificial intelligence and sustainable development in China. *The Chinese Economy*, *54*(4), 235–248. https://doi.org/10.1080/10971475.2020.1857062

Lin, J., Fridley, D., Lu, H., Price, L., & Zhou, N. (2018). Has coal use peaked in China: Near-term trends in China's coal consumption. *Energy Policy*, *123*, 208–214. https://doi.org/10.1016/j.enpol.2018.08.058

Ludwig, D., & Macnaghten, P. (2020). Traditional ecological knowledge in innovation governance: A framework for responsible and just innovation. *Journal of Responsible Innovation*, *7*(1), 26–44. https://doi.org/10.1080/23299460.2019.1676686

Luetz, J. M., & Walid, M. (2019). Social responsibility versus sustainable development in United Nations policy documents: A meta-analytical review of key terms in human development reports. *Social Responsibility and Sustainability*, *8*, 301–334. https://doi.org/10.1007/978-3-030-03562-4_16

Magazzino, C., Mele, M., & Schneider, N. (2021). A machine learning approach on the relationship among solar and wind energy production, coal consumption, GDP, and CO_2 emissions. *Renewable Energy*. *167*, 99–115. https://doi.org/10.1016/j.renene.2020.11.050

Martínez-Ferrero, J., & García-Meca, E. (2020). Internal corporate governance strength as a mechanism for achieving sustainable development goals. *Sustainable Development*, *28*(5), 1189–1198. https://doi.org/10.1002/sd.2068

Michael, B., & Goo, S.-H. (2021). The value of the corporate governance canon on Chinese companies. *Journal of Chinese Governance*, *6*(1), 20–42. https://doi.org/10.1080/23812346.2019.1676537

Mishra, L. (2021). Corporate social responsibility and sustainable development goals: A study of Indian companies. *Journal of Public Affairs*, *21*(1), 2147–2162. https://doi.org/10.1002/pa.2147

Moslehpour, M., Suen, M.-W., Tu, Y.-T., & Qiu, R. (2021). The moderating role of gender in the relationship between ethics and negotiation style. *Advances in Decision Sciences*, *25*(3), 1–20.

Mueller, D. C. (2018). Corporate governance and neoclassical economics. *International Journal of the Economics of Business*, *25*(1), 47–64. https://doi.org/10.1080/13571516.2017.1374038

Ngai, E. W. T., Law, C. C. H., Lo, C. W. H., Poon, J. K. L., & Peng, S. (2018). Business sustainability and corporate social responsibility: Case studies of three gas operators in China. *International Journal of Production Research*, *56*(1–2), 660–676. https://doi.org/10.1080/00207543.2017.1387303

Nicolaides, A. (2017). Ethical practices, eco-centric business and environmental sustainability. *Journal of Human Ecology*, *57*(1–2), 1–10. https://doi.org/10.1080/09709274.2017.1311649

Polasky, S., Kling, C. L., Levin, S. A., Carpenter, S. R., Daily, G. C., Ehrlich, P. R., Heal, G. M., & Lubchenco, J. (2019). Role of economics in analyzing the environment and sustainable development. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(12), 5233–5238. https://doi.org/10.1073/pnas.1901616116

Rahman, Z. U., Khattak, S. I., Ahmad, M., & Khan, A. (2020). A disaggregated-level analysis of the relationship among energy production, energy consumption and economic growth: Evidence from China. *Energy*, *194*, 116836. https://doi.org/10.1016/j.energy.2019.116836

Ramzan, M. (2021). Symmetric impact of exchange rate volatility on foreign direct investment in Pakistan: Do the global financial crises and political regimes matter? *Annals of Financial Economics*, *16*(04), 1–21. https://doi.org/10.1142/S2010495222500075

Ringle, C., Da Silva, D., & Bido, D. (2015). Structural equation modeling with the SmartPLS. *Brazilian Journal of Marketing*, *13*(2), 29–36.

Rjoub, H., Odugbesan, J. A., Adebayo, T. S., & Wong, W.-K. (2021). Sustainability of the moderating role of financial development in the determinants of environmental degradation: Evidence from Turkey. *Sustainability*, *13*(4), 1844. https://doi.org/10.3390/su13041844

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

Safshekan, S., Ozturen, A., & Ghaedi, A. (2020). Residents' environmentally responsible behavior: An insight into sustainable destination development. *Asia Pacific Journal of Tourism Research*, *25*(4), 409–423. https://doi.org/10.1080/10941665.2020.1737159

Shahidullah, A. K. M., Choudhury, M.-U.-I., & Emdad Haque, C. (2020). Ecosystem changes and community wellbeing: Social-ecological innovations in enhancing resilience of wetlands communities in Bangladesh. *Local Environment*, *25*(11–12), 967–984. https://doi.org/10.1080/13549839.2020.1849077

Singh, S. K., Chen, J., Del Giudice, M., & El-Kassar, A.-N. (2019). Environmental ethics, environmental performance, and competitive advantage: Role of environmental training. *Technological Forecasting and Social Change*, *146*, 203–211. https://doi.org/10.1016/j.techfore.2019.05.032

Smith, A., & Greer, K. (2017). Uniting business history and global environmental history. *Business History*, *59*(7), 987–1009. https://doi.org/10.1080/00076791.2017.1338688

Thacker, S., Adshead, D., Fay, M., Hallegatte, S., Harvey, M., Meller, H., O'Regan, N., Rozenberg, J., Watkins, G., & Hall, J. W. (2019). Infrastructure for sustainable development. *Nature Sustainability*, *2*(4), 324–331. https://doi.org/10.1038/s41893-019-0256-8

Wang, Q., & Song, X. (2021). Why do China and India burn 60% of the world's coal? A decomposition analysis from a global perspective. *Energy*, *227*, 120389. https://doi.org/10.1016/j.energy.2021.120389

Xia, B., Olanipekun, A., Chen, Q., Xie, L., & Liu, Y. (2018). Conceptualising the state of the art of corporate social responsibility (CSR) in the construction industry and its nexus to sustainable development. *Journal of Cleaner Production*, *195*, 340–353. https://doi.org/10.1016/j.jclepro.2018.05.157

Ye, N., Kueh, T.-B., Hou, L., Liu, Y., & Yu, H. (2020). A bibliometric analysis of corporate social responsibility in sustainable development. *Journal of Cleaner Production*, *272*, 122679. https://doi.org/10.1016/j.jclepro.2020.122679

Yue, B., Sheng, G., She, S., & Xu, J. (2020). Impact of consumer environmental responsibility on green consumption behavior in China: The role of environmental concern and price sensitivity. *Sustainability*, *12*(5), 2074. https://doi.org/10.3390/su12052074

Yurdakul, M., & Kazan, H. (2020). Effects of eco-innovation on economic and environmental performance: Evidence from Turkey's manufacturing companies. *Sustainability*, *12*(8), 3167. https://doi.org/10.3390/su12083167