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Sustainable and Special Economic Zone Selection under Fuzzy Environment: A Case of Pakistan

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Received: 28 November 2019; Accepted: 13 January 2020; Published: 5 February 2020

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Abstract: The establishment of Special Economic Zones (SEZs) is a lengthy, expensive, and long-term orientated endeavor. Proper selection of SEZs is indispensable to meet the objectives of export-led growth and value up-gradation. Consideration of sustainability issues in such planning under the Zone 3.0 paradigm is critical to achieve Sustainable Development Goals (SDGs) by 2030. Multiple key factors such as location, linkages, labor force, suitability of industries, incentives and facilitation, and market orientation are important in decision-making process of establishing SEZs. Furthermore, environmental conditions and resource availability need to be considered in the planning and policy making processes to keep symmetry in the natural environment and ecosystem of the areas under consideration for SEZs. The present study uses Multi-Criteria Decision Analysis (MCDA) methods in the perspectives of green industrial zone planning and development in Pakistan under the flagship project of China-Pakistan Economic Corridor (CPEC) of China's Belt and Road Initiative (BRI). This research uses Delphi method, Analytical Hierarchy Process (AHP), and the Fuzzy Vlse Kriterijumska Optimizacija Kompromisno Resenje (VIKOR). The Delphi method has been used to identify the main criteria, sub-criteria, and their weights for 3 SEZs under consideration. The results of AHP analysis unfolded that the majority of the experts believe the location and land aspect is the most pivotal criteria in setting SEZs followed by linkages, subsidies, and facilities criteria. Finally, the results of Fuzzy VIKOR analysis considering environmental sustainability reveals that Faisalabad SEZ is the best suited under given criteria and sub-criteria.

Keywords: economic zone selection; planning process; sustainable development; MCDA; AHP; Fuzzy VIKOR; Pakistan

1. Introduction

The establishment of SEZs has been a top priority on the agenda of governments and policy makers to encourage and upgrade the process of industrialization, attract Foreign Direct Investment (FDI) for export-oriented production, and lay down the foundation of robust economic growth. The governments have concentrated on developing facilitation centers, dedicated areas, and investor-friendly policies to encourage exports and value up-gradation. The most successful and widely used policy is the establishment of SEZs that not only uplift industries but also transform the industrial process to eliminate the concept of space economy [1]. However, SEZs are expensive and precarious endeavors that demand meticulous planning. SEZs are established to achieve multiple policy objectives, the first of which is to attract FDI and promote exports with industrialization or up-gradation of the existing industry [2,3]. The second objective is to reduce unemployment in remote and alienated areas at large [4,5]. The third objective is to facilitate an economic policy or take benefit of bilateral economic engagement between countries [6,7]. The fourth objective is to use these SEZs as an experimental place for the application of certain approaches and policies [3,8]. The fifth objective is the development of a system that improves the overall quality of life [8].

Achieving these objectives is challenging, as in many countries they are broadly used for political speculation rather than socio-economic development that ultimately lead to such "white elephants" failing [9,10]. A study by MENA-OECD entails policymakers to focus on six elements of special economic zone planning, i.e., type of zone to be planned, policy framework, incentive framework, regulatory framework, institutional framework and physical development, and management of the zone [11]. It has been learned from the comparison of 30 years of SEZ around the world that most common obstacles in the way of the success of SEZs are: (i) poor site location involving hefty capital expenditure, (ii) uncompetitive policies that mostly rely on tax holidays and have poor labor policies and performance expectations, (iii) poor zone planning, i.e. inappropriate facilities and maintenance (iv) unwieldy procedures and control of zone, (v) poor and lengthy zone administration, and (vi) lack of coordination among departments [10]. The United Nations' SDGs set in 2015 warrant industrialization targets to achieve sustainable growth by 2030. So there is a strong need for enforcing the best industrial practices and monitoring industry types and environmental standards [3]. The Asian Development Bank long-term strategic framework "Strategy 2020" emphasizes environmentally sustainable growth (ESG) where "complementary actions" focus on incorporating environmental considerations in country policies and investment programs by building capacity on legal, regulatory, and enforcement capacities of public institutions [12]. These discourses emphasize the need to identify the key success factors in new industrial and economic dynamics.

In the developing and designing of SEZ, the concept of "Zones 3.0" is imperative [9]. SEZ driven on factors of production are considered Zone 1.0, which merely provides basic infrastructure, real-estate, and environmental compliance. Zone 2.0 is based on efficiency and productivity by aligning zone with business support services and environmental management. Zone 3.0 integrates environmentally sustainable green growth with investor-friendly policies, legal and institutional frameworks, amenities, and linkages with industries and broader communities [13]. Zone 3.0 includes business incubators, science and technology parks, a high-skilled labor facility, and advanced green production. It does more than mere exports, attracts diversified and multifidus investment, reduce costs of production and transportation, generate income and employment, reduces dependence on nonrenewable energy sources, improves productivity, promote sustainable socioeconomic national development, create linkages with global value chains, and much more. Zone 3.0 could have different names but a very well-known manifestation of that is the Eco-Industrial Parks (EIPs) [9]. EIPs cover a wide spectrum of approaches but they all lead to more sustainable economic development. Application of the Zone 3.0 concept not only provides broader integrated and advanced SEZ planning, but also incorporates all elements of Industry 4.0, including sustainability. The importance of sustainable and green development is significant, as many developing countries are highly vulnerable to climate change especially in terms of water stress and air pollution.

In recent years, identification of the key success factors for economic zone selection and green special economic zones are getting researchers' attention. Table 1 provides a summary of some of the latest literature. The review of existing literature provides a gap to explore the symmetry and asymmetry of these key success factors in detail, especially in regards to sustainability. There is also a considerable need to prioritize these key success factors as per industry expert opinions. It is worth noting that the industrial fourth revolution (Industry 4.0) is underway and its embedded technology diffusion process is growing exponentially in terms of socio-economic impact and technological change. During this transformation process, a more holistic approach encompassing innovative and sustainable system solutions is also required. However, these objectives could be easy to achieve if the selection of SEZs, in the first step, is carried out using system engineering tools for the establishment of a sustainable industrial setup. Little to no contribution is available in the economic literature on dealing with such strategic choices; thus, in the absence of rigorous analytical tools, such decisions became capricious, discretionary, and guided by political interests.

The present study is a solid attempt to fill the research gap regarding the prioritization of the SEZs to be established in Pakistan across the CPEC under China's BRI. The current study considers critical socio-economic factors and sub-factors, along with the environmental factors in prioritizing the SEZs. The analysis unfolds how the key success factors and challenging factors determine the ranking of SEZs while taking into account the environmental sustainability factors. In the wake of the Paris agreement, the incorporation of environmental sustainability is indispensable in the decision-making of regional development projects [14] to ensure the sustainability of the natural environment and ecosystem of the locality of the respective SEZ. It is fundamentally important to keep symmetry in the regional development process. However, there is a very limited use of system engineering tools as a tool for scientific decision-making and policy formation about SEZ planning and value up-gradation. This paper investigates the key success factors required for the effective realization of sustainable SEZ(s) based on the Delphi Technique ranked by the AHP-Fuzzy VIKOR method. AHP method is used to determine the pairwise comparison matrices. After finding the pairwise comparison matrices of criteria and sub-criteria, Fuzzy VIKOR is used to find the rankings of the sites of SEZs. This research aims not only to identify key variables that make the SEZs successful, but also incorporates environmental factors combined with economic benefits. The research outcomes of this article would be helpful for the planning of future special economic zone developments with Zone 3.0 dynamics focusing on suitability (see Figure 1).

Table 1. Previous studies based on critical success factors for Special Economic Zones (SEZs).

Author	Research Problem	Type of SEZ	Location	Methodology	Results
Singh and Sanjiv [15]	Effect of location as a success factor for gross state domestic product	SEZs	Madhya Pradesh, India	Chi-Square Test	Identification of 8 key success factors and positive impact
Aggarwal [16]	The integrated institutional framework of SEZs	Export Processing Zone and SEZs	Most Successful: China, Korea, Taiwan Not So Successful: Cambodia, India, Costa Rica, Poland, Egypt Least Successful Countries: Kenya, Liberia, Mauritius	Three-pillared analytical framework	The study presents the success factors and development outcomes of SEZs. The study unveils that well-structured approach aligning the SEZ with broader development strategy, executes it effectively, and continuously evaluates and maneuvers over time makes the SEZ-led economic transformation successful
Kim [17]	Assessment of green SEZ policies and green growth model of development.	SEZs Low-carbon industrial zones Eco-industrial parks,	China	Case Study	The study identified key success factors, lessons, and challenges for the Chinese government policy regarding the establishment of the SEZs while introducing the themes of circular economy and green industrial transition
Qinghe et.al [18]	The Chinese model of Using SEZ for regional development instead of windows or experimental field	SEZs	China	Empirical Analysis	Identification of New special zones and related policies for polarization and produce diffusion effects, which has become a new regional developmental model

Table 1. *Cont.*

Author	Research Problem	Type of SEZ	Location	Methodology	Results
Zeng [9]	Global lessons of the use of SEZs for structural transformation, effectiveness of zones in promoting private-sector development, and risks of adopting SEZ policies in low-income and developing countries	SEZ Industrial Parks	China Singapore India Mexico Bangladesh Srilanka Honduras	Empirical Analysis	The zone should be implemented properly considering a country's specific situation. Also, zones are not a one-fit development instrument.
Zeng [19]	A brief overview of the experiences of SEZ in China and Africa with a focus on the key lessons that Africa can learn from China	SEZs	China and Africa	Empirical Analysis	The Chinese experience of establishing SEZs and industrial parks has been successful and productive. It also provides recommendations on how the Chinese experiences could be used to unleash the power of SEZs in Africa
Wong and Buba [20]	SEZ Literature and Impacts Stocktaking of existing zones Drivers of SEZ Performance	SEZs	22 Emerging Countries	Desk Review Enterprise Survey (ES) dataset ES Questionnaire Regression Analysis	SEZs' overall economic dynamism is not different from the rest of the country. High-tech sectors have performed worse than those in low-cost, labor-intensive sectors
Qadir and Liang [21]	A brief overview of the experiences of SEZ in China and Central Asia with a focus on the key lessons that Central Asia can learn from China	SEZs	China Kazakhstan Kyrgyzstan	Empirical Analysis	Provided critical success factors and lessons learned from Central Asia and China

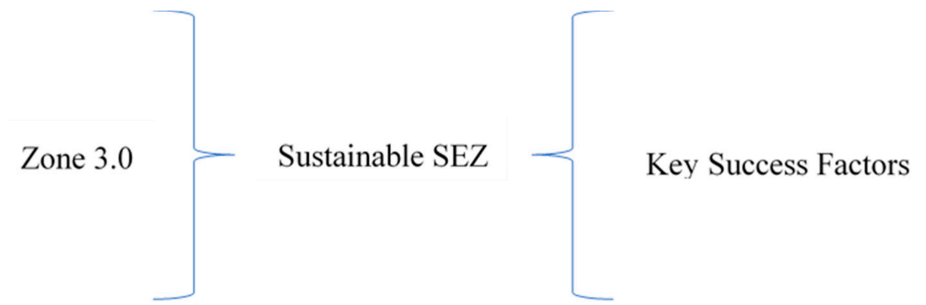

Figure 1. Sustainable SEZs Conceptual Framework.

The rest of the paper is structured as follows: Section 2 describes the key success factors of successful SEZs. Section 3 describes the basic facts of SEZs prioritized under CPEC. Section 4 provides a research framework and methodology of selection criteria under AHP-Fuzzy VIKOR. Section 5 provides results based on our criteria. Section 6 provides our conclusion and policy recommendation.

2. Background

China-Pakistan Economic Corridor (CPEC) is the flagship project of the BRI by the Peoples Republic of China [22]. It has completed its early harvest projects successfully and is now entering the economic development stage. Economists believe it could grow GDP, generate employment, improve regional connectivity, enhance FDI, and promote export by establishing 9 SEZs [23]. As the study is focused on the prioritization of SEZs in Pakistan based on the criteria and sub-criteria, it is imperative to introduce the SEZs and the key success factors for their proper planning and sustainable development, followed by the background and introduction of these zones.

2.1. Key Factors of SEZs

SEZs, by definition, are (i) a geographically demarcated area, (ii) having single administration, (iii) providing tax benefits, (iv) providing ease of processes and customs, (v) providing more liberal policy and juridical regime than rest of the country [9]. Such zones help in catapulting new technologies, catalyze economic development by export orientation, and upgrade and optimally utilize the existing infrastructure of a particular region [3,4,8,24,25] that otherwise normally faces hindrances in doing so [6,26]. There are many types of SEZs based on their objectivity and operations. Table 2 provides the types and details of their characteristics.

Table 2. Types of SEZs.

No.	Name	Characteristics
1.	Free Trade Zones (FTZ)	FTZs duty-free fenced in designated areas providing storage, and distribution facilities for trade, transshipment, and re-export operations.
2.	Export Processing Zones (EPZ)	EPZs are industrial areas specializing in 1 industry or a combination primarily focusing at foreign markets.
3.	Comprehensive Special Economic Zones (SEZs)	Comprehensive or Multifunction SEZs are large industrial amalgamations having industrial, service and urban-amenity operations.
4.	Industrial Parks (IP)	Industrial Parks are at large manufacturing or R&D based sites that work at a smaller scale as compare to comprehensive SEZs.
5.	Enterprise specific—single factory zones	Provide incentives to individual enterprises regardless of where their location is, and they are not required to be located in any specific geographical location
6.	Bonded areas	These are secured territories, in which goods stored, manipulated, or can undergo manufacturing operations without payment of duties. The major difference is that a "bonded area" is subject to customs laws and regulations whereas an FTZ is exempted.
7.	High tech zones	These are aimed at promoting R&D activities and advancement in technology or industries based on science, e.g., pharmaceutical.
8.	Eco-industrial zones or parks	These SEZs focus on sustainability concerning waste reduction and improving the environmental performance of companies.

The successful SEZs share certain characteristics that make them successful. The first and most important factor is the location [27–29]. Its level of accessibility fosters the cost associated with the acquisition of location and its proximity to inputs and markets. It is extremely crucial to choose one or two zones before upscaling and expanding. Historically, China selected four strategically located zones and rolled out similar programs after their success [9]. The urbanization and regional development level in a region is a key decision variable for the investor(s) to take advantage of the domestic market [30]. The second most important factor is linkages. Such strategic locations must be linked with infrastructure (ports, railways, highways, and airports) in a way that they complement the local resources leveraging comparative advantages [9,30]. The competitiveness of the area, based on its unique attributes, labor force, and resource base, identifies strategic industries having the potential to create a high degree of upstream and downstream connections with other sectors [29]. The third critical factor in the success of SEZs is subsidies available to potential industries and investors [3]. The short-term role of fiscal incentives is evident in existing literature as a tool to attract investments in the early stages of zone development. However, there are no conclusive pieces of evidence that financial incentives bring positive outcomes in the long run [31]. For instance, in the Philippines, SEZ located in poor areas failed to get foreign investment despite lucrative rewards and generous incentives [30].

The fourth component of success is the availability of facilities such as one window operation, R&D lab availability, and utilities like electricity, water, energy, etc. It is a universal practice to have all these so-called "quasi incentives" available on the spot in order to minimize the ease of doing business [11]. However, realizing the objectives of sustainable economic development [32], two concepts are getting attention. "Sustainable industrial areas" facilitate and guide sustainability as a whole, and "circular economy zones" stimulate efficient resource utilization, provide waste management, and emissions control [13]. In recent years, South Asia has been facing severe water stress and smog due to poor air quality. The scarcity and quality of water for all the sectors and maintaining air pollution under control is, therefore, the biggest challenge for sustainability in these countries [33]. The United Nations' SDGs and ADBs Strategy 2020 emphasizes industrialization targets for sustainable growth by enforcing best industrial practices and monitoring industry types and environmental standards [3].

The fifth vital component of a successful SEZ is the availability of skilled and innovative labor. The level of skill and regional wage level are strongly associated with the production cost [13] and quality. Low wages play a strong role in the decision on FDI [34]. However, at times firms chose areas with higher wages to take advantage of skill amalgamation or the presence of a large domestic market [30]. The sixth factor that makes an SEZ successful is the suitability of industry. The industries must compliment the resource availability and capabilities of the labor force of the region. It is pertinent to mention that every region has a certain competitive advantage of certain types of industry [5,35], and successful SEZs should not specialize in one or two sectors but blend multiple industries [11]. The seventh success factor is the market orientation of the SEZ. Traditionally, SEZs focus on export orientation [3,5,11,13,35]. However, in recent years, there has been an emphasis on market orientation on domestic market development [11] and value up-gradation by establishing backward and forward linkages [36].

2.2. SEZs under the CPEC Project

The concept of SEZ is not new in Pakistan. Established in 1970, most industrial estates failed except Hattar Industrial Zone near Haripur in KPK province and Bin Qasim Industrial Park near Karachi, Sindh [23]. The reason for such failures is inappropriate selection of location, limited and subpar infrastructure, and limited linkages [37,38]. Since the announcement of CPEC, 9 SEZ have been prioritized out of which 3 SEZs—Rashakai (KPK), Dhabeji (Sindh), and Faisalabad (Punjab) (shown on map in Figure 2) are given priority on war footing as decided in the 8th CPEC Joint Cooperation Committee (JCC) between China and Pakistan [24,39]. The meeting also prioritized industries such as petrochemicals, iron and steel, food, and agriculture, in which Chinese investors have shown immense response. Each prioritized SEZ has its unique resources, capabilities, and strategic importance that make a strong case for review under Zone 3.0 and the sustainability paradigm. Based on facts provided in SEZs websites/government documents, it is evident that each SEZ has certain unique attributes, fiscal incentives, or strategic value. Each SEZ is well connected with markets and has great potential for bringing industrialization and value upgradation options. Each of the SEZs has strategic value and certain competitive advantages. Section 3 provides systematic assessment of each SEZ on the basis of certain criteria that was further enriched given experts' opinions.

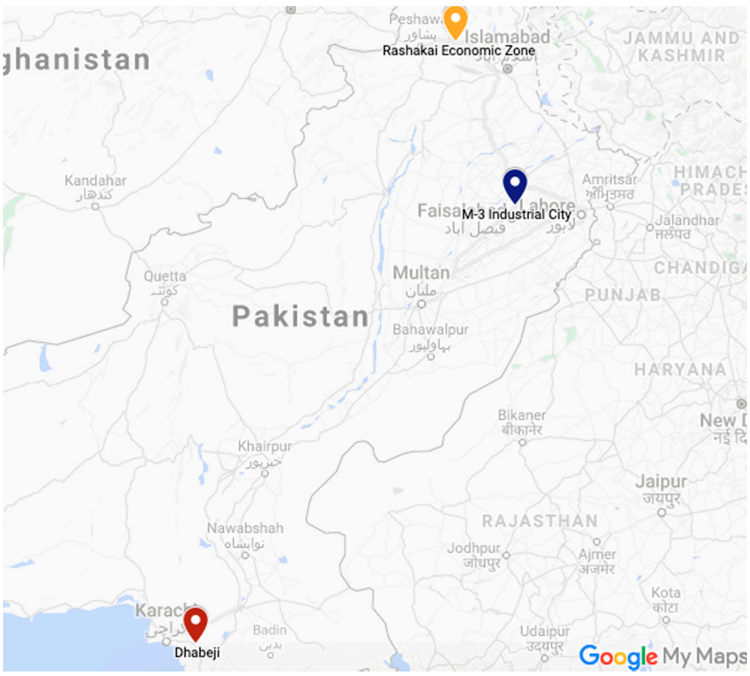

Figure 2. CPEC Priority SEZs.

3. Materials and Methods

As discussed earlier, the selection of SEZ requires complex and meticulous consideration that should be based on an appropriate scientific decision framework. The numerous studies have utilized MCDA methods for complex decision problems, such as PROSA method [39,40], NEAT-F-PROMETHEE method [41], AHP [42], Fuzzy AHP [43–45], and Fuzzy Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) [46]. This study provides a comprehensive research framework comprised of AHP and a fuzzy VIKOR decision model as shown in Figure 3. A decision hierarchy was established based on 8 criteria and their respective sub-criteria using the AHP method. Experts were consulted and reconsidered in the event a high inconsistency (>10%) was found in the AHP results. Finally, considering criteria, weights were assigned using the AHP methodology. Those weights were prioritized and ranked using the fuzzy VIKOR method for the selection of optimal SEZ under Zone 3.0 criterion.

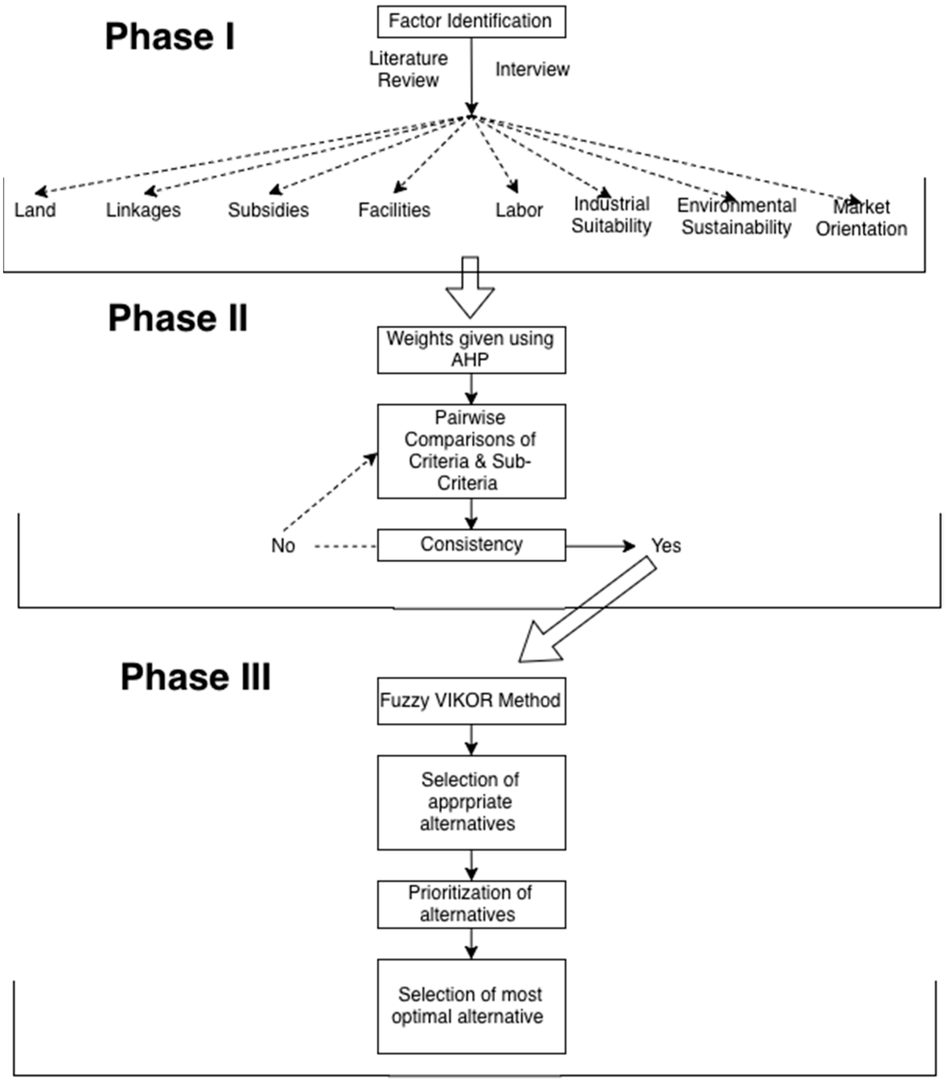

Figure 3. Research Framework.

The framework of the research structure in the present study is comprised of three phases. In phase one, the factor identification by using the Delphi method is carried out. After the determination of pivotal factors, using the AHP method, the factors are prioritized according to the criteria and sub-criteria. Finally, the fuzzy-VIKOR approach is applied for the prioritization of alternatives (SEZs). The summary description of each methodology of the proposed research framework of this study is given below.

3.1. Factor Identification and Enrichment by Delphi Method

With a thorough literature review, the authors identified 8 main criteria and 33 sub-criteria. In this regard, the key success factors based on OECD Good Practices for Economic Zone Development [47] and the World Bank's publication on Eco-Industrial Parks & Zone 3.0 [13] were used that were later enriched and given weightage by Delphi Method. Delphi technique was introduced by RAND Corporation to evoke expert opinion about the issue by brainstorming, prioritizing, forecasting, and advising for better decision-making [48]. In the implementation of this framework, main criteria including land (LA1), linkages (LI2), subsidies (SU3), facilities (FA4), labor (LO5), industrial suitability (IN6), environmental sustainability (EN7), and market orientation (MA8) were identified.

Land (LA) plays an important role in the success of SEZ. Based on available literature and expert opinion, four sub-criteria related to land and location were selected. Experts form a consensus that setup cost (LA1) [31,49] plays a critical role in the selection of place of business being the biggest component of the initial investment. Most investors tend to lower their initial setup cost by selecting those SEZs where lands and the infrastructural cost is lower. The second sub-criteria is the ease of acquisition of land (LA2) [36,38,50]. It is very critical for investors to have possession of the land and they prefer those SEZs that offer facilitation in land acquisition. Government duties on agreements like stamp duty (LA3) are also one important criterion in selecting land and most SEZs use exemption of stamp duties as a fiscal incentive [11,27]. An agglomeration approach of performance evaluation of SEZ considers the size of SEZ (LA4) [37] as a key component of the success of SEZ because of effective land use [11,51]. Facilities (FA) play an important role in the smooth functioning of business production and operations. Almost all SEZs universally offer basic facilities like electricity, gas, and infrastructure. However, there is a growing need for considering sustainability elements of Zone 3.0. Sub-criteria water disposal (FA1) was selected due to its impact on the nearby environment [13,23,37]. Pakistan is among one of the worst water-stressed countries. Therefore, freshwater availability (FA2) is a big determinant of success in SEZ [4,7,9,50]. Thirdly, technical support and scientific labs (FA3) help industries to mitigate the adverse environmental effects and provides state of the art solutions in a given context [9,29,36]. The experts consider the availability of R&D facilities and scientific lab as an integral part of a successful SEZ.

Linkages (LI) are critical for resource and product mobility. A well connected SEZ has better chances of being successful because of its ability to acquire and sell goods and services. For linkages, seven sub-criteria were selected based on literature. Proximity to raw material (LI1) is essential for cheaper transportation and acquisition costs [1,36,52,53]. Railways (LI2) can bring heavy cargo and connect with trade corridors [51,54,55]. Proximity to market (LI3) helps in developing the domestic market [5,30,56]. Like railways, motorways/high way (LI4) helps to connect SEZ with high-speed trade corridor with expanded outreach [30,50,57]. Air transport (LI5) makes the delivery of delicate and perishable items and international exports in quick time [5,6,32]. Availability of Dry port (LI6) for inland customs and clearing [2,23] and Sea Port (LI7) for importing and exporting cargo and raw material in bulk [54] makes SEZ more competitive.

Subsidies attract investors for the establishment and development of their businesses. An SEZ with generous monetary and non-monetary subsidies usually results in better responses from investors. For the main criteria subsidies (SU) four sub-criteria were selected based on literature. Investors decide the investment on the basis of mode of payment (SU1) that is mostly required for the purchase of land and normally give consideration to those SEZs that offer partial payment option [1,13]. Finance is lifeblood for a business. The availability of markup/interest discount [1,23] by financial institutions is a key determinant of SEZ choice. The biggest part of the investment is used for the purchase of land for business. Land price discount plays a critical role in such investment decisions [27,36]. Some SEZs offer transport subsidy [35,58] for the transport of machinery and plants. Access to such a subsidy reduces the cost of doing business and plays an important role in such decisions.

For centuries, labor has been a factor of production, and for decades countries dominated industrialization because of the availability of cheaper, skilled labor. For the main factor labor (LO) the authors selected three sub-criteria, i.e. wage rate (LO1) in the particular region [30,31], unemployment rate (LO2) of surrounding localities [24,28,59], and their level of skill (LO3) [28,34,36,37]. Market orientation (MA) determines the objectivity of the SEZ. For market orientation (MA), three sub-criteria i.e., export (MA1) [1,9,26,54] domestic market [13,24,36,50] were chosen.

Zone 3.0 ensures that SEZ is sustainable in resource utilization. In order to ensure sustainability, the zone's energy consumption (EN1) is vital to address its environmental impacts [9,32,60]. The zones with high energy consumption normally adopt pollutant energy sources like coal that affect the environment adversely. Water is a key industrial component. The level of water stress (EN2) is an important decision element [13,32,37]. The level of air pollution (EN3) in the surrounding area [7,13] and land loss (EN4) due to the land allocation for industrialization [1] are also important factors of sustainability. For main criteria industrial suitability (IN) 5 core industries agriculture (IN1), textiles (IN2), iron and steel (IN3), mines/minerals (IN4), and pharmaceuticals (IN5) were chosen based on CPEC agreed on terms of collaboration between China and Pakistan [38].

Table 3 provides basic facts about the above-mentioned key success factors about all three SEZs prioritized under CPEC.

Table 3. Basic Information of SEZs under CPEC.

Criteria	Key Success Factor	Dhabeji	Rashakai	Faisalabad
Location	Size	1000 Acre	1000 Acre	3000 Acre
	Ease of acquisition	Difficult	Easy	Difficult
	Setup cost	Low	Low	High
	Stamp Duty	3%	2%	3%
Linkages	Railways	5 km	No	0 km
	Air	80 km	50 km	66 km
	Sea	85 km	No	No
	Dry port	No	65 km	0 km
	Motorways/Highway	5 km	0 km	0 km
	Proximity to market	50 km	10 km	25 km
	Proximity to raw materials	100–200 km	10–150 km	0–50 km
Labor Force	Level of skill	High Skill	Low Skill	High Skill
	Unemployment rate	4.92%	7.16%	5.97%
	Wage rate (Skilled)	PKR 7437.12	PKR 7738.31	PKR 13,295.67
Facilities	Fresh Water availability	Low	High	High
	Waste disposal facility	No	No	Yes
	Scientific Labs	No	Yes	Yes
Incentives	Mode of payment	Full Payment	Installment	Installment
	Markup Discount	100% KIBOR	5%	0%
	Land Price Discount	0%	25%	0%
	Transport Subsidy	0%	25%	0%
Industrial Suitability	Iron & Steel	Yes	No	Yes
	Mines/Minerals	No	No	No
	Textiles	Yes	Yes	Yes
	Pharmaceutical	Yes	No	Yes
	Agriculture	No	Yes	Yes
Environmental Sustainability Status	Land Loss	Low	Medium	Medium
	Air Pollution	High	Low	High
	Energy Consumption	High	Medium	High
	Water Stress	High	Low	High
Market Orientation	Export	No	Yes	Yes
	Value Upgradation	Yes	No	Yes
	Domestic Market Development	Yes	Yes	Yes

The Delphi Method was used to obtain and synthesize experts' judgment on prioritizing the weights for rational decision-making. Based on [61] recommendation that the experts must possess knowledge about different dynamics of decision problems, a panel of 12 experts including industrialists, zone planners, environmentalists, and government officials, were selected to keep the conflict of the opinion to the reasonable level [62]. In MCDA studies, it is critical to involve qualified and relevant experts because the inconsistency of the weights assigned leads to uncertainty [63]. The demographic information of experts is given in Table 4.

Table 4. Demographic information of experts.

Designation	Education	Experience	Age	Association
Professor	PhD	15 Years	55 years	COMSATS University
Associate Professor	PhD	12 Years	45 Years	National University of Science & Technology
Industrialist	MSc	30 Years	52 Years	All Pakistan Textile Mills Association
Industrialist	BSc	10 Years	32 Years	Hattar Industrial Zone
Industrialist	BA	13 Years	36 Years	Textile City, Faisalabad
Industrialist	BSc	18 Years	40 Years	Port Qasim Industrial Zone
Environmentalist	PhD	7 Years	32 Years	Ministry of Environment
Environmentalist	MSc	14 Years	42 Years	Lahore Conservation Society
Zone Planner	MSc	12 Years	34 Years	Khyber Pakhtunkhwa Economic Zone Development & Management Company
Under Secretary	MA	8 Years	32 Years	Ministry of Planning & Reforms
CEO	MSc	7 Years	31 Years	Opportunity Think Tank
Researcher	PhD	5 Years	34 Years	CPEC Center of Excellence

The electronic questionnaire was used in the process in round 1 for the selection of appropriate variables. The second round of the questionnaire was used and based on the coefficient of variation (CV) and content validity ratio (*CVR*). The prioritization of variables was obtained to measure agreement among experts, determining the importance of a specific criteria. When the CV (criteria) values were less than 0.50, than a further round would not be undertaken [64]. While the *CVR* was proposed by C.H. Lawshe [65], and its computations which were recommended by Wilson et al. [66] were undertaken to assess the agreement among decision-makers. The *CVR* value varies from +1 to −1 and a higher positive number reflects experts' strong recommendation of criterion importance. A *CVR* higher than 0.29 can usually be considered as a feasible value for the assessment [65,66]. The CV is the ratio of the standard deviation to the mean. Moreover, it is very simple to compare the obtained values or data utilizing the CV, as shown in Equation (1).

$$CVR = \frac{NE - \frac{N}{2}}{\frac{N}{2}} \quad (1)$$

where *NE* is the number of survey respondents showing evaluated criteria and sub-criteria for SEZs, which is "important", and *N* = the total number of survey respondents.

3.2. Analytical Hierarchy Process

AHP method was proposed by Saaty [67]. AHP is one of the most significant and widely applied approaches to MCDM. This method is a hierarchical structure that decomposes the complex decision problem into a very small problem using a pairwise comparisons matrix [68]. In recent years, AHP has been one of the most favorite approaches amongst the MCDA approaches to support the managers, policymakers and the governments in decision-making. It has its application in almost all areas of real life. For instance, Forman and Penewati [69] used AHP in aggregating individual judgments and prioritization in expressing their preferences. Kahraman et al. [70] used AHP to compare the multi-attribute of catering service companies. Ostrosi et al. [71] proposed fuzzy overlapping of individual judgments rather than fuzzy aggregating of individual judgments in modeling consensus while designing conflict resolution. The AHP approach is suitable to assess the performance measurement. Aydogan [72] used rough-AHP to consider both quantitative and qualitative factors and the interrelationships between them to measure performance. Due to the ability of AHP to determine both quantitative and qualitative elements in ranking via comparison matrices, it is the most widely used technique in strategic planning and decision-making. Adel-Basset et al. [73] applied AHP strategic planning and decision-making. Zyoud et al. [74] developed a framework for water loss management in developing economies based on fuzzy-AHP. Fuzzy AHP is a suitable and flexible method in the supplier selection decision process. Weng et al. [73] used AHP and Grey Relational Analysis (GRA) as MCDM for software selection. Recently, many researchers have used AHP in the decision-making process of renewable energy development in the economies. For example, Solangi et al. [43] used fuzzy-AHP in assessing renewable energy strategies in Pakistan. Ahmed et al. [75] also used AHP in prioritizing farmers' preferences about crop residue management. Solangi et al. [48] applied AHP in the ranking and selection of renewable energy resources. Following the previous studies and given the quality of the AHP technique to make it possible to use both qualitative and quantitative factors into consideration, the present study also employed the AHP for the comparison of criteria and sub-criteria in SEZs selection being developed in Pakistan under the CPEC project of the BRI initiative.

The following are the key steps for employing the AHP approach [76]:

Step I. The hierarchical decision problem is comprised of four levels such as goal, criteria, sub-criteria, and alternatives. Each of the levels is interconnected with each other in order to establish a hierarchical decision solution.

Step II. Analyzing the hierarchical structure, the data of the decision problem is collected from the experts based on the pairwise comparisons matrix on a Saaty's numerical scale (Table 5).

Step III. The consistency of the pairwise comparisons matrix is assessed through a consistency index (**CI**). The **CI** is calculated as:

$$\mathbf{CI} = \frac{(\boldsymbol{\lambda}\mathbf{max} - \mathbf{n})}{(\mathbf{n} - 1)} \quad (2)$$

where, $\boldsymbol{\lambda}\mathbf{max}$ is the eigenvalue of the judgment/priority matrix and **n** is the number of elements. The value of **CI** can be compared with a random index (**RI**). So, the consistency ratio (**CR**) is computed as:

$$\mathbf{CR} = \frac{\mathbf{CI}}{\mathbf{RI}} \quad (3)$$

where **RI** is the random consistency index. The value of **CR** must be within the range of 0.10, if it exceeds the value from 0.10, then the **CR** should be undertaken again [77].

Table 5. Saaty's pairwise scale [67].

Definition	Numerical Value
Equal	1
Moderately important	3
Strong important	5
Very strong importance	7
Extremely important	9
Intermediate values	2, 4, 6, and 8
Reciprocal values	$\frac{1}{1}, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}$

Following the above steps of the AHP methodology, the Fuzzy VIKOR approach would be applied to evaluate and rank the alternatives.

3.3. Fuzzy VIKOR

The VIKOR (Multiple criteria compromise ranking) method was developed by Opricovic in 1980 [78]. It is a multi-attribute decision-making technique with a simple computation procedure. This approach places emphasis on the ranking of various alternatives and obtaining the compromise solution of a complex-decision problem with having various conflicting criteria. This solution would assess decision-makers to obtain and reach a final decision goal. The compromise solution is a feasible solution to a decision problem. The compromise solution means an agreement established by mutual concessions [79]. There are numerous studies that compare VIKOR with other MCDA techniques.

For instance, Opricovic and Tzeng [79] compare the VIKOR and TOPSIS methods. In another study, Opricovic and Tzeng [80] compared VIKOR with the Preference Ranking Organization METHod for Enrichment Evaluations (PROMETHEE), ELimination and Choice Expressing REality (ELECTRE), and TOPSIS. Öztayşi and Sürer [81] used uzzfy VIKOR for supply chain performance measurement. Sofiyabadi et al. [81] apply fuzzy VIKOR in prioritizing key performance indicators in service sector. In the SEZ prioritization problem, it is more likely that the judgment of the decision-makers (DMs) is vague. It becomes difficult for the DMs to provide exact values for the criteria. However, for the data evaluation, the alternative SEZs site prioritization can be expressed in linguistic terms. Fuzzy logic could successfully be applied to model such uncertainty in human preferences [82]. According to Öztayşi and Sürer [80], key steps of the Fuzzy VIKOR methodology are the following:

Step I. Fuzzy decision matrix for $\boldsymbol{n}$ criteria and $\boldsymbol{m}$ alternatives may be written as:

$$\tilde{\mathbf{M}} = \begin{pmatrix} \widetilde{x}_{11} & \cdots & \widetilde{x}_{1n} \\ \vdots & \ddots & \vdots \\ \widetilde{x}_{m1} & \cdots & \widetilde{x}_{mn} \end{pmatrix} \tag{4}$$

In the above equation, $\widetilde{x}_{ij}$ indicates the score of ith alternative with respect to jth criteria and $\boldsymbol{\Omega}_i\left(\sum_{i=1}^{m} \omega_i = 1,\ \omega_1 \in [0,\ 1],\ i = 1, \ldots,\ n\right)$. Where, $\boldsymbol{\Omega}$ the weights matrix and symbolizes the weight of the jth criterion.

Step II. The next step is to determine the fuzzy best value $(\widetilde{f_j^+})$ and the fuzzy worst value $(\widetilde{f_j^-})$ for each criterion:

$$\widetilde{f_j^+} = \max_i \widetilde{x}_{ij} \tag{5}$$

$$\widetilde{f_j^-} = \min_i \widetilde{x}_{ij} \tag{6}$$

Step III. The fuzzy separation values $\widetilde{S}_i$ and $\widetilde{R}_i$ are estimated as:

$$\widetilde{S}_i = \sum_{j=1}^{n} \widetilde{\omega}_j \frac{\left(\widetilde{f_j^+} - \widetilde{x}_{ij}\right)}{\left(\widetilde{f_j^+} - \widetilde{f_j^-}\right)} \tag{7}$$

$$\widetilde{R}_i = \max_j \left[\widetilde{\omega}_j \frac{\left(\widetilde{f_j^+} - \widetilde{x}_{ij}\right)}{\left(\widetilde{f_j^+} - \widetilde{f_j^-}\right)}\right] \tag{8}$$

Step IV. The values $\widetilde{S}^+, \widetilde{S}^-, \widetilde{S}^+, \widetilde{S}^-$ and $\tilde{\boldsymbol{\Phi}}_i$ are estimated as:

$$\widetilde{S}^+ = \min_i \widetilde{S}_i \text{ and } \widetilde{S}^- = \max_i \widetilde{S}_i \tag{9}$$

$$\widetilde{R}^+ = \min_i \widetilde{R}_i \text{ and } \widetilde{R}^- = \max_i \widetilde{R}_i \tag{10}$$

$$\tilde{\boldsymbol{\Phi}}_i = \sigma \frac{\left(\widetilde{S}_i - \widetilde{S}^+\right)}{\left(\widetilde{S}^- - \widetilde{S}^+\right)} + (1 - \sigma) \frac{\left(\widetilde{R}_i - \widetilde{R}^+\right)}{\left(\widetilde{R}^- - \widetilde{R}^+\right)} \tag{11}$$

The indices $\min_i \widetilde{S}_i$ is related to a maximum majority rule, and $\min_i \widetilde{R}_i$ is related to minimum individual regret of opponent strategy. The parameter $\boldsymbol{\sigma}$ is the weight for the strategy of maximum group utility function. Generally, σ is assumed to be 0.5. In Equation (11), $\mathbf{1-\sigma}$ indicates the weight of individual regret.

Step V. The next step is to defuzzify the triangular fuzzy numbers.

Step VI. The alternatives are arranged in descending order according to their respective $\tilde{\mathbf{\Phi}}_i$ value. The alternative with minimum $\tilde{\mathbf{\Phi}}_i$ value is deemed to be the best alternative.

4. Results of the Analyses

Based on our research frameworks and subsequent analysis, the results were obtained considering socio-economic and sustainability factors.

4.1. Results of Main Criteria (AHP)

As described in methods, in this first step, the main criterion was identified based on the Delphi technique. In the second step the pairwise comparison matrix of the identified criteria and sub-criteria based on AHP. The CR and RI were established using Equations (1) and (2). Table 6 illustrates the weights of the Main criteria obtained by AHP.

Table 6. Main Criteria Results.

Main Criteria	Weight	Rank
Land (LA)	0.2251	1
Environmental Sustainability (EN)	0.0633	7
Subsidies (SU)	0.1658	3
Labor (LO)	0.0992	5
Linkages (LI)	0.1804	2
Industrial Suitability (IN)	0.0778	6
Facilities (FA)	0.1412	4
Market Orientation (MA)	0.0471	8

Results of the AHP method for main criteria reveal that majority of the experts believe location and land aspect is the most important criterion, with a weight of 0.2251, followed by linkages (0.1804), subsidies (0.1658), facilities (0.1412), labor (0.0992), industrial suitability (0.0778), environmental sustainability (0.0633), and least important criteria is market orientation (0.0471). The result reflects that economic aspects dominate the decision weights, and there is lesser interest in sustainability in Pakistan.

4.2. Results of Main Criteria (AHP)

The interview respondents assessed the 33 sub-criteria following the pair-wise comparison. The respective weights and relevant ranking of these sub-criteria are shown in Figures 3–10.

Based on pairwise sub-criteria land (LA), it has been learned from Figure 4 that criterion ease of acquisition of land (LA2) is the highest weight (0.4186) followed by setup cost (0.2975), size of SEZ (0.1708), and stamp duty (0.1131). The consistency scale of pairwise comparison was 0.0025. It can be inferred from the results that investors prefer those SEZs where land acquisition is easy, and the cost of establishment is cheaper.

Pairwise comparison of the sub-criteria facilities elucidates that criterion availability of freshwater (FA2) has the highest weight (0.4507) followed by waste disposal facilities (0.3339) and scientific labs (0.2154) as provided in Figure 5. The consistency scale of pairwise comparison was 0.0005. Results demonstrate that expert is aware of water stress in Pakistan and pollution and would prefer those SEZs where environmental sustainability is ensured.

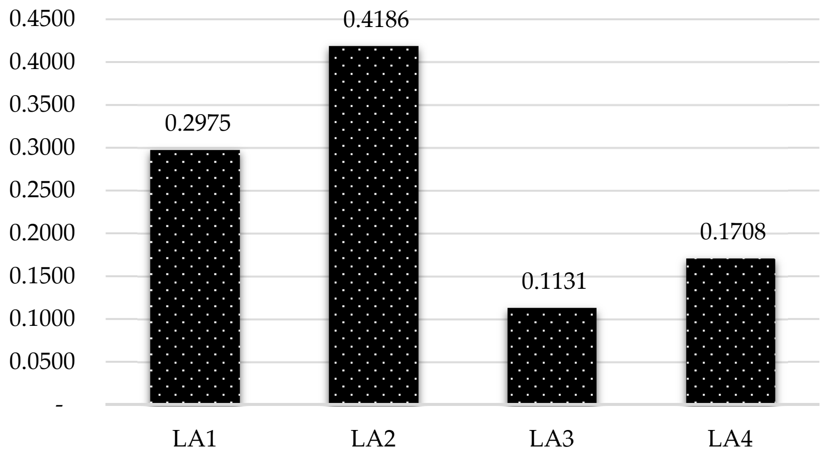

Figure 4. Pairwise comparison matrix of sub-criteria with respect to criteria Land (LA).

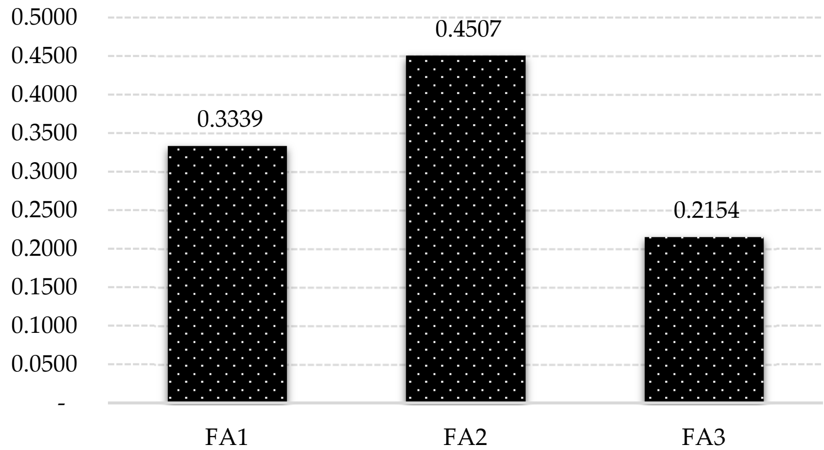

Figure 5. Pairwise comparison matrix of sub-criteria with respect to criteria Facilities (FA).

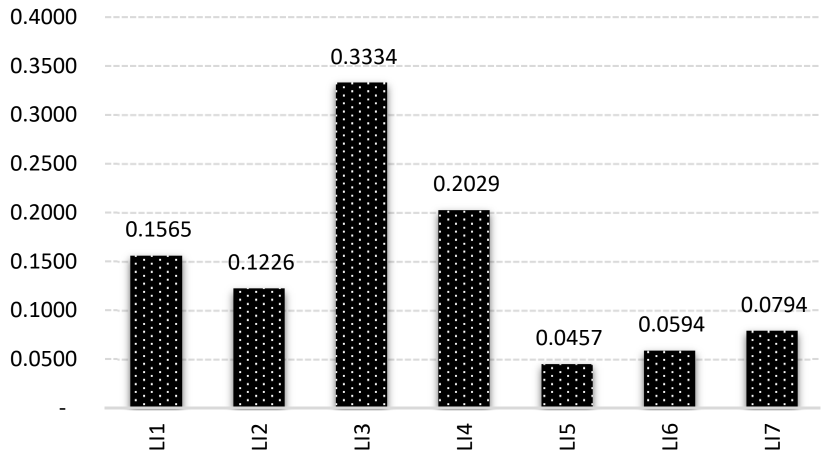

Figure 6. Pairwise comparison matrix of sub-criteria with respect to criteria Linkages (LI).

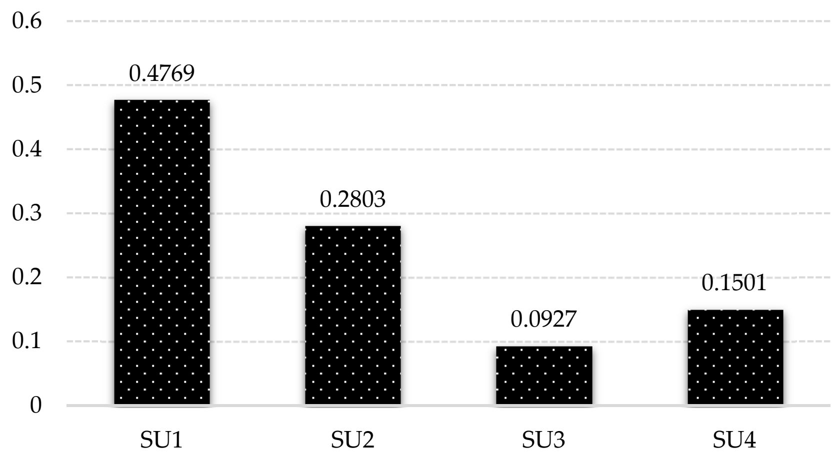

Figure 7. Pairwise comparison matrix of sub-criteria with respect to criteria subsidies (SU).

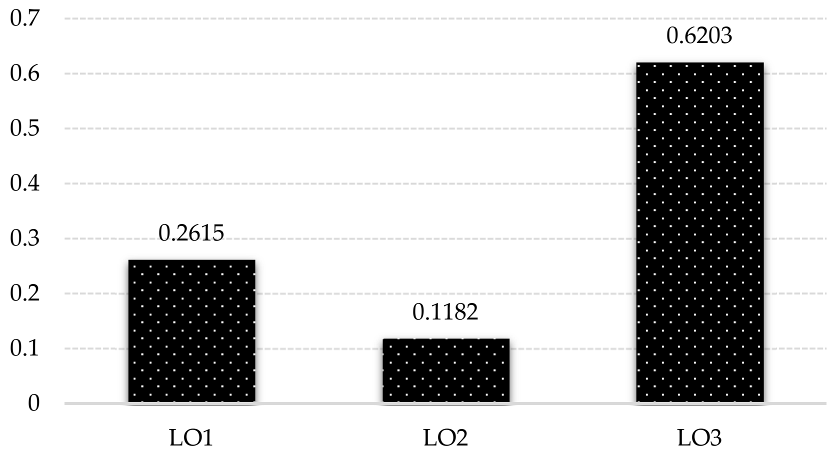

Figure 8. Pairwise comparison matrix of sub-criteria with respect to criteria Labor (LO).

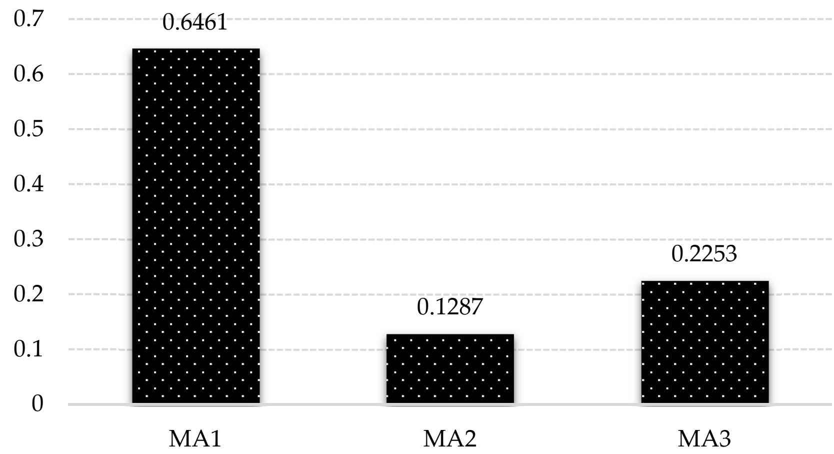

Figure 9. Pairwise comparison matrix of sub-criteria with respect to criteria Market Orientation (MA).

Figure 6 describes the pairwise comparison weight of sub-criterion linkages (LI). It has been learned that criterion proximity to market (LI3) has the highest weight (0.3334) followed by linkages with Highway/Motorway (LI4) (0.2029), proximity to raw materials (0.1565), linkage via railways (0.1226) and there is almost similar preference for sea (0.0794), dry port (0.0594) and airport (0.0457). The consistency scale of pairwise comparison was 0.0189. The result indicates that experts believe SEZ should focus on value up-gradation and local market exploitation. There is also clear domination of the use of land-based linkages with highways and railways.

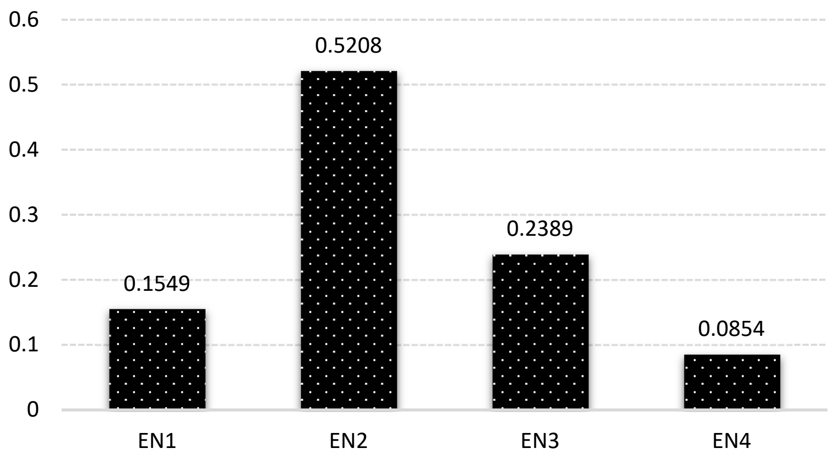

Figure 10. Pairwise comparison matrix of sub-criteria with respect to criteria Environmental Sustainability (EN).

The pairwise comparison of the sub-criteria facilities for subsidies is illustrated in Figure 7. The criterion mode of payment (SU1) has the highest weight (0.4769) followed by markup discount (SU2) (0.3339), land price discount (SU4) (0.1501) and transport subsidy (0.0927) has the least weight. The consistency scale of pairwise comparison was 0.015. Results provide insight about the traditional view of expert preference of fiscal subsidies like in mode of payments and markup discounts.

The pairwise comparison of sub-criteria labor is mentioned in Figure 8. It has been learned that the criterion level of skill (LO3) has the highest weight (0.6203) followed by wage rate (0.2615) and unemployment rate (0.2154). The consistency scale of pairwise comparison was 0.0461. It can be inferred that the expert considers the level of skill of labor as the biggest SEZ selection criterion. Normally, SEZ authorities prefer backward or areas with limited employment options, but the availability of skilled labor in those areas could be troublesome. Experts give little preference to the unemployment rate of the region as their preference is to maximize their output.

The pairwise comparison of the sub-criteria market orientation is mentioned in Figure 9. The experts give the highest weight (0.6461) to export, followed by value up-gradation (0.2253) and domestic market (01287). The consistency scale of pairwise comparison was 0.0093. This shows a clear dominance of exports as compared to value up-gradation and domestic market development. Most of the l SEZ has export orientation traditionally.

Figure 10 describes the pairwise comparison weight of the sub-criterion Environment (EN). It has been learned that criterion Water stress (EN2) has the highest weight (0.5208), followed by air pollution (0.2389), energy consumption (0.1549), and there is the least preference for land loss (0.0854). The consistency scale of pairwise comparison was 0.0264. The result is consistent with the criterion facilities' results. Due to water stress and high levels of air pollution, there is a universal preference for this consideration. Energy efficiency is also an important factor prevailing energy crisis in the country and experts give little importance to land loss despite being an agrarian country.

The pairwise comparison of the sub-criteria industrial suitability (IN) is mentioned in Figure 11. The experts give the highest weight (0.3913) to textiles (IN2), followed by (IN1) agriculture (0.2253), followed by (IN3) iron & steel (0.1721), followed by (IN5) pharmaceutical (0.1005) and least weight to (IN4) mines and minerals (0.0778). The consistency scale of pairwise comparison was 0.0065. The expert preference could have been triggered by the fact that a large proportion of Pakistani exports are textiles and agriculture products based. Due to massive infrastructural products and real-estate developments, the iron and steel industries are thriving. However, the mining and pharmaceutical sector is given the least preferences in terms of their suitability.

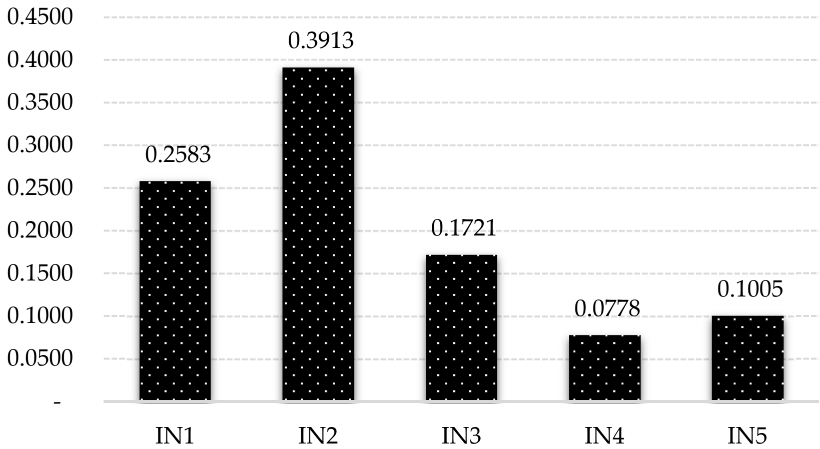

Figure 11. Pairwise comparison matrix of sub-criteria Industrial Suitability (IN).

4.3. Overall Sub-Criteria Results (AHP)

Based on global weights sub-criteria ease of acquisition of land (LA2), mode of payment (SU1), and setup cost (LA1) have the highest weights by experts (Table 7). This ranking is a clear indication that experts believe that land and its allied expenditure are the most decisive factors, and in terms of sustainability availability of freshwater plays a very critical role.

Table 7. Overall sub-criteria weight (Global weight).

Sub-Criteria	Weight	Rank
Ease of acquisition (1) (LA2)	0.0942	1st
Mode of payment (1) (SU1)	0.0791	2nd
Setup Cost (2) (LA1)	0.0670	3rd
Fresh Water availability (1) (FA2)	0.0637	4th
Level of Skill (1) (LO3)	0.0615	5th
Proximity to market (1) (LI3)	0.0602	6th
Waste Disposal Facility (2) (FA1)	0.0472	7th
markup discount (2) (SU2)	0.0465	8th
Size (3) (LA4)	0.0385	9th
Motorways/Highway (2) (LI4)	0.0366	10th
Water Stress (1) (EN2)	0.0329	11th
Textiles (1) (IN2)	0.0305	12th
Export (1) (MA1)	0.0304	13th
Scientific Labs (3) (FA3)	0.0304	14th
Proximity to raw materials (3) (LI1)	0.0282	15th
Wage rate (2) (LO1)	0.0259	16th
Stamp Duty (4) (LA3)	0.0254	17th
Land price Discount (3) (SU4)	0.0249	18th
Railways (4) (LI2)	0.0221	19th
Agriculture (2) (IN1)	0.0201	20th
Transport Subsidy (4) (SU3)	0.0154	21st
Air Pollution (2) (EN3)	0.0151	22nd
Sea (5) (LI7)	0.0143	23rd
Iron & Steel (3) (IN3)	0.0134	24th
Unemployment rate (3) (LO2)	0.0117	25th
Dry port (6) (LI6)	0.0107	26th
Value Upgradation (2) (MA3)	0.0106	27th
Energy Consumption (3) (EN1)	0.0098	28th
Air (7) (LI5)	0.0083	29th
Pharmaceutical (4) (IN5)	0.0078	30th
Domestic Market (3) (MA2)	0.0061	31st
Mines/Minerals (5) (IN4)	0.0061	32nd
Land Loss (4) (EN4)	0.0054	33rd

4.4. Results of Alternatives (Fuzzy VIKOR)

Based on Fuzzy VIKOR methodology, **S**, **R**, and **Φ** values were obtained. Table 8 provides the said values for 3 SEZs.

Table 8. **S**, **R** and **Φ** values.

Economic Zone	S_i	R_i	Φ_i
Dhabeji	0.1261	0.0150	0.0208
Faisalabad	0.1642	0.0136	0.0132
Rashakai	0.1864	0.0143	0.0318

Table 9 provides the final ranking of the SEZs based on the lowest **Φ** value. It can be inferred from the results that Faisalabad is the most suitable and sustainable SEZ under given circumstances. From the results, it was observed that little consideration is given for sustainability issues in SEZ. The policymakers still consider the setup expenditures and costs associated with land acquisition as the most important factor. The sustainability issues need revisiting and inclusion in the initial spatial planning of SEZ in Pakistan that is already very badly affected by climate change.

Table 9. Final alternatives ranking according to lowest Q values.

Economic Zone	Φ_i	Rank
Faisalabad	0.0132	1st
Dhabeji	0.0208	2nd
Rashakai	0.0311	3rd

5. Discussion

This research aimed to explore key success factors and its prioritization by industry experts in terms of Zone 3.0 and the sustainability context in proposed SEZ in Pakistan. However, it is interesting to compare these rankings with key success factors in developed and developing countries. Based on top 10 ranked priorities, the results provides symmetrical patterns of key success factors prioritization on ease of acquisition of land, setup costs that are consistent with studies conducted by [31,36,38,49,50] that investors consider ease in acquisition of land and lowering their initial setup cost by selecting those SEZs where lands and infrastructural cost is lower. The research showed the symmetric result in terms of monetary subsidies for the mode of payment that is mostly required for the purchase of land and normally give consideration to those SEZs that offer partial payment options [1,13]. Markup discount [1,23] by financial institutions is a key determinant of SEZ choice This strategy is useful for promoting the SME sector. The success of Taiwan was mostly focused on SME and Light industries that were mostly made possible by financial incentives [16]. A similar trend was observed in Russia where industrial parks were established for SMEs and SEZs for MNE [3]. Surprisingly and asymmetrically with the experience of developing countries, the experts give due weightage to environment and resource constraints and application of Zone 3.0 that ensures sustainable resource utilization. As Pakistan is considered in one of the highest water stress regions, the experts prioritized 4th to freshwater availability and 7th for the availability of waste management facilities. In recent literature, it has been suggested that governments should intervene to pursue strategic goals such as sustainability and value-based societal goals more than purely economic criteria [26]. The level of water stress is an important decision element for investment [13,32,37]. Similarly, there are symmetric results for waste management, as mentioned in the report of the Asian Development Bank [12]. Ignoring environmental issues could hinder the sustainable development in the future and is an undesirable output that must be considered during policy-making [54]. The well run SEZs have better environmental practices and controls [10].

For decades, countries like China [52] dominated industrialization because of the availability of cheaper and skilled labor [26]. Experts give symmetrical preferences to the level of skill of labor that was considered critical [28,34,36,37]. The Chinese model of development using labor-intensive and low tech is suitable for countries like Pakistan because of its ability to accommodate local manufacturing without hefty trade deficit or unbearable debts that are undesirable consequences of heavy industrialization [83]. Experts emphasized size of SEZ in their preferences, as a larger size offers greater flexibility in terms of plant location and scope for firms to establish inter-firm linkages [10]. The size of the SEZ gave contrasting weightage in developing and developed countries. While analyzing the attractiveness in Polish SEZs the investors didn't care about the size of the plot [5] that is symmetric in all developed countries. However, from the successful examples of China, Philippines, India, and Thailand, it has been learned that investors prefer those SEZ that are bigger in sizes that is consistent in all developing countries [9,11]. In the last, proximity to markets and road connectivity were given the ranking of 7 and 10. All well-performing SEZs in Singapore, China, Malaysia, Korea, and Dubai attracted foreign investment because of the high quality and efficient road network and connectivity of the domestic and international trade hubs [9]. In the Philippines, non-metro Manila, an effective road network, had given preference by investors over ports.

This research concludes that despite high setup cost, high cost of highly skilled labor, and high environmental hazard, Faisalabad SEZ provides strong linkages, suitability for priority industries and multiple market orientations. The results obtained in the case of Rashakai are consistent with the results of the Philippines, where investors did not give preference to remote and poor areas despite lucrative incentives and high unemployment rates [30]. The results also accentuate the assessment of the need for uniform and consistent policy guidelines at subnational and provinces level to facilitate FDI. In the case of CPEC, there is a competition going on between provinces to attract maximum investors without the realization of its effect of such SEZs on existing industrial estates and export processing zones. Pakistan can learn from the expansion strategy of China for the establishment of SEZs.

6. Conclusions

This paper used identified key success factors for the establishment of SEZs with special consideration of Zone 3.0 contemplation to provide essential benchmark using AHP-Fuzzy & VIKOR a tool to enhance regional competitive advantage. From the analysis of literature and after obtaining expert opinions, the 8 key success factors, i.e. location, linkages, subsidies, facilities, labor, industrial suitability, and market orientation and 1 environmental sustainability factor were considered for the selection of SEZs. On the analysis of results, it can be apprehended that there is little concern given to current resource stress conditions in Pakistan and sustainability. All 3 of the SEZs have their unique attributes based on objectivity. However, to have long-lasting economic benefits, job creation, and to meet the UNSDGs, it is imperative to consider zone selection based on prevailing excellent industrial practices and environmental standards and monitoring industry types based on market orientation and industrial suitability. Under regional collaboration projects, an important aspect of being considered while establishing SEZ is the investor's investment protection while establishing global value chains among member countries. A well-established, centrally facilitated, environmentally sustainable, and appropriately connected SEZ could help to achieve the objectives of BRI.

Pakistan is highly vulnerable to climate change. It is facing severe environmental issues such as water stress, air pollution, water contamination, and natural environmental disasters. Establishment of SEZ under such environmentally challenging situations demands special consideration in terms of suitability of industry that require bulk and groundwater, high energy, high emission, and potential land loss. This prioritization also considered the existing environmental conditions regarding establishment of SEZs. The analysis in the present study provides a comprehensive and deeper insights intort the key factors and challenges during the planning and development process of SEZs in Pakistan under the regional development projects of BRI. The zone developers should think about the establishment of domestic markets and value up-gradation rather than a sole focus on export.

This research is an attempt to prove policymakers and zone developers to evaluate the establishment of SEZ in the light of key success factors and Zone 3.0 environmental sustainability paradigm. However, this research is limited in identifying the reasons for the failure of the sustainable growth of existing SEZs in Pakistan due to limited literature available on the topic. It would be insightful for future researchers to do the comparisons of existing and proposed SEZs, include more variables, seek opinions of different experts, and apply other MCDM methods such as ANP, ELECTRE, DEMATEL, and PROMETHEE for tracking the changes and comparing the results.

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

Funding: This research was funded by "Fundamental Research Funds for the Central Universities", grant number NX2017001.

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

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