buildings

MDPI

Article

Barriers to Social Responsibility Implementation in Belt and Road Mega Infrastructure Projects: A Hybrid Fuzzy DEMATEL-ISM-MICMAC Approach

Mohammed Taha Alqershy * **and Qian Shi**

School of Economics and Management, Tongji University, Shanghai 200092, China; qianshi@tongji.edu.cn
* Correspondence: alqershy@tongji.edu.cn or moh.alqershi@hotmail.com

Abstract: Social responsibility strategies are indispensable for the sustainable development of the Belt and Road Initiative (BRI). Nonetheless, the application of social responsibility (SR) policies in such mega infrastructure projects remains a pressing concern since a number of barriers impede the effective integration of SR practices. Therefore, this paper seeks to identify these barriers and determine the interrelationships among them. A list of barriers was first identified from a literature review and expert consultation. Subsequently, a survey was designed to collect experts' views on the interrelations among these barriers. The Fuzzy DEMATEL method was employed to analyze these barriers' causal relationships and interdependencies. Subsequently, the ISM approach was used to develop a hierarchical structure and establish the driving and dependence relationships among them. The classification of barriers, based on driving power and dependence power, was accomplished using the MICMAC analysis. The results reveal that barriers such as "The diverse institutions, cultures, and social conditions among BRI countries", "Lack of robust social responsibility laws and regulations in the host countries", "Lack of stringent and legally binding BRI policies and guidelines governing social responsibility", "The diverse environmental and social frameworks and standards among BRI countries", "The diverse international, national, and private funds for BRI projects", and "Lack of customer awareness and knowledge of CSR" are the most critical barriers and have the greatest influence on social responsibility implementation. Identifying these key barriers and their interrelationships will assist decision-makers, policymakers, and other stakeholders involved in BRI mega infrastructure projects in minimizing or overcoming them, hence increasing the chances of successfully integrating social responsibility practices within these projects.

Keywords: megaproject social responsibility; CSR; Belt and Road Initiative; BRI; DEMATEL; ISM

Citation: Alqershy, M.T.; Shi, Q. Barriers to Social Responsibility Implementation in Belt and Road Mega Infrastructure Projects: A Hybrid Fuzzy DEMATEL-ISM-MICMAC Approach. *Buildings* **2023**, *13*, 1561. https://doi.org/10.3390/buildings13061561

Academic Editor: Giuseppina Uva

Received: 31 May 2023
Revised: 14 June 2023
Accepted: 16 June 2023
Published: 19 June 2023

1. Introduction

Mega infrastructure projects are large-scale construction projects that involve developing infrastructures critical to a country or region's economic growth and development [1,2]. The term 'infrastructure' refers to different types of services, including public utilities such as electricity, telecommunications, water supply, sanitation and sewerage, solid waste collection and disposal, and pipelines, in addition to other forms of public facilities such as bridges, tunnels, high-speed rail lines, airports, seaports, canals, and dams [3]. Mega-infrastructure projects often necessitate extensive land use, long-term financial commitments, and substantial resource consumption [4,5], which can have significant economic, environmental, and societal impacts. Therefore, their contribution to sustainable development is crucial [1,6].

China's Belt and Road Initiative (BRI) has captured the attention of the international media and academia since its launch in 2013 [7]. By 2021, China had signed 206 BRI partnership treaties with 140 nations and 32 international institutions [8]. The initiative promotes regional and transcontinental collaboration and accessibility through investment opportunities, trade, and infrastructure initiatives [9]. This initiative covers the "Silk Road Economic Belt" and "21st Century Maritime Silk Road", in which several megaprojects like railways, airports, dams, roads, bridges, and pipelines across several continents are being developed. This could improve connectivity, reduce transportation costs, and stimulate economic growth. The Belt and Road Initiative's transportation projects have resulted in significant benefits. These include a 12% decrease in travel time within economic corridors and a 3% decrease in travel time globally. Moreover, there has been a trade increase of 2.8–9.7% for corridor economies and 1.7–6.2% for the rest of the world. Additionally, these projects have led to income growth of up to 3.4%, the elimination of extreme poverty for 7.6 million individuals, and the reduction of moderate poverty for 32 million people [10]. Despite the significant economic benefits, such mega transboundary infrastructure projects have some considerable environmental and social risks in addition to the economic issues for the local communities living in those areas where these projects are being developed [11,12]. These environmental and social challenges are considered to be an obstacle to the development of this initiative. With increased criticism from international organizations and the BRI host countries, these challenges, if left unaddressed, will affect the image and reputation of this initiative and hinder its progress [12].

Over the past few years, there has been a notable surge in the attention given by professionals and academics to the concept of megaproject social responsibility [4,13,14]. It involves a diverse set of responsibilities and actions taken by relevant stakeholders to address and mitigate any harmful impacts of a megaproject on social, economic, and environmental outcomes [15,16]. The actions taken are intended to be socially responsible and may cover a wide range of activities, such as environmental protection, community engagement, labor rights, and decision-making transparency [13]. Megaprojects place substantial demands on social resources, including materials, financial investments, and human capital, during their construction phase. At the same time, these projects result in significant environmental pollution and socioeconomic issues [17,18]. In highly complex and dynamic environments of BRI mega infrastructure projects, the absence of social responsibility (SR) poses a persistent issue that hinders sustainable development [13,15]. To address this issue, it is crucial to implement adequate measures to ensure the maintenance of social responsibilities during the governance of these megaprojects. Social responsibility is widely recognized as one of the most effective strategies for tackling multiple challenges simultaneously. By embracing social responsibility, organizations can effectively reduce negative environmental impacts, promote social progress, and foster economic growth. This approach provides a holistic framework that aligns environmental, social, and economic objectives, leading to long-term success and sustainable development [19,20].

Obstacles to social responsibility performance in BRI mega infrastructure projects can stem from multiple sources. These sources include the unique nature of these projects, regulatory and legal frameworks, organizational factors, and project-based characteristics. The nature of BRI projects, characterized by their large-scale, complex, and dynamic nature, presents challenges in implementing social responsibility practices effectively. The diverse geographical locations, extensive supply chains, and involvement of multiple stakeholders further add to the complexity [21]. While existing research has contributed to our understanding of megaproject social responsibility behavior [6,18,22,23], there is a notable scarcity of studies specifically addressing the barriers encountered by the organizations responsible for executing BRI megaprojects. Additionally, a lack of empirical research focused on identifying and prioritizing these barriers in the construction industry has been observed [19,24]. Thus, there is a crucial need to fill these gaps in the literature and provide decision-makers with reliable information to make informed decisions and facilitate the successful implementation of SR in BRI megaprojects. Therefore, this study aims to:

- Explore and identify the barriers to the effective integration of social responsibility practices within mega belt and road infrastructure projects.
- Analyze the interrelations and influence of the identified barriers using a hybrid fuzzy Decision Making Trial and Evaluation Laboratory (DEMATEL), Interpretive

Structural Modelling (ISM), and Matrice d'Impacts Croisés Multiplication Appliqués à un Classement (MICMAC) approach.

The subsequent sections of this paper are structured as follows: Section 2 provides a comprehensive review of the existing literature on social responsibility in the BRI megaprojects, accompanied by an assessment of the barriers identified. The methodology employed in this study is elucidated in Section 3, while Section 4 presents the findings and analysis derived from the research. In Section 5, the study findings are thoroughly discussed. Lastly, the conclusion summarizes the study's key findings and highlights the study's implications, limitations, and future research.

2. Literature Review

2.1. Social Responsibility in BRI Megaprojects

Megaproject social responsibility (MSR) encompasses the policies and practices implemented by stakeholders throughout the life cycle of a project to demonstrate their commitment to the well-being and welfare of the larger community [1]. It is a collaborative effort among project sponsors, governments, private companies, non-governmental organizations (NGOs), and local communities to develop responsible strategies and practices for managing the impacts of megaprojects on society and the environment. MSR differs significantly from corporate social responsibility (CSR). CSR generally involves broad, company-wide initiatives addressing social, environmental, and governance issues. Conversely, MSR is tailored to the specific context and challenges of individual megaprojects, with a focus on managing the unique risks and opportunities associated with large-scale development [1]. Unlike conventional projects, megaprojects are frequently designed to transform society in an ambitious way. As well as potentially causing societal disturbances and inequality, the magnitude of these projects places enormous pressure on the world's oceans, rivers, grasslands, forests, and atmosphere [25]. Thus, the interconnected difficulties and growing controversy surrounding the creation of megaprojects frequently become a cause célèbre, drawing attention and concern worldwide [26]. Because they have the potential to alter human activity drastically and have long-lasting effects on the planet, megaprojects are a significant concern in the context of global sustainability [16].

BRI mega infrastructure projects can potentially drive social and economic development by improving agricultural access, facilitating transportation, and reducing production costs. They play a vital role in connecting and promoting previously isolated communities [27]. However, when planned and built in significant ecological areas, they may affect ecosystems and biodiversity significantly [27]. The sheer magnitude of this initiative has prompted worries from academics and civil society organizations about its possible adverse impacts on the environment [11,27]. A significant proportion of the BRI participating countries are developing countries with various environmental and climatic concerns [12]. Some countries prioritize economic growth ahead of ecological conservation [28]. BRI projects could exacerbate the situation. Furthermore, inadequate investment in workforce development and neglecting employee protection and safety measures pose significant risks within Chinese multinational corporations (MNCs). The high rate of accidents and fatalities within these corporations reflects the shortcomings in corporate safety protocols. This issue is of great concern, as it directly impacts the ability of Chinese MNCs to expand globally under the BRI and hinders the overall progress of the initiative [29]. Additionally, several studies [30,31] have highlighted the negative externalities associated with Chinese-funded infrastructure projects. These externalities encompass issues such as local corruption, lower levels of trade union participation, and labor employment conflict. Consequently, these findings underscore the importance of addressing these concerns in order to ensure that the BRI projects align with sustainable development goals and prioritize the well-being of local communities. Concerns at both local and global levels regarding the adverse social impacts of infrastructure construction have played a role in causing delays in railway projects.

2.2. Barriers to SR Implementation in BRI Mega Infrastructure Projects

The barriers to SR implementation in BRI megaprojects have been categorized into five main groups: BRI-related, regulatory, organizational, stakeholder-related, and industrial barriers. These categories encompass a comprehensive range of barriers to SR implementation in BRI megaprojects, covering aspects from macro to micro levels. These categories are outlined in Table 1 and are explained in detail as follows.

2.2.1. BRI-Related Barriers

- The diverse institutions, cultures, and social conditions among BRI countries (*B1*)

BRI countries' diverse institutions, political contexts, cultures, and social conditions are considered a barrier to implementing social responsibility in belt and road projects [9,32]. Social responsibility governance in these projects might be a significant concern for BRI-participating countries. According to Huang [33], the Chinese government has little experience in leading transboundary projects, and there is no formal structure for coordination among the BRI countries. Different national, geopolitical, and economic contexts play a crucial role in determining the adoption of regional environmental agreements, including considering whether they should be mandatory or voluntary. These factors have a significant impact on shaping decisions across various regions [32].

- The diverse environmental and social frameworks among BRI countries (*B2*)

More than 140 nations across four continents are participating in the BRI, each with its own unique social and environmental regulations, authority, and experience levels [8]. Different BRI countries may have different environmental and social standards and regulations, making it challenging for companies operating in multiple countries to comply with these requirements [32]. This can lead to confusion and a lack of clarity about what is expected of businesses regarding social and environmental responsibility, thereby hindering social responsibility implementation, especially in transboundary projects involving more than one country [32]. Ascensão et al. [27] suggested that the main actors in the BRI could use the opportunity to create comprehensive yet adaptable Strategic Environmental and Social Assessments frameworks and standards.

- The diverse international, national, and private funds for BRI projects (*B3*)

Given the extensive participation of numerous countries, private organizations, and government agencies in the BRI, the funding sources for the initiative are highly diverse. This wide array of funding sources reflects the global nature of the BRI and the involvement of various public and private stakeholders [27]. This diversity in funding sources can also pose a challenge to the implementation of social responsibility in BRI projects. With multiple stakeholders and funding entities involved, there may be variations in their expectations, priorities, and approaches to social responsibility.

2.2.2. Regulatory Barriers

- Lack of stringent and legally binding BRI policies governing social responsibility (*B4*)

In the absence of stricter guidelines outlining concrete sets of actions, China's ambitions for a "green BRI" are highly unlikely to be realized [34]. Since practically all forms of BRI-specific regulations are informal documents rather than legally enforceable agreements, "soft law" describes the normative framework through which China interacts with BRI partner countries [35]. If not properly implemented, the "green BRI" principles may be seen as superficial attempts to improve China's global image rather than ensuring genuine environmental protection [34].

- Lack of robust social responsibility laws and regulations in the host countries (*B5*)

China has been working to improve and expand the "green BRI" institutional framework, but a truly "green BRI" will involve strong environmental governance in BRI recipient countries [9,34]. A large part of the BRI's social responsibility hinges on the political will and institutional capacity of BRI host countries to establish and impose robust social and environmental rules, as many Chinese policies highly encourage Chinese enterprises to comply with partner countries' environmental and social regulatory requirements [34]. However, to attract foreign direct investment, certain low-income countries may put national economic growth ahead of environmental preservation and enact lax environmental legislation [28]. The BRI poses significant environmental concerns, particularly to nations with weak environmental governance history [36]. Environmental standards may be in place, but they may not be strictly adhered to.

2.2.3. Organizational Barriers

- Lack of awareness and knowledge of SR within the firm (*B6*)

Insufficient awareness of social responsibility has been cited as a major barrier to its incorporation into many construction firms and projects. This is due to the fact that most small and medium-sized enterprises are run by individuals who, by virtue of ownership rights, have little interest in or understanding of their firm's social responsibilities. Alotaibi et al. [19] indicated that the construction industry in the Kingdom of Saudi Arabia has a hazy understanding of social responsibility as a concept, and social responsibility is regarded as a charitable endeavor.

- Lack of capacity and expertise (*B7*)

The successful integration of social responsibility into an organization's business activities can be hindered by the lack of capacity and experts in the organization [37]. It is crucial to create adequate training for personnel at all levels to advance their knowledge and skills regarding social responsibility practices [38]. Ensuring the successful implementation of social responsibility practices requires experts within the organization.

- Lack of full commitment and support from top management (*B8*)

Top management needs to integrate social responsibility into the company's mission, vision, and goals in order to ensure successful implementation [19]. For stakeholders, both inside and externally, to change their perceptions, top management's commitment to social responsibility is necessary [19]. Conversely, inadequate social responsibility implementation in any organization's activities will undoubtedly arise from a lack of top management support [38].

- Lack of internal resources (time, financial, and human resources) (*B9*)

Several organizations face challenges in implementing social responsibility in their business, with one major obstacle being the lack of internal resources [39,40]. This issue is particularly prevalent among small and medium-sized enterprises (SMEs) that often do not have a dedicated CSR department. Instead, CSR management is typically assigned to other departments within the organization whose primary focus lies outside the realm of social responsibility. Consequently, these departments are primarily evaluated based on their original scope of responsibilities rather than their CSR efforts [24].

- Lack of familiarity with host countries' laws and regulations (*B10*)

Lack of familiarity with the laws and regulations of partner countries hinders the smooth implementation of social responsibility in the host countries [41]. One possible explanation is that Chinese enterprises simply do not have enough experience working abroad. In 2014, the top 100 non-financial corporations around the globe had an average internationalization index of 64.6%, whereas the top 100 Chinese mainland firms had an internationalization index of only 28.2%. Not a single Chinese company scored above the median on the internationalization index [42]. Given Chinese companies' lack of familiarity with the legal systems of host countries, there is a misunderstanding between Chinese and local stakeholders [41]. For instance, the Polish central government fined China Overseas Engineering Group Corporation USD 271.1 million and ordered the company to suspend construction on the A2 government highway project [37]. It was found that not enough attention was paid to Polish local environmental protection legislation, which led to this failure [43].

2.2.4. CSR Characteristics

- Incremental time and cost (*B11*)

Construction companies can be encouraged to implement social reasonability practices by considering the non-financial benefits of integrating CSR into their businesses, which include reputation and image, human resources, and a unique brand. Nevertheless, the economic benefits of social responsibility activities in the built environment are still up for debate in response to the difference in a business context (such as scope, scale, and location [44]. The benefits of SR are often met with skepticism in the construction sector. There is a shortage of solid evidence proving the efficiency of SR or connecting its deployment to higher revenues. [43] suggested that overestimating the cost of implementing CSR practices could cause construction firms to incur high charges. It has been confirmed by [45] that CSR initiatives, such as corporate volunteerism during the execution of the project or community consultation prior to project delivery, are not implemented because of the significant time and cost constraints.

- Lack of measurement of social responsibility benefits (*B12*)

Wang et al. [46] noted that construction enterprises often invest more in implementing CSR practices but may see few returns at first, leading some to conclude that CSR initiatives are a waste of time and money for their businesses. They asserted that this inaccurate assessment of CSR's economic benefit typically occurs before the U-inflection curve's point. Beyond this stage, however, CSR initiatives within construction firms will have ample time to mature, yielding measurable results reflected in improved financial output [37].

- Limited sustainable materials and technologies (*B13*)

The advancement of technology and innovation may facilitate the environmental protection aspects of megaproject social responsibility. In monetary terms, construction expenses may be lowered due to technological advancement and innovation. For instance, using environmentally friendly products like fiberglass windows might reduce costs [47]. The use of modern materials and technology by construction parties is encouraged in order to conserve resources and improve energy efficiency [47]. However, enterprises continue to be reluctant to implement strategies and regulations that can enhance resource and energy performance through technical advancements like using renewable energy sources [48].

2.2.5. Stakeholder-Related Barriers

- Ineffective communication and coordination among stakeholders (*B14*)

Stakeholders are essential to the success of SR implementation; hence it is critical to involve them in SR training programs. Examples of relevant stakeholders include the government, contractors, consultants, and suppliers [49]. It is vital to involve these stakeholders in the implementation of SR. However, insufficient information and poor stakeholder communication frequently lead to inefficient SR implementation [37]. BRI needs to reduce the social and institutional distance between China and its BRI partners as it is managed by various interconnected governance systems [34]. Although countries may be close in terms of geography, they may be institutionally and socially distant from one another if they do not share governance systems or if they lack social networks, values, and expertise. Significant transaction costs are associated with social responsibility management because of the cultural distance and communication barrier between China and the BRI countries.

- Unclear stakeholder role and power (*B15*)

Social initiatives might be less effective due to the unclear distribution of power among stakeholders and conflicts of interest among them [50]. This frequently happens when

CSR is being implemented on a project level. When 'stakeholders' roles and power are unclear, it can be challenging to determine who is responsible for what aspects of the social responsibility initiative. This can lead to a lack of direction and coordination, resulting in a disjointed effort that is less effective overall. When it comes to significant infrastructure projects, for instance, the government, construction companies, and the general public all have vested interests that might create conflict [1]. These conflicts of interest may be difficult to detect and address, making the governance of social responsibility in these projects more challenging.

- Lack of public participation and stakeholder engagement (*B16*)

The successful implementation of social responsibility in such projects may be hampered by a lack of interest from external stakeholders and a reluctance to provide information about their participation in responsible activities. These projects inherently offer both positive and negative societal impacts. Thus, when there is a vital interaction between all stakeholders regarding social responsibility issues, this will enhance the social responsibility performance of such organizations [1].

2.2.6. Industrial Barriers

- Lack of customer knowledge and awareness about CSR (*B17*)

Some social responsibility practices may be driven by market pressure [37]. On the other hand, customers' ignorance about the economic, social, and environmental endeavors of construction firms may result in a low priority being given to CSR practices in construction projects [37,51]. When customers become more conscious about social responsibility, they may demand that the government enact stricter laws and regulations that hold construction organizations accountable for their actions.

- Lack of evaluation frameworks, procedures, and tools to measure CSR performance (*B18*)

The construction industry lacks standardized tools and procedures for CSR evaluation, hindering the effective communication of the economic, social, and environmental impacts of CSR activities to stakeholders [48,51,52]. Many construction organizations are small or medium-sized enterprises that do not use standard reporting formats, and in most cases, post-construction services lack defined operating processes. Therefore, there is a possibility that consumer comments and complaints will be ignored [24].

- Lack of credibility of the disclosed CSR information (*B19*)

Since the construction industry has been widely criticized for its detrimental impacts on society and the environment, it is challenging to confirm the accuracy and reliability of the social responsibility data being provided [24]. Social responsibility requires a commitment to transparency and accuracy in disclosing the impacts of these megaprojects. Third-party verification for the disclosed CSR information is suggested by some researchers as one potential solution [52–54].

Table 1. Barriers to social responsibility implementation in BRI mega infrastructure projects.

Main Barriers	Definition	Sub-Barriers	Sources
BRI related	Challenges that arise specifically due to the nature of BRI megaprojects.	B1. The diverse institutions, cultures, and social conditions among BRI countries.	[32]
		B2. The diverse environmental and social frameworks among BRI countries.	[11,27,32,55–57]
		B3. The diverse international, national, and private funds for BRI projects.	[27,56]

Table 1. *Cont.*

Main Barriers	Definition	Sub-Barriers	Sources
Regulatory Barriers	Challenges that arise from inadequate and non-binding laws and regulations, hindering the effective implementation of SR practices in BRI megaprojects.	B4. Lack of stringent and legally binding BRI policies and guidelines governing social responsibility.	[12,34,35,41,58]
		B5. Lack of robust social responsibility laws and regulations in the host countries.	[11,34]
Organizational Barriers	Barriers that pertain to challenges within the entities responsible for executing BRI mega infrastructure projects.	B6. Lack of awareness and knowledge of social responsibility within the firm.	[19,37,44,47,59–63]
		B7. Lack of capacity and expertise.	[19,37,44,47,51,61,62]
		B8. Lack of full commitment and support from top management.	[19,37,47]
		B9. Lack of internal resources (time, financial, and human resources).	[32,37,62,64,65]
		B10. Lack of familiarity with the laws and regulations of host countries.	[41,55]
CSR Characteristics	Barriers related to the unique characteristics or nature of corporate social responsibility (CSR).	B11. Incremental time and cost.	[19,37,61,64,66,67]
		B12. Lack of measurement of social responsibility benefits.	[37,47,61,62,64,65,68]
		B13. Limited sustainable materials and technologies.	[37,47,64]
Stakeholder-Related Barriers	Barriers that arise from challenges with engaging and managing stakeholders in BRI projects.	B14. Ineffective communication and coordination among stakeholders.	[19,37]
		B15. Unclear stakeholder power and role.	[37]
		B16. Lack of public participation and stakeholder engagement.	[32,62,66,69]
Industrial Barriers	Barriers that are specific to the industry or sector in which the BRI projects operate. They may include industry-specific challenges in implementing SR practices.	B17. Lack of customer knowledge and awareness about CSR.	[37,44,47,51]
		B18. Lack of evaluation frameworks, procedures, and tools to measure CSR performance.	[37,47,62,70]
		B19. Lack of credibility of the disclosed CSR information.	[37,47]

3. Methods

Different multi-criteria decision-making (MCDM) techniques have been employed in barrier studies. The widely utilized methods in this regard include DEMATEL, ISM, and the Analytical Hierarchy Process (AHP) [24,38,39,71,72]. DEMATEL and ISM have proven to be more effective in capturing the intricate interdependencies among factors compared to the AHP, which, despite its widespread use due to its simplicity, falls short in analyzing such complexities [71]. To overcome these drawbacks, the hybrid fuzzy DEMATEL ISM-MICMAC approach is regarded as the most suitable approach for identifying critical barriers. Table 2 provides an overview of the comparisons between AHP, DEMATEL, ISM, and MICMAC. In their extensive analysis of various multi-criteria decision-making techniques, Farooque et al. [73] concluded that DEMATEL is well-suited for barrier studies. To address the inherent biases and uncertainties in decision-making, Wu & Lee [74] and Lin [75] proposed extending the conventional DEMATEL technique to fuzzy DEMATEL, utilizing fuzzy set theory.

Table 2. A comparison of AHP, DEMATEL, ISM, and MICMAC.

Technique	Description	Purpose	Key Features
AHP	A structured decision-making method that uses pairwise comparisons to prioritize and rank criteria or alternatives based on their relative importance.	To quantify subjective judgments and determine priorities in a hierarchical structure.	• Hierarchical structure with criteria and sub-criteria. • Pairwise comparisons to establish relative weights.
DEMATEL	A method that evaluates interdependencies and causal relationships among barriers to determine their influence and impact.	To analyze complex systems and identify cause and effect relationships.	• Causal relationship modeling using a structural equation matrix. • Identification of influential factors based on direct and indirect effects.
ISM	A technique that establishes hierarchical relationships among barriers to analyze their driving power and dependence.	To determine the hierarchy of barriers and their interrelationships.	• Hierarchical structure development using a reachability matrix. • Determination of driving and dependence relationships. • Graphical representation of the hierarchical structure.
MICMAC	An analysis method that categorizes barriers into four distinct clusters according to their driving and dependence powers.	To classify barriers based on their influence and importance in the system.	• Classification of factors as autonomous, dependent, linkage, or independent. • Identification of key factors that drive or are driven by others.

In 1972, Gabus et al. introduced the Decision-Making Trial and Evaluation Laboratory (DEMATEL) method. This method was designed to analyze causal relationships and significant impacts among variables, demonstrating robust validity [76,77]. A structural modeling technique uses a cause-and-effect diagram to examine complex interactions and significant impact values among significant factors [75]. One of the major benefits of DEMATEL over other models is its capacity to produce substantial outcomes with minimal input data [74]. The DEMATEL helps indicate the degree of connections between subsystems to show direct subsystem relationships. Therefore, if we want to fully reflect the cause-and-effect relationship across different components while analyzing a complex system, DEMATEL is more effective than ISM [78]. The fuzzy DEMATEL method relies on interpreting expert opinions conveyed through linguistic terms. These linguistic terms are converted into fuzzy numbers to mitigate ambiguity and foster consensus. Lin was the first to employ the fuzzy DEMATEL method in 2008, marking a significant advancement in utilizing the approach within a fuzzy context [74]. The fuzzy DEMATEL method has proven to be valuable in diverse research areas, including supply chain management, environmental sustainability, healthcare quality assessment, and automotive parts remanufacturing [75,79–81]. Its application in these fields allows researchers and practitioners to understand the complex interdependencies among variables, identify critical factors, and make informed decisions for improved performance and outcomes.

ISM helps decision-makers by giving them a clear picture of how various elements in a complex system are interrelated and creating a hierarchical structure that represents the interdependence between these elements [82]. It converts vague and ambiguous models into simple, manageable models. It is a technique for categorizing interactions between specific objects that explain a subject or a factor. A complex problem may be tied to numerous elements. Compared to relying on just one factor, the interactions between different factors can far more precisely explain a complicated problem [82]. In light of this, ISM offers constructive identifications of these relationships. Furthermore, MICMAC analysis assesses the interdependence and driving forces among factors. The primary objective of MICMAC analysis is to identify the key factors that significantly influence a system and categorize them accordingly [83]. These key factors can be classified into different categories based on their driving and dependence powers.

The hybrid approach combines the strength of the three methods to provide a more accurate analysis of the study problem. The hybrid DEMATEL–ISM–MICMAC approach has demonstrated its robustness in studying cause–effect relationships, leading to its wide application in various research studies. For instance, Feng et al. [84] used this approach to analyze factors influencing employees' green behavior, while Shanker and Brave [85] employed it to assess sustainable concerns in the diamond supply chain. Vishwakarma et al. [38] applied the hybrid approach to analyze barriers to the sustainable supply chain in the apparel and textile sector. These studies highlight the effectiveness of the hybrid DEMATEL–ISM approach in examining complex relationships and providing valuable insights into different research areas. Figure 1 presents the proposed fuzzy DEMATEL–ISM–MICMAC method.

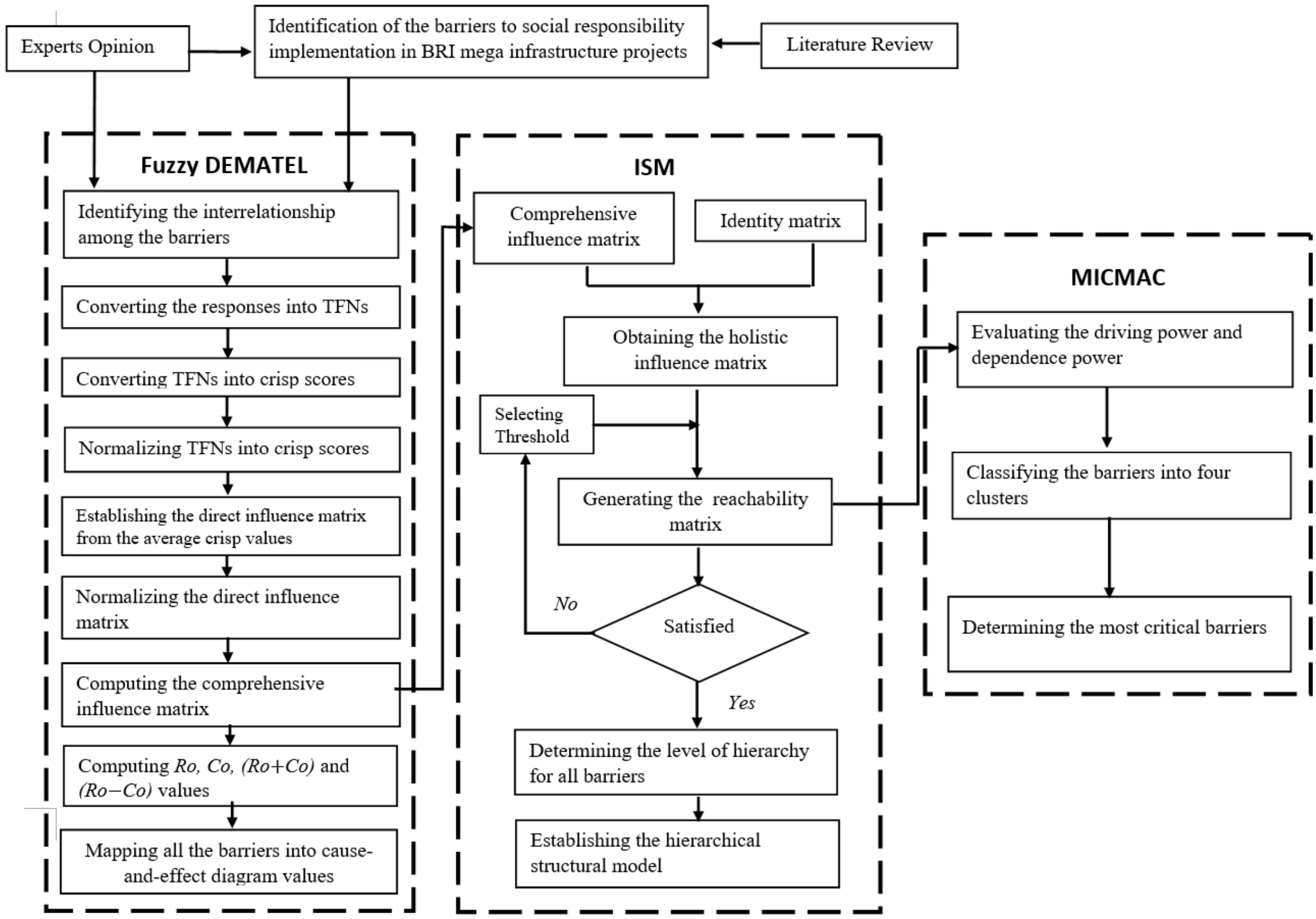

Figure 1. Flow chart of the hybrid fuzzy DEMATEL–ISM–MICMAC procedure.

3.1. Triangular Fuzzy Numbers

The subjective judgments made by decision-makers often possess an inherent ambiguity. To address this, fuzzy numbers are employed to represent subjective judgments as a range instead of a single precise value. In this study, triangular fuzzy numbers (TFNs) are utilized for their simplicity and ease of calculation [86]. Triangular fuzzy numbers were introduced by Zadeh in 1965 as a concept of fuzzy sets to handle situations with limited information [87]. Let Z be the universe of discourse, $Z = \{z_1, z_2, z_3, \ldots, z_n\}$. Then, conduct a fuzzy set as $\overline{A}$ of Z represents a set of pairs $\{(z_1, f_{\overline{A}}(z_1)), (z_2, f_{\overline{A}}(z_2)), (z_n, f_{\overline{A}}(z_n))\}$ where $f_{\overline{A}} : Z \in [0, 1]$ is a membership function of $\overline{A}$ and $f_{\overline{A}}z$ stands for the membership degree of z in $\overline{A}$. A triangular fuzzy number (TFN) can be written as a triplet (a_1, a_2, a_3), and the membership function of the fuzzy number $\overline{A}$ is defined as [75]:

$$f_{\overline{A}}z = \begin{cases} 0,\ z < a_1 \\ \frac{z-a_1}{a_2-a_1},\ a_1 \le z \le a_2 \\ \frac{a_3-z}{a_3-a_2},\ a_2 \le z \le a_3 \\ 0,\ z > a_3 \end{cases} \tag{1}$$

3.2. The Hybrid Fuzzy DEMATEL–ISM–MICMAC Procedure

The subsequent explanation elucidates the stepwise process of the hybrid fuzzy DEMATEL–ISM–MICMAC approach.

Step 1: The initial compilation of barriers was derived from a comprehensive literature review, which served as the foundation for creating a preliminary list. A rigorous selection process was undertaken through collaborative brainstorming sessions involving 10 esteemed academic scholars and industry professionals having expertise in the belt and road mega infrastructure projects and social responsibility to refine this list. The purpose of these sessions was to eliminate redundant barriers and combine those that were conceptually interconnected.

Step 2: In this stage, the researchers invited experts from the industry and academia and distributed the questionnaire designed for each expert. Using linguistic measures, experts were asked to analyze the interrelationships between each barrier. The scales are shown in Table 3 [88].

Table 3. Fuzzy linguistic scale.

Linguistic Expression	Influence Score	Corresponding (TFNs)
No influence	0	(0, 0.1, 0.3)
Very low influence	1	(0.1, 0.3, 0.5)
Low influence	2	(0.3, 0.5, 0.7)
High Influence	3	(0.5, 0.7. 0.9)
Very High Influence	4	(0.7, 0.9, 1.0)

Step 3: The experts' opinions were transferred into TFNs and normalized to a crisp score. The stepwise process for the defuzzification is presented below. Considering the k experts in the decision group, taking the fuzzy weight into account $\overline{W}_{ij}^{k} = \left(w_{1ij}^{K},\ w_{2IJ}^{K}, w_{3IJ}^{K}\right)$ of the i^{th} barrier, this impacts the j^{th} barrier appreciated by the k^{th} evaluators. These equations should be rewritten as [75,88]:

1. Normalize the fuzzy numbers using the following Equation:

$$\begin{aligned} zw_{1ij}^{k} &= \left(w_{1ij}^{K} - min\ w_{1ij}^{k}\right)/\Delta_{min}^{max} \\ zw_{2ij}^{k} &= \left(w_{2ij}^{K} - min\ w_{2ij}^{k}\right)/\Delta_{min}^{max} \\ zw_{3ij}^{k} &= \left(w_{3ij}^{K} - min\ w_{3ij}^{k}\right)/\Delta_{min}^{max} \end{aligned} \tag{2}$$

where $\Delta_{min}^{max} = \left(max\ w_{3ij}^{K} - min\ w_{1ij}^{k}\right)$

2. Generating normalized left (ls) and right (rs) as follows:

$$\begin{aligned} zls_{ij}^{k} &= zw_{2ij}^{k}/\left(1 + zw_{2ij}^{k} - zw_{1ij}^{k}\right) \\ zrs_{ij}^{k} &= zw_{3ij}^{k}/\left(1 + zw_{3ij}^{k} - zw_{2ij}^{k}\right) \end{aligned} \tag{3}$$

3. Computing the overall crisp normalized value:

$$z_{ij}^{k} = \left[zls_{ij}^{k}\left(1 - zls_{ij}^{k}\right) + \left(zrs_{ij}^{k}\right)^{2}\right] / \left[1 - zls_{ij}^{k} + zrs_{ij}^{k}\right] \tag{4}$$

4. Calculating the total normalized crisp values:

$$\overline{W}_{ij}^{k} = min\ w_{ij}^{n} - z_{ij}^{n}\Delta_{min}^{max} \tag{5}$$

5. Aggregating the crisp values of the k respondents and generate the initial direct relation matrix:

$$\overline{W}_{ij}^{k} = 1/k\left(\overline{W}_{ij}^{1} + \overline{W}_{ij}^{2} + \ldots + \overline{W}_{ij}^{k}\right) \tag{6}$$

The initial direct relation matrix $A = [x_{ij}]\eta \times \eta$ is obtained. The extent to which barrier j is affected by barrier i is expressed by x_{ij}.

Step 4: Calculating the normalized direct-influence matrix "B".

The normalized direct-influence matrix "B" is obtained using Equations (7) and (8). All values in this matrix range from zero to one:

$$B = K \times A \tag{7}$$

$$K = \frac{1}{\underset{1 \le i \le n}{max} \sum_{j}^{n} = 1^{X_{ij}}},\ i, j = 1, 2, \ldots, n \tag{8}$$

Step 5: Computing the comprehensive influence matrix "Y".

Using Equation (9), the comprehensive influence matrix "Y" is obtained, where I denotes the identity matrix:

$$Y = B(I - B)^{-1} \tag{9}$$

Step 6: Determining the *Ro* and *Co* values.

Ro is the sum of rows, and *Co* is the sum of columns of the comprehensive influence matrix "Y". Using the ($Ro + Co$), and ($Ro - Co$) values, a causal diagram is created in the last step. The diagram depicts the most significant barriers among all barriers. Each barrier's (Ro + Co) and ($Ro - Co$) values are shown on the horizontal and vertical axes, respectively.

$$Y = [y_{ij}]_{n \times n} \quad (i, j = 1, 2, 3, \ldots .n) \tag{10}$$

$$Ro = \left[\sum\nolimits_{j=1}^{n} y_{ij}\right]_{n \times 1} \tag{11}$$

$$Co = \left[\sum\nolimits_{i=1}^{n} y_{ij}\right]_{1 \times n} \tag{12}$$

Step 7: Obtaining the holistic influence matrix H using the following Equation, where I is the identity matrix:

$$H = Y + I\ = [h_{ij}]_{n \times n}\ (i, j = 1, 2, 3, \ldots n) \tag{13}$$

Step 8: Selecting threshold limit and generating the reachability matrix S.

Experts are required to define a threshold limit that will be used to screen out insignificant effects. The value of λ directly influences the formation of the reachability matrix and, as a result, shapes the subsequent hierarchical structure. The reachability matrix S is computed based on the holistic influence matrix H using the following equations:

$$S = [S_{ij}]_{n \times n}(i, j = 1, 2, \ldots, n) \tag{14}$$

$$S_{ij} = \begin{cases} 1, h_{ij} > \lambda\ (i, j = 1, 2, \ldots, n) \\ 0, h_{ij} \leq \lambda\ (i, j = 1, 2, \ldots, n) \end{cases} \tag{15}$$

Step 9: Determining the level of hierarchy for all barriers.

From the reachability matrix, the output set $P(ai)$, the input set $T(ai)$, and the intersection set $Q(ai) = P\ (ai) \cap T(ai)$ for all barriers are determined. If $Q(ai) = P(ai)$, this barrier is then regarded as a first-level barrier; barriers are subsequently eliminated from the sets, and this procedure is replicated until all barriers are hierarchically divided.

Step 10: Evaluating the driving and dependence power of all barriers.

The driving power and dependence power are computed by utilizing the reachability matrix S. The driving power signifies the level of influence exerted by a specific barrier on another barrier, while the dependence power indicates the extent to which other factors influence the factor. The driving power, referred to as DR_i, and the dependence power, denoted as DE_j can be calculated using the subsequent Equation [89]:

$$DR_i = \sum_{j=1}^{n} s_{ij(i=1,2,3,\ldots n)},\ DE_j = \sum_{i=1}^{n} s_{ji(j=1,2,3,\ldots n)} \tag{16}$$

4. Results

4.1. Application of the Hybrid Fuzzy DEMATEL–ISM–MICMAC Approach

4.1.1. Fuzzy DEMATEL Results

First, a panel of experts was invited to assess the direct influence of pairwise barriers for social responsibility implementation in belt and road megaprojects. Twenty experts were invited to participate in this study, and only 14 accepted the invitation. The team of experts consists of 5 academic scholars and 9 senior engineers and managers with considerable expertise in corporate social responsibility and belt and road mega infrastructure projects. They belong to different organizations, including consulting firms, contracting companies, and academic institutions. Therefore, their background can be counted on to deliver trustworthy findings regarding social responsibility literature. Most of the experts interviewed had an average of 10 years of experience in the field (Table 4). Step 2 involved determining the degree of impact between pairwise barriers, which was done by 14 experts using the linguistic variables provided in Table 3. In Step 3, the linguistic variables provided by each expert were converted into corresponding TFNs. These fuzzy numbers were then transformed into crisp values through a defuzzification process using Equations (2)–(5). The resulting average initial direct relation matrix, based on all expert inputs, is presented in Table 5 using Equation (6). In Step 4, the normalized direct relation matrix was derived using Equations (7) and (8).

Table 4. The background information of the experts.

Demographic Characteristics	Percentage
Gender	
Male	86
Female	14
Educational Background	
Bachelor	14
Master	50
Doctoral	36

Table 4. *Cont.*

Demographic Characteristics	Percentage
Working experience	
<5 years	7
5–10 years	36
>10 years	57
Job position	
Academic Scholar	36
Engineer	14
Senior Manager	50

Table 5. Initial direct influence matrix (numbers multiplied by 100).

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19
B1	86.2	66.6	67.2	46.8	32.2	26.6	28.3	18	18.1	60.6	5.6	15.1	20.8	74.6	47.9	35.2	21.1	26.6	51.9
B2	23.8	83.5	24.9	48.6	41.8	22.7	32.4	23.9	21.8	60.5	15.0	18.8	13.4	57.3	51.6	35.3	28.5	32.3	53.8
B3	8.6	68.1	84.9	52.7	22.7	5.8	11.4	23.7	27.7	27.5	5.6	22.5	30.2	61.3	67.1	54.4	17.1	32.2	41.7
B4	16.3	18.3	11.6	86.2	44	63.2	46.1	48.9	43.2	35.2	3.7	7.4	13.4	49.7	47.7	45	43.7	63.3	68.9
B5	12.4	12.5	32.4	45	87.5	63.3	57.4	64.2	64.1	41	20.7	0	53.6	53.5	51.6	62.4	57.3	76.5	65.2
B6	10.5	8.6	11.6	1	18.7	87.5	53.8	58.6	25.9	64.3	7.5	55.5	22.7	49.7	45.6	64.3	21.1	43.7	41.8
B7	4.7	6.7	7.6	1	1.9	34.2	87.5	31.4	37	68	37.9	63.1	37.8	61.3	57.5	56.7	32.3	41.7	51.6
B8	4.7	4.9	7.6	6.6	7.4	26.6	61.2	77.4	68	56.6	32.1	53.7	41.9	68.9	67.1	58.3	24.6	48	53.8
B9	4.7	4.9	11.6	5	1.9	9.5	51.6	41.2	86.2	58.6	51.7	51.7	30.2	57.5	36.2	53	20.7	51.7	53.7
B10	4.7	4.9	2	1	3.7	33.9	20.8	29.5	39	86.2	19.0	34	11.2	49.9	32.6	62.4	19.2	13.4	19
B11	4.7	3	7.6	6.6	7.4	1.9	14.9	54.5	44.9	8.4	87.5	38.2	20.8	32.3	1.9	27.7	5.8	32.3	30.4
B12	2.9	4.9	7.6	19.9	24.6	36.4	15	37.4	18	25.7	38.0	87.5	39.7	64.9	20.9	66.1	36.1	41.9	66.8
B13	4.7	4.9	7.6	6.6	7.4	1.9	9.5	33.6	16.1	4.8	34.4	32.4	87.5	9.5	3.8	3	5.8	3.8	11.5
B14	4.7	35.5	7.6	3	1.9	7.6	11.3	27.8	23.7	47	20.9	20.6	30.3	87.5	74.6	68.2	41.9	13.2	55.6
B15	6.6	8.6	7.6	1	5.6	15.3	7.4	39.2	14.4	25.6	32.3	5.6	7.6	59.5	87.5	60.6	15.3	9.5	11.5
B16	4.7	6.7	7.6	19.9	36	47.8	13.2	37.4	6.8	48.9	22.7	32.1	15.2	59.5	32.2	86.2	26.6	7.6	70.8
B17	2.9	4.9	7.6	54.5	51.6	55.6	36.1	41.4	14.1	6.8	42.1	40	38.2	53.6	5.6	71.8	87.5	51.9	57.6
B18	2.9	4.9	7.6	1	1.9	15.1	47.8	44.9	35.1	10.4	45.9	68.9	17	16.9	28.2	10.5	15.3	87.5	57.5
B19	2.9	8.8	7.6	6.6	1.9	9.5	49.6	18.1	8.6	8.7	5.6	7.6	5.6	19	11.4	52.9	19	20.9	87.5

In Step 5, the comprehensive influence matrix was obtained by employing Equation (9) and is shown in Table 6. In Step 6, using Equations (10)–(12), the "prominence" horizontal axis vector is created by summing the direct and indirect influence scores for each barrier Ro to Co, indicating the significance of the barrier. Similarly, the vertical axis ($Ro - Co$) labeled "Relation" is calculated by subtracting Co from Ro. This axis may serve as a cause group barrier (Table 7). If ($Ro - Co < 0$), barriers are assigned to the effect group. Accordingly, the cause-and-effect diagram can be generated by mapping the ($Ro + Co$, $Ro - Co$) data (Figure 2).

Table 6. Comprehensive influence matrix (numbers multiplied by 100).

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19
B1	12	12.2	11.4	9.9	8.2	9.9	11.2	11.4	9.5	16.8	6.98	9.8	8.7	21.5	16	17.3	9.2	11.1	18.4
B2	4.5	12.9	5.7	9.4	8.8	9	11.3	11.5	9.4	15.8	7.83	9.7	7.3	18.2	15.1	16.2	9.6	11.3	17.6
B3	2.6	11.4	12.5	9.9	6.4	6.4	8.1	10.9	9.6	11.3	6.38	9.6	8.9	18.1	16.6	17.6	7.8	10.7	15.6
B4	3.7	5.3	4.2	13.6	9.3	14.6	14.3	15.7	12.8	13.8	7.41	9.8	8.1	18.5	15.6	18.7	12	16.1	20.8
B5	3.5	5.3	7.2	9.7	14.9	15.8	17.2	19.5	16.9	16.2	11.14	11	14.4	21.3	17.9	23.2	14.9	19.3	22.7
B6	2.6	3.7	3.7	3	5.5	16.3	13.6	15.5	9.8	16.2	7.27	14.8	8.5	17.2	14.1	19.6	8.4	12.3	15.9
B7	1.9	3.3	3.1	2.8	3.4	9.8	17	12.2	10.8	16.2	11.07	15.6	10.2	18.3	15	18.5	9.6	11.8	16.8
B8	2	3.3	3.3	3.6	4.2	9.3	14.8	18.1	15.1	15.6	11.02	15.2	11.2	20.1	17	19.6	9.1	13.2	18
B9	1.8	3	3.4	3.1	3.1	6.4	12.7	12.9	16.3	14.6	12.47	13.9	9	17.2	12.1	17.2	7.8	12.7	16.6
B10	1.5	2.3	1.7	2	2.7	8.1	7.2	9.4	9.1	15.9	6.64	9.6	5.2	13.7	9.7	15.6	6.3	6.3	9.7
B11	1.3	1.9	2.3	2.5	2.7	3.5	6.2	11.7	9.6	5.8	14.28	9.6	6.1	10.4	5.2	10.1	4.1	8.3	10.3
B12	1.6	3	3	5.2	6.2	9.9	8.4	12.4	8.1	10.3	10.35	17.4	10.1	17.6	10	18.5	9.8	11.6	18.2
B13	1.1	1.5	1.8	1.9	2.1	2.2	3.7	7.2	4.6	3.4	6.62	6.9	12.6	5.1	3.3	4.4	2.7	3.2	5.3

Table 6. *Cont.*

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19
B14	1.7	6.4	2.7	2.9	3.1	5.5	6.7	9.9	7.7	12	7.45	8.3	7.9	19	15.4	17.4	9.5	6.7	15
B15	1.6	2.7	2.2	1.8	2.6	5.1	4.7	9.6	5.5	7.9	7.48	5.1	4.1	13.6	15.3	14	5.2	4.9	7.6
B16	1.8	3.1	2.9	5	7.3	10.9	7.6	11.6	6.3	12.7	7.62	10	6.6	16.2	10.9	20.1	8.2	6.8	17.5
B17	1.9	3.4	3.5	10.1	10.3	13.5	12.5	14.5	9	9.5	11.74	13.3	11	18	9.6	21	16.8	14.4	19.1
B18	1.2	2.3	2.5	2	2.4	5.7	11	11.5	9	6.9	10.39	14.3	6.3	9.8	9.1	9.5	5.8	15.5	14.7
B19	1	2.3	2	2.2	1.9	4.1	9.4	6.2	4.1	5.1	3.61	4.8	3.4	7.6	5.4	11.9	5.1	5.9	15.6

Table 7. Results of the cause-and-effect model (numbers multiplied by 100).

	Ro	Rank	Co	Rank	Ro + Co	Rank	Ro − Co	Cause/Effect
B1	232.7	3	49.6	19	282.3	17	183.2	Cause
B2	212.6	6	90.2	17	302.8	16	122.4	Cause
B3	201.4	9	79.4	18	280.8	18	121.9	Cause
B4	235.7	2	101.5	16	337.2	15	134.2	Cause
B5	284.2	1	105.8	15	390.0	7	178.3	Cause
B6	209.0	7	167.8	12	376.8	10	41.2	Cause
B7	208.6	8	198.8	10	407.4	4	9.8	Cause
B8	225.1	4	231.3	5	456.4	3	(6.3)	Effect
B9	197.4	10	182.6	11	380.0	9	14.7	Cause
B10	143.1	15	227.8	6	370.9	11	(84.7)	Effect
B11	125.4	16	167.7	7	293.2	14	(42.3)	Effect
B12	192.8	11	208.8	8	401.6	5	(15.9)	Effect
B13	79.4	19	160.0	14	239.4	19	(80.7)	Effect
B14	166.0	13	303.0	2	469.0	2	(137.0)	Effect
B15	121.4	17	235.7	4	357.0	12	(114.3)	Effect
B16	173.8	12	312.5	1	486.3	1	(138.7)	Effect
B17	224.6	5	163.2	13	387.8	8	61.4	Cause
B18	150.4	14	202.2	9	352.6	13	(51.8)	Effect
B19	101.3	18	296.8	3	398.2	6	(195.5)	Effect

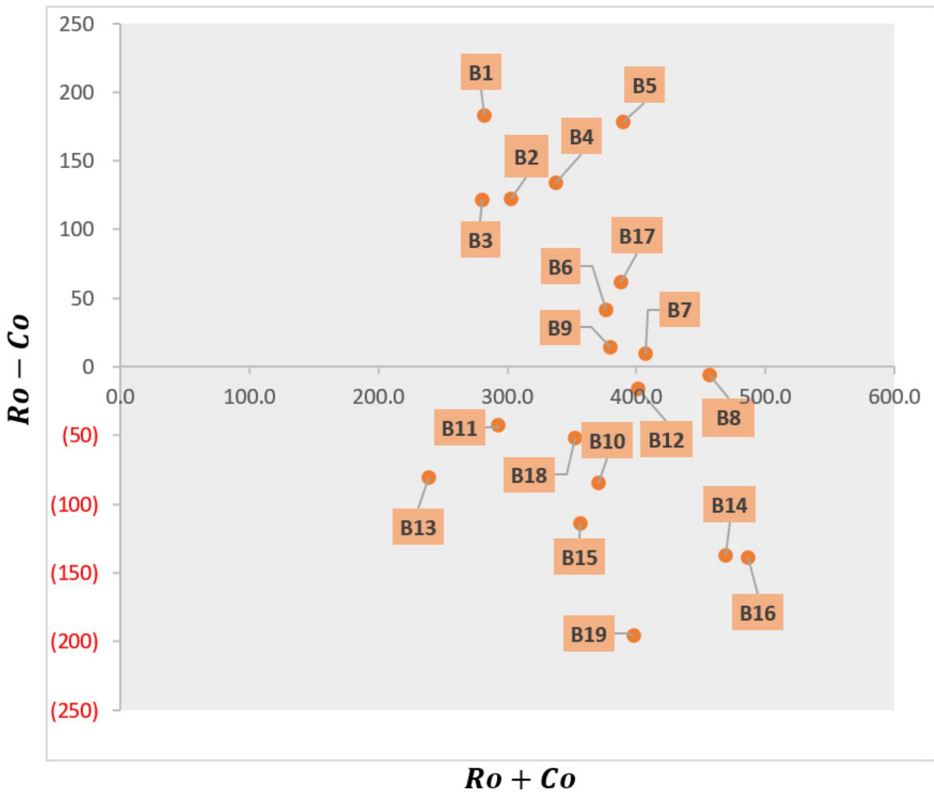

Figure 2. Cause and effect diagram of the barriers to SR implementation in BRI mega infrastructure projects.

Table 7 and Figure 2 reveal several findings. The vertical axis in the cause and effect diagram determines the cause and effect groups. The values along this axis range from (195.5) to +183.2. The barriers, "Lack of robust social responsibility laws and regulations in the host countries (*B5*)", "Lack of stringent and legally binding BRI policies and guidelines governing social responsibility (*B4*)", "The diverse institutions, cultures, and social conditions among BRI countries (*B1*)", "The diverse environmental and social frameworks and standards among BRI countries (*B2*)," "The diverse international, national, and private funds for BRI projects (*B3*)", "Lack of customer awareness and knowledge about CSR (*B17*)", "Lack of awareness and knowledge of social responsibility within the firm (*B6*)", "Lack of capacity and expertise (*B7*)", and "Lack of internal resources (time, financial, and human resources) (*B9*)", are the influence-forwarding barriers. These barriers will influence "Lack of full commitment and support from top management (*B8*)", "Lack of familiarity with host countries' laws and regulations (*B10*)", "Incremental time and cost (*B11*)", "Lack of measurement of social responsibility benefits (*B12*)", "Limited sustainable materials and technologies (*B13*)", "Ineffective communication and coordination among stakeholders (*B14*)", "Unclear stakeholder role and power (*B15*)", "Lack of public participation and stakeholder engagement (*B16*)", " Lack of evaluation frameworks, procedures, and tools to measure CSR performance (*B18*)", and "Lack of credibility of the disclosed CSR information (*B19*)". On the horizontal axis, the values along this axis range from +239.4 to +486.3. Furthermore, the significance of the barriers can be ranked from highest to lowest along this axis, moving from far right to far left: (*B16*), (*B14*), (*B8*), (*B7*), (*B12*), (*B19*), (*B5*), (*B17*), (*B9*), (*B6*), (*B10*), (*B15*), (*B18*), (*B11*), (*B4*), (*B2*), (*B1*), (*B3*), and (*B13*).

4.1.2. ISM Results

Equation (13) is used to calculate the holistic influence matrix H (see Table 8). In Step 8, the reachable matrix S (Table 9) is calculated based on the holistic influence matrix using Equations (14) and (15). In this study, $\lambda = 0.100$ was selected based on the experts' opinions. In Step 9, the level of the barriers was determined. From the reachability matrix, the output set $P(ai)$, the input set $T(ai)$, and the intersection set $Q(ai) = P\ (ai) \cap T(ai)$, for all the barriers, are determined. If $Q(ai) = P(ai)$, this barrier is then regarded as a first-level barrier; barriers are subsequently eliminated from the sets, and this procedure is replicated until all barriers are hierarchically divided, as shown in Table 10.

Table 8. Holistic F matrix (numbers multiplied by 100).

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19
B1	112	12.2	11.4	9.9	8.2	9.9	11.2	11.4	9.5	16.8	7.0	9.8	8.7	21.5	16	17.3	9.2	11.1	18.4
B2	4.5	112.9	5.7	9.4	8.8	9	11.3	11.5	9.4	15.8	7.8	9.7	7.3	18.2	15.1	16.2	9.6	11.3	17.6
B3	2.6	11.4	112.5	9.9	6.4	6.4	8.1	10.9	9.6	11.3	6.4	9.6	8.9	18.1	16.6	17.6	7.8	10.7	15.6
B4	3.7	5.3	4.2	113.6	9.3	14.6	14.3	15.7	12.8	13.8	7.4	9.8	8.1	18.5	15.6	18.7	12	16.1	20.8
B5	3.5	5.3	7.2	9.7	114.9	15.8	17.2	19.5	16.9	16.2	11.1	11	14.4	21.3	17.9	23.2	14.9	19.3	22.7
B6	2.6	3.7	3.7	3	5.5	116.3	13.6	15.5	9.8	16.2	7.3	14.8	8.5	17.2	14.1	19.6	8.4	12.3	15.9
B7	1.9	3.3	3.1	2.8	3.4	9.8	117	12.2	10.8	16.2	11.1	15.6	10.2	18.3	15	18.5	9.6	11.8	16.8
B8	2	3.3	3.3	3.6	4.2	9.3	14.8	118.1	15.1	15.6	11.0	15.2	11.2	20.1	17	19.6	9.1	13.2	18
B9	1.8	3	3.4	3.1	3.1	6.4	12.7	12.9	116.3	14.6	12.5	13.9	9	17.2	12.1	17.2	7.8	12.7	16.6
B10	1.5	2.3	1.7	2	2.7	8.1	7.2	9.4	9.1	115.9	6.6	9.6	5.2	13.7	9.7	15.6	6.3	6.3	9.7
B11	1.3	1.9	2.3	2.5	2.7	3.5	6.2	11.7	9.6	5.8	114.3	9.6	6.1	10.4	5.2	10.1	4.1	8.3	10.3
B12	1.6	3	3	5.2	6.2	9.9	8.4	12.4	8.1	10.3	10.3	117.4	10.1	17.6	10	18.5	9.8	11.6	18.2
B13	1.1	1.5	1.8	1.9	2.1	2.2	3.7	7.2	4.6	3.4	6.6	6.9	112.6	5.1	3.3	4.4	2.7	3.2	5.3
B14	1.7	6.4	2.7	2.9	3.1	5.5	6.7	9.9	7.7	12	7.4	8.3	7.9	119	15.4	17.4	9.5	6.7	15
B15	1.6	2.7	2.2	1.8	2.6	5.1	4.7	9.6	5.5	7.9	7.5	5.1	4.1	13.6	115.3	14	5.2	4.9	7.6
B16	1.8	3.1	2.9	5	7.3	10.9	7.6	11.6	6.3	12.7	7.6	10	6.6	16.2	10.9	120.1	8.2	6.8	17.5
B17	1.9	3.4	3.5	10.1	10.3	13.5	12.5	14.5	9	9.5	11.7	13.3	11	18	9.6	21	116.8	14.4	19.1
B18	1.2	2.3	2.5	2	2.4	5.7	11	11.5	9	6.9	10.4	14.3	6.3	9.8	9.1	9.5	5.8	115.5	14.7
B19	1	2.3	2	2.2	1.9	4.1	9.4	6.2	4.1	5.1	3.6	4.8	3.4	7.6	5.4	11.9	5.1	5.9	115.6

Table 9. The reachability matrix.

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	DR
B1	1	1	1	0	0	0	1	1	0	1	0	0	0	1	1	1	0	1	1	11
B2	0	1	0	0	0	0	1	1	0	1	0	0	0	1	1	1	0	1	1	9
B3	0	1	1	0	0	0	0	1	0	1	0	0	0	1	1	1	0	1	1	9
B4	0	0	0	1	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	14
B5	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
B6	0	0	0	0	0	1	1	1	0	1	0	1	0	1	1	1	0	1	1	10
B7	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	13
B8	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	12
B9	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	1	0	1	1	11
B10	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	3
B11	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0	0	1	5
B12	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	0	1	1	9
B13	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
B14	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	1	5
B15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	3
B16	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	4
B17	0	0	0	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	13
B18	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	6
B19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2
DE	1	3	2	2	2	5	10	13	5	13	8	9	6	16	11	17	3	12	16	

Table 10. Level partition of the ISM model.

	P(ai)	T(ai)	Q(ai)	Level
B1	1, 2, 3, 7, 8, 10, 14, 15, 16, 18, 19	1	1	8
B2	2, 7, 8, 10, 11, 14, 15, 16, 18, 19	1, 2, 3	2	6
B3	2, 3, 8, 10, 14, 15, 16, 18, 19	1, 3	3	7
B4	4, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19	4, 17	4, 17	6
B5	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	5, 17	5, 17	6
B6	6, 7, 8, 10, 12, 11, 14, 15, 16, 18, 19	4, 5, 6, 7, 17	6, 7	5
B7	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19	1, 2, 4, 5, 6, 7, 8, 9, 17, 18	6, 7, 8, 18	5
B8	7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 17, 18	7, 8, 9, 11, 18	4
B9	7, 8, 9, 10, 11, 12, 14, 15, 16, 18, 19	4, 5, 7, 8, 9	7, 8, 9	5
B10	10, 14, 16	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16	10, 14, 16	1
B11	8, 11, 14, 16, 19	2, 4, 5, 6, 7, 8, 9, 11, 12, 17, 18	8, 11	3
B12	8, 10, 11, 12, 13, 14, 16, 18, 19	4, 5, 6, 7, 8, 9, 12, 17, 18	8, 12, 18	4
B13	13	5, 7, 8, 12, 13, 17	13	1
B14	10, 14, 15, 16, 19	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17	10, 15, 16	2
B15	14, 15, 16	1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15	14, 15	3
B16	10, 14, 16, 19	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19	10, 14, 16	2
B17	4, 5, 6, 7, 8, 11, 12, 13, 14, 16, 17, 18, 19	4, 5, 17	4, 5, 17	6
B18	7, 8, 11, 12, 18, 19	1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 17, 18	7, 8, 18	4
B19	16, 19	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 14, 16, 17, 18, 19	16, 19	1

The hierarchical structure was established, as illustrated in Figure 3. "The diverse institutions, cultures, and social conditions among BRI countries (*B1*)" occupies the eighth level, and "The diverse international, national, and private funds for BRI projects (*B3*)" is at the seventh level. The barriers, namely "The diverse environmental and social frameworks and standards among BRI countries (*B2*)", "Lack of stringent and legally binding BRI policies and guidelines governing social responsibility (*B4*)", "Lack of robust and enforcing social responsibility laws and regulations at the host countries (*B5*)", and "Lack of customer awareness and knowledge about CSR (*B17*)" occupy the sixth level. "Lack of awareness and knowledge of social responsibility within the firm (*B6*)", "Lack of capacity and expertise (*B7*)", and "Insufficient internal resources (time, cost, human) (*B9*)" occupy the fifth level. "Lack of full commitment and support from top management (*B8*)", "Lack of measurement of social responsibility benefits (*B12*)", and "Lack of evaluation frameworks, procedures, and tools to measure CSR performance (*B18*)" occupy the fourth level. "Unclear stakeholder role and power (*B15*)" and "Incremental time and cost (*B11*)" occupy the third level.

"Ineffective communication and coordination among stakeholders (*B14*)", and "Lack of public participation and stakeholders' engagement (*B16*)", occupy the second level. "Lack of familiarity with host countries' laws and regulations (*B10*)", "Limited sustainable materials and technologies (*B13*)", and "Lack of credibility of the disclosed CSR information (*B19*)" occupy the first level.

Figure 3. The eight-level hierarchical structure model of the barriers to SR implementation in BRI mega infrastructure projects.

4.1.3. MICMAC Analysis Results

MICMAC analysis was performed to analyze the reachability matrix and categorize barriers according to their driving and dependency power. Equation (16) was utilized to obtain their driving and dependence power, as shown in Table 9. The barriers are classified into the following four categories (see Figure 4):

- Autonomous: These are the barriers with weak driving and dependence power. These barriers are less integrated with the rest of the barriers and have less effect. Only one barrier (*B13*) is located in this cluster
- Dependent: These are the barriers with low driving power and high dependence power. These barriers represent the system's output and are thus highly sensitive to variations in the system's driver and linkage barriers. (*B10*), (*B11*), (*B14*), (*B15*), (*B16*), (*B18*), and (*B19*) are located in this cluster.
- Linkage: These are the barriers that have strong driving and reliance power. They not only impact other barriers but are also significantly impacted by other barriers. Any changes to these barriers will have an influence on other barriers. The three barriers in this cluster are (*B7*), (*B8*), and (*B12*)
- Independent: These are the barriers that have a significant driving power but a weak reliance power. They are often unaffected by other barriers and have considerable influence. Depending on the effectiveness with which these barriers are managed, the entire system will be significantly affected. (*B1*), (*B2*), (*B3*), (*B4*), (*B5*), (*B6*), (*B9*), and (*B17*) are in this cluster.

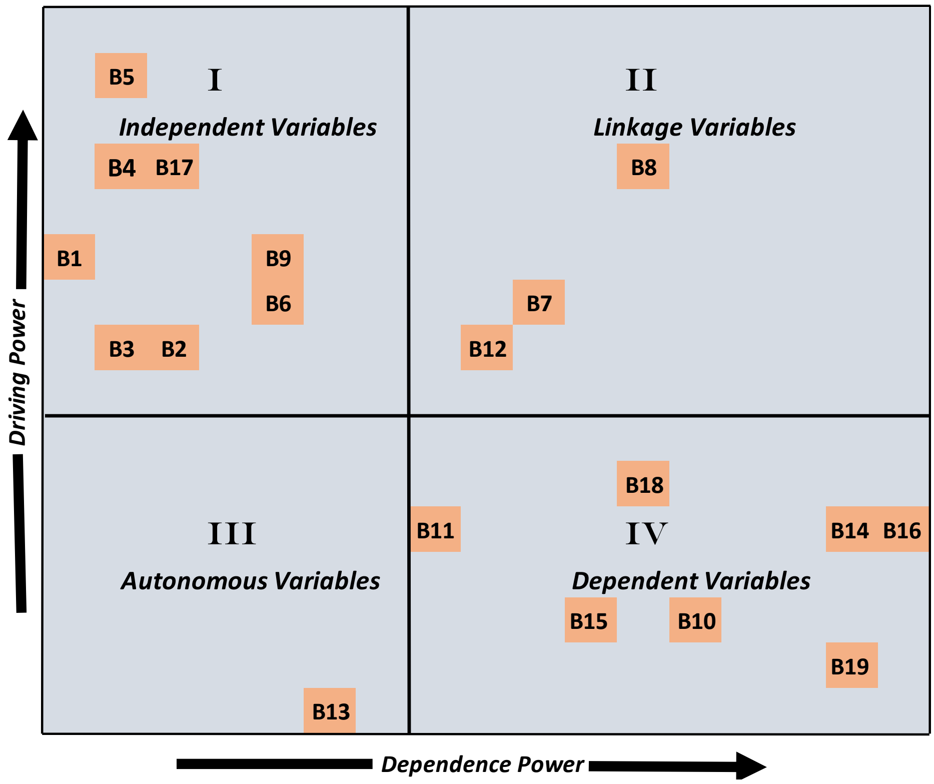

Figure 4. Clustering of barriers to SR implementation in BRI mega infrastructure projects through MICMAC analysis.

5. Discussion

The findings derived from the application of the hybrid fuzzy DEMATEL–ISM–MICMAC model highlight the critical role of certain barriers in hindering SR implementation in mega BRI infrastructure. Notably, the identified barriers include: "The diverse institutions, cultures, and social conditions among BRI countries (*B1*)", "Lack of robust social responsibility laws and regulations in the host countries (*B5*)", "Lack of stringent and legally binding BRI policies and guidelines governing social responsibility (*B4*)", "The diverse international, national, and private funds for BRI projects (*B3*)", "The diverse environmental and social frameworks and standards among BRI countries (*B2*), and "Lack of customer awareness and knowledge about CSR (*B17*)". These barriers emerge as the most influential, exerting a significant impact on all other barriers. These barriers are considered causal barriers, as shown in Figure 2, situated in the first quadrant of Figure 4, and occupy the bottom three levels of the hierarchical model (Figure 3), signifying their pivotal position in the developed hierarchical model.

According to the hierarchical model, as shown in Figure 3, "The diverse institutions, cultures, and social conditions among BRI countries (*B1*)" is associated with "The diverse international, national, and private funds for BRI projects (*B3*)" and "The diverse environmental and social frameworks and standards among BRI countries (*B2*)". These interconnections create a ripple effect, impacting other barriers within the model. This is in line with previous reports [27,32,33] which found that these factors are major challenges in the governance of social responsibility of the BRI mega infrastructure projects. Several scholars acknowledge that variations in environmental and social assessment frameworks and processes arise from diverse political regimes, regional environmental priorities, and cultural values, despite the presence of a consistent main framework [32,90]. Therefore, the differences in institutions, cultures, and social conditions among the BRI countries influence the establishment and effectiveness of unified and consistent environmental and social frameworks. Similarly, the diversity of funding sources impacts the prioritization and application of these frameworks and standards [27]. The interplay of these factors creates a dynamic environment where the successful implementation of social responsibility becomes increasingly intricate and multifaceted.

The remaining three barriers at the lower three levels of the hierarchical model are "Lack of robust and enforcing social responsibility laws and regulations in the host countries (*B5*)", "Lack of stringent and legally binding BRI policies and guidelines governing social responsibility (*B4*)", and "Lack of customer awareness and knowledge about CSR (*B17*)". According to Coenen et al. [34] and Carrai [41], the commitment of host countries to enforcing environmental and social regulations and laws is vital for upholding social and environmental responsibilities in BRI projects. These studies highlight that the effectiveness of social responsibility governance in BRI projects relies not solely on Chinese actors but also on the host countries' capacity to execute, monitor, and enforce environmental and social laws and regulations. Gallagher et al. [91] further emphasized the inadequacy of regulations governing the social and environmental impact of Chinese investments overseas. These regulations are predominantly voluntary and inconsistent when compared to those governing domestic investments. This discrepancy raises concerns about the efficacy of domestic environmental laws in effectively regulating foreign direct investments (FDIs) that have detrimental environmental impacts [12]. Enforcement mechanisms ensure that decision-makers remain focused on broader financial goals and do not neglect their social responsibilities [24]. The success of social responsibility strategies depends on the presence of effective enforcement mechanisms, which are an integral component in any new legislation [24,92]. Moreover, the absence of robust legal frameworks can perpetuate inadequate customer and end-user awareness. Without clear regulations and guidelines, there may be limited education or information campaigns to raise customer awareness about the significance of corporate social responsibility. Conversely, a lack of customer demand for socially responsible projects can reduce the pressure on governments and project developers to establish robust legal frameworks and policies.

The barriers at the fourth and fifth levels of the hierarchical model are considered to be the linkage between the critical obstacles at the bottom levels and the direct barriers at the top levels. Most of these barriers are organizational-related and are influenced by regulatory and BRI-related barriers. Regulatory and BRI-related barriers can influence an organization's internal awareness and commitment. The barriers "Lack of awareness and knowledge of social responsibility within the firm (*B6*)", "Lack of capacity and expertise (*B7*)", "insufficient internal resources (time, cost, human) (*B9*)", "Lack of full commitment and support from top management (*B8*)", "Lack of measurement of social responsibility benefits (*B12*)", and "Lack of evaluation frameworks, procedures, and tools to measure CSR performance (*B18*)" are interconnected, interdependent, and relate to issues in recognizing the economic benefits and the role of construction firms and organizations in social change and development. The organization's limited awareness of social responsibility, the absence of top management support, the lack of resources and experts, and the lack of measurement of SR benefits to this business are all barriers that hinder the successful implementation of SR practices in such projects. Due to the limited knowledge and information about social responsibility, there is a shortage of experts in the field [24,37]. Consequently, this shortage leads to a lack of understanding and awareness regarding the implementation of social responsibility [24]. Moreover, a lack of support from top management hinders the effective performance of SR strategies, as it may result in a lack of resources, inadequate allocation of responsibilities, and insufficient integration of SR principles into the organizational culture. This finding suggests that there is a lack of widespread recognition and acceptance of SR as a fundamental element of corporate strategy. Many organizations still have a limited understanding of the crucial role that SR plays in achieving sustainable long-term objectives and maximizing overall business performance [19].

The barriers at the fourth level, specifically (*B8*), (*B12*), and (*B18*), have an influence on "Incremental time and cost (*B11*)" at the third level of the hierarchical model. The absence of top management support and measurement of social responsibility benefits makes it challenging to quantify the positive impacts and returns on investment of CSR practices. Without this measurement, it becomes difficult to justify the additional time and cost investments. Numerous organizations find themselves lacking the necessary financial resources to implement comprehensive CSR strategies. This deficiency stems from a prevailing reluctance to integrate social responsibility practices, fueled by the mistaken belief that such endeavors entail extra expenses and time investments [47,93].

The second barrier at the third level of the hierarchical model is "Unclear stakeholder roles and power (*B15*)". Projects under the BRI involve many stakeholders and actors, each possessing distinct roles, powers, and interests. This complex web of stakeholders often leads to conflicts of interest that impede the successful integration of social responsibility practices. Consequently, achieving effective stakeholder engagement becomes challenging within these projects, where multiple stakeholders compete with differing interests and priorities. Furthermore, stakeholders' varying levels of power and influence pose a formidable obstacle in achieving comprehensive inclusion and consideration of all perspectives. This challenge stems from the ambiguity surrounding stakeholder power to effectively address diverse social issues, thereby undermining the effectiveness and efficiency of their collective social endeavors [50]. This barrier significantly leads to the barriers in the second level, namely, "Ineffective communication and coordination among stakeholders (*B14*)", and "Lack of public participation and stakeholders' engagement (*B16*)". These two barriers are considered the most significant at the top levels with the most links in this model. They are considered the most significant barriers in the cause and effect diagram (Figure 2). The stakeholder theory places considerable emphasis on the imperative involvement of various stakeholders to attain effective social responsibility performance. Consequently, the theory elucidates the underlying rationale behind the diminished feasibility of the CSR pathway in instances where support and active participation from a particular party are lacking [24].

The barriers "Ineffective communication and coordination among stakeholders (*B14*)" and "Lack of public participation and stakeholders' engagement (*B16*)" are profoundly impacted by and exert a substantial influence on "Lack of familiarity with host countries' laws and regulations (*B10*)". A key hurdle encountered by Chinese international contractors operating abroad stems from the limited acquaintance of Chinese organizations with the legal frameworks of host countries [55]. This deficiency engenders a lack of sufficient consideration by these organizations toward environmental and social responsibility practices. Chinese State-Owned Enterprises (SOEs) faced challenges when it came to effectively communicating with the host country's local communities regarding various disputes such as wages, employment benefits, land compensation, environmental impact, and supply contracts [94]. These difficulties stemmed from the lack of familiarity of Chinese SOEs with strikes and divergent interpretations of labor laws [41]. It is essential for project participants to invest in understanding the legal and regulatory landscape of the host country and to ensure *compliance* with all relevant regulations. This may involve partnering with local experts or legal counsel or investing in education and training initiatives to ensure that all project participants are aware of their legal obligations.

The final two barriers at the first level of the hierarchical model, namely "Limited sustainable materials and technologies (*B13*)" and "Lack of credibility of the disclosed CSR information (*B19*)", exhibit distinctive characteristics warranting closer examination. Barrier (*B13*) emerges as an autonomous factor compared to other barriers, as evidenced by its low driving and dependence power, positioning it within the third quadrant of the MICMAC analysis (Figure 4). The scarcity or high costs associated with sustainable materials and technologies present significant challenges in realizing the consistent and effective implementation of sustainable practices. Consequently, ensuring the widespread adoption of sustainable approaches becomes arduous, given the regional and country-specific constraints regarding the availability and affordability of such resources.

Regarding the final barrier (*B19*), it is noteworthy that the construction industry still faces challenges in maintaining the credibility of disclosed CSR information [37]. This issue stems from the absence of social audits and the limited involvement of public media [39]. Consequently, project stakeholders may perceive CSR initiatives as mere "greenwashing" or superficial attempts by companies to appear socially responsible without actually implementing substantial measures. To address this concern, it is crucial for the key stakeholders of the BRI to prioritize transparency and accountability in their CSR initiatives. This entails timely and transparent disclosure of CSR information and investment in independent verification and auditing processes to ensure the credibility and authenticity of CSR initiatives [12].

6. Conclusions and Implications

This study contributes significantly to the field of social responsibility in megaprojects by advancing the understanding of social responsibility through an extensive investigation and identification of barriers that hinder the integration of social responsibility practices within the context of BRI mega infrastructure projects. By comprehensively examining these barriers, this research sheds light on the intricate interrelationships that underlie their dynamics, providing valuable insights into their complex nature. Previous studies (e.g., [19,24,47]) have made notable contributions to the knowledge surrounding social responsibility barriers in the construction industry. However, these studies did not comprehensively explore the interdependencies among the challenges that impede the effective implementation of social responsibility practices. Consequently, this study aims to bridge this gap in the current literature by explicitly addressing this critical aspect. The findings of the integrated fuzzy DEMATEL–ISM–MICMAC analysis concluded the following:

- By computing the cause degree and prominence degree of each influencing barrier using the fuzzy DEMATEL method, nine influencing barriers and ten affected barriers to SR implementation in BRI mega infrastructure projects are identified.
- A multilevel hierarchical structure model of influencing barriers is developed using interpretative structural modeling and MICMAC analysis. Nineteen significant barriers are subdivided into eight different levels and clustered into four clusters. From the top to the bottom level, the degree of influence and mutual influence connection of the various barriers to the implementation of social responsibility is evaluated.

The results show that the key causes and most critical barriers to SR implementation in mega BRI infrastructure projects include: "Lack of robust social responsibility laws and regulations in the host countries", "Lack of stringent and legally binding BRI policies and guidelines governing social responsibility", "The diverse institutions, cultures, and social conditions among BRI countries", "The diverse environmental and social frameworks and standards among BRI countries", "The diverse international, national and private funds for BRI projects", "Lack of customer awareness and knowledge of CSR", "Lack of awareness and knowledge of social responsibility within the firm", "Lack of capacity and expertise", and "Lack of internal resources (time, financial, and human resources)". In addition, the other significant direct factors may include: "Ineffective communication and coordination among stakeholders", "Lack of public participation and stakeholder engagement", and "Lack of full commitment and support from top management".

This study has both theoretical and practical implications for decision-makers. From the theoretical perspective, the described research framework and methodology provide a novel theoretical approach for future research on social responsibility in megaprojects. Moreover, this study sheds light on the research gap identified by [19,24] by examining the interdependencies among CSR barriers. The research highlights that many of the barriers have notable connections with one another, suggesting that any progress made in one area can have significant implications for other barriers.

Currently, the existing body of research on environmental and social responsibility challenges in BRI megaprojects primarily examines the impact of specific challenges and tends to concentrate on the macro-level implementation of CSR [9,32,34]. However, to contribute to the advancement of knowledge in this field, this study takes a comprehensive approach by identifying and analyzing several barriers that can impede social responsibility efforts within BRI megaprojects by categorizing these barriers into distinct levels, namely institutional, industrial, organizational, and project levels. In addition, the barriers related to CSR attributes are also considered in this study, which offers a more nuanced understanding of the multifaceted challenges faced in promoting social responsibility within the context of BRI megaprojects. This categorization framework allows for a systematic examination of the various factors and dynamics that contribute to the barriers at different levels, shedding light on the specific areas that need to be addressed to foster effective social responsibility implementation. Moreover, using novel MCDM techniques like fuzzy DEMATEL, ISM, and MICMAC can identify the intrarelationships among these barriers instead of the conventional ranking tools like the relative importance index. This helps scholars refine their thinking as they attempt to address the challenges of social responsibility in mega belt and road infrastructure projects.

From a practical point of view, this study yields significant practical implications that decision-makers engaged in mega BRI megaprojects should consider. These implications revolve around reinforcing legal frameworks and formulating comprehensive policies concerning social responsibility practices by the BRI actors. For countries with weak legal systems, Chinese contractors working under the BRI umbrella can adopt domestic social and environmental laws as part of their social responsibility initiatives. By voluntarily adhering to and implementing these laws, Chinese contractors can help fill the gaps in regulatory frameworks and contribute to sustainable development in the host countries. This approach demonstrates a commitment to social responsibility and helps address the barriers posed by inadequate legal systems, promoting better practices and positive impacts on local communities and the environment. In addition, decision-makers ought to accord utmost importance to fostering cross-cultural understanding and aligning environmental and social frameworks. As suggested by Ascensão et al. [27], the diverse environmental and social frameworks among BRI countries or regions present an opportunity for the key stakeholders to develop comprehensive and adaptable frameworks and standards for Strategic Environmental and Social Assessments (SESA). BRI actors can establish robust assessment mechanisms that consider each country or region's unique environmental and social contexts. These frameworks and standards can play a vital role in promoting sustainable development and responsible practices throughout the BRI projects. Furthermore, key considerations need to be addressed to overcome the barriers to SR implementation in BRI mega infrastructure projects. These include increasing public awareness about social responsibility, strengthening internal organization capabilities, improving communication and stakeholder engagement, and securing unequivocal support from top management. By taking proactive measures in these areas, decision-makers can effectively navigate challenges such as lax regulations, diverse institutional and cultural conditions, resource limitations, communication inefficiencies, and limited stakeholder participation. Ultimately, implementing these measures promises to advance social responsibility and sustainability practices across BRI countries.

This study is not without conceptual and analytical limitations. This study investigates a limited number of barriers to SR implementation within Belt and Road mega infrastructure projects. Further research may investigate other barriers not considered in this study. Future research can reveal the interrelations and relative importance of barriers by using other advanced decision-making techniques. The limited number of experts may not accurately reflect all BRI projects across different regions. Although MCDM techniques, such as the fuzzy DEMATEL and ISM, are powerful tools for prioritizing SR barriers, it is essential to note that they do not offer statistical evidence of the barriers' significance. While these techniques provide valuable insights into the interrelationships among SR barriers, further research is required to delve deeper into the specific implications and nuances of these barriers. In light of these limitations, it is crucial to interpret the findings of this study as indicative rather than conclusive. Therefore, future research should build upon this study by addressing the identified limitations and exploring additional avenues for investigation.

Author Contributions: Conceptualization, M.T.A. and Q.S.; methodology, M.T.A.; software, M.T.A.; validation, M.T.A. and Q.S.; formal analysis, M.T.A.; investigation, M.T.A. and Q.S.; resources, M.T.A.; data curation, M.T.A.; writing—original draft preparation, M.T.A.; writing—review and editing, Q.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The presented data are shown in the paper, more details are available from the corresponding author.

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

References

1. Zeng, S.X.; Ma, H.Y.; Lin, H.; Zeng, R.C.; Tam, V.W.Y. Social Responsibility of Major Infrastructure Projects in China. *Int. J. Proj. Manag.* **2015**, *33*, 537–548. [CrossRef]
2. Zeng, S.; Chen, H.; Ma, H.; Shi, J.J. Governance of Social Responsibility in International Infrastructure Megaprojects. *Front. Eng. Manag.* **2022**, *9*, 343. [CrossRef]
3. Shen, L.; Wu, Y.; Zhang, X. Key Assessment Indicators for the Sustainability of Infrastructure Projects. *J. Constr. Eng. Manag.* **2011**, *137*, 441–451. [CrossRef]
4. Flyvbjerg, B. What You Should Know about Megaprojects and Why: An Overview. *Proj. Manag. J.* **2014**, *45*, 6–19. [CrossRef]
5. Delphine; Witte, P.; Spit, T. Bridging the Perception Gap? When Top-down Built Megaprojects Meet Bottom-up Perceptions: A Case Study of Suramadu Bridge, Indonesia. *Asian Geogr.* **2020**, *39*, 21–43. [CrossRef]
6. Xie, L.; Xu, T.; Han, T.; Xia, B.; Chen, Q.; Skitmore, M. Influence of Institutional Pressure on Megaproject Social Responsibility Behavior. *J. Civ. Eng. Manag.* **2022**, *28*, 177–195. [CrossRef]
7. Lee, P.T.-W.; Hu, Z.-H.; Lee, S.-J.; Choi, K.-S.; Shin, S.-H. Research Trends and Agenda on the Belt and Road (B&R) Initiative with a Focus on Maritime Transport. *Marit. Policy Manag.* **2018**, *45*, 282–300.
8. Zhai, T. Environmental Challenges, Opportunities, and Policy Implications to Materialize China's Green Belt and Road Initiative. *Sustainability* **2021**, *13*, 10428. [CrossRef]
9. Coenen, J.; Newig, J.; Meyfroidt, P. Environmental Governance of a Belt and Road Project in Montenegro–National Agency and External Influences. *Land Use Policy* **2022**, *119*, 106136. [CrossRef]
10. Bank, W. *Belt and Road Economics: Opportunities and Risks of Transport Corridors*; The World Bank: Washington, DC, USA, 2019.
11. Teo, H.C.; Lechner, A.M.; Walton, G.W.; Chan, F.K.S.; Cheshmehzangi, A.; Tan-Mullins, M.; Chan, H.K.; Sternberg, T.; Campos-Arceiz, A. Environmental Impacts of Infrastructure Development under the Belt and Road Initiative. *Environments* **2019**, *6*, 72. [CrossRef]
12. Zhang, M.; Zhang, C.; Li, F.; Liu, Z. Green Finance as an Institutional Mechanism to Direct the Belt and Road Initiative towards Sustainability: The Case of China. *Sustainability* **2022**, *14*, 6164. [CrossRef]
13. Ma, H.; Sun, D.; Zeng, S.; Lin, H.; Shi, J.J. The Effects of Megaproject Social Responsibility on Participating Organizations. *Proj. Manag. J.* **2021**, *52*, 418–433. [CrossRef]
14. He, Q.; Chen, X.; Wang, G.; Zhu, J.; Yang, D.; Liu, X.; Li, Y. Managing Social Responsibility for Sustainability in Megaprojects: An Innovation Transitions Perspective on Success. *J. Clean. Prod.* **2019**, *241*, 118395. [CrossRef]
15. Ma, H.; Zeng, S.; Lin, H.; Chen, H.; Shi, J.J. The Societal Governance of Megaproject Social Responsibility. *Int. J. Proj. Manag.* **2017**, *35*, 1365–1377. [CrossRef]
16. Lin, H.; Zeng, S.; Ma, H.; Zeng, R.; Tam, V.W.Y. An Indicator System for Evaluating Megaproject Social Responsibility. *Int. J. Proj. Manag.* **2017**, *35*, 1415–1426. [CrossRef]
17. Wang, G.; Wu, P.; Wu, X.; Zhang, H.; Guo, Q.; Cai, Y. Mapping Global Research on Sustainability of Megaproject Management: A Scientometric Review. *J. Clean. Prod.* **2020**, *259*, 120831. [CrossRef]
18. Xie, L.; Ju, T.; Han, T.; Hou, L. A Meta-Network-Based Management Framework for Megaproject Social Responsibility Behaviour in China. *Eng. Constr. Archit. Manag.* 2022; *in press*. [CrossRef]
19. Alotaibi, A.; Edum-Fotwe, F.; Price, A.D.F. Critical Barriers to Social Responsibility Implementation within Mega-Construction Projects: The Case of the Kingdom of Saudi Arabia. *Sustainability* **2019**, *11*, 1755. [CrossRef]
20. Kramer, M.R.; Porter, M.E. Strategy and Society: The Link between Competitive Advantage and Corporate Social Responsibility. *Harv. Bus. Rev.* **2006**, *84*, 78–92.
21. Andrić, J.M.; Wang, J.; Zou, P.X.W.; Zhang, J.; Zhong, R. Fuzzy Logic–Based Method for Risk Assessment of Belt and Road Infrastructure Projects. *J. Constr. Eng. Manag.* **2019**, *145*, 4019082. [CrossRef]
22. Lin, H.; Sui, Y.; Ma, H.; Wang, L.; Zeng, S. CEO Narcissism, Public Concern, and Megaproject Social Responsibility: Moderated Mediating Examination. *J. Manag. Eng.* **2018**, *34*, 04018018. [CrossRef]
23. Xie, L.; Ju, T.; Xia, B. Institutional Pressures and Megaproject Social Responsibility Behavior: A Conditional Process Model. *Buildings* **2021**, *11*, 140. [CrossRef]
24. Van Nguyen, M. Barriers to Corporate Social Responsibility Performance in Construction Organizations. *Eng. Constr. Archit. Manag.* 2022; *in press*. [CrossRef]

25. Levitt, R.E. CEM Research for the next 50 Years: Maximizing Economic, Environmental, and Societal Value of the Built Environment. *J. Constr. Eng. Manag.* **2007**, *133*, 619–628. [CrossRef]
26. Gil, N.; Beckman, S. Introduction: Infrastructure Meets Business: Building New Bridges, Mending Old Ones. *Calif. Manag. Rev.* **2009**, *51*, 6–29. [CrossRef]
27. Ascensão, F.; Fahrig, L.; Clevenger, A.P.; Corlett, R.T.; Jaeger, J.A.G.; Laurance, W.F.; Pereira, H.M. Environmental Challenges for the Belt and Road Initiative. *Nat. Sustain.* **2018**, *1*, 206–209. [CrossRef]
28. Gray, K.R. Foreign Direct Investment and Environmental Impacts-Is the Debate Over. *Rev. Eur. Comp. Int. Environ. L.* **2002**, *11*, 306. [CrossRef]
29. Hong, W.; Shuai, D. Research on the Social Responsibility of Chinese Enterprises along the "Belt and Road". In *CSR in an Age of Isolationism*; Emerald Publishing Limited: Bingley, UK, 2020; pp. 181–203.
30. Brazys, S.; Elkink, J.A.; Kelly, G. Bad Neighbors? How Co-Located Chinese and World Bank Development Projects Impact Local Corruption in Tanzania. *Rev. Int. Organ.* **2017**, *12*, 227–253. [CrossRef]
31. Isaksson, A.-S.; Kotsadam, A. Racing to the Bottom? Chinese Development Projects and Trade Union Involvement in Africa. *World Dev.* **2018**, *106*, 284–298. [CrossRef]
32. Dávila, J.G.; Zhang, J.; Kørnøv, L. Challenges to Carry out Transboundary Environmental Assessment in ASEAN Countries. *Environ. Impact Assess. Rev.* **2020**, *84*, 106432. [CrossRef]
33. Huang, Y. Understanding China's Belt & Road Initiative: Motivation, Framework and Assessment. *China Econ. Rev.* **2016**, *40*, 314–321.
34. Coenen, J.; Bager, S.; Meyfroidt, P.; Newig, J.; Challies, E. Environmental Governance of China's Belt and Road Initiative. *Environ. Policy Gov.* **2021**, *31*, 3–17. [CrossRef]
35. Wang, H. China's Approach to the Belt and Road Initiative: Scope, Character and Sustainability. *J. Int. Econ. Law* **2019**, *22*, 29–55. [CrossRef]
36. Tracy, E.F.; Shvarts, E.; Simonov, E.; Babenko, M. China's New Eurasian Ambitions: The Environmental Risks of the Silk Road Economic Belt. *Eurasian Geogr. Econ.* **2017**, *58*, 56–88. [CrossRef]
37. Zhang, Q.; Oo, B.L.; Lim, B.T.H. Drivers, Motivations, and Barriers to the Implementation of Corporate Social Responsibility Practices by Construction Enterprises: A Review. *J. Clean. Prod.* **2019**, *210*, 563–584. [CrossRef]
38. Vishwakarma, A.; Dangayach, G.S.; Meena, M.L.; Gupta, S. Analysing Barriers of Sustainable Supply Chain in Apparel & Textile Sector: A Hybrid ISM-MICMAC and DEMATEL Approach. *Clean. Logist. Supply Chain* **2022**, *5*, 100073.
39. Shen, L.; Govindan, K.; Shankar, M. Evaluation of Barriers of Corporate Social Responsibility Using an Analytical Hierarchy Process under a Fuzzy Environment—A Textile Case. *Sustainability* **2015**, *7*, 3493–3514. [CrossRef]
40. Arevalo, J.A.; Aravind, D. Corporate Social Responsibility Practices in India: Approach, Drivers, and Barriers. *Corp. Gov. Int. J. Bus. Soc.* **2011**, *11*, 399–414.
41. Carrai, M.A. Adaptive Governance along Chinese-Financed BRI Railroad Megaprojects in East Africa. *World Dev.* **2021**, *141*, 105388. [CrossRef]
42. Nikjow, M.A.; Liang, L.; Qi, X.; Sepasgozar, S. Engineering Procurement Construction in the Context of Belt and Road Infrastructure Projects in West Asia: A SWOT Analysis. *J. Risk Financ. Manag.* **2021**, *14*, 92. [CrossRef]
43. Wu, C.-L.; Fang, D.-P.; Liao, P.-C.; Xue, J.-W.; Li, Y.; Wang, T. Perception of Corporate Social Responsibility: The Case of Chinese International Contractors. *J. Clean. Prod.* **2015**, *107*, 185–194. [CrossRef]
44. Loosemore, M.; Lim, B.T.H. Mapping Corporate Social Responsibility Strategies in the Construction and Engineering Industry. *Constr. Manag. Econ.* **2018**, *36*, 67–82. [CrossRef]
45. Close, R.; Loosemore, M. Breaking down the Site Hoardings: Attitudes and Approaches to Community Consultation during Construction. *Constr. Manag. Econ.* **2014**, *32*, 816–828. [CrossRef]
46. Wang, H.; Tong, L.; Takeuchi, R.; George, G. Corporate Social Responsibility: An Overview and New Research Directions: Thematic Issue on Corporate Social Responsibility. *Acad. Manag. J.* **2016**, *59*, 534–544. [CrossRef]
47. Pham, H.; Pham, T.; Dang, C.N. Barriers to Corporate Social Responsibility Practices in Construction and Roles of Education and Government Support. *Eng. Constr. Archit. Manag.* **2021**, *29*, 2714–2735. [CrossRef]
48. Zhao, Z.-Y.; Zhao, X.-J.; Davidson, K.; Zuo, J. A Corporate Social Responsibility Indicator System for Construction Enterprises. *J. Clean. Prod.* **2012**, *29*, 277–289. [CrossRef]
49. Heravi, A.; Coffey, V.; Trigunarsyah, B. Evaluating the Level of Stakeholder Involvement during the Project Planning Processes of Building Projects. *Int. J. Proj. Manag.* **2015**, *33*, 985–997. [CrossRef]
50. Lin, X.; Ho, C.M.F.; Shen, G.Q.P. Research on Corporate Social Responsibility in the Construction Context: A Critical Review and Future Directions. *Int. J. Constr. Manag.* **2018**, *18*, 394–404. [CrossRef]
51. Loosemore, M. Social Procurement in UK Construction Projects. *Int. J. Proj. Manag.* **2016**, *34*, 133–144. [CrossRef]
52. Lu, W.; Ye, M.; Flanagan, R.; Ye, K. Corporate Social Responsibility Disclosures in International Construction Business: Trends and Prospects. *J. Constr. Eng. Manag.* **2016**, *142*, 4015053. [CrossRef]
53. Evangelinos, K.; Skouloudis, A.; Jones, N.; Isaac, D.; Sfakianaki, E. Exploring the Status of Corporate Social Responsibility Disclosure in the UK Building and Construction Industry. *Int. J. Glob. Environ. Issues* **2016**, *15*, 377–399. [CrossRef]
54. Willetts, R.; Burdon, J.; Glass, J.; Frost, M. Corporate Responsibility Practices in Engineering Consultancies. *Int. J. Constr. Manag.* **2011**, *11*, 19–35. [CrossRef]

55. Weng, L.; Xue, L.; Sayer, J.; Riggs, R.A.; Langston, J.D.; Boedhihartono, A.K. Challenges Faced by Chinese Firms Implementing the 'Belt and Road Initiative': Evidence from Three Railway Projects. *Res. Glob.* **2021**, *3*, 100074. [CrossRef]
56. Wang, X.; Wong, Y.D.; Yuen, K.F.; Li, K.X. Environmental Governance of Transportation Infrastructure under Belt and Road Initiative: A Unified Framework. *Transp. Res. Part A Policy Pract.* **2020**, *139*, 189–199. [CrossRef]
57. Hu, D.; Ou, J.; Hu, X. On the Environmental Responsibility of Chinese Enterprises for Their FDIs in Countries within the Belt and Road Initiative. In *Normative Readings of the Belt and Road Initiative*; Springer: Berlin/Heidelberg, Germany, 2018; pp. 183–205.
58. Bohnett, E.; Coulibaly, A.; Hulse, D.; Hoctor, T.; Ahmad, B.; An, L.; Lewison, R. Corporate Responsibility and Biodiversity Conservation: Challenges and Opportunities for Companies Participating in China's Belt and Road Initiative. *Environ. Conserv.* **2022**, *49*, 42–52. [CrossRef]
59. Barnes, L.R.; Croker, N. The Relevance of the ISO26000 Social Responsibility Issues to the Hong Kong Construction Industry. *Australas. J. Constr. Econ. Build.* **2013**, *13*, 37–50. [CrossRef]
60. Chang, R.-D.; Zuo, J.; Zhao, Z.-Y.; Soebarto, V.; Lu, Y.; Zillante, G.; Gan, X.-L. Sustainability Attitude and Performance of Construction Enterprises: A China Study. *J. Clean. Prod.* **2018**, *172*, 1440–1451. [CrossRef]
61. Bernaciak, A.; Halaburda, M.; Bernaciak, A. The Construction Industry as the Subject of Implementing Corporate Social Responsibility (the Case of Poland). *Sustainability* **2021**, *13*, 9728. [CrossRef]
62. Williams, J.; Fugar, F.; Adinyira, E. Identification of Corporate Social Responsibility Challenges and Performance in the Ghanaian Construction Industry. In *Construction Research Congress 2020: Project Management and Controls, Materials, and Contracts*; American Society of Civil Engineers: Reston, VA, USA, 2020; pp. 76–84.
63. Issa, N.S.C.; Al Abbar, S.D. Sustainability in the Middle East: Achievements and Challenges. *Int. J. Sustain. Build. Technol. Urban Dev.* **2015**, *6*, 34–38. [CrossRef]
64. 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]
65. Gurmu, A.; Shooshtarian, S.; Mahmood, M.N.; Hosseini, M.R.; Shreshta, A.; Martek, I. The State of Play Regarding the Social Sustainability of the Construction Industry: A Systematic Review. *J. Hous. Built Environ.* **2022**, *37*, 595–624. [CrossRef]
66. Seriki, O. Knowledge Transfer in the African Construction Sector: The CSR and Sustainable Development Nexus. In *The Future of the UN Sustainable Development Goals*; Springer: Berlin, Germany, 2020; pp. 45–67.
67. Chang, R.; Zillante, G.; Zhao, Z.; Zuo, J. Research on Sustainability and Construction Firms: Current Status and Future Agenda. In Proceedings of the ICCREM 2015, Lulea, Sweden, 11–12 August 2015; pp. 310–317.
68. Ajayi, A.A.; Oyeyipo, O.; Apete, L.A.; Dahunsi, O.S. Evaluation of Corporate Social Responsibility of Construction Companies in Lagos State, Nigeria. *Evaluation* **2022**, *9*, 15092–15101.
69. Dyer, R. Cultural Sense-Making Integration into Risk Mitigation Strategies towards Megaproject Success. *Int. J. Proj. Manag.* **2017**, *35*, 1338–1349. [CrossRef]
70. Price, H. Developing Alignments With Green Building For A Project Home Market. In Proceedings of the Implementing Innovative Ideas in Structural Engineering and Project Management, Parramata, NSW, Australia, 23–28 November 2015.
71. Farooque, M.; Jain, V.; Zhang, A.; Li, Z. Fuzzy DEMATEL Analysis of Barriers to Blockchain-Based Life Cycle Assessment in China. *Comput. Ind. Eng.* **2020**, *147*, 106684. [CrossRef]
72. Agarwal, A.; Kapoor, K. Analysis of Barriers in Green Human Resource Implementation for Enhancing Organizational Sustainability: A DEMATEL Approach. *Transnatl. Corp. Rev.* **2022**, *14*, 1–15. [CrossRef]
73. Farooque, M.; Zhang, A.; Liu, Y. Barriers to Circular Food Supply Chains in China. *Supply Chain Manag. Int. J.* **2019**, *24*, 677–696. [CrossRef]
74. Wu, W.-W.; Lee, Y.-T. Developing Global Managers' Competencies Using the Fuzzy DEMATEL Method. *Expert Syst. Appl.* **2007**, *32*, 499–507. [CrossRef]
75. Lin, R.-J. Using Fuzzy DEMATEL to Evaluate the Green Supply Chain Management Practices. *J. Clean. Prod.* **2013**, *40*, 32–39. [CrossRef]
76. Mohammadfam, I.; Khajevandi, A.A.; Dehghani, H.; Babamiri, M.; Farhadian, M. Analysis of Factors Affecting Human Reliability in the Mining Process Design Using Fuzzy Delphi and DEMATEL Methods. *Sustainability* **2022**, *14*, 8168. [CrossRef]
77. Saraswathi, A. A Fuzzy-Trapezoidal DEMATEL Approach Method for Solving Decision Making Problems under Uncertainty. In *AIP Conference Proceedings*; AIP Publishing LLC: Mellvile, NY, USA, 2019; Volume 2112, p. 20076.
78. Tzeng, G.-H.; Huang, J.-J. *Multiple Attribute Decision Making: Methods and Applications*; CRC Press: Boca Raton, FL, USA, 2011.
79. Goyal, S.; Routroy, S.; Singhal, A. Analyzing Environment Sustainability Enablers Using Fuzzy DEMATEL for an Indian Steel Manufacturing Company. *J. Eng. Des. Technol.* **2019**, *17*, 300–329. [CrossRef]
80. Farhadi, P.; Niyas, M.; Shokrpour, N.; Ravangard, R. Prioritizing Factors Affecting Health Service Quality Using Integrated Fuzzy DEMATEL and ANP: A Case of Iran. *Open Public Health J.* **2020**, *13*, 263–272. [CrossRef]
81. Xia, X.; Govindan, K.; Zhu, Q. Analyzing Internal Barriers for Automotive Parts Remanufacturers in China Using Grey-DEMATEL Approach. *J. Clean. Prod.* **2015**, *87*, 811–825. [CrossRef]
82. Mandal, A.; Deshmukh, S.G. Vendor Selection Using Interpretive Structural Modelling (ISM). *Int. J. Oper. Prod. Manag.* **1994**, *14*, 52–59. [CrossRef]
83. Ali, S.M.; Hossen, M.A.; Mahtab, Z.; Kabir, G.; Paul, S.K. Barriers to Lean Six Sigma Implementation in the Supply Chain: An ISM Model. *Comput. Ind. Eng.* **2020**, *149*, 106843. [CrossRef]

84. Feng, X.; Li, E.; Li, J.; Wei, C. Critical Influencing Factors of Employees' Green Behavior: Three-Stage Hybrid Fuzzy DEMATEL–ISM–MICMAC Approach. *Environ. Dev. Sustain.* **2023**, *25*, 1–29. [CrossRef]
85. Shanker, S.; Barve, A. Analysing Sustainable Concerns in Diamond Supply Chain: A Fuzzy ISM-MICMAC and DEMATEL Approach. *Int. J. Sustain. Eng.* **2021**, *14*, 1269–1285. [CrossRef]
86. Chai, Q.; Li, H.; Tian, W.; Zhang, Y. Critical Success Factors for Safety Program Implementation of Regeneration of Abandoned Industrial Building Projects in China: A Fuzzy DEMATEL Approach. *Sustainability* **2022**, *14*, 1550. [CrossRef]
87. Zadeh, L.A. Fuzzy Sets. *Inf. Control* **1965**, *8*, 338–353. [CrossRef]
88. Wu, K.-J.; Liao, C.-J.; Tseng, M.-L.; Chiu, A.S.F. Exploring Decisive Factors in Green Supply Chain Practices under Uncertainty. *Int. J. Prod. Econ.* **2015**, *159*, 147–157. [CrossRef]
89. Jiang, X.; Wang, H.; Guo, X.; Gong, X. Using the FAHP, ISM, and MICMAC Approaches to Study the Sustainability Influencing Factors of the Last Mile Delivery of Rural E-Commerce Logistics. *Sustainability* **2019**, *11*, 3937. [CrossRef]
90. Bruch, C.; Nakayama, M.; Troell, J.; Goldman, L.; MARUMA MREMA, E. Assessing the Assessments: Improving Methodologies for Impact Assessment in Transboundary Watercourses. *Water Resour. Dev.* **2007**, *23*, 391–410. [CrossRef]
91. Gallagher, K.S.; Qi, Q. *Policies Governing China's Overseas Development Finance Implications for Climate Change*; Center for International Environment and Resource Policy, The Fletcher School, Tufts University: Medford, MA, USA, 2018; Volume 16.
92. Christensen, H.B.; Hail, L.; Leuz, C. Mandatory CSR and Sustainability Reporting: Economic Analysis and Literature Review. *Rev. Account. Stud.* **2021**, *26*, 1176–1248. [CrossRef]
93. Kechiche, A.; Soparnot, R. CSR within SMEs: Literature Review. *Int. Bus. Res.* **2012**, *5*, 97. [CrossRef]
94. Wang, Y.; Wissenbach, U. Clientelism at Work? A Case Study of Kenyan Standard Gauge Railway Project. *Econ. Hist. Dev. Reg.* **2019**, *34*, 280–299. [CrossRef]