sustainability

Article

Green Practices in Mega Development Projects of China–Pakistan Economic Corridor

Shakir Ullah [1], Sergey Barykin [2,*], Ma Jianfu [3,*], Taher Saifuddin [4], Mohammed Arshad Khan [5] and Ruben Kazaryan [6]

1 Center for Social Sciences, Southern University of Science and Technology, Shenzhen 518055, China
2 Graduate School of Service and Trade, Peter the Great St. Petersburg Polytechnic University, 195251 St. Petersburg, Russia
3 Pakistan Center, School of Community for Chinese Nation, North Minzu University, Yinchuan 750021, China
4 UMC Upper Madison College—Premium Language School, Montreal, QC H3A 1N7, Canada
5 Department of Accountancy, College of Administrative and Financial Sciences, Saudi Electronic University, Riyadh 11673, Saudi Arabia
6 Department of Technology and Organization of Construction Production, Moscow State University of Civil Engineering, 109377 Moscow, Russia
* Correspondence: sbe@list.ru (S.B.); majianfu@nmu.edu.cn (M.J.)

Abstract: This research aimed to investigate the green practices in the mega construction project of the China–Pakistan Economic Corridor (CPEC). Over recent years, there has been an increasing need for adopting and implementing more green and sustainable practices, leading to national and international sustainable and green environmental agendas. To address the issue, green project practices were considered an independent variable comprising green design, procurement, and construction. The dependent variables were environmental performance and economic performance. Primary data were collected from respondents working on the CPEC project. A representative sample of 276 respondents was used. The analysis was conducted using PLS-SEM. The results indicated that green design significantly influences economic performance, green procurement has a positive and significant effect on environmental performance, and green construction has a positive and significant impact on both environmental and economic and financial performance. The research showed that construction management at CPEC should adopt all facets of green project practices together, reducing negative environmental effects, increasing environmental benefits, and improving long-term economic performance in the area.

Keywords: China–Pakistan Economic Corridor; green construction; green design; green practices; green procurement; sustainability

check for updates

Citation: Ullah, S.; Barykin, S.; Jianfu, M.; Saifuddin, T.; Khan, M.A.; Kazaryan, R. Green Practices in Mega Development Projects of China–Pakistan Economic Corridor. *Sustainability* **2023**, *15*, 5870. https://doi.org/10.3390/su15075870

Academic Editors: Ashraf Dewan, GM Shafiullah, Kamrul Hassan, Khan M. R. Taufique and Fazlul K. Rabbanee

Received: 1 December 2022
Revised: 8 March 2023
Accepted: 20 March 2023
Published: 28 March 2023

1. Introduction

Sustainable development has become the most feasible and pragmatic approach for protecting and advancing humankind and the Earth. This global shift toward sustainable development was pioneered by advances in green technology, practices, and processes in governmental and non-governmental affairs. Considering the climate change events linked to Pakistan, this is an especially pertinent consideration. More and more organizations are expected to join the green revolution bandwagon as the demand for environmentally friendly goods and services grows, partly due to government mandates, resulting in a virtuous cycle of ever-improving green goods and services. The construction sector has emerged as a critical sector that requires the input of sustainable development, not just to lower costs but to deliver sustainable projects. Advancements in the construction industry are essential for achieving concrete development goals and agendas [1,2]. With the increasing trend toward urbanization and the development of industries, innovation, and national and international trade hubs, substantial development projects are being implemented by constructing roads, towns, cities, and other related projects [3]. The construction sector is a significant contributor to every country's development agenda and to improve the quality of life [4].

However, at both national and international scales, the construction projects adopted and implemented to achieve development objectives significantly contribute to environmental pollution problems [5,6]. According to the Copenhagen Resource Institute, the construction sector contributes approximately 40% of the energy consumed, about 30% of the carbon dioxide emitted, and 40% of the solid production waste produced globally [7,8]. Therefore, the global construction sector is the major contributor to environmental pollution, especially through the emission of carbon dioxide.

Recently, the increase in construction projects has come due to the global economic development adopted by the different governments [9,10]. These have resulted in significant conflicts and issues in terms of waste of energy, water, air pollution, and noise pollution [10]. According to this pollution issue, global industrial regulators, government associations, and policymakers have made great efforts toward developing green standards, policies, specifications, and guidelines to ensure green practices and environmental conservation in construction projects [11–16]. Bohari [17] illustrates that construction projects have become an essential part of most countries in the world. They are a significant source of income and employment and are considered an asset to their host societies. However, construction projects are also responsible for much pollution, which can lead to serious environmental concerns. For example, cement production accounts for nearly 7% of global carbon emissions, while concrete production accounts for almost 1% [18].

Shen [19] argues that construction activities are responsible for many kinds of pollution, such as dust, noise, odor, carbon monoxide, etc. Construction sites are frequently located near busy roads or railways, which cause additional noise and dust emissions into the atmosphere. Construction activities also emit volatile organic compounds (VOCs), including formaldehyde, benzene, and xylene, which contribute significantly to ambient air pollution [20,21]. VOCs can adversely affect air quality, causing respiratory problems among construction workers [22]. With the increased growth in the construction sector, there is an increasing need for adopting and implementing more green and sustainable practices, leading to national and international sustainable and green environmental agendas. According to Nduka and Ogunsanmi [3], the objective of a green environment should be geared towards achieving healthy, secure, green, and environmentally friendly project development practices. Therefore, searching for projects combining economic and ecological aspects and their in-depth analysis is justified.

The China–Pakistan Economic Corridor (CPEC) is a network of roads, railways, and pipelines that will run from Kashgar in China's western Xinjiang region to the Arabian Sea port of Gwadar on the Pakistani coast [23]. CPEC is an economic corridor in Pakistan consisting of transportation and energy infrastructure projects built under the Belt and Road Initiative (BRI) framework. It is considered one of the most ambitious infrastructure projects ever undertaken by China [24]. The CPEC is a vital component of the BRI that links China's western provinces to its eastern ones. It will be a significant part of Central Asia's transport network and connect Kashgar in Xinjiang with Gwadar Port in Balochistan [25].

Therefore, establishing the CPEC is a very significant project for the economies of both countries. In economic terms, CPEC will allow for dynamic development, but its construction impacts the environment. This study seeks to understand the numerous actions undertaken to limit the negative environmental effect and perceptions associated with the project by adopting green practices in the various construction processes. This research aims to investigate the green practices in the mega construction project of CPEC. The objective is to evaluate the green practices in mega development projects of CPEC to understand the compliance level with green initiatives and sustainable practices. Climate change and global warming are essential issues that have raised critical international discussions [26,27]. Global warming has adversely affected the food supply chain [28–31], where farmers and fishermen have felt the impact of poor harvests and the need to fish deeper in the oceans due to fish migration [32–36]. It is thus vital to understand the CPEC initiative from the public's perspective directly involved in the project execution to understand the compliance level with green practices in the different mega development projects. While the CPEC project will foster economic development and integration for the countries involved [37–40], it should come at a reasonable cost to the environment and the people in the project areas [41–43].

The findings are expected to advance discussions, highlight the green practices if they are appropriate, underused, and not included in the project design, and make recommendations that the government, policymakers, and other green activists can implement towards enhancing the green initiatives of the CPEC projects. The rest of the paper is split into six sections; the introduction is the first section and presents what is known about green projects in the CPEC zone, the study objectives, and the motivations of the study. The variables, the development of the conceptual framework, the study's hypotheses, and how the constructs are linked are discussed in the literature review. The methodology covers the research design, study population, sample selection, data collection method, data analysis, and presentation of results. The study's findings and any implications and restrictions are presented in the discussion section. The managerial and theoretical implications of the findings are discussed in the fifth section. The study conclusions are covered in the last section.

2. Literature Review

2.1. China–Pakistan Economic Corridor Background

The CPEC aims to improve connectivity between China and South Asia through Pakistan's barren north and southwest. It will also include a series of hydroelectric dams, modern highways, and railways connecting Kashgar with Gilgit-Baltistan in Pakistan. The corridor aims to boost trade between Asia's two largest economies. It is expected to be completed by 2030, creating around 100,000 jobs [43]. The CPEC involves development projects across seven provinces: Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, Gilgit-Baltistan, and Azad Kashmir. The total cost of these projects will be over USD 46 billion [44]. A total length of more than 6000 km encompasses a diverse range of projects, including roads, railways, power stations, and industrial parks. It is expected to provide direct employment for over two million people across Pakistan.

Despite the great economic contributions of CPEC economically, the project has been criticized by environmentalists due to its associated effects on the environment. The first criticism comes because of its detrimental effects on nature and wildlife. The construction of roads, along with other developmental activities, will result in the loss of natural habitats and wildlife corridors, which are vital for their survival. The corridor includes some of the most environmentally sensitive areas in Pakistan. It runs through the Thar Desert, one of the world's largest desert areas. The area has been subject to many problems due to its dryness and high summer temperatures [17]. The Indus River System is another region where CPEC intersects, which flows through the Gilgit-Baltistan region and Punjab province. At the same time, it passes through Khyber Pakhtunkhwa province on its way into Indian Territory before flowing into the Arabian Sea at Karachi Port near Gwadar city in Balochistan province. The Indus River Basin includes highly populated cities, such as Ganeriwala, Lahore, Mohenjo-Daro, and Harappa [45]. There have also been concerns about how much damage will be inflicted on local ecosystems and wildlife during the construction phases. Additionally, it will have a significant negative impact on Pakistan's already fragile ecosystems [3]. To clarify some of these points, the following research questions have been raised to guide this research:

1. To what extent are green designs included in the CPEC project?
2. To what extent do green constructions affect construction projects' economic and environmental performance in the CPEC zone?

Nonetheless, the project has implemented several initiatives to ensure green practices and environmentally friendly construction schemes. The first thing to note is that the CPEC will use existing infrastructure to carry its cargo instead of building new ones. This suggests that fewer construction materials and fuel will be utilized. The idea behind this is to reduce carbon emissions by using renewable energy sources for electricity generation. The government has also introduced measures such as reducing the water used by construction projects and recycling wastewater from construction sites [46]. The CPEC has been labeled as a green project because it aims to use renewable energy sources such as solar power, wind farms, and hydroelectricity to minimize its carbon footprint.

2.2. Theoretical Review

This study is theoretically founded on the Stakeholder Theory postulated by Freeman [47]. The relevance of green practices is no longer a matter of debate; they have now been integrated into nearly all spheres of government and public enterprises [48,49]. Environmental indicators have also been researched in many practical scenarios, including entrepreneurial orientation [50], green supply chain management [51], sustainable development of smart cities [52], issues about biodegradables [53], transportation and traceability [54], and so on. Studies have demonstrated that the environmental advantages of the country's business are of a long-term disposition [55–57]. Improved communication between countries and their industry partners becomes critical and leads to long-term sustainability [58–61]. Freeman's [47] Stakeholder Theory assumes that businesses must try to meet the expectations of numerous stakeholders, including shareholders, employees, contractors, customers, suppliers, and others in the supply chain.

Correspondingly, stakeholders can inspire businesses to adopt sustainable practices for achieving sustainable design performance [62]. Freeman introduced the stakeholder model as a corporate strategy, which not only delineates stakeholders from shareholders in organizations but also illustrates the effects of diverse stakeholders on the decision-making processes of entities [63]. In alignment with the CPEC project, the various stakeholders can ensure the environmental sustainability of the operations in the construction, procurement, and supply chain stages of the multiple aspects of the project. Numerous environmental studies have incorporated the principle of stakeholders, and stakeholders have been essential in shaping enterprise environmental awareness [64–66]. As an integral partner in the CPEC project, the suggestion is for Pakistan to embrace environmentally conscious practices that promote employee motivation and loyalty to the project. Stakeholders must share in the CPEC vision to fully embrace it, especially in realizing the sustainable aspect of the local environment. The shareholders actively monitor these organizational trends, including environmentally responsible practices, which attract foreign and domestic investors and enhance corporate performance [67–70].

2.3. Green Practices in Development Projects

Various previous studies have widely discussed the aspect of environmental principles [71,72]. However, the element of green development is quite a new concept. Previous studies focused on sustainable development practices [22,73–77].

Several aspects could be put forward from the prior literature related to green practices in development projects. Traditional development projects in the construction sector have been associated with various problems. These problems include time management issues, overbudget expenditure, building defects, and environmental problems [23]. Addressing these issues could be managed by adopting various techniques such as green development, lean techniques, and sustainable supply chain management [78]. Qi et al. [79] defined green construction as the planning and managing of a construction project which meets the obligations acquired in a contract while minimizing the impacts of the construction process on the environment.

According to Olawumi and Chan [80], green practices in development projects have been considered the appropriate technology that could effectively address the issue of environmental pollution resulting from construction projects. Darko and Chan [81] note that the terms "green" and "sustainable" development projects in the construction sector are interchangeably used. From them, the triple-bottom concept is developed, which includes the integration of economic, social, and environmental concepts so that all of them are achieved without adverse effects on each other. However, Darko [82] asserts that the "green" concept concentrates on the environmental aspect, whose focus is to reduce environmental pollution in terms of carbon dioxide emissions, noise pollution, and other pollutants that destroy the atmosphere [74].

Many governments and environmentalists have tried to push for adopting and implementing green practices. These elements are driven by global and government environmental regulations and contribute toward attaining sustainable development goals. Green practices in building activities are critical in various aspects. They have social impacts on the health and well-being of the building occupants and the surrounding environment [78]. Several environmental benefits emanate from green practices. There are opportunities for the growth of construction management and effective product development. Green building is considered a "quiet revolution" that has experienced an increasing trend over the recent past.

2.4. Development of Hypotheses

2.4.1. Green Project Design

Green designs have become important elements of modern architecture and planning in recent years [81]. To reduce the negative impact on the environment, many architects have begun to use natural materials in their projects, such as wood and stone. Darko [82] have quoted green design as starting the process of a sustainable and environmentally friendly construction project before proceeding to other steps of procurement and construction. Olawumi and Chan [80] argue that in addition to using natural materials, architects should also pay attention to renewable energy sources such as solar power and wind power in their designs. Some buildings even use geothermal energy as a heat source for heating water or cooling spaces. These would have a long-lasting and friendly effect both environmentally and economically [78]. Wong et al. [83] allude that green procurement is essential and is the most critical component that sets the basis for green construction projects. Subsequent practices in the construction depend on the green design. If environmentally friendly practices are not adopted at the start of the project, then it would be difficult to adopt them at later stages of the project implementation. Therefore, it is clear that green design minimizes the environmental impact of construction and operation while maximizing sustainability and efficiency. Hence, the following hypotheses were proposed:

Hypothesis 1 (H1). *Green project design positively affects environmental performance in CPEC mega development projects.*

Hypothesis 2 (H2). *Green project designs have positive effects on economic performance in CPEC mega development projects.*

2.4.2. Green Project Procurement

In the construction sector, green project procurement is simple: it is about finding construction products and services that are as environmentally friendly as possible. The construction firm would want to use products and services that do not harm the environment because they are more expensive than those that do, particularly in the long run [83]. Shen [20] indicated that the aspect of green practices should be considered from the initiation of the project. Suppliers and contractors are knowledgeable in environmental protection issues, and it is advisable to engage them early in the project and share with them the green objectives of the project [11,20]. It would benefit the project's green goals to communicate the green and environmental vision of the project to its suppliers and contractors [84]. However, it is critical to note that there are limited green suppliers who act as barriers to implementing green practices [78]. Saleh and Al-Swidi [23] believe that green project procurement is not just about choosing between one product and service over another; it is also about making sure that they are purchased from businesses that understand the importance of sustainability issues in their business operations. Shan and Hwang [85] contend that although green project procurement is a relatively new concept in architecture, it is being embraced widely [83]. The idea behind this concept is to use natural materials and renewable energy sources to create a more environmentally friendly building. These findings led to the development of the following hypotheses:

Hypothesis 3 (H3). *Green procurements have positive effects on environmental performance in CPEC mega development projects.*

Hypothesis 4 (H4). *Green procurements have positive effects on economic performance in CPEC mega development projects.*

2.4.3. Green Project Construction

Green buildings are an essential part of the future of our planet. They are more efficient, more comfortable, and better for the environment. To achieve this goal, there is a need to start thinking about building a green home which will be safe and comfortable, and environmentally friendly [78]. Green construction activities involve the use of environmentally friendly materials to reduce the negative impact on the environment. This can include using recycled materials and reducing the amount of noise pollution, and carbon dioxide emitted. Studies have demonstrated that environmentally friendly architecture can save money by reducing the amount of energy and materials used, which in turn lowers expenses. Additionally, green designs aim to reduce waste by reusing, recycling, and recovering the materials used in construction projects, which has positive financial implications [86,87].

According to Ding et al. [46], the construction industry is one of the most important contributors to pollution and greenhouse gas emissions. The primary reason for this is that many materials are being used in the production process, which adversely impacts human health and the environment. This can be reduced by using green building construction techniques and designs that ensure energy efficiency and reduce pollution. This leads to the following hypotheses:

Hypothesis 5 (H5). *Green constructions have positive effects on environmental performance in CPEC mega development projects.*

Hypothesis 6 (H6). *Green constructions have positive effects on economic performance in CPEC mega development projects.*

As far as environmental performance in terms of conservation is concerned, green and sustainable construction cannot be ignored [80]. Green building practices can help businesses reduce their carbon footprint, leading to more sustainable practices overall. Consequently, green construction projects can be very profitable for businesses. The need for environmentally friendly buildings is not only a requirement in the current climate crisis but also the future as well. According to a survey conducted by Energy Star, nearly 60% of Americans are interested in purchasing energy-efficient homes, and they want these homes to be safe and healthy. Eighty-six percent of those surveyed said they would consider buying a house that was LEED certified [78]. One of the most significant differences between green and non-green buildings is their environmental impact. It is essential to reduce the environmental effects by adopting and perfecting environmentally friendly construction practices [88]. Green building projects are designed with environmentally conscious materials and methods, requiring less energy and chemical use than older buildings. Svensson et al. [89] indicate that this can positively impact both the environment and your bottom line, as you will be able to cut down on costs without sacrificing quality or safety [90,91]. The following hypotheses are therefore developed:

Hypothesis 7 (H7). *Environmental performance positively affects environmental performance in CPEC mega development projects.*

Hypothesis 8 (H8). *Environmental performance is a mediator between the green project practices and economic performance.*

2.4.4. Conceptual Framework

The research will include five variables. The independent variables are green project design, green project procurement, and green project construction, which make up green project practices. The dependent variables are environmental performance and economic performance, where environmental performance is also a mediating variable. The conceptual framework is summarized in Figure 1.

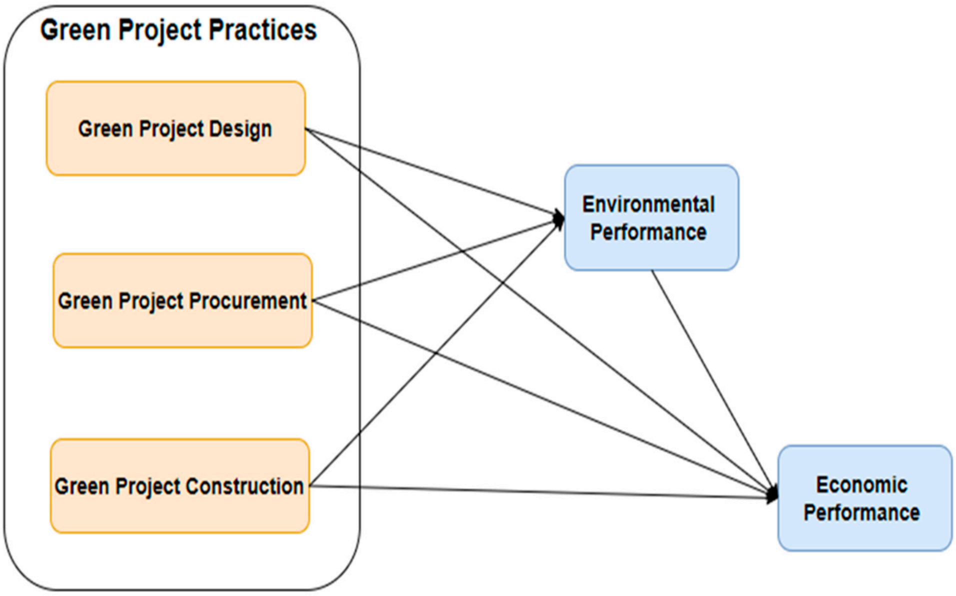

Figure 1. Conceptual framework of the study. Source: Authors' elaboration.

The scales for each latent variable and their source references are also presented in Table 1.

Table 1. Latent variables and scales.

Latent Variables and Scales	Sources
Green Project Design 1. The designs implemented in this CPEC are carried out according to green specifications; 2. A green specialist consultant or trainer is involved in the initial design stages of the project; 3. There was a government approval at the early CPEC stages to incorporate green construction practices; 4. In the design stage, there is National Strategic Plan for Solid Waste Management policy; 5. A preliminary study was conducted on the environmental impact of CPECT project;	Bohari and Xia [44]; Mahat et al. [92]
Green Project Procurement 6. The procurement of the construction materials follows an eco-friendly and green requirement; 7. Building materials suppliers are informed of the green and environmental impacts before being awarded the supply tender; 8. There is a mandatory green environmental criterion to be observed by all the suppliers; 9. The pre-qualification of the material suppliers is based on the past credentials of knowledge of green construction; 10. There is a policy of giving priority to suppliers with long term policy which promote efficient waste management and green practices; 11. The pre-qualification of suppliers is based on past experience in green construction;	Onubi [93,94].

Table 1. *Cont.*

Latent Variables and Scales	Sources
Green Project Construction 12. There is effective waste management, recycling, and reuse of construction materials; 13. In-house training is conducted to educate the stakeholders on the required green constructing threshold and its importance; 14. Stakeholders are able to understand the bigger picture of green construction; 15. There is effective on-site systematic waste management, e.g., separate hazardous, waste, with general waste; 16. CPEC construction observes the Green Building technology rating system and roadmap;	Onubi et al. [94]; Collins et al. [95]
Environment Performance 17. Availability of appropriate reward/incentives at project level on green achievement; 18. There are greater benefits realized in terms of cost savings from green practices; 19. There is protection and restoration of the natural state of the building site in terms of ecosystem, agriculture, plants, and animal habitat; 20. CPEC has conformed to the environmental laws; 21. In CPEC project, there has been a significant reduction in energy consumption;	Onubi [94]; Collins [95]
Economic Performance 22. The CPEC projected profit levels will be achieved; 23. Budget contingencies were well within acceptable limits; 24. Project cost performance was met within projected limits; 25. Rework costs will not be surpassed; 26. Minimal disruption of construction works has been recorded so far; 27. CPEC project activities are completed based on set pre-project timelines and goals.	Zarei [96]; Albort-Morant [97]

3. Methodology

3.1. Sampling and Data Collection

This research was conducted using the data collected from respondents taking part in constructing the China–Pakistan Economic Corridor to test the hypothesized statements in the previous chapter. This research applied a non-probabilistic sampling technique because the study was conducted on a specific construction project, and there was a need to obtain data from the appropriate respondents working on the project. The research population comprised all those directly involved in the CPEC project, including project managers, project team members such as supervisors, masons, plumbers, etc., engineers, general construction workers, and other vendors connected to the project such as suppliers, contractors etc. This ensured that the respondents had the necessary knowledge and experience regarding project construction and green project concepts. The data were collected using a structured questionnaire. The questionnaire was developed using questions on all the stated study variables. The questionnaire was hosted on a website, allowing a convenient data collection process. The respondents were invited to participate in the questionnaire through an email containing the link to the questionnaire. The participants were also asked to share the link with their other colleagues. The research had a target of 381 respondents. The data were collected from 1 March 2022 to 30 June 2022. However, 298 questionnaires were completed, of which 276 were deemed suitable for the study's analysis.

3.2. Research Instrument and Data Analysis

The questionnaire was developed to comprise closed-ended questions. The questionnaire was divided into four sections. The first section was to introduce the purpose of the questionnaire and disclose the relevant information regarding the study. The second section comprised the questions that captured the demographic characteristics of the respondents. The third section encompasses the questions regarding green project practices—green project design, procurement, and construction. The fourth section collected the data for the environmental and economic performance practices. The study data analysis was evaluated using the partial least square structural equation modeling (PLS-SEM) approach. This model was considered suitable because it allows the estimation of complex relationships between the variables and the execution of both the confirmatory factor analysis (CFA) and the path analysis. For this study, AMOS was used to carry out the analysis. The measurement model was evaluated to determine individual reliability, convergent validity, and discriminant validity. The hypotheses were evaluated using the structural model.

3.3. Descriptive Statistics

The first analysis conducted was of descriptive statistics in Table 2. The findings indicated that males were the majority, comprising 70.3% of the total, and 29.7% were females. Considering the work experience, the majority had worked 11–15 years (35.9%), followed by those who had worked 6–10 years (31.2%), and those who had worked 1–5 years (18.1%). The working title of those working in the CPEC was also evaluated, where the majority was the general construction workers, comprising 35.9%, followed by the project team members (20.7%), then engineers (19.6%). The least was the project managers (8.3%). The nature of the firm in the project was also considered, where the majority of respondents were from contractors' firms (48.9%), followed by those from consultants' firms (19.9%). The smallest sample were those from the clients' firms (11.6%).

Table 2. Descriptive statistics findings.

Characteristics		Frequency (n)	Percent (%)
Gender	Male	194	70.3
	Female	82	29.7
Work Experience	1–5 Years	50	18.1
	6–10 Years	86	31.2
	11–15 Years	99	35.9
	16+ Years	41	14.9
Work Title	Project Team Member	57	20.7
	Project Manager	23	8.3
	General Construction Worker	99	35.9
	Engineer	54	19.6
	Other	43	15.6
Firm Nature	Client	32	11.6
	Government	54	19.6
	Consultant	55	19.9
	Contractor	135	48.9

3.4. Measurement Model Evaluation

The model adopted in the study was measured using confirmatory factor analysis (CFA). CFA was used to determine the validity and reliability of the adopted model and the data used in the analysis. The first result obtained was the discriminant validity. The results are presented in Table 3. The required threshold is that the square root of the AVE for EVP should be larger than the absolute value of the correlations with another factor. The conditions were satisfied. Moreover, the Fornell and Larcker [98] criterion states that (1) the square root of each construct's AVE is higher than its correlation with another construct; and (2) each item loads highest on its associated construct.

Table 3. Discriminant validity.

MaxR(H)	EVP	GPD	GPP	GPC	ECP
0.787	0.842				
0.836	0.61	0.870			
0.849	0.749	0.839	0.894		
0.851	0.642	0.781	0.821	0.829	
0.869	0.785	0.775	0.771	0.736	0.821

In addition, the reliability of the model and used constructs was evaluated using composite reliability (CR) and Cronbach's alpha. The validity of the constructs was also further evaluated using standardized factor loadings and average variance extracted (AVE). Fornell and Larcker's [98] validity determination criteria require that Cronbach's alpha and CR should be greater than 0.7, while AVE and factor loadings should be greater than 0.5. These conditions, as illustrated in Table 4, were fulfilled. As a result, the validity and reliability of the study constructs and proposed model were satisfied.

Table 4. Reliability and validity evaluation results.

		Standardized Factor Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)	Cronbach's Alpha
ECP	ECP1	0.635	0.87	0.62	0.90
	ECP2	0.742			
	ECP3	0.73			
	ECP4	0.762			
	ECP5	0.728			
	ECP6	0.724			
EVP	EVP1	0.625	0.78	0.51	0.82
	EVP2	0.712			
	EVP3	0.509			
	EVP4	0.643			
	EVP5	0.705			
GPC	GPC1	0.735	0.85	0.53	0.80
	GPC2	0.758			
	GPC3	0.681			
	GPC4	0.732			
	GPC5	0.738			
GPD	GPD1	0.687	0.84	0.60	0.88
	GPD2	0.75			
	GPD3	0.712			
	GPD4	0.717			
	GPD5	0.681			
GPP	GPP1	0.681	0.85	0.68	0.88
	GPP2	0.726			
	GPP3	0.699			
ECP	GPP4	0.717			
	GPP5	0.697			
	GPP6	0.641			

3.5. Structural Equation

Before conducting the actual analysis to determine the relationship between the study variables, the model fitness was evaluated. The results indicated that NFI was 0.904, indicating a satisfactory fit; RFI was 0.914, indicating a satisfactory fit; TLI was 0.22, indicating a good fit; and CFI was 0.931, indicating a good fit. In addition, the RMSEA value was 0.056, which showed an acceptable fit since it was less than 0.08. These results confirmed the fitness of the model applied (Figure 2), and it was now appropriate to interpret the SEM results (Table 5).

The results indicated in Table 3 that green project design has a negative and non-significant influence on environmental performance (β = −041, p = 0.525) but a positive, direct, and significant influence on economic performance (β = 266, p = 0.000). As a result, Hypothesis 1 (H1) was not confirmed, while Hypothesis 2 (H2) was established. The results also indicated that green project procurement has a direct, positive, and significant influence on environmental performance (β = 681, p = 0.000) but a negative, non-significant influence on economic performance (β = −0.091, p = 0.159). As a result, Hypothesis 3 (H3) was confirmed, while Hypothesis 4 (H4) was not confirmed. For the case of green project construction, the results indicated that it has a direct, positive, and significant influence on environmental performance (β = 239, p = 0.000) and a positive and significant influence on economic performance (β = 0.338, p = 0.000). This led to the confirmation of both Hypothesis 5 (H5) and Hypothesis 6 (H6). In addition, the effects of environmental performance on economic performance were evaluated, which revealed a positive and significant effect of environmental performance on economic performance (β = 0.333, $p = 0.000$). Lastly, the statistics indicated that environmental performance significantly and positively mediates the effects of green project design, green project procurement, and green project construction on economic performance (Figure 3).

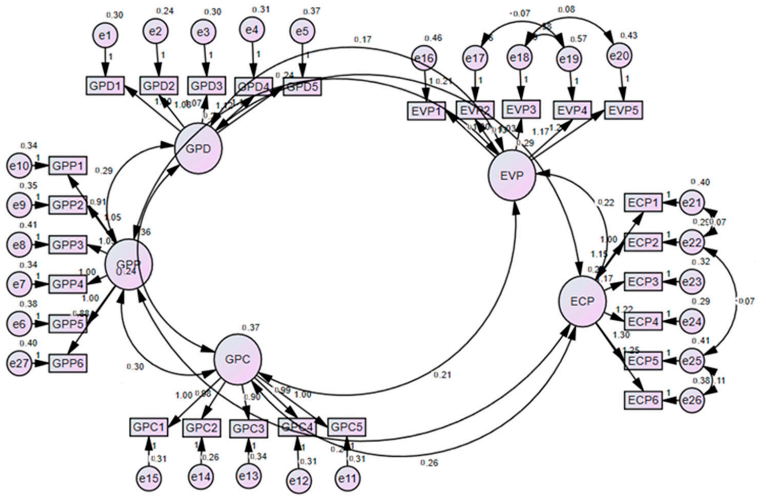

Figure 2. Model fitness test.

Table 5. Structural equation results.

Hypothesis	Paths					Estimate	S.E.	C.R.	p
Direct Effects									
H1	GPD	→			EVP	−0.041	0.065	−0.636	0.525
H2	GPD	→			ECP	0.266	0.049	5.477	***
H3	GPP	→			EVP	0.681	0.087	7.851	***
H4	GPP	→			ECP	−0.091	0.064	−1.408	0.159
H5	GPC	→			EVP	0.239	0.064	3.767	***
H6	GPC	→			ECP	0.338	0.054	6.218	***
H7	EVP	→			ECP	0.383	0.082	4.663	***
Indirect Effects									
	GPD	→	EVP	→	ECP	0.273	0.072	1.163	***
H8	GPP	→	EVP	→	ECP	0.682	0.027	4.728	***
	GPC	→	EVP	→	ECP	0.873	0.826	2.278	***

Note: *** $p < 0.01$; EVP = environmental performance, ECP = economic performance, GPD = green project design, GPP = green project procurement, GPC = green project construction.

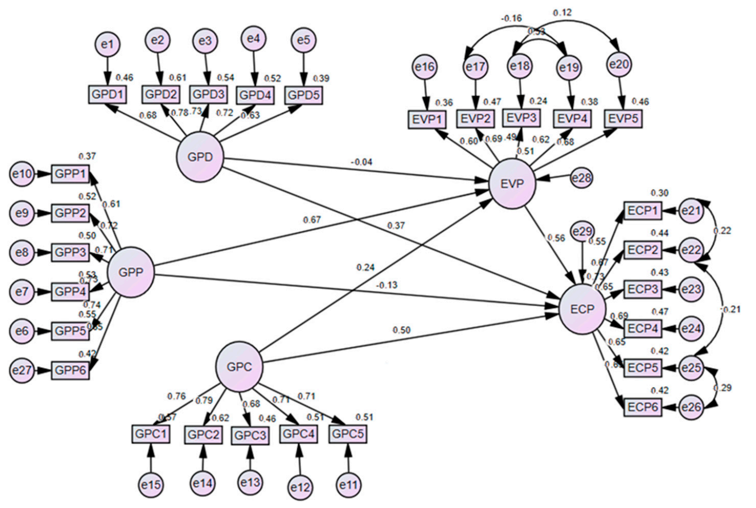

Figure 3. Structural equation results.

4. Discussion

This study used the China–Pakistan Economic Corridor case study to assess the effects of green project practices in the construction sector on environmental performance and economic performance. The study considered three green project practices—green project design, procurement, and construction. The findings of this study indicated that green project design has a positive and significant influence on economic performance rather than environmental performance. The green project design has been established as starting a sustainable and environmentally friendly construction project process before proceeding to other procurement and construction steps [24]. This research finds that paying attention to this aspect is economically beneficial compared to environmental benefits. These findings agree with Zhu [86] and Brones [87], who indicated that green design helps reduce energy and materials, which is economical as it reduces costs. Moreover, green design works toward the reuse, recycling, and recovery of materials used in construction projects, which is economically beneficial.

The finding that green project design had a negative and non-significant influence on environmental performance is at variance with the literature, as suggested in Darko [82], Olawumi, and Chan [80], but confirms the positive influence of green project designs on economic performance as postulated by the scholars. The positive affinity with economic performance indicates the need for construction companies to encourage green designs in road construction and building projects. The government can also assist by passing laws and regulations that include green designs in projects. The CPEC project has significant economic ramifications for the governments of China and Pakistan, the contractors involved in the project, and the people residing and doing business around the corridor belt. These should be considered when deciding on the policy directions and including them in decisions that will affect them. The main essence of green designs is to improve the quality of life by reducing emissions and pollutants that harm environmental harmony. Confirming the positive influence of green innovations and economic performance should further encourage the adoption of green project designs.

Green project procurement was found to have a significant and positive influence on environmental performance but not economic performance. Green procurement practices ensure that entities they have bought from businesses that understand the importance of sustainability issues in their business operations [25]. The results imply that suppliers and contractors in the construction project are critical to ensuring the project's environmental requirements are met. The results agree with the findings of Varnäs [84], who indicated that sharing a project's green and environmental vision with the suppliers and contractors would help achieve green objectives. It is essential, as well, to share with them the benefits of green project practices.

Considering the construction of the green project, the results indicate that it significantly and positively influences environmental and economic performance. Green construction activities involve the use of environmentally friendly materials to reduce the negative impact on the environment. Constructing green buildings is an integral part of the future of our planet. They are more efficient, more comfortable, and better for the environment. To achieve this goal, there is a need to start thinking about building a green home that will be safe, comfortable, and environmentally friendly [78]. These findings agree with previous results, such as Lam [88], who indicated that adopting and optimizing green construction processes are critical in reducing environmental impacts. In support, Ding et al. [46] earlier averred that the construction industry is one of the most significant contributors to pollution as well as emissions of greenhouse gases because the manufacturing process makes use of a large number of materials, each of which has a potential to affect both human health and the natural environment negatively. This can be lessened by employing green building construction practices and designing buildings to maximize energy efficiency and minimize emissions.

Additionally, environmental performance was found to be a significant influencer of economic performance. If the construction projects have good environmental performance, these effects will spill over to economic performance. More importantly, environmental performance significantly mediates the impact of green project practices on economic performance. This means that if green practices are adopted and implemented, they will influence economic performance by adjusting the environmental performance [84].

5. Managerial and Theoretical Implications

For theoretical implications, this study focused on investigating the effects of green construction practices on economic and environmental performance considering the various stakeholders in the construction components of the CPEC projects utilizing the Stakeholder Theory. The study contributes theoretically in several ways. First, while the Stakeholder Theory has been integrated into different research studies as highlighted in other studies [48–61], the research brought in three aspects of green project practices—green project design, procurement, and construction—when considering the input and effects on stakeholders in the CPEC zone. Through these aspects, this research provides an in-depth understanding of how green project practices influence a construction project's construction and environmental performance. Specifically, it extends the postulations about the environment proposed by Islam et al. [50] about entrepreneurial orientation and green supply chain management [51]. The study established the relationship between the five variables of the study. The green project design was found to influence the economic performance of a project. This strengthens the assertions of Suyendikova et al. [52] about green project design, procurement, and construction. Notably, green construction is also applicable in the design of transportation frameworks that enable sustainability in the project design and implementation proposed by Khan et al. [54]. Similarly, green procurement was found to affect the environmental performance of a project, while green construction was found to influence both the economic and environmental performance of a construction project. In other words, the study indicated an interdependence between green design, green procurement, green construction, economic performance, and environmental performance, creating the need for conscious efforts by stakeholders to achieve optimum implementation of green practices in the CPEC projects supporting the assumptions of Freeman's [47] propositions on the need for businesses to meet their stakeholders' expectations in their quest to achieve sustainability.

From the managerial implications, this research highlights several recommendations that could be adopted by construction managers, particularly in the case study of the China–Pakistan economic corridor. The paper suggests that adopting and implementing green practices (green design, green procurement, and green construction) is vital for ensuring better environmental performance and economic performance within the economic corridor. The key here is that from the onset of the project, green practices must be a part of the project from the conceptualization stage, not something to be included after the commencement and execution of the project. The next stage is to ensure that project managers are trained on green practices, as they will be directly supervising other workers on site, and ensuring everything is consistent with the original conceptualization of the project. The operations, construction, and procurement managers can determine the major impediments that could obstruct the progress of the CPEC project. Their background might aid them in strategically focusing and removing obstacles so that organizations can embrace green practices. Another characteristic is that to deliver a green construction project effectively and successfully, the three aspects should be adopted in an integrated manner. Green design, green procurement, and green construction practices should be adopted and practiced together within the whole construction project process. Entities should be encouraged to plan their operations and procurements more environmentally friendly to significantly contribute to societal, economic growth, and environmental improvement. These variables point to the potential for broader positive effects of incorporating green practices in the mega development projects for the construction industry. This study confirms that if construction projects were environmentally friendly and green, they would eventually be economically beneficial.

Limitations and Future Research Recommendations

One of the study's limitations is that it can only be applied to the CPEC project being carried out between Pakistan and China. The findings may be used as a guide for further research in regions with similar bilateral cooperation projects, and while they should not be used to generalize the findings of such areas, they may be used as a guide. Another shortcoming of the research was that it was limited to participants directly involved in the CPEC project. It did not include the perspectives of other people who could be affected by the scope of the project, such as residents and other economic participants in the corridor. Future studies may incorporate these important demographics that have yet to be included to ascertain if the findings will be consistent. An important recommendation from the results is that future studies investigate the negative and non-significant influence ascribed to the relationship between green project design and environmental performance. The finding is not supported by the literature and should be investigated to understand its dissonance from the cited literature. The research recommends that future studies focus on another construction project and apply a similar model to determine whether similar findings could be observed. Future research could also consider expounding the model and including other green project practices.

6. Conclusions

This paper has investigated how green project practices (green design, green procurement, and green construction) influence environmental and economic performance under a case study of the China–Pakistan Economic Corridor. An empirical analysis of data collected from the respondents working in the corridor revealed interesting findings. First, green design significantly influences economic performance rather than environmental performance. Green procurement influences environmental performance but not economic performance. Green construction significantly affects both economic performance and environmental performance. Furthermore, a construction or development project's environmental performance was found to influence its economic performance significantly. The research was found to have both theoretical and empirical contributions. Theoretically, it informed the theory by forging the three aspects of green project practices (green design, green procurement, and green construction). Additionally, an integrated relationship exists between green project practices, environmental performance, and economic performance. The research showed that green design, procurement, and construction techniques should be adopted and practiced together in the construction project process to improve environmental and resultant economic performance.

Author Contributions: All authors contributed to the conceptualization, methodology, investigation, data curation, formal analysis, software, and writing or editing of this paper. All authors have read and agreed to the published version of the manuscript.

Funding: The research of Sergey Barykin was partially funded by the Ministry of Science and Higher Education of the Russian Federation under the strategic academic leadership program 'Priority 2030' (agreement 075-15-2021-1333, dated 30 September 2021).

Institutional Review Board Statement: Not Applicable.

Informed Consent Statement: In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and falsification, double publication and submission, and redundancies, have been ultimately observed by the authors.

Data Availability Statement: The data presented in this study are available on request from the corresponding authors.

Acknowledgments: The authors wish to thank the *Sustainability* anonymous reviewers for their valuable time and effort in improving the manuscript.

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

References

1. Fei, W.; Opoku, A.; Agyekum, K.; Oppon, J.A.; Ahmed, V.; Chen, C.; Lok, K.L. The Critical Role of the Construction Industry in Achieving the Sustainable Development Goals (SDGs): Delivering Projects for the Common Good. *Sustainability* **2021**, *13*, 9112. [CrossRef]
2. Goubran, S. On the Role of Construction in Achieving the SDGs. *J. Sustain. Res.* **2019**, *1*, e190020. [CrossRef]
3. Nduka, D.O.; Ogunsanmi, O.E. Stakeholders perception of factors determining the adoptability of green building practices in construction projects in Nigeria. *J. Environ. Earth Sci.* **2015**, *5*, 188–196.
4. Opoku, A.; Deng, J.; Elmualim, A.; Ekung, S.; Hussien, A.A.; Abdalla, S.B. Sustainable procurement in construction and the realisation of the sustainable development goal (SDG) 12. *J. Clean. Prod.* **2022**, *376*, 134294. [CrossRef]
5. Ngowi, H.A. Prevalence and pattern of waterborne parasitic infections in eastern Africa: A systematic scoping review. *Food Waterborne Parasitol.* **2020**, *20*, 643–663. [CrossRef]
6. Albtoush, A.M.F.; Doh, S.I.; Rahman, R.A.; Al-Momani, A.H. Critical success factors of construction projects in Jordan: An empirical investigation. *Asian J. Civ. Eng.* **2022**, *23*, 1087–1099. [CrossRef]
7. Copenhagen Resource Institute. *Resource Efficiency in the Building Sector Final Report*; Ecorys: Rotterdam, The Netherlands, 2014.
8. Herczeg, M.; McKinnon, D.; Milios, L.; Bakas, I.; Klaassens, E.; Svatikova, K. *Resource Efficiency in the Building Sector*; ECORYS Final Report; Copenhagen Resource Institute: Rotterdam, The Netherlands, 2014.
9. Pheng, L.S.; Hou, L.S. The economy and the construction industry. In *Construction Quality and the Economy. Management in the Built Environment*; Springer: Singapore, 2019. [CrossRef]
10. Wang, F.; Yao, M.; Huang, X.; Guo, H.; Zheng, P.; Yu, H. The Effects of Investment in Major Construction Projects on Regional Economic Growth Quality: A Difference-In-Differences Analysis Based on PPP Policy. *Sustainability* **2022**, *14*, 6796. [CrossRef]
11. Agbajor, F.D.; Mewomo, M.C. Green building research in South Africa: A scoping review and future roadmaps. *Energy Built. Environ.* **2022**, *in press*. [CrossRef]
12. Ali, E.B.; Anufriev, V.P.; Amfo, B. Green economy implementation in Ghana as a road map for a sustainable development drive: A review. *Sci. Afr.* **2021**, *12*, e00756. [CrossRef]
13. Ndinojuo, B.-C.E. Visual Images Associated With Reporting about Biodegradables in Nigerian Newspapers. *Int. J. Environ. Sustain. Soc. Sci.* **2020**, *1*, 46–51. [CrossRef]
14. Maqbool, R.; Amaechi, I.E. A systematic managerial perspective on the environmentally sustainable construction practices of UK. *Environ. Sci. Pollut. Res.* **2022**, *29*, 64132–64149. [CrossRef] [PubMed]
15. Bungau, C.C.; Bungau, T.; Prada, I.F.; Prada, M.F. Green Buildings as a Necessity for Sustainable Environment Development: Dilemmas and Challenges. *Sustainability* **2022**, *14*, 13121. [CrossRef]
16. Iqbal, M.; Ma, J.; Ahmad, N.; Hussain, K.; Waqas, M.; Liang, Y. Sustainable construction through energy management practices: An integrated hierarchal framework of drivers in the construction sector. *Environ. Sci. Pollut. Res.* **2022**, *29*, 90108–90127. [CrossRef]
17. Bohari, A.A.M.; Skitmore, M.; Xia, B.; Teo, M. Green oriented procurement for building projects: Preliminary findings from Malaysia. *J. Clean. Prod.* **2017**, *148*, 690–700. [CrossRef]
18. Hwang, B.G.; Shan, M.; Phua, H.; Chi, S. An exploratory analysis of risks in green residential building construction projects: The case of Singapore. *Sustainability* **2017**, *9*, 1116. [CrossRef]
19. Shen, L.Y.; Tam, V.W.Y.; Tam, L.; Ji, Y.B. Project feasibility study: The key to successful implementation of sustainable and socially responsible construction management practice. *J. Clean. Prod.* **2010**, *18*, 254–259. [CrossRef]
20. Carvalho, M.M.; Rabechini, R., Jr. Can project sustainability management impact project success? An empirical study applying a contingent approach. *Int. J. Proj. Manag.* **2017**, *35*, 1120–1132. [CrossRef]
21. David, E.; Niculescu, C. Volatile Organic Compounds (VOCs) as environmental pollutants: Occurrence and mitigation using nanomaterials. *Int. J. Environ. Res. Public Health* **2021**, *18*, 13147. [CrossRef]
22. Saleh, R.M.; Al-Swidi, A. The adoption of green building practices in construction projects in Qatar: A preliminary study. *Manag. Environ. Qual. Int. J.* **2019**, *30*, 1238–1255. [CrossRef]
23. Olawumi, T.O.; Chan, D.W. Identifying and prioritizing the benefits of integrating BIM and sustainability practices in construction projects: A Delphi survey of international experts. *Sustain. Cities Soc.* **2018**, *40*, 16–27. [CrossRef]
24. Ullah, S.; Khan, U.; Rahman, K.U.; Ullah, A. Problems and benefits of the China-Pakistan Economic Corridor (CPEC) for local people in Pakistan: A critical review. *Asian Perspect.* **2021**, *45*, 861–876. [CrossRef]
25. Darko, A.; Chan, A.P.C. Strategies to promote green building technologies adoption in developing countries: The case of Ghana. *Build. Environ.* **2018**, *130*, 74–84. [CrossRef]
26. Filho, W.L.; Setti, A.F.F.; Azeiteiro, U.M.; Lokupitiya, E.; Donkor, F.K.; Etim, N.N.; Matandirotya, N.; Olooto, F.M.; Sharifi, A.; Nagy, G.J.; et al. An overview of the interactions between food production and climate change. *Sci. Total. Environ.* **2022**, *838*, 156438. [CrossRef] [PubMed]
27. Rosenzweig, C.; Parry, M.L. Potential impact of climate change on world food supply. *Nature* **1994**, *367*, 133–138. [CrossRef]
28. Khan, M.; Lee, H.Y.; Bae, J.H. The Role of Transparency in Humanitarian Logistics. *Sustainability* **2019**, *11*, 2078. [CrossRef]
29. Hendriks, S.L.; Montgomery, H.; Benton, T.; Badiane, O.; de la Mata, G.C.; Fanzo, J.; Guinto, R.R.; Soussana, J.-F. Global environmental climate change, covid-19, and conflict threaten food security and nutrition. *BMJ* **2022**, *378*, e071534. [CrossRef]

30. Leslie, J. How Climate Change is Disrupting the Global Supply Chain. Yale Environ 360. 2022. Available online: https://e360.yale.edu/features/how-climate-change-is-disrupting-the-global-supply-chain (accessed on 15 November 2022).
31. Raj, S.; Roodbar, S.; Brinkley, C.; Wolfe, D.W. Food Security and Climate Change: Differences in Impacts and Adaptation Strategies for Rural Communities in the Global South and North. *Front. Sustain. Food Syst.* **2022**, *5*, 1–18. [CrossRef]
32. Cheung, W.W.; Watson, R.; Pauly, D. Signature of ocean warming in global fisheries catch. *Nature* **2013**, *497*, 365–368. [CrossRef]
33. Froehlich, H.E.; Gentry, R.R.; Halpern, B.S. Global change in marine aquaculture production potential under climate change. *Nat. Ecol. Evol.* **2018**, *2*, 1745–1750. [CrossRef]
34. Rahman, M.M.; Akter, R.; Bari, J.B.A.; Hasan, A.; Rahman, M.S.; Abu Shoaib, S.; Shatnawi, Z.N.; Alshayeb, A.F.; Shalabi, F.I.; Rahman, A.; et al. Analysis of Climate Change Impacts on the Food System Security of Saudi Arabia. *Sustainability* **2022**, *14*, 14482. [CrossRef]
35. Begum, M.; Masud, M.M.; Alam, L.; Bin Mokhtar, M.; Amir, A.A. The Adaptation Behaviour of Marine Fishermen towards Climate Change and Food Security: An Application of the Theory of Planned Behaviour and Health Belief Model. *Sustainability* **2022**, *14*, 14001. [CrossRef]
36. Siddique, M.A.B.; Ahammad, A.K.S.; Mahalder, B.; Alam, M.; Hasan, N.A.; Bashar, A.; Biswas, J.C.; Haque, M.M. Perceptions of the Impact of Climate Change on Performance of Fish Hatcheries in Bangladesh: An Empirical Study. *Fishes* **2022**, *7*, 270. [CrossRef]
37. Amir, F. CPEC and regional integration. In Proceedings of the 32nd Conference of the Pakistan Society of Development Economists, Islamabad, Pakistan, 13–15 December 2016; pp. 579–596. Available online: http://www.jstor.org/stable/44986506 (accessed on 20 October 2022).
38. Rizvi, H.A. The China-Pakistan Economic Corridor: Regional Cooperation and Socio-Economic Development. *Strateg. Stud.* **2014**, *34/35*, 1–17. Available online: https://www.jstor.org/stable/48527472 (accessed on 15 November 2022).
39. Wen, R.; Saleeem, H. The Opportunities and Challenges That the Belt and Road Initiative Brings: Analysis from Perspective of China-Pakistan Economic Corridor. *Am. J. Ind. Bus. Manag.* **2021**, *11*, 675–691. [CrossRef]
40. Khadim, Z.; Batool, I.; Lodhi, M.B. China–Pakistan Economic Corridor, Logistics Developments and Economic Growth in Pakistan. *Logistics* **2021**, *5*, 35. [CrossRef]
41. Kouser, S.; Subhan, A. Abedullah Uncovering Pakistan's Environmental Risks and Remedies under the China-Pakistan Economic Corridor. *Environ. Sci. Pollut. Res.* **2019**, *27*, 4661–4663. [CrossRef]
42. Surahio, M.K.; Gu, S.; Mahesar, H.A.; Soomro, M.M. China–Pakistan Economic Corridor: Macro Environmental Factors and Security Challenges. *SAGE Open* **2022**, *12*, 21582440221. [CrossRef]
43. Anwar, S.U.; Wuyi, Z.; Shah, S.Z.A.; Ullah, Q.; Amir, S.M.; Syed, A. The resilient economic impact of CPEC and future of MNCs: Evidence from Pakistan. *Front. Environ. Sci.* **2022**, *10*, 1–14. [CrossRef]
44. Bohari, A.A.M.; Xia, B. Developing green procurement framework for construction projects in Malaysia. In Proceedings of the 6th International Conference on Engineering, Project, and Production Management (EPPM2015), Gold Coast, Australia, 2–4 September 2015; Association of Engineering, Project, and Production Management (EPPM). pp. 282–290.
45. Hashmi, A.; Bhatti, A.I.; Ahmed, S.; Tariq, M.A.U.R.; Savitsky, A. Revisiting the Indus Basin Model for an Energy Sustainable Pakistan. *Water* **2022**, *14*, 702. [CrossRef]
46. Ding, Z.; Fan, Z.; Tam, V.W.; Bian, Y.; Li, S.; Illankoon, I.C.S.; Moon, S. Green building evaluation system implementation. *Build. Environ.* **2018**, *133*, 32–40. [CrossRef]
47. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Pitman: Marblehead, MA, USA, 1984.
48. Wang, H.; Khan, M.A.S.; Anwar, F.; Shahzad, F.; Adu, D.; Murad, M. Green Innovation Practices and Its Impacts on Environmental and Organizational Performance. *Front. Psychol.* **2021**, *11*, 1–15. [CrossRef] [PubMed]
49. Santos, H.; Lannelongue, G.; Gonzalez-Benito, J. Integrating Green Practices into Operational Performance: Evidence from Brazilian Manufacturers. *Sustainability* **2019**, *11*, 2956. [CrossRef]
50. Muangmee, C.; Dacko-Pikiewicz, Z.; Meekaewkunchorn, N.; Kassakorn, N.; Khalid, B. Green Entrepreneurial Orientation and Green Innovation in Small and Medium-Sized Enterprises (SMEs). *Soc. Sci.* **2021**, *10*, 136. [CrossRef]
51. Islam, S.; Karia, N.; Fauzi, F.B.A.; Soliman, M. A review on green supply chain aspects and practices. *Manag. Mark.* **2017**, *12*, 12–36. [CrossRef]
52. Suyendikova, G.K.; Barykin, S.E.; Sergeev, S.M.; Kapustina, I.V.; Krupnov, Y.; NikolaevnaShchepkina, N. Sustainable development of smart cities and smart territories based on the model of minimizing externalities. *F1000Research* **2022**, *11*, 522. [CrossRef]
53. Ndinojuo, B.C.E. Framing biodegradable issues in selected online Nigerian newspapers: An environmental communication study. *Acta Univ. Danubius. Commun.* **2020**, *14*, 120–139.
54. Khan, M.; Parvaiz, G.S.; Dedahanov, A.T.; Abdurazzakov, O.S.; Rakhmonov, D.A. The Impact of Technologies of Traceability and Transparency in Supply Chains. *Sustainability* **2022**, *14*, 16336. [CrossRef]
55. Ekins, P.; Zenghelis, D. The costs and benefits of environmental sustainability. *Sustain. Sci.* **2021**, *16*, 949–965. [CrossRef]
56. Andersson, S.; Svensson, G.; Molina-Castillo, F.; Otero-Neira, C.; Lindgren, J.; Karlsson, N.P.E.; Laurell, H. Sustainable development—Direct and indirect effects between economic, social, and environmental dimensions in business practices. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 1158–1172. [CrossRef]
57. Ahmadi-Gh, Z.; Bello-Pintado, A. Why is manufacturing not more sustainable? The effects of different sustainability practices on sustainability outcomes and competitive advantage. *J. Clean. Prod.* **2022**, *337*, 130392. [CrossRef]

58. Depoux, A.; Hémono, M.; Puig-Malet, S.; Pédron, R.; Flahault, A. Communicating climate change and health in the media. *Public Health Rev.* **2017**, *38*, 7. [CrossRef] [PubMed]
59. Mavrodieva, A.V.; Rachman, O.K.; Harahap, V.B.; Shaw, R. Role of Social Media as a Soft Power Tool in Raising Public Awareness and Engagement in Addressing Climate Change. *Climate* **2019**, *7*, 122. [CrossRef]
60. Feliciano, D.; Sobenes, A. Stakeholders' perceptions of factors influencing climate change risk in a Central America hotspot. *Reg. Environ. Chang.* **2022**, *22*, 23. [CrossRef]
61. Wu, M.; Long, R.; Yang, S.; Wang, X.; Chen, H. Evolution of the Knowledge Mapping of Climate Change Communication Research: Basic Status, Research Hotspots, and Prospects. *Int. J. Environ. Res. Public Health* **2022**, *19*, 11305. [CrossRef] [PubMed]
62. Awan, U.; Kraslawski, A.; Huiskonen, J. Understanding the Relationship between Stakeholder Pressure and Sustainability Performance in Manufacturing Firms in Pakistan. *Procedia Manuf.* **2017**, *11*, 768–777. [CrossRef]
63. Hörisch, J.; Freeman, R.E.; Schaltegger, S. Applying Stakeholder theory in sustainability management: Links, similarities, dissimilarities, and a conceptual framework. *Organ. Environ.* **2014**, *27*, 328–346. [CrossRef]
64. Barney, J.B. Why resource-based theory's model of profit appropriation must incorporate a stakeholder perspective. *Strateg. Manag. J.* **2018**, *39*, 3305–3325. [CrossRef]
65. Kujala, J.; Sachs, S.; Leinonen, H.; Heikkinen, A.; Laude, D. Stakeholder Engagement: Past, Present, and Future. *Bus. Soc.* **2022**, *61*, 1136–1196. [CrossRef]
66. Wang, L.; Li, W.; Qi, L. Stakeholder Pressures and Corporate Environmental Strategies: A Meta-Analysis. *Sustainability* **2020**, *12*, 1172. [CrossRef]
67. Barko, T.; Cremers, M.; Renneboog, L. Shareholder Engagement on Environmental, Social, and Governance Performance. *J. Bus. Ethics* **2022**, *180*, 777–812. [CrossRef]
68. Kordsachia, O.; Focke, M.; Velte, P. Do sustainable institutional investors contribute to firms' environmental performance? Empirical evidence from Europe. *Rev. Manag. Sci.* **2022**, *16*, 1409–1436. [CrossRef]
69. Pfajfar, G.; Shoham, A.; Małecka, A.; Zalaznik, M. Value of corporate social responsibility for multiple stakeholders and social impact—Relationship marketing perspective. *J. Bus. Res.* **2022**, *143*, 46–61. [CrossRef]
70. Marshall, A.; Rao, S.; Roy, P.P.; Thapa, C. Mandatory corporate social responsibility and foreign institutional investor preferences. *J. Corp. Financ.* **2022**, *76*, 102261. [CrossRef]
71. Elcio, M.T.; Chee, Y.W. Towards a theory of multi-tier sustainable supply chains: A systematic literature review. *Supply Chain. Manag.* **2014**, *19*, 643–663. [CrossRef]
72. Zhu, Q. Green supply chain management in China: Pressures, practices and performance. *Int. J. Oper. Prod. Manag.* **2012**, *25*, 449–468. [CrossRef]
73. Aarseth, W.; Ahola, T.; Aaltonen, K.; Økland, A.; Andersen, B. Project sustainability strategies: A systematic literature review. *Int. J. Proj. Manag.* **2016**, *35*, 1071–1083. [CrossRef]
74. Banihashemi, S.; Hosseini, M.R.; Golizadeh, H.; Sankaran, S. Critical success factors (CSFs) for integration of sustainability into construction project management practices in developing countries. *Int. J. Proj. Manag.* **2017**, *35*, 1103–1119. [CrossRef]
75. Eskerod, P.; Huemann, M. Sustainable development and project stakeholder management: What standards say. *Int. J. Manag. Proj. Bus.* **2013**, *6*, 36–50. [CrossRef]
76. Martens, M.L.; Carvalho, M.M. Sustainability and success variables in the project management context: An expert panel. *Proj. Manag. J.* **2017**, *47*, 24–43. [CrossRef]
77. Silvius, A.J.G.; Kampinga, M.; Paniagua, S.; Mooi, H. Considering sustainability in project management decision making: An investigation using Q-methodology. *Int. J. Proj. Manag.* **2017**, *35*, 1133–1150. [CrossRef]
78. Hwang, B.G.; Tan, J.S. Green building project management: Obstacles and solutions for sustainable development. *Sustain. Dev.* **2012**, *20*, 335–349. [CrossRef]
79. Qi, G.Y.; Shen, L.Y.; Zeng, S.X.; Jorge, O.J. The drivers for contractors' green innovation: An industry perspective. *J. Clean. Prod.* **2010**, *18*, 1358–1365. [CrossRef]
80. Olawumi, T.O.; Chan, D.W.; Wong, J.K.; Chan, A.P. Barriers to the integration of BIM and sustainability practices in construction projects: A Delphi survey of international experts. *J. Build. Eng.* **2018**, *20*, 60–71. [CrossRef]
81. Darko, A.; Chan, A.P.C.; Yang, Y.; Shan, M.; He, B.-J.; Gou, Z. Influences of barriers, drivers, and promotion strategies on green building technologies adoption in developing countries: The Ghanaian case. *J. Clean. Prod.* **2018**, *200*, 687–703. [CrossRef]
82. Darko, A.; Chan, A.P.; Huo, X.; Owusu-Manu, D.G. A scientometric analysis and visualization of global green building research. *Build. Environ.* **2019**, *149*, 501–511. [CrossRef]
83. Wong, J.K.W.; San Chan, J.K.; Wadu, M.J. Facilitating effective green procurement in construction projects: An empirical study of the enablers. *J. Clean. Prod.* **2016**, *135*, 859–871. [CrossRef]
84. Varnäs, A.; Balfors, B.; Faith-Ell, C. Environmental consideration in procurement of construction contracts: Current practice, problems and opportunities in green procurement in the Swedish construction industry. *J. Clean. Prod.* **2009**, *17*, 1214–1222. [CrossRef]
85. Shan, M.; Hwang, B. Green building rating systems: Global reviews of practices and research efforts. *Sustain. Cities Soc.* **2018**, *39*, 172–180. [CrossRef]
86. Zhu, Q.; Sarkis, J.; Lai, K. Confirmation of a measurement model for green supply chain management practices implementation. *Int. J. Prod. Econ.* **2008**, *111*, 261–273. [CrossRef]

87. Brones, F.; de Carvalho, M.M.; de Senzi Zancul, E. Ecodesign in project management: A missing link for the integration of sustainability in product development? *J. Clean. Prod.* **2014**, *80*, 106–118. [CrossRef]
88. Lam, P.T.I.; Chan, E.H.W.; Poon, C.S.; Chau, C.K.; Chun, K.P. Factors affecting the implementation of green specifications in construction. *J. Environ. Manag.* **2010**, *91*, 654–661. [CrossRef] [PubMed]
89. Svensson, G.; Ferro, C.; Høgevold, N.; Padin, C.; Carlos Sosa Varela, J.; Sarstedt, M. Framing the triple bottom line approach: Direct and mediation effects between economic, social and environmental elements. *J. Clean. Prod.* **2018**, *197*, 972–991. [CrossRef]
90. Ahmad, S.; Wong, K.Y. Development of weighted triple-bottom line sustainability indicators for the Malaysian food manufacturing industry using the Delphi method. *J. Clean. Prod.* **2019**, *229*, 1167–1182. [CrossRef]
91. Vongjaturapat, S.; Chaveesuk, S.; Chotikakamthorn, N.; Tongkhambanchong, S. Analysis of Factor Influencing the Tablet Acceptance for Library Information Services: A Combination of UTAUT and TTF Model. *J. Inf. Knowl. Manag.* **2015**, *14*, 1550023. [CrossRef]
92. Mahat, N.A.A.; Alwee, S.N.A.S.; Adnan, H.; Hassan, A.A. Propelling green building technologies adoption in Malaysia construction industry. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2019; Volume 233, p. 022032.
93. Onubi, H.O.; Yusof, N.; Hassan, A.S. Effects of green construction on project's economic performance. *J. Financ. Manag. Prop. Constr.* **2020**, *25*, 331–346. [CrossRef]
94. Onubi, H.O.; Yusof, N.A.; Hassan, A.S. Green construction practices: Ensuring client satisfaction through health and safety performance. *Environ. Sci. Pollut. Res.* **2022**, *29*, 5431–5444. [CrossRef] [PubMed]
95. Collins, W.; Parrish, K.; Gibson, G.E., Jr. Development of a project scope definition and assessment tool for small industrial construction projects. *J. Manag. Eng.* **2017**, *33*, 04017015. [CrossRef]
96. Zarei, B.; Sharifi, H.; Chaghouee, Y. Delay causes analysis in complex construction projects: A semantic network analysis approach. *Prod. Plan. Control* **2018**, *29*, 29–40. [CrossRef]
97. Albort-Morant, G.; Leal-Millán, A.; Cepeda-Carrión, G. The antecedents of green innovation performance: A model of learning and capabilities. *J. Bus. Res.* **2016**, *69*, 4912–4917. [CrossRef]
98. Fornell, C.G.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* **1981**, *18*, 39–50. [CrossRef]