sustainability

MDPI

Article

Interpretive Structural Modeling of Barriers to Sustainable Tourism Development: A Developing Economy Perspective

Kramat Hussain [1,†], Huaping Sun [1,2,*,†], Muhammad Ramzan [1,*], Shahid Mahmood [1] and Muhammad Zubair Saeed [3]

[1] School of Finance and Economics, Jiangsu University, Zhenjiang 212013, China; kramat381@hotmail.com (K.H.); shahidnajam786@live.com (S.M.)
[2] School of Economics and Management, University of Science and Technology Beijing, Beijing 100083, China
[3] Department of Economics, National College of Business Administration and Economics, Multan 60000, Pakistan; drzubair.mul@ncbae.edu.pk
* Correspondence: shp@ujs.edu.cn (H.S.); ramzanmuhammad@ujs.edu.cn (M.R.)
† These authors contributed equally to this work.

Abstract: Sustainable tourism development (STD) has been much touted in academia and policy circles; however, developing economies are still struggling to adopt STD. This phenomenon motivated us to trace the barriers hindering STD and their interrelationships in the context of developing economies. This study identified barriers through a systematic literature review and expert opinions. A six-tier hierarchical structure was developed using interpretive structural modeling (ISM). The Matrice d'Impacts croisés multiplication appliquée á un classement (MICMAC) was applied to assess the driving and dependence power. The findings illustrate that all barriers are significant and influence STD; however, the most critical are 'lack of government interest', 'funding constraints', and 'lack of integration among institutions and public–private people partnerships (4P)'. The findings of this research will be helpful for managers and policymakers to comprehend the driving and dependent power and categorization of barriers and devise pragmatic strategies to mitigate the barriers and promote STD.

Keywords: sustainable tourism development (STD); interpretive structural modeling; barriers; MICMAC

check for updates

Citation: Hussain, K.; Sun, H.; Ramzan, M.; Mahmood, S.; Zubair Saeed, M. Interpretive Structural Modeling of Barriers to Sustainable Tourism Development: A Developing Economy Perspective. *Sustainability* **2024**, *16*, 5442. https://doi.org/10.3390/su16135442

Academic Editors: Marc A. Rosen and Harry Coccossis

Received: 19 March 2024
Revised: 6 June 2024
Accepted: 19 June 2024
Published: 26 June 2024

Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

Recent decades have seen overwhelming discourse on tourism due to its relevance to the world economy, environment, and society [1]. A proportion of 10.3% of the world's GDP and 25% of jobs were attributed to tourism in 2022 [2]. Tourism is an integral part of human life. It remains resilient in the face of security concerns and other global challenges. In the first quarter of 2023, two hundred thirty-five million people traveled globally [3]. Tourism is a multi-sectoral, resource-intensive industry [4]. Whereas tourism offers multiple benefits, it damages the environment and society as well. Tourists' colossal use of water, energy, and food produces waste and puts pressure on natural resources. Tourism-associated CO_2 emissions from the transport industry during the period of 2016–2030 are estimated to increase by 45 percent, reaching 665 million tonnes (MT) [5]. In addition, excessive tourist activities risk the quality of life of inhabitants, cultural sustainability, and the environment. These aspects should be balanced to drive sustainability in the tourism sector. To manage these concerns, sustainable tourism development (STD) is gaining traction among researchers and policymakers [6,7].

The term sustainability emerged in tourism in the late 1980s. During that era, linking tourism practices and ecology was termed "alternative tourism". According to the United Nations World Tourism Organization (UNWTO), sustainable tourism (ST) is "*Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment, and host communities*" [8]. In addition,

it must meet the needs of current visitors and destinations; ensure opportunities for future advancement; and manage heritage, ecological, socio-cultural, and biological soundness [9]. Pakistan joined the UNWTO in 1975. STD assists in developing a regulatory framework and handling tourism development, unveiling methods to lock in positive outcomes and frame tourism operations as part of the climate system [10]. The fast growth and coherence between tourism and other industries (hotels, hospitality, and transport) make STD critical and complex. STD is impossible without offering incentives to conserve and repair the ecosystem in conjunction with social initiatives [11].

Therefore, initiatives at the global scale, e.g., the UNWTO, Earth Council (EC), and WTTC, introduced Agenda 21 for STD. In 2012, Rio + 20 meeting participants crafted a document, "The Future We Want", to elaborate on the significance of tourism in transforming the green economy from the perspective of sustainable development (SD) and poverty reduction. Contemporarily, the 2030 agenda for STD and SDGs advocates for responsible, sustainable, and approachable tourism for everybody. Considering the SDGs and the 2030 development agenda, the UNWTO mentions the following five major dimensions for tourism to support SDGs: (1) 'attractions', (2) 'accessibility', (3) 'accommodation', (4) 'amenities', and (5) 'activities'. Although these five pillars promote all SDGs, they are specifically relevant to goals 8, 12, and 14 [12]. However, adopting STD is not straightforward, especially for developing economies, where multiple barriers influence STD.

Although the investigation of barriers to STD has been emerging and many barriers have been reported, their implications may vary from country to country due to different socio-cultural, economic, environmental, and political conditions. Most studies conducted on STD are limited to developed countries [1]. Developing countries lag in STD compared to developed economies. In addition, the absence of clearly illustrated driving and dependence power and interdependencies among the barriers may lead to the failure of strategies for STD and adversely influence people, the environment, socio-cultural aspects, and economies.

The impacts of these barriers disrupt the whole system through their driving and dependence power and interdependencies, which are hard to locate [13]. Addressing one barrier may lead to the dissipation of several other barriers connected in a loop if identified systematically. Therefore, identifying the barrier's driving and dependence power, along with interdependencies structure, is critical to formulating auspicious strategies for STD. Multicriteria decision-making methodology (MCDM) got enough attention to deal with an intricate network of barriers impacting a system. However, no study has yet been conducted to unravel the mutual interdependencies and driving and dependent power of the barriers to STD, particularly in the context of a developing economy.

Therefore, the main objectives of this research are as follows:

1. To identify the significant barriers to STD;
2. To trace the interdependencies among barriers and categorize the barriers according to driving and dependence power;
3. To infer practical implications for the mitigation of barriers and the promotion of STD.

This study employed a qualitative methodology to explore respondents' perceptions and evaluations of barriers to STD, drawing from their personal experiences. Brainstorming sessions play a pivotal role in qualitative research methodologies, serving as dynamic forums for generating and exploring ideas, perspectives, and insights [14]. In these sessions, participants—often experts or stakeholders in the field of study—engage in open and collaborative discussions to share their diverse viewpoints, experiences, and knowledge [15]. Through free-flowing dialogue and creative exchange, brainstorming sessions yield qualitative data that capture the richness and complexity of the topic under investigation. Ultimately, brainstorming sessions contribute invaluable qualitative inputs that enrich the research process, enhance understanding, and inform decision making in various fields of inquiry [16].

ISM is an MCDM approach to locating complex elements of a network and their interdependencies. Warfield [17] and Sage [18] recommended the use of ISM to draw in-

terdependencies and create a hierarchical model of factors influencing a system. ISM can demonstrate direct and indirect associations among complex elements in a hierarchical diagram [19]. ISM cannot elaborate on the driving and dependence power of the variables. The Matrice d'Impacts croisés multiplication appliquée á un classement (MICMAC) can portray the driving and dependence power of the elements [11]. A two-step research approach was utilized to attain the objectives of this study. Initially, a list of barriers related to STD was identified through a thorough literature review. Subsequently, the list of barriers was refined based on expert opinions. Finally, deploying an integrated ISM-MICMAC approach, the driving and dependent power and interdependencies among barriers were assessed from the perspective of developing economies.

The results of this study contribute to the existing body of knowledge in two ways. First, this study identifies and validates barriers to STD in a developing economy. Secondly, this research delineates the driving and dependent forces of the barriers and interdependencies among them in adopting STD. Mitigation strategies are also recommended based on the study findings. Our analysis based on interdependencies and driving and dependence forces offers an improved systematic investigation of barrier evaluation, mitigation, and control and monitoring in STD. This work sheds light on new insights for the professionals and organizations interested in and already working on STD to learn from the judgment of industry veterans and academics with respect to how to manage barriers more effectively and efficiently. In addition, society will benefit through improved quality of life and health, employment opportunities, a sustainable environment, and sustainable development through successful STD adoption.

The article is divided as follows: Section 2 discusses the literature on barriers to ST, in addition to a background on the methodology. Section 3 comprises a problem statement. Section 4 details the materials and methods used in this study. Section 5 discusses the results based on a hierarchical structure and illustrates policy recommendations and managerial implications. Finally, Section 6 presents our conclusion and discusses limitations of this study, as well as future research directions.

2. Literature Review

2.1. Sustainable Tourism

Recently, assigning priorities for SD, Agenda 21 listed tourism as an important means of economic improvement that could enhance the living standard of residents, satisfy tourists, and preserve the ecology with which both tourists and local communities are associated [11]. Policymakers and the tourism sector may align various milestones and objectives with Agenda 21 [20]. These go beyond improved departmental cooperation, waste management, guiding host communities and tourists, and swapping knowledge and skills linked to travel and tourism. Economically, politically, environmentally, and socially sound tourism should be developed to be accepted worldwide. STD revolves around environmental, economic, and socio-cultural perspectives of development. Since tourism consumes immense resources, its operations have environmental, societal, cultural, and economic repercussions. Environmental degradation encompasses ocean pollution and the disruption of endangered plants and animals in protected places [21]. Hence, a complete and whole balance should be maintained among these four aspects to safeguard the long-term and short-term progress of the tourism industry in the face of climate challenges. The input and output of tourism activities are shown in Figure A1.

There are multiple tourism categories, e.g., leisure, adventure, eco-, cultural, medical, religious, business, culinary, sports, and educational tourism. Leisure tourism includes vacations, holidays, and recreational travel and is the most common type of tourism, involving activities like sightseeing, relaxation, and cultural experiences [22]. Adventure tourism involves physically challenging or risky activities, such as trekking, mountaineering, scuba diving, and zip lining [23]. Cultural tourism focuses on experiencing a destination's culture, heritage, and traditions [24]. Medical tourism involves traveling to another country for medical treatment, surgery, or wellness procedures [25]. Religious tourism in-

volves traveling to sacred or religious sites for pilgrimage, spiritual retreats, or religious festivals [26]. Sports tourism involves traveling to attend or participate in sports events, tournaments, or competitions [27].

With increasing knowledge of sustainability in tourism, ecotourism, nature-based tourism, and heritage tourism are also being considered as a strategy to overcome adverse effects [28]. Ecotourism promotes responsible travel to natural areas that conserve the environment, sustain the well-being of local people, and involve interpretation and education [29]. In addition, the WTO has stated that STD should (1) make the best utilization of the ecological resources that form an integral part of tourism development by controlling primary environmental operations and assisting in the preservation of natural heritage and biodiversity; (2) protect the socio-cultural values of local communities and safeguard their built and living environment and tolerance; and (3) secure the sustainability of economic activities by offering equal socio-economic advantages to all stakeholders, encompassing employment, social services, and poverty reduction [11]. Kumar et al. [30] suggested that future research should focus on the emerging challenges associated with sustainable tourism and the role of government and other stakeholder cooperation in improving sustainable practices in the tourism sector, and Dias et al. [31] emphasized that future studies should assess the barriers to sustainable tourism in different geographical and cultural contexts, considering local peculiarities.

2.2. Barriers to STD

Barriers are 'obstacles' or 'challenges' that restrict firms and governments from executing a specific strategy or action [32]. Although several researchers have discussed barriers to STD from different perspectives [7,33–35], deeper comprehension and fresh insights into these barriers are insufficient. In addition, the current literature does not provide up-to-date identification and categorization of barriers, as well as their associations. Different barriers have emerged in the literature, namely a poor ecosystem for businesses [7,9,34], funding constraints [7,9,36,37], a lack of guidelines and training [7,36,37], inadequate data [10,11,38], a lack of organizational vision and resistance to change [34,35,39], meager communication networks smart technologies [9,34,36], a lack of integration among institutions and public–private people partnerships (4P) [10,33,40], a shortage of expertise and human capital [34,35], a lack of awareness [35,37], the non-existence of sustainable tourism certifications (STCs) [10,34,41], and economic crises [33,36].

Cao [42] examined opportunities for and barriers to STD in China from policy and regulatory perspectives. The author found conflicts among objectives, equivocal obligations, ambiguous articulation of responsibilities, overlapping activities, and poor communication to be major challenges with respect to STD. Gu et al. [43] stated that the influx of tourists beyond the carrying capacity is a significant obstacle to STD in Jiuzhaigou, China. A lack of stakeholder coordination is a critical barrier to STD in Indonesia [44]. Andrades and Dimanche [45] identified poor location impression, infrastructure, human resource skills, and quality as tourism development issues in Russia. In a US-based study, Day and Cai [46] contended that system capacity and technological adoption are critical challenges with respect to ecological and energy-related STD.

Ruhanen [47] arranged interviews with local government and tourism industry professionals, and the lack of government knowledge of how to transform sustainability into action emerged as a significant inhibitor of STD in Queensland, Australia. In a review-based study, Carter et al. [48] claimed that political, social, and economic capacity-related challenges need to be addressed to promote STD in Cambodia. Harrison et al. [49] found a lack of carrying capacity assessment, lack of awareness, and lack of a common vision to be practical challenges with respect to STD in the Caribbean. Social and political issues were found to be major hurdles to STD in the Maldives [50]. Jarvis, Weeden, and Simcock [41] interviewed local tourism and hospitality firms. They declared that a lack of awareness, the cost to become a member, a lack of time for application procedures, and the effort needed to obey regulations are the hurdles to obtaining green tourism certification. Kaul

and Gupta [51], based on government documents and inputs from industry stakeholders, suggested that poor infrastructure, inadequate service facilities, a lack of attention on product quality, and lack of training and education are the major obstacles to STD in India. A summary of barriers to STD is provided in Table 1. Barriers converge in myriad influencing mechanisms, which may or may not be linear. It is not convenient for firms to mitigate all barriers simultaneously. A further deep analysis is worthwhile, since the identified barriers may not have an identical influence on STD.

Table 1. Barriers to STD.

Code	Barrier	Description	Sources
Br1	Greenwashing	Small-scale tourist operations in multiple locations claim to be sustainable or ecotourism-related but work in a "brown economy" to compete for good tourists. Poorly managed, limited developments at multiple sites can cause as much environmental degradation as individual mega-developments.	[9,38]
Br2	Lack of organizational vision and resistance to change	Organizational policies and culture reflect a vision, going beyond regulatory obligations to deliver sustainable outcomes. Therefore, not having a clear definition and vision of STD and resisting the adoption of sustainability ideas results in unsustainable tourism practices (UTPs). Opting for new goals is challenging and requires structural reforms at the organizational or industry level.	[7,34–37,39]
Br3	Inadequate data	Insufficient environmental information and poor data on the usage of water, energy, and other materials can cause tourism activities to be unsustainable. Academicians, firms, institutions, and other stakeholders struggle to establish regulations and metrics to gauge ecological sustainability, especially climate change, which is a hot debate in global tourism policy. The metrics for sustainable tourism processes can only be designed based on data availability and accuracy.	[9–11,38]
Br4	Lack of guidelines and training	The lack of guidelines and training programs hinders stakeholders from absorbing sustainable tourism concepts. Furthermore, specific training and guidelines are essential for tourism classification, owing to its complexities and interdisciplinary nature.	[7,34–37]
Br5	Lack of carrying capacity information	Missing or inaccurate information on the carrying capacity of a tourist spot may lead to poor site management; waste generation; and other environmental, financial, and socio-cultural damage, as well as tourist dissatisfaction.	[9,33,38,40]
Br6	Insufficient knowledge of development limits	A lack of development capacity limits for tourism destinations based on physical and human aspects leads to UTPs. It is necessary to clearly articulate which kinds of development are necessary and how and at which pace these developments need to be carried out to safeguard biodiversity, natural beauty, and STD development principles (ST).	[9,33,38,40]
Br7	Poor business ecosystem	Business difficulties due to political, economic, technological, and social factors collide with STD principles. A financially lucrative and environmentally sound industry may satisfy tourists and improve local inhabitants' quality of life.	[7,9,34,39]

Table 1. *Cont.*

Code	Barrier	Description	Sources
Br8	Funding constraints	Emerging economies face resource scarcity, especially for sustainable or green initiatives. Funds are necessary to establish green infrastructure, buildings, and operations and conduct training in the primary step of STD to reap long-term social, financial, and ecological dividends.	[7,9,34–37,39]
Br9	Meager communication networks and smart technologies	In the era of big data, artificial intelligence, and machine learning, a lack of smart technologies and communication networks paves the way for the unsustainable use of resources and economic deficiencies and generates waste and visitor dissatisfaction.	[9–11,34–36,39]
Br10	Weak governance	Weak governance causes poor implementation of rules and regulations. Weak governance mechanisms, policies, and standards harm STD objectives.	[9,33,34,36,38,39]
Br11	Lack of integration among institutions and public–private people partnerships (4P)	The execution of STD strategies requires the commitment of all stakeholders. Without cross-sectional consensus and cooperation on STD, the transition to and scaling up of STD is impossible.	[7,9,10,33–37,39]
Br12	Shortage of expertise and human capital	The shortage of well-equipped personnel with an STD philosophy is a challenge for the long-term survival of the tourism sector. The contemporary advancement and increasing complexities of STD have widened the space between the demand for capable personnel and the availability of such professionals.	[7,9,34,35]
Br13	Lack of awareness	A lack of awareness of stakeholders becomes a hurdle to pursuing any initiative. STD is not achievable without comprehension of sustainable consumption and production (SCP). Tourists' awareness and of education about "the principles of STD, its benefits and implication" are essential, so tourist agencies' acceptance of STD activities must increase to improve customer satisfaction and sustainability indicators.	[7,10,33,35,37,39,41]
Br14	Inadequate green transport and smart mobility	The inadequate provision of green transport and smart mobility puts pressure on resources, generates waste, and discourages SCP. Conventional transport and mobility paradigms undermine environmental, economic, and social integrity.	[9,10,34,35,37,39]
Br15	Lack of green infrastructure	Green infrastructure represents a network of green buildings, rest areas, streets, parking spaces, roads, and visiting centers that permits people to tour and enhances the ecological operational advantages of its recreational use. A lack of green infrastructure is an obstacle to STD.	[9,10,34–37]
Br16	Lack of government interest	Deficits in national policies, agendas, and promotion programs for STD lead to UTPs. The government needs to embed sustainable consumption and production approaches in tourism protocols. The government is not actively educating and training the masses in navigating STD.	[33–39]
Br17	Safety and security concerns	Crime, the unavailability or poor quality of food and health facilities, and terrorism destroy the image of tourist locations. Peace and security are the core agendas of STD.	[9,34,35,39]

Table 1. *Cont.*

Code	Barrier	Description	Sources
Br18	Non-existence of sustainable tourism certifications (STCs)	The absence or lack of implementation of STC systems in the tourism industry hinders STD behaviors. The lack of STCs, on the one hand, promotes greenwashing tactics and, on the other hand, discourages true believers in STD goals. STC encourages firms and destinations to adopt, analyze, and control their sustainable management holistically, permitting them to participate in the visible spectrum to achieve SDGs.	[10,34,41]
Br19	Economic crises	Economic crises affect household disposable income and generate uncertainty, leading to lower levels of tourist activities. In addition, policymakers ignore STD fundamentals in the interest of foreign exchanges during an economic crisis. During economic downturns, the interdisciplinary nature of the tourism industry further makes STD a complex and challenging task.	[33,36]
Br20	Inappropriate waste management	Increasing tourist activities spurs waste production. The inappropriate management and treatment of water, energy, food, and other waste causes detrimental impacts. For example, excessive water consumption may lead to harmful effects such as saltwater inclusion, declining land levels, and degraded water quality. Improper sewage systems may risk the mixing of waste into drinking water channels.	[9–11,33,39]
Br21	Difficult visa process	Restrictions on arrival visa issuance and long processing times for visa approval due to security challenges place Pakistan on the list of difficult-to-travel countries, ultimately hurting the 'frictionless travel' and equal opportunity aspects of tourism philosophy.	[35,45,51]

2.3. Theoretical Underpinning for Barriers

This study establishes a theoretical framework to locate barriers to STD. Following the guidelines of Shaikh et al. [52], the framework is rooted in several prominent organizational theories. It was conceptualized through an iterative process involving a comprehensive literature review, synthesis, and refinement. The process had two main stages. First, an extensive literature review produced an initial list of barriers. This list was then discussed with experts. Second, based on these discussions and organizational theories, the barriers were categorized to develop a theoretical framework.

An organization's resource-based view (RBV) has been an important topic of discourse in management. All assets, organizational processes, firm attributes, capabilities, information, knowledge, etc., owned by a firm support the firm in growing and adopting initiatives that can enhance its effectiveness, efficiency, and competitive advantage [53]. According to Khana et al. [54], an organizations' resources can be classified into physical, human, and capital categories. Physical resources consist of plants, equipment, physical technology, and the facility's location. Human resources can be defined as employees' intelligence, experience, skills, training, and capabilities. Organizational capital includes a firm's reporting structures, as well as informal and formal planning, and the company's operations [54]. Resources can also be classified as tangible (physical and financial assets) or intangible (corporate reputation and employee knowledge, experience, skills, commitment, and loyalty). However, resources are not productive on their own and can only be a source of competitive advantage if firms use them efficiently. Developing eco-friendly operations and products depends on the interaction of organizational culture and managerial operations involving various human, financial, and knowledge-based resources through the building of dynamic capabilities [55]. In this context, the dynamic capabili-

ties theory, derived from the RBV [56], provides a theoretical perspective to understand this phenomenon. Dynamic capabilities refer to a firm's ability to adapt to its changing business environment [57]. This adaptation is achieved by developing management capabilities, new resource configurations, and organizational strategies [58]. Therefore, we identify the following barriers based on theoretical arguments in the RBV and dynamic capabilities theory (see Figure A2).

The institutional theory explains how organizations respond to institutional pressures, seek to adopt or legitimize themselves in the sight of stakeholders, and adopt homogeneous, institutionalized structures and practices [59]. There are three types of institutional pressure, namely coercive, mimetic, and normative isomorphisms. Coercive isomorphisms exist where powerful stakeholders such as government agencies and regulatory bodies impose certain rules and regulations. Mimetic isomorphisms occur when organizations imitate competitors' paths to success. Normative isomorphisms are related to external stakeholders such as customers, nongovernment organizations (NGOs), pressure groups, and media organizations that demand appropriate and legitimate behavior. The institutional theory shares some common understandings with the stakeholder theory [60]. Freeman [61] suggested that companies produce externalities that affect many stakeholders (both internal and external to the firm) and that the subsequent pressure from those stakeholders results in significant motivation for organizations to adopt proactive environmental strategies. Therefore, drawing on theoretical arguments in the institutional theory and stakeholder theory, we put forward the following barriers (see Figure A2).

2.4. Previous Multi-Criteria Decision-Making (MCDM) Analysis Studies

ISM is a multi-criteria decision-making (MCDM) approach. Various MCDM techniques have been used in many studies to identify complex problems. These techniques are known as the analytical hierarchy process (AHP) [62], TOPSIS [63], the best–worst method (BWM) [64], and DEMATEL [65]. However, each MCDM technique has strengths and inherent weaknesses that can limit its applicability and reliability in certain contexts. AHP and TOPSIS, while useful for prioritizing and ranking, do not effectively capture dependencies between criteria. BWM's effectiveness depends on accurately identifying the best and worst criteria, which can be subjective. DEMATEL, although good for understanding influences among elements, relies heavily on expert judgment and can become complex for large systems. On the other hand, ISM offers a robust way to model and understand the complex interrelationships among variables, making it well-suited for studies like the one on barriers to sustainable tourism development [66].

2.5. Background of ISM

ISM transforms ambiguous and intricately structured mental models into unequivocal ones [17]. This technique uses theoretical and metric calculation tools based on graph theory to draw a directed graph (digraph) or web of mutual interactions [18]. ISM involves the phenomenal utilization of words, digraphs, and discrete mathematics to portray visual and comprehensive models [18]. Easy-to-understand models of complex problems are generated considering "variables" and "contextual interactions". The issues under observation are composed in a hierarchical structure according to their criticality [67]. ISM incorporates professionals' perceptions in hard-to-understand problems to derive a subjective opinion about the association between facts. This technique has been elaborated as the reflection of experts brainstorming on whether and how elements interact in a system. The application of ISM starts with exploring the issues influencing a problem, then proceeds with a group-oriented problem-solving approach. Usually, the issues related to a system are generated through a literature review and are modified, dropped, or selected based on expert consensus [68].

ISM has been adopted and validated in broad contexts and industries, including for the identification of drivers and enablers for Green Lean Six Sigma (GLS) execution in the construction industry [69], knowledge management (KM) in sustainable supply chains [70],

and barriers to corporate social responsibility in the supply chain [71]. Many experts have implemented the ISM technique in tourism [11,72–74]. For instance, Erol, Neuhofer, Dogru, Oztel, Searcy, and Yorulmaz [11] traced obstacles to blockchain application in the tourism sector, and Lin and Yeh [67] established tour values in the tourism sector [67]. Jain and Ajmera [75] examined the driving and dependence forces of the factors influencing medical tourism. Alqahtani and Makki [66] established hierarchical effects of factors relevant to destination image by employing the ISM approach in the tourism industry. Mi, Chen, Cheng, Uwanyirigira, and Lin [73] explored the determinants for improving customer satisfaction in hot spring tourism based on the ISM-MICMAC approach. A summary of ISM adoption in different fields is provided in Table 2. The interpretive structuring of barriers while unlocking the contextual relationships, along with driving and dependence power, is complicated, but the literature justifies ISM's competency to achieve it.

Table 2. Summary of ISM adoption in different fields.

No	Source	Elements	Area	Description
1	Sulistyadi et al. [72]	Factors	Geo-tourism	Assessed the key factors involved in establishing a sustainable plan for marine tourist development in geo-tourism using ISM-MICMAC.
2	Shafiee et al. [68]	Factors	Smart tourism	Developed a model for smart tourism destinations using ISM-MICMAC.
3	Lim et al. [70]	Measures	Textiles	Evaluated driving and dependence force of KM measures to boost firm performance.
4	Mi et al. [73]	Determinants	Hot spring tourism	This paper explored the determinants for improving hot spring customer satisfaction, employing ISM-MICMAC.
5	Gupta et al. [74]	Factors	Tourism	Applied ISM methodology to determine mutual interactions between factors impacting foreign direct investment in tourism.
6	Alqahtani and Makki [66]	Factors	Tourism	Developed hierarchical structures of the factors influencing destination image using ISM.
7	Erol, Neuhofer, Dogru, Oztel, Searcy, and Yorulmaz [11]	Obstacles	Sustainable tourism	Used ISM to establish a framework that illustrates the mutual interactions between barriers to blockchain adoption.
8	Lin and Yeh [67]	Enablers	Tourism	Developed tour value enablers and calculated their degrees of influence and dependence on each other.
9	Patri and Suresh [76]	Barriers	Health care	Analyzed different clusters of lean implementation barriers in health care.
10	Agrawal et al. [77]	Barriers	Digital supply chain	Applied ISM to examine mutual dependence among digital supply chain implementation challenges.
11	Jain and Ajmera [75]	Factors	Medical tourism	Analyzed the driving and dependence forces of different factors affecting medical tourism through ISM-MICMAC.
12	Alaboud and Alshahrani [78]	Factors	Construction industry	Analyzed factors influencing building information modeling adoption in Saudi Arabia using the ISM-MICMAC approach.

2.6. Background of MICMAC

Duperrin and Godet [79] introduced MICMAC to multiply metrics. MICMAC emphasizes the evaluation of an item through its indirect paths compared to its direct affiliations. The degrees of driving and dependence of variables are demonstrated through MICMAC

analysis [68]. Hybrid ISM-MICMAC analysis yields more accurate and detailed findings with respect to a problem to support decision making. Such analyses have been implemented in a variety of practical situations, e.g., driving and dependence force assessment of tour value enablers [67] and analysis of the barriers to GL implementation [80].

2.7. Research Gap

Carbon emissions, climate change, and global warming are being aggravated across the globe due to unsustainable tourism practices (UTPs). To effectively manage these challenges, STD should be promoted, which is difficult. Despite the benefits of STD, managers and policymakers struggle to adopt STD. Although multiple studies have identified the reasons for the limited growth of STS, multistage analysis of the barriers based on the consensus of academia and practitioners has been ignored in the literature. Higgins-Desbiolles [81] found that there are differences between the academic community and industry professionals on the issues of STD. In addition, earlier studies focused on the barriers to STD based on specific tourism destinations or institutions. Budeanu et al. [82] stated that to be efficient, there is a need to focus on broader issues related to STD and deploy methodologies suitable to identify and analyze issues beyond individual institutions or specific tourist destinations. These research gaps are the source of the current work.

3. Problem Statement

The major concentration of population in developing countries affects the country's ability to meet SDGs [83]. A growing population intensifies tourism activities and their repercussions [21]. Pakistan has the fifth largest population in the world, growing at 1.9% annually. In addition, Pakistan is among the ten countries most affected by climate change worldwide [84]. Floods, unstable weather conditions, and water scarcity are effects of ecological imbalances in Pakistan. Last year, floods in Pakistan killed 1730 people and affected 33 million, and around 8 million people were displaced, with a projected loss of more than USD 30 billion [85]. To deal with sustainability issues, a special focus on STD is required.

Pakistan has abundant tourism resources ranging from adventure to religious, cultural, recreational, and ecotourism [34]. There are six United Nations Educational, Scientific and Cultural Organization (UNESCO) sites in Pakistan. In 2019, 3.89 million jobs and approximately USD 8 billion were contributed from the tourism industry, which accounts for 5.7% of the country's GDP. Still, the tourism sector is not delivering on its potential. The opportunities hidden in tourism will be a zero-sum game without rigorous attention to STD. Sustainability in tourism is essential to achieving SDGs. Growing populations in developing economies require special attention to tackle STD, as UTPs cause negative externalities for the environment and society. Barriers are roadblocks to adopting and executing STD operations.

Therefore, to promote STD, a more comprehensive and multistage analysis of the barriers to STD is inevitable. The authors are optimistic that this study will anchor a smooth transition towards STD practices by identifying and analyzing key barriers to STD after the COVID-19 era. COVID provided an opportunity to transform tourism sustainably [81].

4. Material and Methods

To assess the criticality of barriers to STD in Pakistan, we followed different steps to create an easy-to-understand ISM-MICMAC model.

The sequence of the research methodology is described in Figure A3.

4.1. Exploring Barriers to STD

The authors conducted a literature review to extract barriers from the literature, an unequivocal technique to generate precise and reproducible insights into the phenomenon under study [86]. A review procedure was initially designed based on keywords, data sources, search strings, and language preferences. Studies published from 1990 to April 2023 were searched for in the Scopus and Google Scholar databases, as suggested by vari-

ous scholars. To avoid noise in the data, the following inclusion and exclusion protocol was created: (i) 'peer-reviewed and conference papers', (ii) 'excluding editorial notes, reports, letters, books, etc. Search strings were composed using Boolean operators, e.g., 'barriers, 'obstacles' or 'challenges' to sustainable tourism development', 'barriers or obstacles or challenges to green tourism', and 'barriers or challenges to sustainable tourism' in developing economies. In the first stage, 198 articles were listed. These articles were scrutinized based on keywords, abstracts, and inclusion and exclusion criteria.

Further redundancy was removed, and 53 articles pertinent to the research theme were identified [32]. A literature review may identify a large number of factors that affect the inputs of the expert panel. Therefore, the 25 most relevant and frequently appearing barriers to STD were selected based on a literature survey and expert judgment.

4.2. Screening Barriers

Because of the study's empirical nature and the absence of STD guidelines in the country, choosing suitable participants for this research was cumbersome. Criteria were designed to select suitable experts. A purposive sampling method was adopted to recruit experts conversant with STD philosophy in theory and practice [20,87]. A total of 19 potential respondents were approached through calls, emails, and in person, and 12 consented to contribute to this study. However, 6 out of 12 could not join in later stages due to their busy schedules or other personal reasons. Then, using snowballing sampling, other appropriate respondents were recruited [20]. Finally, a decision team composed of 8 experts was assembled. In the ISM technique, one can be considered an expert if they have in-depth knowledge and experience in a particular field, have published in well-known journals, or have higher education credentials in relevant subjects [88].

Furthermore, the participants should be willing to share their knowledge, time, and skills and have enough time to participate in the research [89]. Studies using the ISM methodology use different criteria for expert selection. This study selected experts with at least 15 years of working experience or more than 10 years of working experience with at least 5 publications in the relevant field. The literature indicates eight experts to be suitable for a study. However, in some research, fewer than eight respondents were selected. For example, Lin and Yeh [67] considered seven experts with more than ten years of working experience to be suitable to analyze tour value enablers related to the tourism sector of Taiwan. Ravi and Shankar [90] employed ISM, selected two experts with more than ten years of working experience, and examined the interactions among barriers to reverse logistics in the automobile industry. ISM is particularly suitable for studies with smaller sample sizes, provided the respondents are well-versed in the subject matter.

Team formation took almost four months, during which time Internet searches, calls, emails, and personal meetings took place to select the appropriate participants for the study. Expert selection and data collection were conducted from 1 January to 30 June 2023. The expert team consists of industry experts and academics. The demographic details of the expert panel are presented in Table 3. The academics had at least 13 years of working experience (15 publications), and industry professionals had no fewer than 15 years of working experience. Of the eight experts, one was a senior manager in a tourism company; two were tour operators; one was a tour consultant; one was a senior manager from an NGO; and three were professors—two specialized in tourism management and one in hospitality management. The senior manager oversees strategic operations and development, providing insights into industry trends and sustainable tourism initiatives. The tour operators manage travel packages, offering perspectives on logistical barriers and customer preferences. The tour consultant advises clients on travel planning, highlighting barriers related to consumer behavior. The NGO senior manager focuses on sustainable development and community engagement, providing insights into social and environmental barriers. The academics conduct research in tourism and hospitality management, offering theoretical and empirical foundations. Participants were selected for their diverse perspectives and relevant expertise, ensuring a comprehensive understanding of barriers

to sustainable tourism [19]. Their insights were validated through multiple rounds of discussion and feedback, enhancing the study's robustness.

Table 3. Details of the decision panel.

Participant	Organization Classification	Profession	Education	Experience (years)	Publications
A	Tourism company	Senior manager	Ph.D.	18	5
B	Academia	Professor	Ph.D.	14	16
C	Tourism firm	Tour operator	Master	17	--
D	Tour operator	Tourism consultant	Ph.D.	15	2
E	Academia	Professor	Ph.D.	16	19
F	Non-government organization	Senior manager	Ph.D.	18	4
G	Tour company	Tour operator	Master	15	--
H	Academia	Professor	Ph.D.	13	15

Higgins-Desbiolles [81] stated that there is a gap between academic and industrial practitioners in the tourism sector. Therefore, this study brought together academics and industry experts to form a consensus on issues related to STD through brainstorming sessions. Three brainstorming sessions were conducted to generate a consensus among the decision team. In the final session, convergence was evident, so further brainstorming sessions were avoided to save the authors and decision team time. The experts were requested to evaluate whether the barriers extracted from the literature review are relevant from Pakistan's perspective and whether their descriptions are correct. Moreover, they were allowed to edit, remove, or add barriers to the list. The following questions were asked:

a. Are there any irrelevant barriers?
b. Are the descriptions of the barriers correct and precise? If not, how can they be improved?
c. Would you like to recommend another barrier that is important and missing from the listed barriers?
d. Assign scores using a Likert scale from 1 to 5 (1 = not critical; 5 = very critical).

The literature may yield multiple barriers affecting a system. However, some barriers might not be significantly relevant to the country where the study is conducted due to different socio-economic, environmental, and geographical conditions. Hence, ISM relies on the judgment of experts to include or exclude the factors affecting a system to reduce noise in the data [66]. In addition, analyzing the most pertinent factors generates valid and reliable results while saving valuable resources required for analysis. Therefore, the scores were accumulated, and barriers were ranked; barriers with a score of less than 30 (75%) were removed following the criteria recommended by Ahmad et al. [91]. The rankings and scores of the selected barriers are presented in Table 4. In Table 4, "E" represents experts, whereas ∑Ei shows the summation of the scores assigned by experts to each barrier. Based on the aggregate score, the ranking of the barriers is defined in descending order; as the score decreases, the ranking increases, which signifies that barriers with a higher ranking are less critical compared to the lower-ranking barriers.

Table 4. Decision team scores used to scrutinize the relevant barriers.

Code	E1	E2	E3	E4	E5	E6	E7	E8	∑*Ei*	Ranking
Br1	3	4	4	4	3	5	4	4	31	7
Br2	4	4	4	5	4	4	4	4	33	5
Br3	5	5	4	5	5	4	5	5	38	2
Br4	4	5	4	5	5	5	4	5	37	3
Br5	5	4	5	4	5	4	5	4	36	4
Br6	3	4	4	4	4	4	5	4	32	6
Br7	4	5	4	4	4	5	4	4	34	5
Br8	4	5	4	5	5	5	5	4	37	3
Br9	4	4	4	3	4	4	3	4	31	7
Br10	5	4	5	4	5	4	5	4	36	4
Br11	4	3	4	4	4	5	4	4	32	6
Br12	5	4	5	5	4	5	5	5	38	2
Br13	3	4	3	4	4	5	4	4	31	7
Br14	5	5	4	5	5	5	5	5	39	1
Br15	4	4	4	3	4	4	3	4	31	7
Br16	5	4	5	5	5	4	5	4	37	3
Br17	4	4	4	5	4	4	4	4	33	5
Br18	4	3	4	4	4	5	4	4	32	6
Br19	5	5	5	5	5	5	5	4	39	1
Br20	5	4	5	5	4	5	5	4	37	3
Br21	3	4	3	4	5	4	4	4	31	7

The relationships among barriers were decided by consensus among the experts. Nevertheless, experts with heterogeneous professions may perceive the relationships differently, affecting the consensus. To roll out this probability, the "majority is authority" principle was adopted [32]. A contextual interaction was not enacted until six out of eight participants agreed.

Regarding the first and second objectives, various barriers were examined and cross-verified through brainstorming sessions with the authors, the moderator, and the decision team. All the inputs were recorded in a structural self-interaction matrix (SSIM). The ISM execution procedure is detailed in the coming section.

4.3. Execution of ISM Approach

ISM is a suitable research tool to inter-relate the variables in a situation in social sciences. ISM exploits the perceptions of the most experienced stakeholders facing real-time issues to decode the disruptions in a system into easy-to-understand visual models [92]. ISM delineates hierarchical functions and establishes a different stage prioritization structure to devise resultant strategies. The ISM application stages are described as follows [67]:

Stage 1: Elements affecting a situation are identified. The barriers to STD investigated in this article were extracted from SLR and expert opinions.

Stage 2: An SSIM is established through pairwise comparison to decide on the mutual relations between variables. These relations are coded as "V, A, X, or O", where:

"V" means barrier α leads to barrier β;

"A" means barrier β leads to barrier α;

"X" means barrier α and β lead to each other;

"O" means barrier α and β are indifferent.

An SSIM matrix was generated using these codes, as presented in Table 5.

Table 5. SSIM of STD barriers.

Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Br1		A	A	A	A	A	O	O	A	A	A	A	A	O	O	A	O	A	O	A	O
Br2			O	X	O	O	O	O	O	A	A	A	A	O	O	A	O	A	A	V	O
Br3				X	V	V	A	A	A	X	X	A	X	V	O	A	O	A	A	V	O
Br4					V	V	O	A	O	A	X	X	X	V	V	A	V	A	A	V	V
Br5						X	O	A	A	A	A	A	A	V	V	A	O	A	O	V	O
Br6							O	A	A	A	A	O	A	O	V	A	O	A	O	V	O
Br7								V	A	A	A	A	A	V	O	A	A	A	X	O	O
Br8									V	V	A	V	V	V	V	X	X	V	A	V	V
Br9										X	X	A	O	V	O	A	O	O	A	V	V
Br10											A	A	A	A	V	A	V	X	A	A	V
Br11												O	X	V	V	V	X	V	O	V	V
Br12													V	V	V	A	O	V	A	V	O
Br13														V	V	A	O	V	A	V	O
Br14															O	A	O	A	A	O	O
Br15																A	O	A	A	O	O
Br16																	V	V	A	V	V
Br17																		A	A	O	V
Br18																			A	V	O
Br19																				A	O
Br20																					O
Br21																					

Stage 3: An adjacency matrix (AM) is generated by transforming codes designated in the SSIM into binary language. The SSIM is translated to the AM within the boundaries of the following rules:

- If the representative cell for $Br\ (\alpha, \beta)$ denotes "X" in the SSIM, the (α, β) and (β, α) values in the AM are transformed to '1';
- If the representative cell for $Br\ (\alpha, \beta)$ denotes "V" in the SSIM, the (α, β) values in the AM are transformed to '1', and the (β, α) values are transformed to 0;
- If the representative cell for $Br\ (\alpha, \beta)$ denotes "0" in the SSIM, the (α, β) and (β, α) values in the AM are transformed to 0;
- If the representative cell for $Br\ (\alpha, \beta)$ denotes "A" in the SSIM, the (α, β) values in the AM are transformed to 0, and the (β, α) values are transformed to '1'.

The AM is articulated based on Equation (1), as shown in Figure A4 (Table 6).

$$a_{(\alpha,\beta)} = \begin{cases} 1,\ V_\alpha M V_\beta \\ 0, V_\alpha \overline{M} V_\beta \end{cases} \quad (1)$$

In Table 6, "0" represents no relation between barriers, while "1" represents a specific barrier influencing another barrier. For instance, "1" is placed in the row of barrier (Br1) and under column 1, and all other values in the row of Br1 are "0", which means that barrier 1 is only influencing itself.

In Equation (1), M reflects that V_α influences V_β, $\overline{M}$ signifies that V_α does not influence V_β, V_α indicates the elements in the column of the AM, and V_β represents the elements in the row of the AM.

Stage 4: Reachability matrix (RM): The AM in Table 6 signifies direct relations among 21 barriers. However, the AM does not reflect the transitive interactions among elements. An RM is prepared by performing power iterations based on AM data (Table 7). The RM can demonstrate direct and indirect associations among elements. Transitivity analysis is the basic assumption in ISM, which states that if variable 'α' drives variable 'β' and variable 'β' drives variable 'C,' then 'α' must drive 'C'. The logic behind transitivity is portrayed in Figure A5. An RM was formed to establish antecedents, reachability sets, and the driving and dependence power of the barriers to STD in Pakistan. In Table 7, "1*" represents tran-

sitive values inserted based on the transitivity rule explained in stage 3. Transitive links show that these barriers have hidden influences on other barriers in the system, while DEF represents the "driving force" and DRF represents the "dependence force" of the barriers.

Table 6. The adjacency matrix of barriers to STD.

Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Br1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Br2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Br3	1	0	1	1	1	1	0	0	0	1	1	0	1	1	0	0	0	0	0	1	0
Br4	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	0	0	1	1
Br5	1	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0
Br6	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Br7	0	0	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0
Br8	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1
Br9	1	0	1	0	1	1	1	0	1	1	1	0	0	1	0	0	0	0	0	1	1
Br10	1	1	1	1	1	1	1	0	1	1	0	0	0	0	1	0	1	1	0	0	1
Br11	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1
Br12	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	1	0	1	0
Br13	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	0	0	1	0	1	0
Br14	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
Br15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Br16	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1
Br17	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	1
Br18	1	1	1	1	1	1	1	0	0	1	0	0	0	1	1	0	1	1	0	1	0
Br19	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0
Br20	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0
Br21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Table 7. Reachability matrix of STD barriers.

Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	DEF
Br1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Br2	1	1	1*	1	1*	1*	0	0	0	1*	1*	1*	1*	1*	1*	0	1*	0	1*	1	1*	16
Br3	1	1*	1	1	1	1	1*	1*	1*	1	1	1*	1	1	1*	1*	1*	1*	1*	1	1*	21
Br4	1	1	1	1	1	1	1*	1*	1*	1*	1	1	1	1	1	1*	1	1*	1*	1	1	21
Br5	1	1*	0	0	1	1	0	0	0	1*	0	0	0	1	1	0	0	0	1*	1	0	9
Br6	1	0	0	0	1	1	0	0	0	1*	0	0	0	1*	1	0	0	0	1*	1	0	8
Br7	1*	1*	1	1*	1*	1*	1	1	1*	1*	1*	1*	1*	1	1*	1*	1*	1*	1	1*	1*	21
Br8	1*	1*	1	1	1	1	1*	1	1	1	1*	1	1	1	1	1	1	1	1*	1	1	21
Br9	1	1*	1	1*	1	1	1	1*	1	1	1	0	1*	1	1*	1*	1*	1*	1*	1	1	20
Br10	1	1	1	1	1	1	1	1*	1	1	1*	1*	1*	1*	1	0	1	1	1*	1*	1	20
Br11	1	1	1	1	1	1	1	1	1	1	1	1*	1	1	1	1	1	1	1*	1	1	21
Br12	1	1	1	1	1	1*	1	1*	1	1	1*	1	1	1	1	0	1*	1	1*	1	1*	20
Br13	1	1	1	1	1	1	1	1*	1*	1	1	1*	1	1	1	1*	1*	1	1*	1	1*	21
Br14	1	1	1*	1*	1*	1*	1*	0	1*	1	0	0	0	1	1*	0	1*	1*	0	1*	1*	15
Br15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Br16	1	1	1	1	1	1	1	1	1	1	1*	1	1	1	1	1	1	1	1*	1	1	21
Br17	1*	1	1*	1*	1*	1*	1	1	1*	1*	1	1*	1*	1*	1*	1*	1	1*	1*	1*	1	21
Br18	1	1	1	1	1	1	1	1*	1*	1	1*	1*	1*	1	1	0	1	1	1*	1	1*	20
Br19	1	1	1	1	1*	1*	1	1	1	1	1*	1	1	1	1	1	1	1	1	1*	1*	21
Br20	1	1*	1*	1*	1*	1*	1*	1*	1*	1	0	1*	1*	1*	1*	1*	1*	1*	1	1	1*	20
Br21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
DRF	19	17	16	16	18	18	15	14	15	18	14	14	15	18	19	11	16	15	17	18	17	340/340

Stage 5: Retrieving partition levels: RM formulation lays the foundation to retrieve antecedent and reachability sets and the driving and dependence power of the barriers to STD in Pakistan. The reachability set comprises the barrier itself and barriers under its influence. For instance, barrier 1 only reaches itself and does not influence any other

barriers; therefore, only "1" is present in the reachability set of barrier 1. However, multiple numbers exist in the antecedent set of barrier 1. The antecedent set consists of the barrier itself and barriers that can affect it. Intersection sets are defined based on the common properties of antecedent and reachability sets. Barriers with identical intersection and reachability sets are first assigned levels, then removed, and this process is iterated until all barriers achieve the desired level. The iteration procedure was completed in six retrievals, as summarized in Table 8. The distinguished levels shape a unique hierarchical structure, as shown in the digraph in Figure A6. The final ISM model after assigning transitivity and barriers to the nodes is portrayed in Figure A7.

Table 8. Summary of partition iterations.

No	Reachability Set	Antecedent Set	Intersection	Levels
1	,1,	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,	,1,	1st
2	,1,2,3,4,5,6,10,11,12,13,14,15,17,19,20,21,	,2,3,4,5,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,5,10,11,12,13,14,17,19,20,	3rd
3	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	3rd
4	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	3rd
5	,1,2,5,6,10,14,15,19,20,	,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,5,6,10,14,19,20,	2nd
6	,1,5,6,10,14,15,19,20,	,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,	,5,6,10,14,19,20,	2nd
7	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	4th
8	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,3,4,7,8,9,10,11,12,13,16,17,18,19,20,	,3,4,7,8,9,10,11,12,13,16,17,18,19,20,	4th
9	,1,2,3,4,5,6,7,8,9,10,11,13,14,15,16,17,18,19,20,21,	,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	,3,4,7,8,9,10,11,13,14,16,17,18,19,20,	4th
10	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,17,18,19,20,21,	,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,5,6,7,8,9,10,11,12,13,14,17,18,19,20,	2nd
11	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,2,3,4,7,8,9,10,11,12,13,16,17,18,19,	,2,3,4,7,8,9,10,11,12,13,16,17,18,19,	3rd
12	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,17,18,19,20,21,	,2,3,4,7,8,10,11,12,13,16,17,18,19,20,	,2,3,4,7,8,10,11,12,13,17,18,19,20,	5th
13	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,2,3,4,7,8,9,10,11,12,13,16,17,18,19,20,	,2,3,4,7,8,9,10,11,12,13,16,17,18,19,20,	3rd
14	,1,2,3,4,5,6,7,9,10,14,15,17,18,20,21,	,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,5,6,7,9,10,14,17,18,20,	2nd
15	,15,	,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,	,15,	1st
16	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,3,4,7,8,9,11,13,16,17,19,20,	,3,4,7,8,9,11,13,17,19,20,	6th
17	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	3rd
18	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,17,18,19,20,21,	,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,	,3,4,7,8,9,10,11,12,13,14,17,18,19,20,	4th
19	,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,	,2,3,4,5,6,7,8,9,10,11,12,13,16,17,18,19,20,	,2,3,4,5,6,7,8,9,10,11,12,13,16,17,18,19,20,	3rd
20	,1,2,3,4,5,6,7,8,9,10,12,13,14,15,16,17,18,19,20,21,	,2,3,4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,	,2,3,4,5,6,7,8,9,10,12,13,14,16,17,18,19,20,	2nd
21	,21,	,2,3,4,7,8,9,10,11,12,13,14,16,17,18,19,20,21,	,21,	1st

4.4. MICMAC Analysis

MICMAC classifies the driving and dependence power of variables [78]. The driving force (DRF) of an element is the sum of all values reflecting "1" in the row of that element extracted from the RM, while dependence force (DEF) is the sum of all values in the column representing "1" [11]. MICMAC consists of the following steps:

Step 1: Estimate the driving/dependence forces of barriers. The barriers' driving force ($DF\alpha$) and dependence force ($DF\beta$) are calculated following Equation (2).

$$DF_\alpha = \sum_{\beta=1}^{n} a_{\alpha\beta} (\alpha = 1, 2, 3, \ldots\ldots n), DF_\beta = \sum_{\alpha=1}^{n} a_{\beta\alpha} (\beta = 1, 2, 3, \ldots\ldots n) \quad (2)$$

Step 2: Assess the barrier rankings based on driving and dependence force. The rankings are shown in Table 9. The ranking of driving and dependence forces of the barriers is allocated in a descending pattern; as the driving force increases, the ranking decreases. A lower driving force ranking illustrates that a specific barrier influences multiple barriers, while a lower dependence force ranking conveys that a specific barrier is highly dependent on other barriers.

Table 9. DRF- and DEF-based ranking of barriers.

Barriers	DRF	DRF Ranking	DEF	DEF Ranking
1	1	VII	19	I
2	16	III	17	III
3	21	I	16	IV
4	21	I	16	IV
5	9	V	18	II
6	8	VI	18	II
7	21	I	15	V
8	21	I	14	VI
9	20	II	15	V
10	20	II	18	II
11	21	I	14	VI
12	20	II	14	VI
13	21	I	15	V
14	15	IV	18	II
15	1	VII	19	I
16	21	I	11	VI
17	21	I	16	IV
18	20	II	15	V
19	21	I	17	III
20	20	II	18	II
21	1	VII	17	III

Step 3: Categorize the barriers into segments, e.g., driving, linking, or dependent. The categories of barriers are presented in Figure A8. The categorizations are derived by identifying the reachability set ($RS(V_i)$), antecedent set ($AS(V_i)$), and intersection set ($IS(V_i)$) according to Equations (3)–(6), respectively.

$$RS(V_i) = \{V_j | V_j \in V, r_{ij} = 1\} \quad (3)$$

$$AS(V_i) = \{V_j | V_j \in V, r_{ji} = 1\} \quad (4)$$

$$IS(V_i) = RS(V_i) \cap AS(V_i) \quad (5)$$

Level partitioning is performed following Equation (6).

$$L_m = \{V_j | V_j \in V - L_0 - L_1 - \ldots - L_{m-1},\ IS(V_i) = RS(F_i)\} \quad (6)$$

where L_m reflects level m; $m = 1, 2, \ldots, |;| \leq n; L_0 = .$

The details of the segments are described as follows:

- **Autonomous category**

Barriers in this cluster have weak DRF and DEF. The barriers in this cluster are indifferent and neither drive nor are driven by other barriers in the system. The findings of this study report no barriers in this cluster, which signifies that all the barriers identified and analyzed in this research are complexly integrated and influence the whole system.

- **Driving category**

Strong DRF and weak DEF characterize driving barriers. These barriers influence linking and dependent categories.

- **Linking category**

Linking category barriers influence dependent barriers and have a feedback effect. These barriers have strong DRF and DEF. Therefore, they require special attention to control the affecting pattern of a loop in a given system. This study found 16 barriers in this category (Figure A8), namely 'lack of government interest', 'shortage of expertise and human capital', 'non-existence of sustainable tourism certificates', 'funding constraints, 'meager communication and smart technology', 'poor business ecosystem', etc.

- **Dependent category**

Dependent barriers in the system have inherently strong DEF and weak DRF. These barriers are directly under the influence of the linking category. Therefore, linking elements must be carefully addressed to curtain-dependent elements. Barriers such as 'greenwashing', 'lack of carrying capacity information', 'insufficient knowledge of development limits', 'lack of green infrastructure', and 'difficult visa process' are in dependent quadrant II.

5. Results and Discussion

Human civilization is on the verge of destruction without sustainable development. In this context, STD has gained traction. However, STD implementation is not easy, hindered by different barriers. Without a proper understanding of these obstacles, stakeholders cannot start and ensure the effective implementation of STD concepts into their operations.

This paper identified, analyzed, and categorized the barriers to STD after the COVID era using ISM with MICMAC. Members of industry and academia were the participants in shaping the scenario of barriers to STD. After describing the obstacles, they were examined individually to overcome or reduce their effects. The present research is an initial endeavor to identify and analyze the barriers to STD adoption using the MCDM technique in a developing economy, namely Pakistan.

Study findings were shared with the expert panel through virtual meetings to find any discrepancies between the existing situation and study outcomes. The online meeting was held in April 2023. The virtual meeting was concluded in 55 min, in which hierarchical structures, DRF; DEF; and driving, linking, and dependent clusters of the barriers were illustrated to the decision team. They analyzed and discussed their soundness. Eventually, no deviations were noticed, and a consensus was reached, validating the findings. In addition, the study findings are discussed hierarchically in the below section.

5.1. Hierarchical Structure

This is the primary endeavor to deploy ISM-MICMAC to frame barriers to STD. The hierarchical structure represents six levels of barriers to STD in Pakistan. The importance of elements increases with movement from top to bottom in the ISM model. '*Lack of government interest (Br_{16})*' emerged as a major barrier to STD and is located at the basement of the ISM hierarchy. This barrier is the base of the ISM model and drives all other barriers. This finding aligns with Neger [36], who, using a multiscale framework, found ignorance of the government responsible for STD-related issues in Mexico. Khodadadi, Pezeshki, and O'Donnell [39] argued that the lack of national and regional tourism policies and changing policies with changing governments is a problem for SD of heritage sites in Iran. The reason for this barrier in Pakistan's context may be the tilt of governments toward industrial recovery rather than reform after COVID-19 [81]. The lack of government interest represents less focus on laws, planning, and assistance related to STD.

Moreover, stakeholders are unwilling to adopt sustainable initiatives without government interest due to a lack of external force. Nave, Laurett, and do Paço [7] maintained that external pressure positively affects the implementation of sustainable operations in wine tourism. Therefore, government support and pressure cannot be undermined for STD [9]. The government's interest is crucial not only for STD but also for the sustainability of all other industries. '*Shortage of expertise and human capital (Br_{12})*' is a second-level linking barrier. This barrier is associated with the human resource category. Pakistan does not possess sufficient human resources required for the smooth transition from traditional to STD practices. Experts and a skilled workforce are essential to designing and implementing STD operations. A lack of human resources was also reported to be a barrier to the SD of wine tourism [7].

This barrier leads to the next hierarchy of barriers, namely a 'poor business ecosystem (Br_7),' 'non-existence of sustainable tourism certifications (Br_{18})', 'funding constraints' (Br_8)', and 'meager communication networks and smart technologies (Br_9)'. In a review-

based study Pan, Gao, Kim, Shah, Pei, and Chiang [9] concluded that a lack of communication networks, funding scarcity, and a poor business ecosystem in developing economies impede STD towards a green economy. STD certifications encourage tour operators to go green and facilitate environmentally conscious tourists in choosing the right service providers and destinations. Lockhart Smith [70] introduced regional eco-certification to stimulate STD in the hotel business and indicated that 34% of visitors came based on certification sources. However, to initiate a certification system, the availability and efficient allocation of funds, as well as ease of business, are prerequisites. High costs and budget limitations are broadly accepted challenges to adopting any strategy. Furthermore, strong communication network and smart technologies are integral for smart mobility, safety and security, data collection, destination management, and waste reduction.

The following seven barriers in the next level are widely cited in the literature: '*economic crises* (Br_{19}) [33]', '*safety and security concerns* (Br_{17}) [34,35]', '*lack of awareness* (Br_{13}) [7,37]', '*lack of guidelines and training* (Br_4) [35]', '*lack of integration among institutions and public–private people partnerships (4P)* (Br_{11}) [33,40]', '*lack of organizational vision and resistance to change* (Br_2) [36,39]', and *inadequate data* (Br_3) [9,38]'. Pakistanirupee's depreciation, increasing external debt, the balance of payment deficit, and foreign reserves of USD 4.24 billion indicate a serious threat of default on debt repayment [93]. A study reported that exchange and interest rate volatility and unpredictable weather patterns are critical risk factors in multinational joint ventures in Pakistan [94]. Jiskani et al. [95] argued that multiple mining projects have been abandoned because of financial instability in Pakistan. Furthermore, due safety and security issues, 11 tourists were killed on the base camp of Nanga Parbat, Pakistan, the world's ninth-highest mountain peak. In addition, a lack of integration among institutions and public–private people partnerships (4P), resistance to change, and lack of guidelines disrupt the SD process due to the multi-disciplinary nature of the tourism sector. One department or stakeholder is not merely responsible for ST; it is the obligation of all stakeholders, including investors, developers, government, academia, and, ultimately, tourists.

These barriers affect each other and influence the five following barriers in the next structure: '*inappropriate waste management* (Br_{20})', '*insufficient knowledge of development limits* (Br_6)', '*inadequate green transport and smart mobility* (Br_{14}), '*lack of carrying capacity information* (Br_5)', and '*weak governance* (Br_{10})'. Last year, due to inadequate smart mobility, lack of carrying capacity information, and weak governance, 22 tourists died in cars stranded in snow amid the influx of visitors at Murree Hill station in Pakistan [96]. Weak governance, lack of carrying capacity information, and lack of smart mobility also instigate waste and poor waste management.

Finally, fifth-level barriers prompt sixth-level barriers, including '*greenwashing* (Br_1)', '*lack of green infrastructure* (Br_{15})', and '*difficult visa process* (Br_{21})'. Weak governance, lack of certification, and lack of carrying capacity information promote greenwashing tactics. Small-scale unsustainable tourism operations in various places are as harmful as one large-scale operation [9]. The green infrastructure of tourist places is also a part of STD. Moreover, a difficult visa process disrupts the inflow of foreign currencies, dents employment, and destroys the country's image on a global scale. Pakistan has opportunities in religious tourism; however, this industry is unexplored due to the problematic visa process [35].

5.2. Mitigation Strategies

This study provides various policy implications. This research will assist practitioners in adopting STD smoothly and achieving SDGs. According to the results, lack of government interest and shortage of expertise and human capital are the most significant barriers to the tourism industry adopting STD to meet SDGs. The tourism industry largely depends on government policies, human capital, tourist places, and tourists. Consequently, less government focus and shortages of expertise and human capital have become critical barriers for this sector.

Mitigation of barriers at tier I: '*Lack of government interest* (Br_{16})' is this study's most significant linking barrier. Despite the fact that lack of government interest in STD is a

macro element and is not easily addressed by the tourism sector, its appearance in the linking segment suggests that it can be controlled. The general public can address this barrier. As Pakistan is a democratic country, the election commission and other relevant organizations should educate people to vote for a political party with a green vision. In addition, public–private people partnerships (4Ps) need to be strengthened. Primarily, firms cannot intervene in government policies; nevertheless, embedding corporate governance and CSR in tourism activities may overcome the impact of this crucial barrier. In addition, forming an independent organization to protect the principles of STD and applying green taxes on UTPs that ignore environmental footprints may also work.

Mitigation of barriers at tier II: '*Shortage of expertise and human capital (Br_{12})*' emerged as the second most important linking barrier. Training programs, diplomas, and international talent programs must be launched to educate the locals and hire foreign talents to overcome the expertise and human capital shortages. Visa-free travel for professionals and personnel with expertise in STD projects and student exchange programs could also mitigate this barrier.

Mitigation of barriers at tier III: Four barriers were found at this level. The barrier of a '*poor business ecosystem*' can be mitigated by devising strategies through the input and involvement of all stakeholders. Government, academia, and tour operators must be on a single page to form healthy business policies conducive to a flourishing business ecosystem. The second barrier, the '*non-existence of sustainable tourism certifications*', can be addressed by setting benchmarks for sustainable tourism practices and issuing STCs to promote SCP through low utility bills, a productive and healthy environment, and less solid waste [41]. In addition, STC will garner a competitive advantage, unique marketing opportunities, and increased awareness among tourists. The third barrier in this tier is 'funding constraints'. STD requires higher levels of capital in the early phase, and dividends are received in a longer time frame. However, in developing countries, organizations face a scarcity of resources. This barrier needs to be managed by generating funds from multiple sources, tax rebates, and interest-free bank loans. The ease of doing business will also drive investments in STD.

Furthermore, the government may provide grants, low-markup loans, subsidies, and direct foreign investment in tourism. Jiang, Ritchie, and Verreynne [55] noted that tourism firms with ample financial resources can better alter their products or services during critical situations. Moreover, the 'meager communication networks and smart technologies' barrier can be minimized with sufficient funds and the importing of state-of-the-art ICT technologies. These cutting-edge technologies can facilitate decision making and strengthen 4Ps and data collection.

Mitigation of barriers at tier IV: 'Economic crises', 'safety and security concerns'; 'lack of awareness', 'lack of guidelines and training', 'lack of integration among institutions and public–private people partnerships (4P), 'lack of organizational vision and resistance to change', and 'inadequate data' emerged at this tier. A slogan should highlight the increasing impacts of tourism activities on the environment and promote STD as a promising solution. Training programs, brainstorming sessions, seminars, and conferences about STD should be conducted locally to consolidate 4Ps, change organizational vision, and make stakeholders aware of their part in reducing the negative externalities of tourism operations with respect to ecology and society. Special forces to protect tourists or special protection zones can be established to address safety and security concerns.

Mitigation of barriers at tier V: '*Inappropriate waste management (Br_{20})*, '*insufficient knowledge of development limits (Br_6)*', '*inadequate green transport and smart mobility (Br_{14})*, '*lack of carrying capacity information (Br_5)*', and '*weak governance (Br_{10})*' are positioned at this tier. These barriers can be curtailed by properly addressing the linking barriers related to smart technology, integration among departments, availability of data, and certification systems. These barriers are under the influence of upper tier 4. For instance, to minimize the barriers of weak governance and lack of carrying capacity information, smart technology, strong communication networks, 4Ps, guidelines and training, and data are imperative.

Mitigation of barriers at tier VI: '*Greenwashing (Br_1)*', '*lack of green infrastructure (Br_{15})*', and '*difficult visa process (Br_{21})*' were explored at this level. Through good governance and the formulation and enforcement laws and regulations with respect to SCP, the government can overcome the barrier of greenwashing. The barriers at this tier fall under the linking category, which suggests that these barriers can be mitigated by carefully managing linking barriers.

STD must be immediately adopted to overcome environmental issues, e.g., unpredictable weather conditions and increasing temperatures. SCP should be expedited by employing innovative tourism practices and restructuring the tourism sector.

5.3. Managerial Implications

Considering the above discourse and findings of the ISM-MICMAC approach, the following implications are derived from managerial perspectives.

Primary Step—Introducing STD practices into tourism firms is crucial. These principles are integral, as they can improve the economy and yield ecological benefits. A relentless commitment to refining and strategically prioritizing STD is the key to fostering competitiveness and garnering support for sustainable development.

Sustained Improvement—The path to continuous progress lies in eliminating all UTPs that offer no value to tourists or the overall operation. It demands a meticulous focus on designing, modifying, investigating, and rectifying processes based on precise data and information, thus ensuring a consistent drive for improvement.

Tourist-Centric Approach—Acknowledging and addressing the needs and demands of tourists is paramount. Tourists wield immense influence and can significantly impact a business's success. Their requirements must be handled with care, and their contributions to STD should be actively sought, keeping them informed and engaged with evolving STD concepts.

Interpreting Relationships—By utilizing models such as ISM and conducting MICMAC analyses, we can discern the value and significance of various barriers, including driving, linking, and dependent barriers, as well as their hierarchical structure. With insights into these relationships and barrier hierarchies, organizations can pinpoint their managerial policies for targeted impact.

Central Learning—To adopt sustainable practices in the tourism sector, mitigating the barriers identified in this research and infusing SCP philosophies into tourism activities are imperative. This transformation will empower the tourism sector to embrace sustainable practices fully. Importantly, embedding STD philosophies within the cultural fabric of tourism firms is vital to enhance their competitiveness and cost-efficiency, as well as for the realization of STD objectives. STP concepts should be integrated across all levels of tourism operations to ensure comprehensive comprehension by all stakeholders. The significance of barriers at different stages of tourism operations and the identified relationships should be meticulously analyzed. Additionally, monitoring tourist activities is imperative throughout the three critical stages, namely the design, development, and final phases.

Mitigating the barriers that drive other barriers can be particularly beneficial during the adoption of STD to expedite the process. Managing linkage barriers becomes crucial during the development stage of the process, and a deep understanding of dependent barriers can prove advantageous in the final phase of tourism operations.

5.4. Theoretical Implications

This study adds to the sustainable tourism literature by identifying and analyzing driving and dependence power, mutual interactions, and hierarchical structures among barriers to STD. Tourism professionals and academics are aware of the competitive advantages of STD practices. However, tour operators and other stakeholders do not completely understand the mutual interactions and hierarchy of influence of different barriers linked with ST. In this regard, this study supports tour operators and policymakers in identifying and investigating obstacles to STD. It will improve stakeholders' comprehension of the significant barriers and their snowball impacts. This study provides a contextual relationship

assessment of the significant barriers to STD. Relying only on the frequency of appearance of factors related to STD may lead to a flawed assessment.

Stakeholder and institutional theories are particularly useful for understanding the prominent and independent barriers to STD. The main barrier is the lack of government interest (Br16), which emerged at the bottom of the ISM model and has higher driving and lower dependence power. Firms often respond seriously to pressures from stakeholders and institutions, which drives the need for proactive sustainability strategies. The findings indicate that stakeholder theory barriers largely influence barriers related to the RBV dynamic capabilities theory. This suggests that adopting sustainable tourism practices relies more heavily on external factors, as emphasized by institutional and stakeholder theories, than internal factors, such as those outlined by RBV dynamic capabilities theory. The results highlight that social pressures shape organizational and management practices more than purely economic ones. Sustainable tourism practices can be more effectively adopted by improving the coordination and relationships between stakeholders and the focal organization. This paper contributes significantly to the literature by addressing an area that has received limited attention in previous research.

Employing the MCDM method, experts can categorize barriers into segments based on their DRF and DEF. This paper provides options to mitigate barriers, as various strategies fail at the beginning of the application stage due to the mismanagement of barriers. In addition, practitioners cannot address all barriers simultaneously due to limited resources. Therefore, examination of barriers using ISM-MICMAC constitutes a systematic mechanism for decision makers considering barrier categorization and hierarchical structures. Addressing linking barriers according to their contextual interactions and hierarchical levels is crucial while establishing timely response strategies. This research bridges a gap in the literature by exploring barriers to STD within the context of developing economies, leveraging insights from academia and industry professionals. A framework for identifying and ranking barriers to STD was established. This framework can be used to identify barriers to STD in other countries.

6. Conclusions, Limitations, and Future Directions

STD is crucial to avoid the depletion of natural resources and improve economic, environmental, and societal development. Nevertheless, in EVAs and developing countries like Pakistan, STD adoption after COVID-19 has become more difficult due to government interest in 'recovery' rather than 'reform' and funding constraints. Based on this situation, this article identifies barriers, locates their complex nexus, and establishes a hierarchical structure of the influence of the barriers in the context of Pakistan. Generally, policymakers may concentrate on one barrier. However, the intricate mechanism of interactions with driving power indicates that one barrier may activate others if not mitigated. The interdependencies of barriers, driving and dependent power, and hierarchical structures are essential in precisely estimating the barriers to STD. However, past research on STD has overlooked or inadequately addressed this aspect. This study pioneers the exploration of the indirect relations and driving and dependence power by adopting an analysis model that integrates the ISM-MICMAC method.

Through a comprehensive literature review and expert opinions, we identified 21 barriers and determined their complex relationships. Subsequently, a hierarchical network structure illustrating cause-and-effect relationships among barriers and the significance of barriers to STD was then assessed based on influence transmission through network paths. The drive/dependence powers of barrier interdependency were also assessed using MICMAC analysis.

This study offers theoretical contribution in the following three ways: (1) it identifies barriers to STD, (2) it explores indirect relationships among barriers, and (3) it examines the driving and dependence power of barriers to STD. This enables STD practitioners to enhance their understanding of critical barriers, facilitating the formulation of better strategies to mitigate barriers.

A comprehensive literature review and expert judgment yielded 21 barriers to STD in Pakistan. 'Greenwashing', 'lack of green infrastructure', and 'difficult visa process' are the least significant dependent barriers, whereas 'lack of government interest', 'lack of integration among departments and public–private people partnerships', and 'funding constraints' are the most significant.

Despite drawing worthwhile insights into barriers, this research has a few shortcomings. This study identified 21 barriers to STD in Pakistan's tourism sector; however, some barriers may still be missing. The implications of this article may not suit other countries with different economic, political, and social structures. Future research may deploy the developed mechanism in different countries and can compare the findings. ISM-MICMAC is limited in explaining how and why variables impact or are impacted by other variables. In addition, ISM-MICMAC does not gauge the strength of the influence between factors. Therefore, total interpretive structural modeling and fuzzy MICMAC can be deployed in future studies to judge the intensity of interactions among barriers and explain the causes of interactions. Modeling strategies to mitigate the identified barriers will also be useful.

Author Contributions: K.H.: conceptualization, data analysis, data curation, writing—original draft, and data analysis; H.S.: methodology and writing—review and editing; M.R.: methodology and writing—review and editing; S.M.: data analysis, data curation, and methodology. M.Z.S.: data analysis, data curation, and formal analysis. All authors have read and agreed to the published version of the manuscript.

Funding: This study was supported by the Beijing Social Science Foundation Planning Project (20GLC054).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are contained within the article.

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

Appendix A

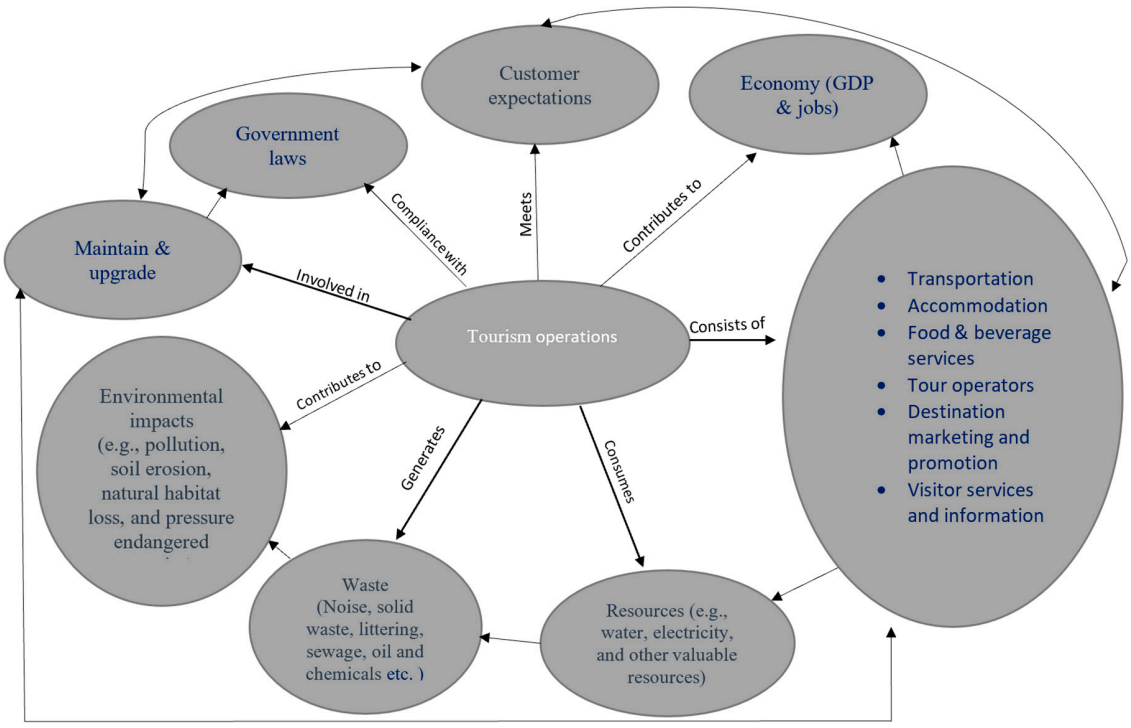


Figure A1. The input and output of tourism activities.

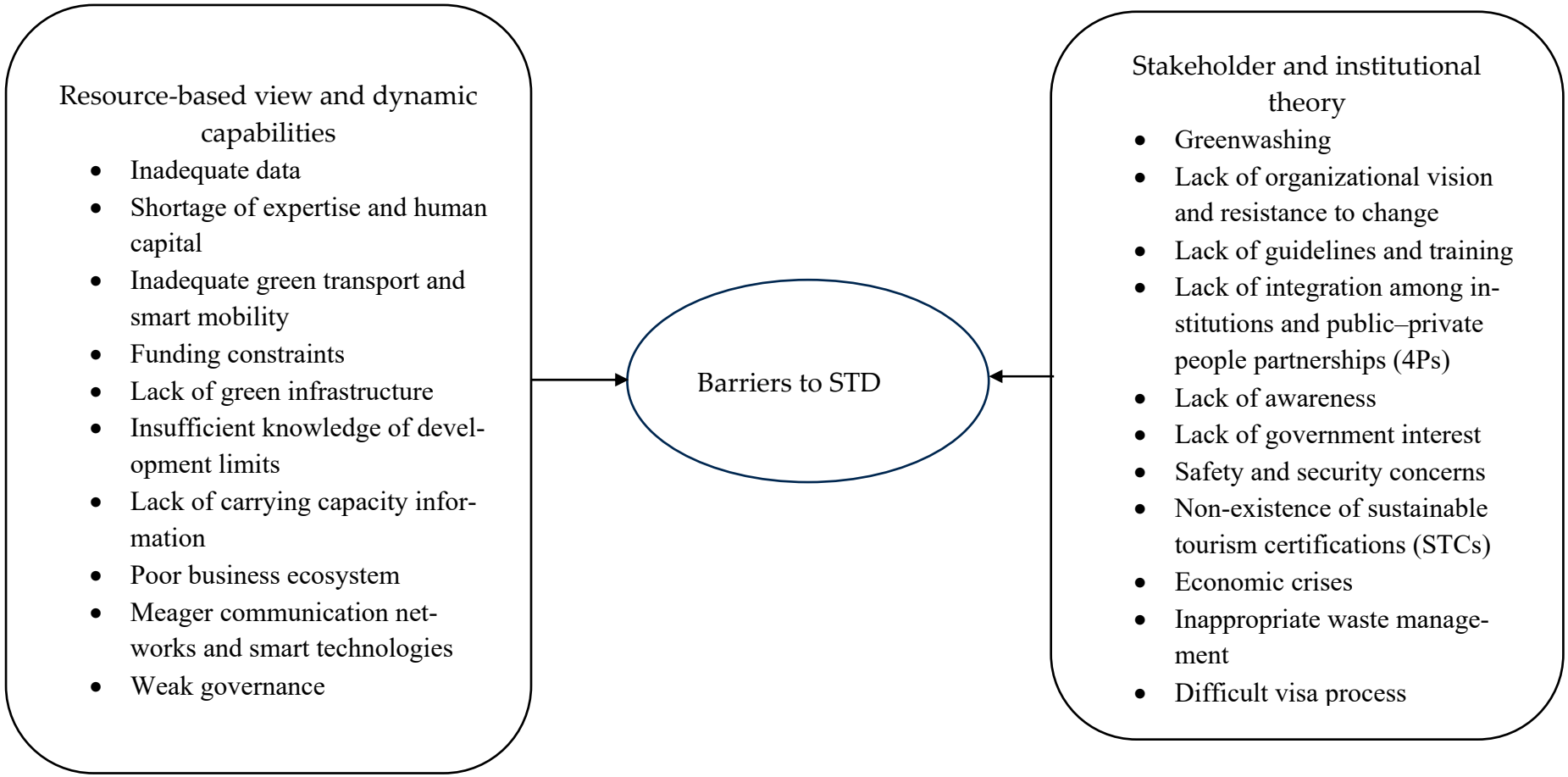


Figure A2. A theoretical framework for identifying barriers to STD.

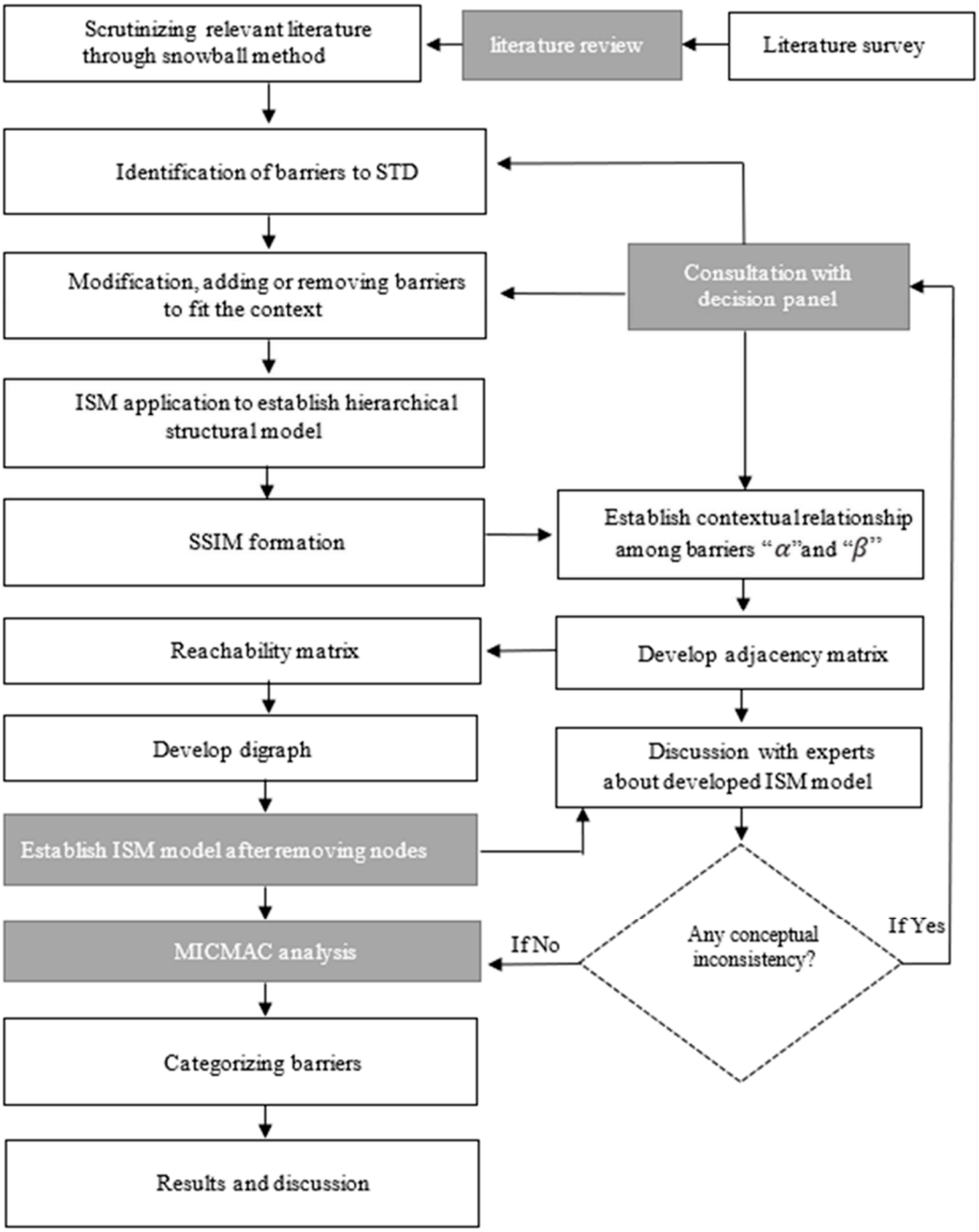


Figure A3. Step-by-step process of the ISM approach.

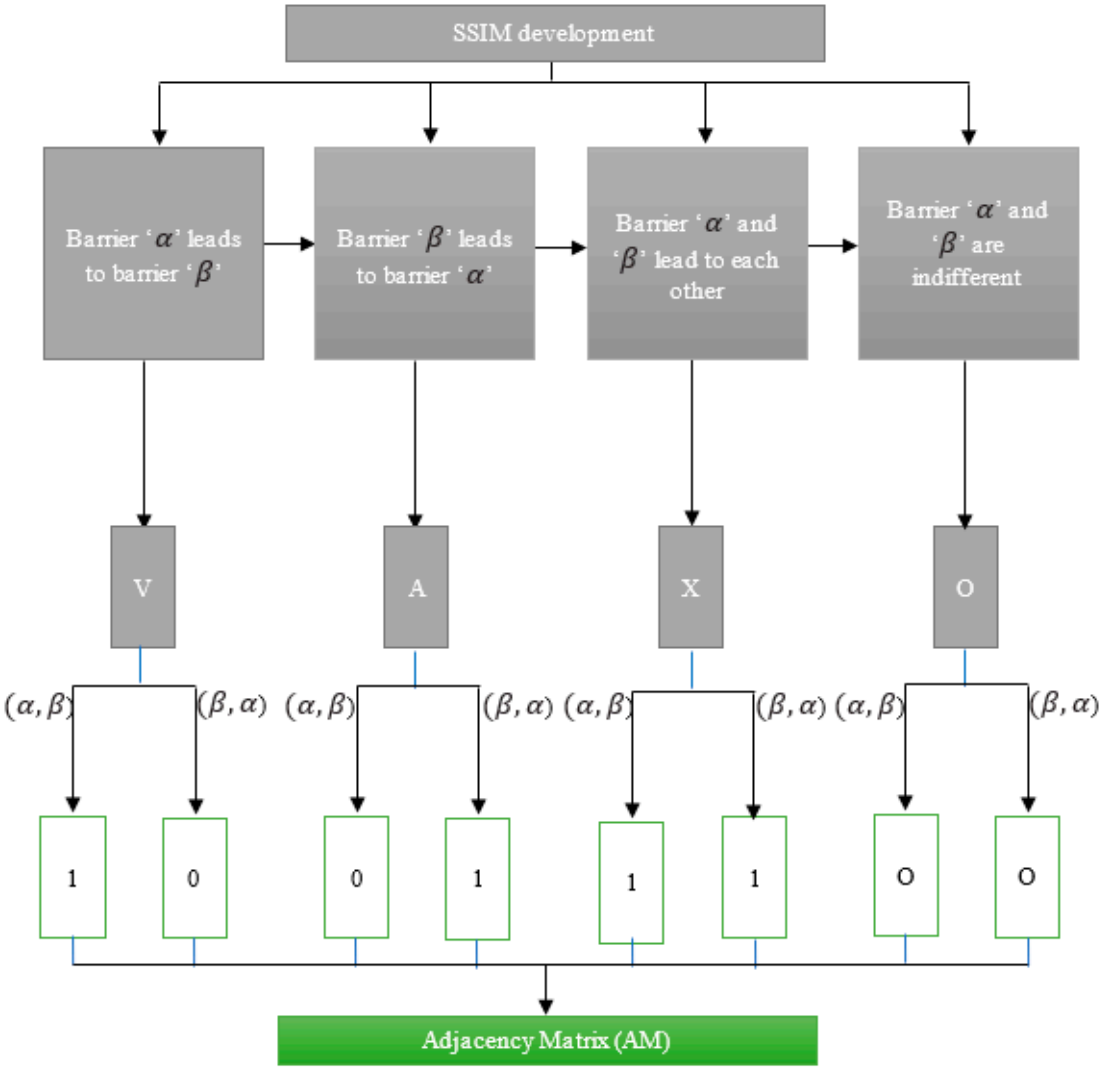


Figure A4. The process to convert SSIM into AM.

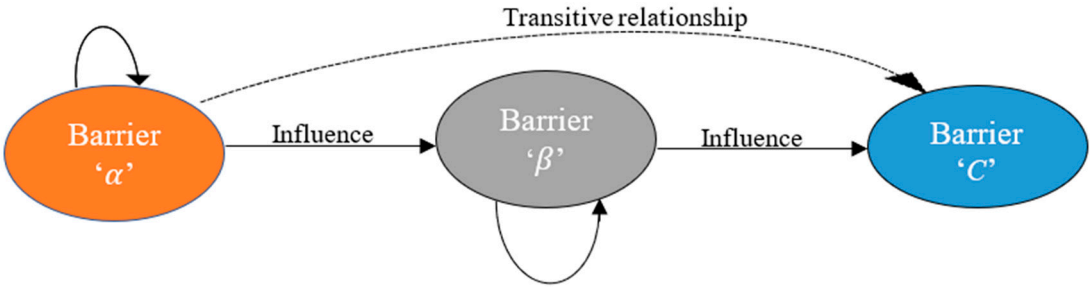


Figure A5. The principle of incorporating transitivity.

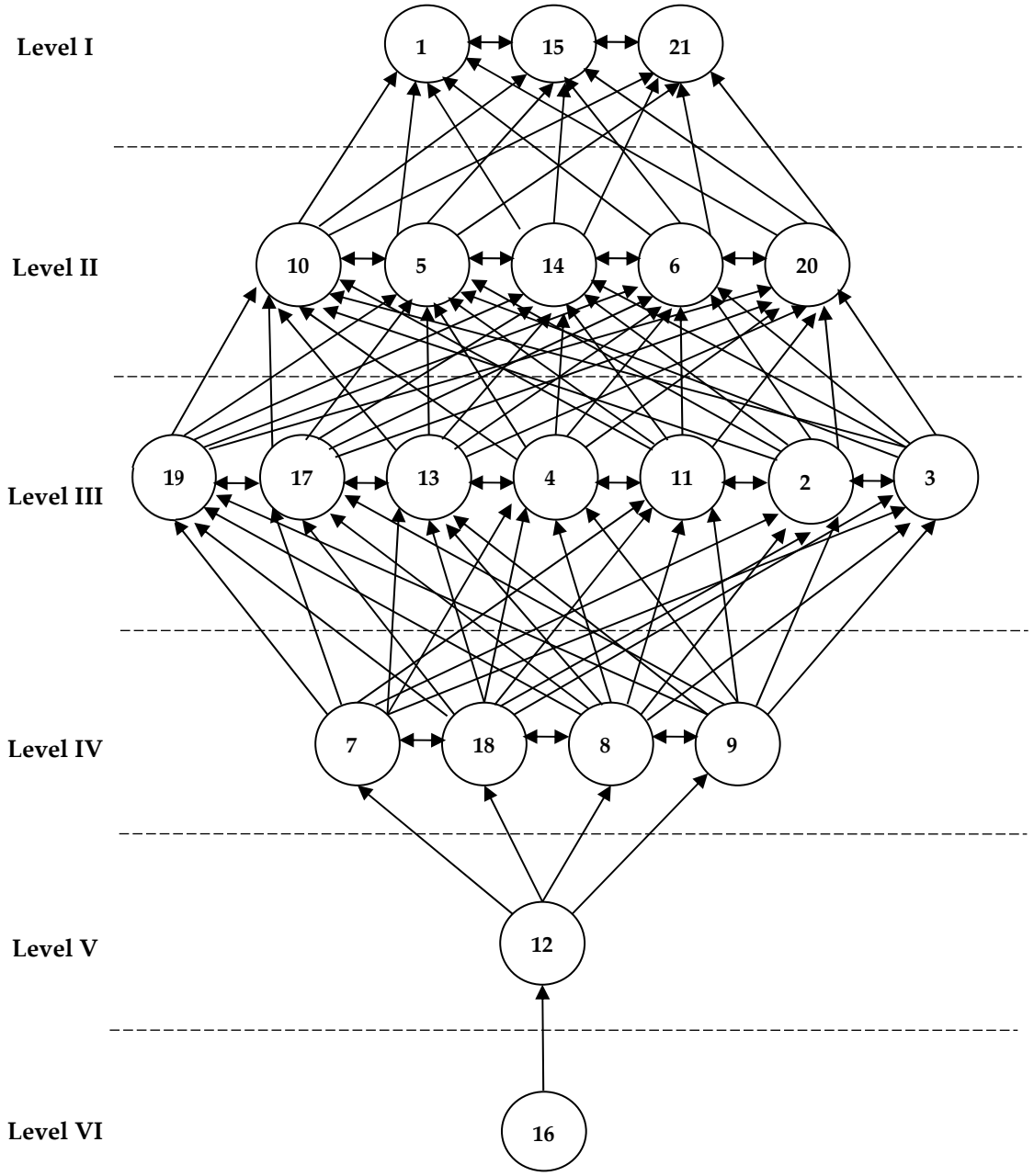


Figure A6. Digraph of barriers to STD.

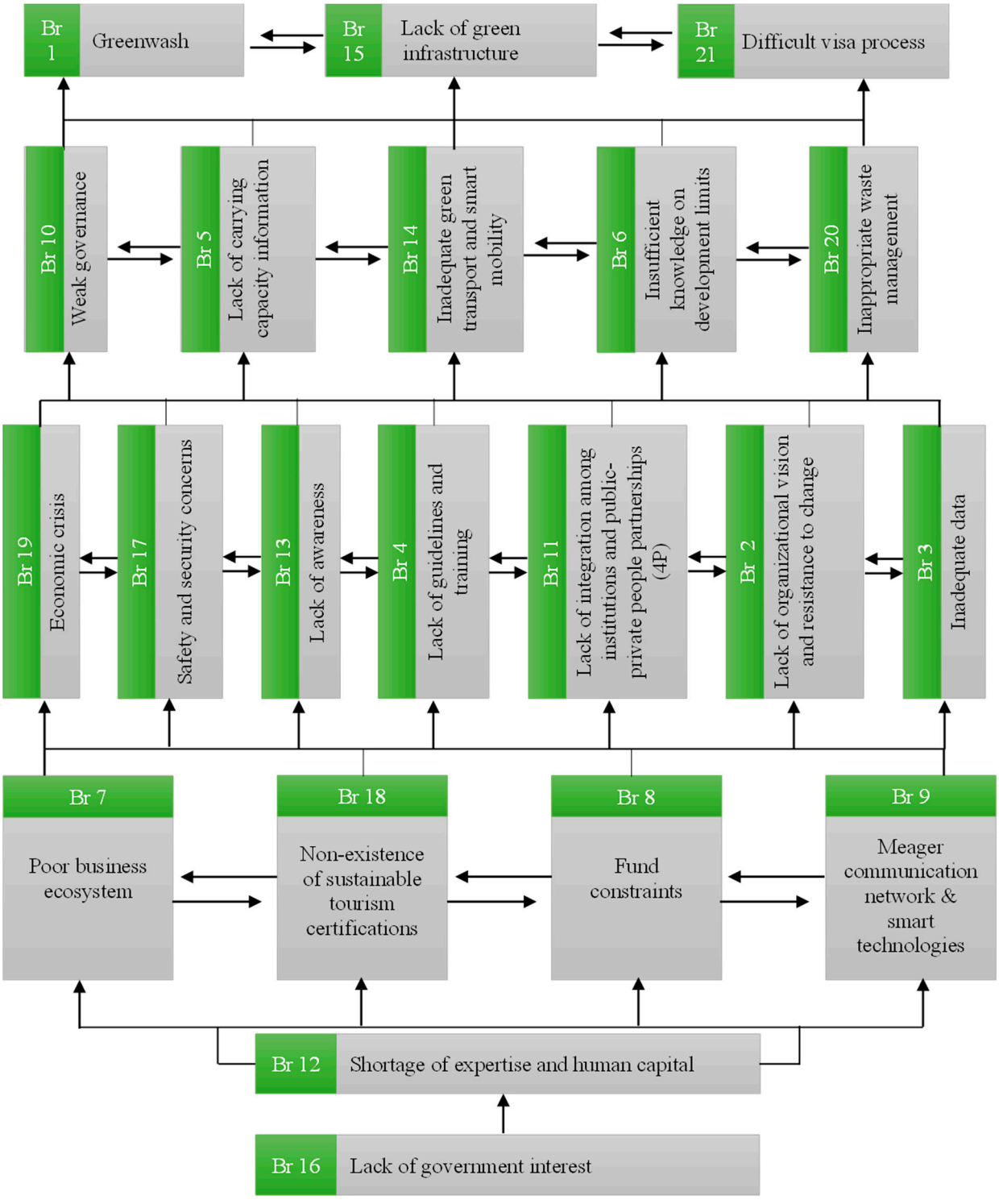


Figure A7. ISM model of barriers to STD.

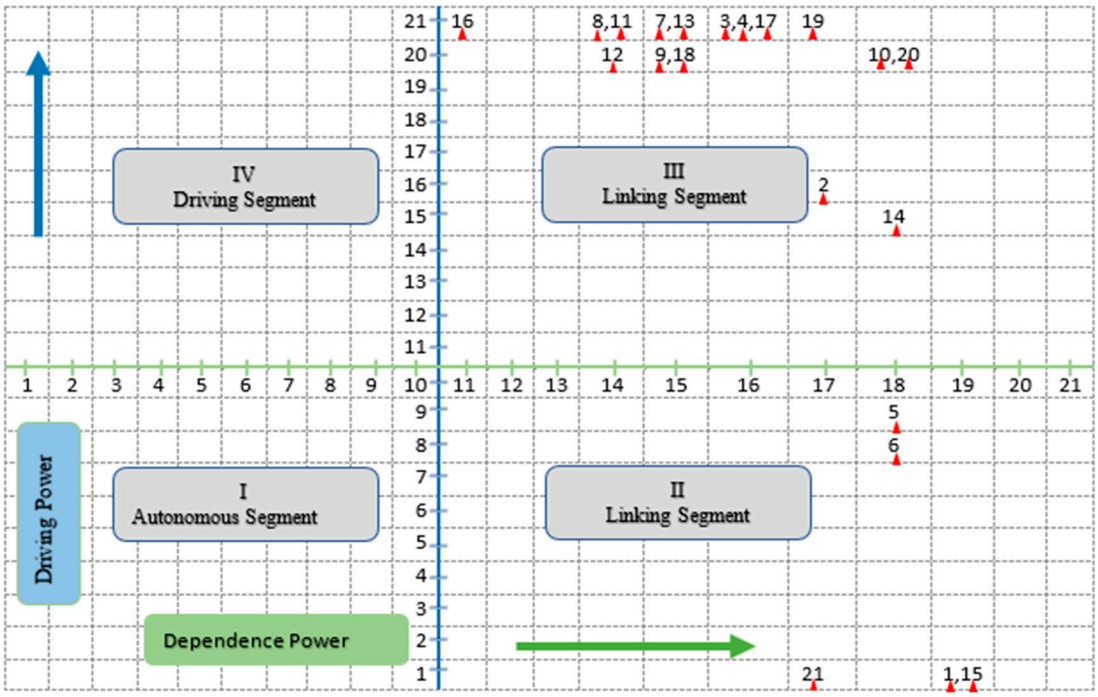


Figure A8. MICMAC classification of barriers to STD.

References

1. Niñerola, A.; Sánchez-Rebull, M.-V.; Hernández-Lara, A.-B. Tourism research on sustainability: A bibliometric analysis. *Sustainability* **2019**, *11*, 1377. [CrossRef]
2. Buhalis, D.; Leung, X.Y.; Fan, D.; Darcy, S.; Chen, G.; Xu, F.; Wei-Han Tan, G.; Nunkoo, R.; Farmaki, A. Editorial: Tourism 2030 and the contribution to the sustainable development goals: The tourism review viewpoint. *Tour. Rev.* **2023**, *78*, 293–313. [CrossRef]
3. UNWTO. Available online: https://www.unwto.org/news/tourism-on-track-for-full-recovery-as-new-data-shows-strong-start-to-2023 (accessed on 4 May 2023).
4. Dessai, A.G. Sustainable Tourism. In *Environment, Resources and Sustainable Tourism: Goa as a Case Study*; Dessai, A.G., Ed.; Springer Nature: Singapore, 2023; pp. 187–228.
5. UNWTO. Transport-Related CO2 Emissions from the Tourism sector. Available online: https://www.unwto.org/sustainable-development/tourism-emissions-climate-change#:~:text=Transport-related%20emissions%20from%20international,to%201103%20Mt%20CO2 (accessed on 15 May 2023).
6. Streimikiene, D.; Svagzdiene, B.; Jasinskas, E.; Simanavicius, A. Sustainable tourism development and competitiveness: The systematic literature review. *Sustain. Dev.* **2021**, *29*, 259–271. [CrossRef]
7. Nave, A.; Laurett, R.; do Paço, A. Relation between antecedents, barriers and consequences of sustainable practices in the wine tourism sector. *J. Destin. Mark. Manag.* **2021**, *20*, 100584. [CrossRef]
8. UNWTO. Sustainable Tourism Development. Available online: https://www.unwto.org/sustainable-development#:~:text=%22Tourism%20that%20takes%20full%20account,the%20environment%20and%20host%20communities%22 (accessed on 3 April 2023).
9. Pan, S.-Y.; Gao, M.; Kim, H.; Shah, K.J.; Pei, S.-L.; Chiang, P.-C. Advances and challenges in sustainable tourism toward a green economy. *Sci. Total Environ.* **2018**, *635*, 452–469. [CrossRef] [PubMed]
10. Herrero, C.C.; Laso, J.; Cristóbal, J.; Fullana-i-Palmer, P.; Albertí, J.; Fullana, M.; Herrero, Á.; Margallo, M.; Aldaco, R. Tourism under a life cycle thinking approach: A review of perspectives and new challenges for the tourism sector in the last decades. *Sci. Total Environ.* **2022**, *845*, 157261. [CrossRef] [PubMed]
11. Erol, I.; Neuhofer, I.O.; Dogru, T.; Oztel, A.; Searcy, C.; Yorulmaz, A.C. Improving sustainability in the tourism industry through blockchain technology: Challenges and opportunities. *Tour. Manag.* **2022**, *93*, 104628. [CrossRef]
12. United Nations World Tourism Organization (UNWTO). Tourism in the 2030 Agenda. Available online: https://www.unwto.org/tourism-in-2030-agenda (accessed on 4 April 2023).
13. Saxena, J.; Vrat, P. Scenario building: A critical study of energy conservation in the Indian cement industry. *Technol. Forecast. Soc. Change* **1992**, *41*, 121–146. [CrossRef]
14. Wilson, C. *Brainstorming and Beyond: A User-Centered Design Method*; Newnes: Oxford, UK, 2013.
15. Paulus, P.B.; Brown, V.R. Toward More Creative and Innovative Group Idea Generation: A Cognitive-Social-Motivational Perspective of Brainstorming. *Soc. Personal. Psychol. Compass* **2007**, *1*, 248–265. [CrossRef]

16. Runco, M.A.; Jaeger, G.J. The standard definition of creativity. *Creat. Res. J.* **2012**, *24*, 92–96. [CrossRef]
17. Warfield, J.N. Toward interpretation of complex structural models. *IEEE Trans. Syst. Man Cybern.* **1974**, *SMC-4*, 405–417. [CrossRef]
18. Sage, A.P. *Methodology for Large-Scale Systems*; McGraw-Hill College: New York, NY, USA, 1977.
19. Attri, R.; Dev, N.; Sharma, V. Interpretive structural modelling (ISM) approach: An overview. *Res. J. Manag. Sci.* **2013**, *2319*, 1171.
20. Kc, B.; Dhungana, A.; Dangi, T.B. Tourism and the sustainable development goals: Stakeholders' perspectives from Nepal. *Tour. Manag. Perspect.* **2021**, *38*, 100822. [CrossRef]
21. Buckley, R. Tourism and Environment. *Annu. Rev. Environ. Resour.* **2011**, *36*, 397–416. [CrossRef]
22. Mannell, R.C.; Iso-Ahola, S.E. Psychological nature of leisure and tourism experience. *Ann. Tour. Res.* **1987**, *14*, 314–331. [CrossRef]
23. Weber, K. Outdoor adventure tourism: A Review of Research Approaches. *Ann. Tour. Res.* **2001**, *28*, 360–377. [CrossRef]
24. Du Cros, H.; McKercher, B. *Cultural Tourism*; Routledge: Abingdon, UK, 2020.
25. Connell, J. Contemporary medical tourism: Conceptualisation, culture and commodification. *Tour. Manag.* **2013**, *34*, 1–13. [CrossRef]
26. Olsen, D.H.; Timothy, D.J. Tourism and religious journeys. In *Tourism, Religion and Spiritual Journeys*; Routledge: Abingdon, UK, 2006; pp. 1–21.
27. Gammon, S.; Robinson, T. Sport and Tourism: A Conceptual Framework. *J. Sport Tour.* **2003**, *8*, 21–26. [CrossRef]
28. Grilli, G.; Tyllianakis, E.; Luisetti, T.; Ferrini, S.; Turner, R.K. Prospective tourist preferences for sustainable tourism development in Small Island Developing States. *Tour. Manag.* **2021**, *82*, 104178. [CrossRef]
29. Fennell, D.A. A Content Analysis of Ecotourism Definitions. *Curr. Issues Tour.* **2001**, *4*, 403–421. [CrossRef]
30. Kumar, P.; Aggarwal, B.; Kumar, V.; Saini, H. Sustainable tourism progress: A 10-year bibliometric analysis. *Cogent Soc. Sci.* **2024**, *10*, 2299614. [CrossRef]
31. Dias, Á.; Viana, J.; Pereira, L. Barriers and policies affecting the implementation of sustainable tourism: The Portuguese experience. *J. Policy Res. Tour. Leis. Events* **2024**, 1–19. [CrossRef]
32. Ahmad, N.; Zhu, Y.; Hongli, L.; Karamat, J.; Waqas, M.; Mumtaz, S.M.T. Mapping the obstacles to brownfield redevelopment adoption in developing economies: Pakistani Perspective. *Land Use Policy* **2020**, *91*, 104374. [CrossRef]
33. Tosun, C. Challenges of sustainable tourism development in the developing world: The case of Turkey. *Tour. Manag.* **2001**, *22*, 289–303. [CrossRef]
34. Arshad, M.I.; Iqbal, M.A.; Shahbaz, M. Pakistan tourism industry and challenges: A review. *Asia Pac. J. Tour. Res.* **2018**, *23*, 121–132. [CrossRef]
35. Irfan, E.; Ali, Y. Religious tourism in Pakistan: Scope, obstacles & strategies. *J. Conv. Event Tour.* **2021**, *22*, 134–154. [CrossRef]
36. Neger, C. Ecotourism in crisis: An analysis of the main obstacles for the sector's economic sustainability. *J. Ecotourism* **2022**, *21*, 311–333. [CrossRef]
37. Beames, S.; Mackenzie, S.H.; Raymond, E. How can we adventure sustainably? A systematized review of sustainability guidance for adventure tourism operators. *J. Hosp. Tour. Manag.* **2022**, *50*, 223–231. [CrossRef]
38. Butler, R.W. Sustainable tourism: A state-of-the-art review. *Tour. Geogr.* **1999**, *1*, 7–25. [CrossRef]
39. Khodadadi, M.; Pezeshki, F.; O'Donnell, H. Small but perfectly (in)formed? Sustainable development of small heritage sites in Iran. *J. Herit. Tour.* **2022**, *17*, 74–90. [CrossRef]
40. Samat, N.; Harun, N. Urban Development Pressure: Challenges in Ensuring Sustainable Tourism Development in Langkawi Island. *Procedia-Soc. Behav. Sci.* **2013**, *91*, 385–394. [CrossRef]
41. Jarvis, N.; Weeden, C.; Simcock, N. The Benefits and Challenges of Sustainable Tourism Certification: A Case Study of the Green Tourism Business Scheme in the West of England. *J. Hosp. Tour. Manag.* **2010**, *17*, 83–93. [CrossRef]
42. Cao, X. Challenges and potential improvements in the policy and regulatory framework for sustainable tourism planning in China: The case of Shanxi Province. *J. Sustain. Tour.* **2015**, *23*, 455–476. [CrossRef]
43. Gu, Y.; Du, J.; Tang, Y.; Qiao, X.; Bossard, C.; Deng, G. Challenges for sustainable tourism at the Jiuzhaigou World Natural Heritage site in western China. *Nat. Resour. Forum* **2013**, *37*, 103–112. [CrossRef]
44. Graci, S. Collaboration and Partnership Development for Sustainable Tourism. *Tour. Geogr.* **2013**, *15*, 25–42. [CrossRef]
45. Andrades, L.; Dimanche, F. Destination competitiveness and tourism development in Russia: Issues and challenges. *Tour. Manag.* **2017**, *62*, 360–376. [CrossRef]
46. Day, J.; Cai, L. Environmental and energy-related challenges to sustainable tourism in the United States and China. *Int. J. Sustain. Dev. World Ecol.* **2012**, *19*, 379–388. [CrossRef]
47. Ruhanen, L. Local government: Facilitator or inhibitor of sustainable tourism development? *J. Sustain. Tour.* **2013**, *21*, 80–98. [CrossRef]
48. Carter, R.W.; Thok, S.; O'Rourke, V.; Pearce, T. Sustainable tourism and its use as a development strategy in Cambodia: A systematic literature review. *J. Sustain. Tour.* **2015**, *23*, 797–818. [CrossRef]
49. Harrison, L.C.; Jayawardena, C.; Clayton, A. Sustainable tourism development in the Caribbean: Practical challenges. *Int. J. Contemp. Hosp. Manag.* **2003**, *15*, 294–298. [CrossRef]
50. Scheyvens, R. The challenge of sustainable tourism development in the Maldives: Understanding the social and political dimensions of sustainability. *Asia Pac. Viewp.* **2011**, *52*, 148–164. [CrossRef]
51. Kaul, H.; Gupta, S. Sustainable tourism in India. *Worldw. Hosp. Tour. Themes* **2009**, *1*, 12–18. [CrossRef]

52. Shaikh, A.R.; Qazi, A.; Ali, I.; Appolloni, A. Analyzing the barriers to sustainable procurement in an emerging economy: An interpretive structural modeling approach. *Int. J. Emerg. Mark.* 2023; *ahead-of-print*. [CrossRef]
53. Barney, J.B. Looking inside for competitive advantage. *Acad. Manag. Perspect.* **1995**, *9*, 49–61. [CrossRef]
54. Khana, M.P.; Talibb, N.A.; Kowangc, T.O. The development of a sustainability framework via lean green six sigma practices in SMEs based upon RBV theory. *Development* **2020**, *12*, 135–156.
55. Jiang, Y.; Ritchie, B.W.; Verreynne, M.-L. Building dynamic capabilities in tourism organisations for disaster management: Enablers and barriers. *J. Sustain. Tour.* **2023**, *31*, 971–996. [CrossRef]
56. Newbert, S.L. Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strateg. Manag. J.* **2007**, *28*, 121–146. [CrossRef]
57. MGK. *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*; MGK: Houston, TX, USA, 1941.
58. Duarte Alonso, A.; Kok, S.; O'Brien, S. Sustainable wine tourism development through the lens of dynamic capabilities and entrepreneurial action: An exploratory four-region perspective. *Tour. Recreat. Res.* **2020**, *45*, 401–419. [CrossRef]
59. DiMaggio, P.J.; Powell, W.W. The iron cage revisited institutional isomorphism and collective rationality in organizational fields. In *Economics Meets Sociology in Strategic Management*; Baum, J.A.C., Dobbin, F., Eds.; Advances in Strategic Management; Emerald Group Publishing Limited: Dubai, United Arab Emirates, 2000; Volume 17, pp. 143–166.
60. Greenwood, R.; Raynard, M.; Kodeih, F.; Micelotta, E.R.; Lounsbury, M. Institutional Complexity and Organizational Responses. *Acad. Manag. Ann.* **2011**, *5*, 317–371. [CrossRef]
61. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Cambridge University Press: Cambridge, UK, 2010.
62. Wang, X.; Li, X.; Zhen, F.; Zhang, J. How smart is your tourist attraction?: Measuring tourist preferences of smart tourism attractions via a FCEM-AHP and IPA approach. *Tour. Manag.* **2016**, *54*, 309–320. [CrossRef]
63. Zhang, H.; Gu, C.-L.; Gu, L.-W.; Zhang, Y. The evaluation of tourism destination competitiveness by TOPSIS & information entropy—A case in the Yangtze River Delta of China. *Tour. Manag.* **2011**, *32*, 443–451. [CrossRef]
64. Haqbin, A.; Shojaei, P.; Radmanesh, S. Prioritising COVID-19 Recovery Solutions for Tourism Small and Medium-sized Enterprises: A Rough Best-Worst method Approach. *J. Decis. Syst.* **2022**, *31*, 102–115. [CrossRef]
65. Altuntas, F.; Gok, M.S. The effect of COVID-19 pandemic on domestic tourism: A DEMATEL method analysis on quarantine decisions. *Int. J. Hosp. Manag.* **2021**, *92*, 102719. [CrossRef]
66. Alqahtani, A.Y.; Makki, A.A. A DEMATEL-ISM Integrated Modeling Approach of Influencing Factors Shaping Destination Image in the Tourism Industry. *Adm. Sci.* **2023**, *13*, 201. [CrossRef]
67. Lin, L.-Z.; Yeh, H.-R. Analysis of tour values to develop enablers using an interpretive hierarchy-based model in Taiwan. *Tour. Manag.* **2013**, *34*, 133–144. [CrossRef]
68. Shafiee, S.; Ghatari, A.R.; Hasanzadeh, A.; Jahanyan, S. Developing a model for smart tourism destinations: An interpretive structural modelling approach. *Inf. Technol. Tour.* **2022**, *24*, 511–546. [CrossRef]
69. Hussain, K.; He, Z.; Ahmad, N.; Iqbal, M.; Nazneen, S. Mapping Green, Lean, Six Sigma enablers through the lens of a construction sector: An emerging economy's perspective. *J. Environ. Plan. Manag.* **2022**, *66*, 779–812. [CrossRef]
70. Lim, M.K.; Tseng, M.-L.; Tan, K.H.; Bui, T.D. Knowledge management in sustainable supply chain management: Improving performance through an interpretive structural modelling approach. *J. Clean. Prod.* **2017**, *162*, 806–816. [CrossRef]
71. Faisal, M.N. Analysing the barriers to corporate social responsibility in supply chains: An interpretive structural modelling approach. *Int. J. Logist. Res. Appl.* **2010**, *13*, 179–195. [CrossRef]
72. Sulistyadi, Y.; Demolingo, R.H.; Latif, B.S.; Indrajaya, T.; Adnyana, P.P.; Wiweka, K. The Implementation of Integrated Coastal Management in the Development of Sustainability-Based Geotourism: A Case Study of Olele, Indonesia. *Sustainability* **2024**, *16*, 1272. [CrossRef]
73. Mi, C.; Chen, Y.; Cheng, C.-S.; Uwanyirigira, J.L.; Lin, C.-T. Exploring the Determinants of Hot Spring Tourism Customer Satisfaction: Causal Relationships Analysis Using ISM. *Sustainability* **2019**, *11*, 2613. [CrossRef]
74. Gupta, A.; Gupta, S.; Shekhar. Determining Interrelationship Between Factors Impacting Foreign Direct Investment in Tourism: An ISM-based Approach. *Asia-Pac. J. Manag. Res. Innov.* **2021**, *17*, 17–30. [CrossRef]
75. Jain, V.; Ajmera, P. Modelling the factors affecting Indian medical tourism sector using interpretive structural modeling. *Benchmarking Int. J.* **2018**, *25*, 1461–1479. [CrossRef]
76. Patri, R.; Suresh, M. Factors influencing lean implementation in healthcare organizations: An ISM approach. *Int. J. Healthc. Manag.* **2018**, *11*, 25–37. [CrossRef]
77. Agrawal, P.; Narain, R.; Ullah, I. Analysis of barriers in implementation of digital transformation of supply chain using interpretive structural modelling approach. *J. Model. Manag.* **2020**, *15*, 297–317. [CrossRef]
78. Alaboud, N.; Alshahrani, A. Adoption of Building Information Modelling in the Saudi Construction Industry: An Interpretive Structural Modelling. *Sustainability* **2023**, *15*, 6130. [CrossRef]
79. Duperrin, J.-C. and M. Godet. Hierarchization Method for the Elements of a System. An Attempt to Forecast a Nuclear Energy System in Its Societal Context. CEA. 1973. Available online: https://inis.iaea.org/collection/NCLCollectionStore/_Public/05/115/5115595.pdf (accessed on 4 April 2023).
80. Cherrafi, A.; Elfezazi, S.; Garza-Reyes, J.A.; Benhida, K.; Mokhlis, A. Barriers in Green Lean implementation: A combined systematic literature review and interpretive structural modelling approach. *Prod. Plan. Control.* **2017**, *28*, 829–842. [CrossRef]

81. Higgins-Desbiolles, F. The "war over tourism": Challenges to sustainable tourism in the tourism academy after COVID-19. *J. Sustain. Tour.* **2021**, *29*, 551–569. [CrossRef]
82. Budeanu, A.; Miller, G.; Moscardo, G.; Ooi, C.-S. Sustainable tourism, progress, challenges and opportunities: An introduction. *J. Clean. Prod.* **2016**, *111*, 285–294. [CrossRef]
83. UN Organization. *UN Projects World Population to Reach 8.5 Billion by 2030, Driven by Growth in Developing Countries*; UN: New York, NY, USA, 2015.
84. Abas, N.; Kalair, A.; Khan, N.; Kalair, A.R. Review of GHG emissions in Pakistan compared to SAARC countries. *Renew. Sustain. Energy Rev.* **2017**, *80*, 990–1016. [CrossRef]
85. United Nations Development Programme. Pakistan: Flood Damages and Economic Losses Over USD 30 Billion and Reconstruction Needs Over USD 16 Billion. Available online: https://www.undp.org/pakistan/press-releases/pdna-pakistan-floods?utm_source=EN&utm_medium=GSR&utm_content=US_UNDP_PaidSearch_Brand_English&utm_campaign=CENTRAL&c_src=CENTRAL&c_src2=GSR&gclid=Cj0KCQiAt66eBhCnARIsAKf3ZNE9Dja8H_7voe1rZHXXcYU-mkyHemmF9I65SeMS1k-3WSBTZbPklIEaAh2REALw_wcB (accessed on 21 January 2023).
86. Tranfield, D.; Denyer, D.; Smart, P. Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *Br. J. Manag.* **2003**, *14*, 207–222. [CrossRef]
87. Etikan, I.; Musa, S.A.; Alkassim, R.S. Comparison of convenience sampling and purposive sampling. *Am. J. Theor. Appl. Stat.* **2016**, *5*, 1–4. [CrossRef]
88. Yadav, G.; Desai, T.N. Analyzing lean six sigma enablers: A hybrid ISM-fuzzy MICMAC approach. *TQM J.* **2017**, *29*, 488–511. [CrossRef]
89. Dewangan, D.K.; Agrawal, R.; Sharma, V. Enablers for competitiveness of Indian manufacturing sector: An ISM-fuzzy MICMAC analysis. *Procedia-Soc. Behav. Sci.* **2015**, *189*, 416–432. [CrossRef]
90. Ravi, V.; Shankar, R. Analysis of interactions among the barriers of reverse logistics. *Technol. Forecast. Soc. Change* **2005**, *72*, 1011–1029. [CrossRef]
91. Ahmad, N.; Zhu, Y.; Ullah, Z.; Iqbal, M.; Hussain, K.; Ahmed, R.I. Sustainable solutions to facilitate brownfield redevelopment projects in emerging countries—Pakistani scenario. *Land Use Policy* **2021**, *109*, 105727. [CrossRef]
92. Warfield, J.N. *An Assault on Complexity*; Battelle, Office of Corporate Communications: Columbus, OH, USA, 1973.
93. The Express Tribune. Rupee Plumbs New Low at 287.29 vs Dollar. Available online: https://tribune.com.pk/story/2409922/rupee-plumbs-new-low-at-28729-vs-dollar (accessed on 5 April 2023).
94. Razzaq, A.; Thaheem, M.J.; Maqsoom, A.; Gabriel, H.F. Critical External Risks in International Joint Ventures for Construction Industry in Pakistan. *Int. J. Civ. Eng.* **2018**, *16*, 189–205. [CrossRef]
95. Jiskani, I.M.; Cai, Q.; Zhou, W.; Lu, X. Assessment of risks impeding sustainable mining in Pakistan using fuzzy synthetic evaluation. *Resour. Policy* **2020**, *69*, 101820. [CrossRef]
96. The Express Tribune. Calamity in Murree as at Least 22 Tourists Freeze to Death in Cars. Available online: https://tribune.com.pk/story/2337723/calamity-in-murree-as-at-least-22-tourists-freeze-to-death-in-cars (accessed on 9 March 2023).

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