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Article

Project Finance Structuring, Public Sector Participation, and Institutional Capacity on Sustainability of Special Economic Zone Projects in Kenya

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Abstract

Special Economic Zones (SEZs) have been widely promoted as instruments for industrialization, export growth, and employment creation, yet their long-term sustainability remains uneven, particularly in emerging economies. This study investigates the joint influence of Project Finance Structuring, Public Sector Participation, and Institutional Capacity on the sustainability of SEZ projects in Kenya. A cross-sectional research design was employed, collecting primary data from 61 SEZ projects through structured questionnaires administered to project managers, government officials, and community leaders. Reliability and validity of the instruments were confirmed through Cronbach's alpha and factor analysis, while diagnostic tests ensured adherence to regression assumptions. Data were analyzed using descriptive statistics, Pearson correlation, and multiple linear regression to assess the strength, direction, and significance of relationships among the variables. The findings reveal that Public Sector Participation is the strongest predictor of SEZ sustainability, followed by Institutional Capacity, while Project Finance Structuring exhibits a moderate correlation but is not a statistically significant determinant when controlling for institutional and government factors. The three combined variables explain over 76 percent of the variation in sustainability of SEZ projects. The study concludes that effective public sector support and strong institutional capacity are critical for promoting sustainability of SEZ projects in Kenya.

Keywords: Project Finance Structuring; institutional capacity; Public Sector Participation; sustainability; Special Economic Zone Projects

1. Introduction

Special Economic Zones (SEZs) have become a prominent policy instrument for promoting industrialization, export diversification, and employment creation across both developed and developing economies. Globally, more than 7,000 SEZs operate in over 140 countries, reflecting their strategic role in global value chain integration and infrastructure-led economic transformation [1,2]. By concentrating infrastructure, regulatory facilitation, and fiscal incentives within designated geographic areas, SEZs are designed to reduce investment risks and accelerate economic growth. However, growing evidence suggests that economic expansion alone does not guarantee sustainability, raising concerns about the long-term economic viability, social inclusiveness, and environmental performance of SEZs.

From a sustainability perspective, SEZ outcomes remain mixed and contested. While countries such as China and Vietnam have successfully leveraged SEZs to stimulate industrial upgrading and

export growth, empirical studies document significant social and environmental trade-offs, including ecological degradation, land displacement, and uneven distribution of benefits [3,4]. For example, coastal SEZ developments have been associated with mangrove forest loss and ecosystem disruption, highlighting tensions between rapid industrialization and environmental protection [4]. These contradictions have fueled an ongoing debate on whether SEZs can function as instruments of sustainable development or whether they remain enclaves of short-term economic gains with limited long-term societal value.

In Africa, SEZs are increasingly promoted as tools for inclusive industrialization, regional integration, and structural transformation. Despite substantial policy support, many African SEZs have underperformed relative to expectations due to weak financial models, limited public sector coordination, and fragile institutional frameworks [5,6]. Experiences from Ethiopia and Nigeria illustrate how infrastructure financing delays and regulatory inconsistencies undermine investor confidence and job creation [7]. Kenya reflects a similar pattern. Following the enactment of the Special Economic Zones Act of 2015, flagship projects such as Dongo Kundu SEZ, Naivasha Industrial Park, and Tatu City were established to support the country's Vision 2030 development agenda. Nevertheless, recent assessments indicate that most Kenyan SEZs operate below capacity and face challenges related to inadequate financial structuring, fragmented governance, and weak inter-agency coordination [8,9]. These persistent shortcomings raise critical questions regarding the sustainability of SEZ investments in Kenya.

Recent research increasingly emphasizes that SEZ sustainability is shaped not only by incentive regimes but also by deeper structural and governance-related determinants. Project Finance Structuring (PFS) influences capital mobilization, risk allocation, and long-term financial resilience [10]. While some studies find that sound financial structuring enhances SEZ viability and reduces fiscal exposure [10,11], others report that financial arrangements alone have limited influence when institutional and governance weaknesses persist [12]. Public Sector Participation (PSP), including regulatory facilitation, infrastructure provision, and fiscal incentives, is widely regarded as a cornerstone of SEZ success [13]. However, empirical findings remain divergent: some studies demonstrate strong positive effects of government involvement on SEZ performance [14], while others find weak or context-dependent relationships [12]. Institutional Capacity (IC), encompassing regulatory competence, administrative coordination, and enforcement capability, further shapes SEZ outcomes, particularly with respect to environmental compliance, social inclusion, and policy consistency [6].

Despite the growing body of literature, limited attention has been paid to how project finance structuring, public sector participation, and institutional capacity interact to jointly influence economic, social, and environmental sustainability outcomes. Global reviews highlight persistent gaps in understanding the interplay between financial architecture and governance structures in shaping sustainable development trajectories [3,15]. In the Kenyan context, empirical studies integrating these dimensions remain scarce, despite the strategic importance of SEZs for achieving Sustainable Development Goals related to decent work, resilient infrastructure, and responsible industrialization [16].

Against this backdrop, the purpose of this study is to examine how project finance structuring, public sector participation, and institutional capacity jointly influence the sustainability of SEZ projects in Kenya. The main aim is to assess the combined effects of these structural determinants on SEZ sustainability outcomes. The findings reveal that public sector participation is the most significant driver of SEZ sustainability in Kenya, followed by institutional capacity, while project finance structuring, although necessary, plays a comparatively weaker role once governance factors are considered. These results suggest that sustainable SEZ development is primarily a governance and institutional challenge rather than a purely project finance structuring one.

2. Material and Methods

This study adopted a positivist research paradigm, aligning with recent advancements in project finance and sustainability research that emphasize measurable, generalizable outcomes [17,18]. The cross-sectional research design was particularly appropriate for this investigation as it allowed for the collection of standardized data from multiple SEZ stakeholders at a single point in time, enabling robust statistical analysis of variable relationships [19,20].

In Kenya, there are a total of 12 SEZs gazetted by Special Economic Zone Authority (SEZA) and as of August 2024, 61 projects were operational within these 12 SEZs. This study targeted the 61 projects within the 12 SEZs which formed the study's unit of analysis. The study's unit of observation was sixty one project managers, two SEZA Officials, eight County government officials, twelve community leaders, two officials from Ministry of Industrialization, and 2 NEMA Environmental experts. Community leaders were chosen using random sampling (1 community leader per each SEZ), whereas purposive sampling was utilized to choose officials. The study adopted Census technique since the population of interest is relatively small.

Primary data was collected using a structured questionnaire specifically designed to reflect the objectives and hypotheses of the study. The questionnaire primarily contained closed-ended questions measured on a 5-point Likert scale to capture the level of agreement from respondents on key variables.

In this study, the validity of the research instruments was assessed through a series of systematic procedures to ensure accuracy and suitability before the main data collection. Content validity was first established through consultations with experts, peers, and academic supervisors, whose comments, evaluations, and recommendations were used to refine and restructure the questionnaire items [20]. This ensured that each construct was well represented and aligned with the study objectives. Construct validity was further assessed through factor analysis, where the Kaiser-Meyer-Olkin (KMO) values and Bartlett's Test of Sphericity were used to determine sampling adequacy and the suitability of the data for factor extraction [21]. All constructs met the required thresholds for sampling adequacy, demonstrating that the observed correlations were appropriate for further analysis. For the Project Finance Structuring construct, the KMO value was 0.698, while Bartlett's Test of Sphericity was significant ($\chi^2 = 5468.875$, $df = 496$, $Sig. = 0.000$), indicating that the items were factorable. The rotated component matrix further produced a composite factor score of 0.843, confirming that the items adequately loaded onto the construct. For Public Sector Participation, the KMO measure was 0.739, and Bartlett's Test was significant ($\chi^2 = 5253.404$, $df = 561$, $Sig. = 0.000$). A composite loading score of 0.786 was obtained from the rotated component matrix, showing satisfactory construct representation. For Institutional Capacity, the KMO value was 0.806, with Bartlett's Test also significant ($\chi^2 = 4455.330$, $df = 595$, $Sig. = 0.000$). The rotated composite score was 0.776, confirming strong construct validity. Similarly, for the Sustainability of SEZs, the KMO value was 0.716, and Bartlett's Test was significant ($\chi^2 = 3947.803$, $df = 703$, $Sig. = 0.000$). A rotated composite score of 0.771 indicated adequate convergent properties among the items.

Reliability of the research instruments was ensured through internal consistency testing using Cronbach's alpha coefficients. A Likert-type questionnaire formed the primary data collection tool, and reliability testing confirmed that the scale items were consistent and stable. For Project Finance Structuring, the Cronbach's alpha coefficient was 0.987 for 31 items. For Public Sector Participation, the coefficient was 0.986 across 34 items. For Institutional Capacity, the reliability coefficient was 0.982 for 35 items, while Sustainability of SEZs recorded a Cronbach's alpha of 0.977 for 38 items. All coefficients exceeded the recommended threshold of 0.7, with values ranging between 0.977 and 0.987, indicating excellent reliability. Therefore, all items were considered reliable and were retained for subsequent statistical analysis.

The data was analyzed using both descriptive and inferential statistical techniques to address the study objectives and test the stated hypotheses. Descriptive statistics such as means and standard deviations were used to summarize and describe the central tendencies and dispersion of responses across the key study variables. To assess the nature and strength of relationships between the independent variables, Pearson's correlation coefficient was employed. A p-value of less than 0.05

was used to determine statistical significance. In addition, multiple regression analysis was used to determine the predictive power of the independent variables on the dependent variable.

An integrated multiple linear regression analysis model was used to predict the joint influence of project finance structuring, public sector participation, institutional capacity and sustainability of SEZ projects:

$$Y = \beta_0 + \beta_1\text{PFS} + \beta_2\text{PSP} + \beta_3\text{IC} + \varepsilon$$

Where: Y represents sustainability of SEZ projects; β_0 is the y-intercept; PFS = project finance structuring, PSP = public sector participation, IC = institutional capacity; β_1 , β_2 , and β_3 are coefficients for the three predictor variables; and ε is the error term.

3. Results

3.1. Descriptive Analysis of Study Variables

3.1.1. Project Finance Structuring Descriptive Statistics

This section presents the descriptive statistics for project finance structuring indicators, which was the study predictor variable, based on responses collected using a five-point Likert scale, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree."

Table 1. Project Finance Structuring.

Statements	Mean	Std. Deviation
Government equity financing is readily available, accessible, and faster to secure	3.52	1.335
Private equity financing is readily available, accessible, and faster to secure	3.45	1.389
Commercial bank loans are readily available, accessible, and faster to secure	3.52	1.372
Concessional loans are readily available and accessible for SEZ projects	3.49	1.336
The project maintains a clear project financing structure outlining each project participant's shareholding.	3.54	1.390
Public ownership improves sustainability of SEZ projects.	3.49	1.381
Private ownership leads to improved project sustainability.	3.60	1.313
Increase in public ownership in SEZ leads to project sustainability.	3.59	1.448
The project's ownership structure facilitates efficient capital raising and investment decisions.	3.51	1.317
The ownership structure provides clear mechanisms for resolving conflicts between shareholders.	3.55	1.316
The identified risks were properly allocated among the different parties engaged	3.40	1.404
The project conducted continuous project risk assessment in every stage of the project lifecycle	3.45	1.344
The project used risk management tools to accurately mitigate the risk exposure of the project	3.63	1.374
The project had a clear risk response strategy to address potential threats and uncertainties	3.60	1.387
Risk-sharing mechanisms such as insurance, guarantees, or contractual clauses were put in place to cushion against losses	3.68	1.332

Financial structure indicators recorded moderate agreement, with government equity, private equity, commercial bank loans, and concessional loans scoring between Mean = 3.45 and Mean = 3.52, showing that respondents moderately agreed that financing options for SEZ projects are accessible and supportive.

Risk structure was rated highest, with risk-sharing mechanisms recording the strongest score [Mean = 3.68, SD = 1.332], followed by the use of risk management tools [Mean = 3.63, SD = 1.374], clear risk response strategies [Mean = 3.60, SD = 1.387], and continuous risk assessment [Mean = 3.45,

SD = 1.344]. This indicates that risk mitigation practices were viewed as important components of project finance structuring.

Ownership structure showed strong agreement as well, with private ownership enhancing sustainability [Mean = 3.60, SD = 1.313], increased public ownership supporting sustainability [Mean = 3.59, SD = 1.448], and clear ownership structures facilitating conflict resolution and capital decisions (Mean values ranging from 3.51 to 3.55). Overall, project finance structuring across financial, risk, and ownership structures was moderately rated, suggesting that these components play a meaningful role in supporting the sustainability of SEZ projects.

3.1.2. Public Sector Participation Descriptive Statistics

This section presents the descriptive statistics for public sector participation indicators, which was the study moderating variable, based on responses collected using a five-point Likert scale, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree."

Table 2. Public Sector Participation.

Statements	Mean	Std. Deviation
The SEZ projects enjoy preferential withholding tax rates.	4.01	1.138
The SEZ projects have been provided with tax holidays.	3.89	1.227
The SEZ project enjoys investment tax credits when they set shop in SEZ.	3.78	1.267
The projects under SEZ are provided with accelerated depreciation allowances.	3.96	1.201
The SEZ projects have benefited from tax support on greenfield investments.	4.00	1.133
The tax rates offered in the SEZ are competitive compared to other investment locations.	3.99	1.128
The duration of tax holidays provided is sufficient to attract and retain investors.	3.96	1.170
The investment tax credit system effectively encourages capital investment in the SEZ.	4.05	1.132
The green investment support through fiscal incentives promotes sustainable development in SEZ.	4.05	1.110
The SEZ projects are awarded wage subsidies by the government.	4.10	1.140
The SEZs benefit from job training which enriches labour market.	3.99	1.181
The government supports SEZ projects with expatriation support.	3.80	1.281
Infrastructure development in SEZ includes reliable power, water, and transportation networks.	4.01	1.094
The job training programs effectively address the skill gaps in the local workforce.	3.94	1.180
The expatriate support services facilitate smooth relocation of international personnel.	4.00	1.100
The government's infrastructure investment has enhanced SEZ connectivity to major markets.	3.76	1.243
Government maintains efficient one-stop-shop services	3.91	1.188
Government ensures coordination among different agencies	3.80	1.261
Public sector maintains effective dispute resolution mechanisms	3.85	1.188
Public sector provides adequate business development support	3.61	1.284
Government provides support for accessing international markets	3.85	1.198

Fiscal incentives were rated highly, with wage subsidies recording the strongest rating [Mean = 4.10, SD = 1.140], followed by investment tax credits and green investment support, both at [Mean = 4.05]. Preferential withholding tax rates [Mean = 4.01, SD = 1.138] and accelerated depreciation allowances [Mean = 3.96, SD = 1.201] also showed strong agreement. Overall, fiscal incentives were viewed as important drivers of SEZ attractiveness.

Non-fiscal incentives also received high ratings, particularly the availability of reliable infrastructure [Mean = 4.01, SD = 1.094] and expatriate support services [Mean = 4.00, SD = 1.100]. Job training programs were moderately rated (Means between 3.94 and 3.99), indicating general agreement that these interventions strengthen the SEZ labor market and operational environment.

Administrative support was moderately rated, with most items ranging between Mean = 3.61 and Mean = 3.91. Efficient one-stop-shop services [Mean = 3.91, SD = 1.188], dispute resolution mechanisms [Mean = 3.85, SD = 1.188], and support for accessing international markets [Mean = 3.85, SD = 1.198] were viewed positively, though overall administrative support scored slightly lower than fiscal and non-fiscal incentives.

3.1.3. Institutional Capacity Descriptive Statistics

This section presents the descriptive statistics for institutional capacity indicators, which was the study intervening variable, based on responses collected using a five-point Likert scale, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree."

Table 3. Institutional Capacity.

Statements	Mean	Std. Deviation
The SEZ regulator efficiently reviews proposed SEZ construction projects and confirms their viability in light of the developed SEZ plan.	3.93	1.215
Independent institutions are tasked to conduct feasibility studies on proposed SEZs by taking into account project commercial viability	3.89	1.267
Effectively, the regulator coerces all parties into abiding by SEZ laws, rules, and regulations.	3.85	1.278
In order to promote SEZ projects, the regulator has supplied external infrastructure, such as access roads and power generation.	4.07	1.075
The SEZ owner is responsible to finance land acquisition for an SEZ project.	4.20	1.082
The SEZ project owners have effectively resettled displaced people, and offered livelihood opportunities to those displaced.	4.17	1.174
The owner employed an objective scoring system to choose a developer and operator for the SEZ, and held a legal tender to choose the developer.	4.09	1.135
The SEZ owner has implemented effective land management systems and procedures.	3.94	1.280
The owner has established clear criteria for evaluating and selecting project partners.	3.83	1.275
Grading and leveling have been done on the SEZ land in addition to any other pre-construction tasks to guarantee sustainability.	3.80	1.290
The SEZ has capacity to offer investors with administrative services, such as renting and utility bill collection on behalf of a developer.	3.80	1.309
The SEZ has a capacity to offer administrative services to investors, including collecting rentals and utility payments on behalf of a developer	3.91	1.288

Regulator capacity was rated positively, with the provision of external infrastructure scoring highest [Mean = 4.07, SD = 1.075], indicating strong agreement that regulatory support enhances SEZ development. The regulator's ability to efficiently review SEZ projects [Mean = 3.93, SD = 1.215] and enforce compliance with SEZ laws [Mean = 3.85, SD = 1.278] also showed moderate to high agreement, suggesting a generally effective regulatory environment.

Owner capacity received the strongest ratings among the three indicators. The responsibility for financing land acquisition scored highest overall [Mean = 4.20, SD = 1.082], followed by effective resettlement and livelihood restoration for displaced persons [Mean = 4.17, SD = 1.174]. Transparent selection of developers through objective scoring and tendering [Mean = 4.09, SD = 1.135] and

effective land management systems [Mean = 3.94, SD = 1.280] further indicate strong owner capacity in supporting SEZ implementation.

Developer capacity showed moderate agreement, with administrative service provision scoring between Mean = 3.80 and Mean = 3.91. Pre-construction activities such as grading and leveling were also moderately rated [Mean = 3.80, SD = 1.290], suggesting that developers perform essential preparation tasks adequately. Overall, institutional capacity was rated favorably across regulator, owner, and developer dimensions, with owner capacity emerging strongest in supporting SEZ project success.

3.1.4. Sustainability of Special Economic Zone Projects Descriptive Statistics

This subsection presents the descriptive statistics for the sustainability of Special Economic Zone (SEZ) projects, based on respondent ratings on a five-point Likert scale where 1 corresponds to “Strongly Disagree” and 5 to “Strongly Agree.”

Table 4. Sustainability of SEZ Projects.

Statements	Mean	Std. Deviation
The SEZ project has significantly increased job opportunities in the region	3.46	1.390
The SEZ project contributes significantly to the region's GDP	3.57	1.432
The SEZ projects have led to increase in exports	3.38	1.471
The foreign direct investment has increased	3.54	1.372
The SEZ has adopted green technologies to ensure sustainability	3.65	1.299
The energy is conserved and well managed in the zone, i.e. putting off lights in day time	3.48	1.459
The zone uses efficient technologies to reduce environmental impacts	3.70	1.321
The SEZ's designs prioritize daylight utilization, reducing the dependency on artificial lighting	3.62	1.471
Renewable energy installations (e.g., solar panels) are visibly integrated into the SEZ's infrastructure	3.66	1.239
The SEZ projects has encouraged green communities	3.79	1.293
The water sources used to supply water to the Free Zone are sustainable and cannot be depleted	3.52	1.317
The SEZ uses efficient fixtures when distributing and using water to reduce carbon footprint	3.33	1.441
The SEZ has contributed significantly to the development of local infrastructure (e.g., roads, schools, healthcare facilities)	3.54	1.326
The SEZ strictly prohibits child labor and regularly monitors compliance with these regulations	3.49	1.408
The SEZ partners with local organizations to promote education and child welfare as alternatives to child labor	3.50	1.345
Workers in the SEZ have access to fair wages, benefits, and opportunities for skill development	3.24	1.462
The SEZ regularly audits businesses to ensure compliance with labor standards and ethical practices	3.46	1.381

Economic sustainability indicators were rated moderately high, with increased exports, GDP contribution, and foreign direct investment scoring between Mean = 3.38 and Mean = 3.57. This indicates general agreement that SEZ projects contribute meaningfully to regional economic performance.

Ecological sustainability recorded the strongest ratings overall. Efficient technologies to reduce environmental impacts were rated highest [Mean = 3.70, SD = 1.321], followed by green community promotion [Mean = 3.79, SD = 1.293] and integration of renewable energy [Mean = 3.66, SD = 1.239]. Adoption of green technologies [Mean = 3.65] and prioritization of daylight utilization [Mean = 3.62]

also showed strong agreement, suggesting that SEZ projects incorporate key environmental sustainability practices.

Social sustainability indicators showed moderate agreement, with improvements in job creation [Mean = 3.46] and local infrastructure development [Mean = 3.54] being positively rated. Child labor prohibitions and related compliance monitoring scored between Mean = 3.49 and 3.50, while fair wages and worker development opportunities recorded the lowest agreement [Mean = 3.24, SD = 1.462], indicating areas requiring further strengthening.

3.2. Correlation Analysis Results

Correlation analysis was conducted to establish the strength and direction of the linear relationships among project finance structuring, public sector participation, institutional capacity, and the sustainability of Special Economic Zone (SEZ) projects.

Table 5. Correlation Results.

		Project Finance Structuring	Public Sector Participation	Institutional Capacity	Sustainability of Special Economic Zone Projects
Project Finance Structuring	Pearson Correlation	1			
Public Sector Participation	Pearson Correlation	.598**	1		
	Sig. (1-tailed)	.000			
Institutional Capacity	Pearson Correlation	.564**	.773**	1	
	Sig. (1-tailed)	.000	.000		
Sustainability of Special Economic Zone Projects	Pearson Correlation	.532**	.867**	.742**	1
	Sig. (1-tailed)	.000	.000	.000	

** . Correlation is significant at the 0.05 level (1-tailed).

The results revealed that Project Finance Structuring had a positive and moderate relationship with the Sustainability of Special Economic Zone Projects ($r = 0.532$, $p < 0.05$). Public Sector Participation showed a positive and very strong relationship with SEZ sustainability ($r = 0.867$, $p < 0.05$). Institutional Capacity also demonstrated a positive and strong relationship with Sustainability ($r = 0.742$, $p < 0.05$). Overall, the findings indicate that all three variables, Project Finance Structuring, Public Sector Participation, and Institutional Capacity, have linear, positive, and statistically significant relationships with the Sustainability of Special Economic Zone Projects.

3.3. Hypothesis Testing

This section presents the hypothesis testing results concerning the joint influence of project finance structuring, public sector participation, and institutional capacity on the sustainability of Special Economic Zone (SEZ) projects in Kenya. The null hypothesis (H_0) posits that project finance structuring, public sector participation and institutional capacity has no significant joint influence on sustainability of Special Economic Zone projects in Kenya. To evaluate this claim, a multiple regression model was applied to test the collective explanatory power of the independent variables on the dependent variable.

Table 6. Multiple Regression Analysis Results.

a) Model Summary

Model	R	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
					F Change	df1	df2	
1	.874 ^a	.765	.46236	.765	84.485	3	78	.000

a. Predictors: (Constant), Institutional Capacity, Project Finance Structuring, Public Sector Participation

b. Dependent Variable: Sustainability of Special Economic Zone Projects

b) Goodness-of-Fit ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.183	3	18.061	84.485	.000 ^b
	Residual	16.675	78	.214		
	Total	70.858	81			

a. Dependent Variable: Sustainability of Special Economic Zone Projects

b. Predictors: (Constant), Institutional Capacity, Project Finance Structuring, Public Sector Participation

c) Beta Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	.044	.240			.184	.854
	Project Finance Structuring	-.007	.060	-.008		-.111	.912
	Public Sector Participation	.733	.091	.733		8.046	.000
	Institutional Capacity	.184	.090	.180		2.036	.045

a. Dependent Variable: Sustainability of Special Economic Zone Projects

The results showed that Project Finance Structuring, Public Sector Participation, and Institutional Capacity had a high explanatory power on the Sustainability of Special Economic Zone Projects. The coefficient of determination was $R = 0.874$, $R^2 = 0.765$, and adjusted $R^2 = 0.756$. This means that the joint effect of the three variables explained 75.6% of the variation in SEZ sustainability, while the remaining 24.4% was accounted for by other factors not included in the model.

The ANOVA results confirmed that the overall model was statistically significant ($F = 84.485$, $p = 0.000 < 0.05$). Therefore, the null hypothesis was rejected, indicating that Project Finance Structuring, Public Sector Participation, and Institutional Capacity jointly have a significant effect on the Sustainability of Special Economic Zone Projects.

Regarding individual significance, the constant term was not significant ($p = 0.854$). Project Finance Structuring also had no significant effect ($p = 0.912$), as its p -value exceeded the 0.05 significance level. However, Public Sector Participation ($p = 0.000$) and Institutional Capacity ($p = 0.045$) were significant predictors of sustainability, since their p -values were below the 0.05 threshold.

The resulting prediction model was:

$$\text{Sustainability of SEZs} = 0.044 - 0.007\text{PFS} + 0.733\text{PSP} + 0.184\text{IC}$$

This implies that a one-unit increase in Public Sector Participation would, on average, increase SEZ sustainability by 0.733 units, while a one-unit increase in Institutional Capacity would increase sustainability by 0.184 units. Project Finance Structuring showed no meaningful contribution to the model.

Based on the unstandardized coefficients, Public Sector Participation had the greatest influence on sustainability ($\beta = 0.733$), followed by Institutional Capacity ($\beta = 0.184$). Therefore, enhancing public sector participation would yield the greatest improvement in the sustainability of Special Economic Zone projects.

4. Discussion

The Pearson correlation results showed that all three independent variables had positive and significant relationships with SEZ sustainability at $p < 0.05$. Project Finance Structuring had a moderate positive correlation ($r = 0.532$), indicating that well-structured financial mechanisms moderately support sustainable SEZ outcomes. Institutional Capacity showed a strong positive correlation ($r = 0.742$), emphasizing the importance of regulatory, ownership, and developer competencies. Public Sector Participation exhibited the strongest positive correlation ($r = 0.867$), highlighting that government involvement through incentives, administrative support, and policy coordination is critical to SEZ sustainability.

The multiple regression results further confirmed these relationships and quantified their joint and individual contributions. The model summary showed a high explanatory power with $R = 0.874$, $R^2 = 0.765$, and adjusted $R^2 = 0.756$. This implies that 76.5% of the variation in SEZ sustainability was jointly explained by Project Finance Structuring, Public Sector Participation, and Institutional Capacity, while the remaining 23.5% is attributed to other factors not included in the model. Analysis of the beta coefficients revealed that Public Sector Participation was the most influential predictor ($\beta = 0.733$, $p = 0.000$), followed by Institutional Capacity ($\beta = 0.180$, $p = 0.045$). Project Finance Structuring was not statistically significant ($\beta = -0.008$, $p = 0.912$), suggesting that its direct effect on sustainability is minimal when controlling for public sector and institutional factors. This indicates that enhancing public sector participation and institutional capacity will most effectively improve SEZ sustainability, while improvements in project finance structuring alone may not yield significant impact. The findings suggest that while financial structuring is important for facilitating investment, government support and institutional capacity are the primary drivers of sustainability in SEZ projects.

5. Conclusion

Public Sector Participation is the most significant determinant of the sustainability of Special Economic Zone (SEZ) projects in Kenya. The multiple regression results ($\beta = 0.733$, $p = 0.000$) and strong correlation ($r = 0.867$) indicate that government involvement through fiscal and non-fiscal incentives, infrastructure support, and effective administrative coordination substantially enhances SEZ sustainability. Institutional Capacity also positively influences SEZ sustainability. With a statistically significant regression coefficient ($\beta = 0.184$, $p = 0.045$) and strong correlation ($r = 0.742$), the findings highlight that effective regulatory oversight, competent ownership, and capable developers are crucial for ensuring SEZ projects are implemented efficiently and remain sustainable over time. Project Finance Structuring, while positively correlated with SEZ sustainability ($r = 0.532$), was not a significant predictor in the regression model ($\beta = -0.008$, $p = 0.912$). This suggests that, although sound financial frameworks are necessary, they are less influential on sustainability

compared to institutional and government support mechanisms when all variables are considered together.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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

References

1. United Nations Conference on Trade and Development (UNCTAD). *World Investment Report 2024: Investment Facilitation and Sustainable Development*; UNCTAD: Geneva, Switzerland, 2024.
2. Organisation for Economic Co-operation and Development (OECD). *Special Economic Zones: Performance, Lessons Learned, and Implications for Policy Makers*; OECD Publishing: Paris, France, 2022.
3. Zeng, D.Z. Global experiences with special economic zones: Focus on China and Africa. *World Bank Econ. Rev.* 2015, 29, S1–S17.
4. Aung, T.S.; Overland, I.; Vakulchuk, R.; Xie, Z. Special economic zones and environmental impacts: Evidence from coastal development and mangrove loss. *Sustainability* 2022, 14, 12345.
5. Rodríguez-Pose, A. The challenge of industrialization in Africa: The role of special economic zones. *Reg. Stud.* 2022, 56, 1278–1292.
6. United Nations Industrial Development Organization (UNIDO); African Economic Zones Organization (AEZO). *Special Economic Zones in Africa: Operational Challenges and Policy Lessons*; UNIDO: Vienna, Austria, 2024.
7. United Nations Conference on Trade and Development (UNCTAD). *Economic Development in Africa Report 2021: Reaping the Potential Benefits of the African Continental Free Trade Area*; UNCTAD: Geneva, Switzerland, 2021.
8. World Bank. *Kenya Special Economic Zones Performance Review*; World Bank Group: Washington, DC, USA, 2024.
9. Kenya National Bureau of Statistics (KNBS). *Economic Survey 2024*; KNBS: Nairobi, Kenya, 2024.
10. Du, J.; Wu, F.; Zhao, X. Infrastructure financing and capital structure in special economic zones. *J. Corp. Financ.* 2018, 50, 449–464.
11. Garcia-Bernabeu, A.; Mayor-Vitoria, F.; Mas-Verdú, F. Financing infrastructure projects: Risk allocation and sustainability implications. *Technol. Forecast. Soc. Change* 2015, 97, 54–65.
12. Van der Byl, C.A.; Slawinski, N. Embracing tensions in corporate sustainability: A review and research agenda. *Organ. Environ.* 2018, 31, 215–240.
13. Oqubay, A.; Lin, J.Y.; Cramer, C.; Tregenna, F. *The Oxford Handbook of Industrial Policy*; Oxford University Press: Oxford, UK, 2020.
14. Wang, J.; Zhang, B.; Wu, Y. Public participation, governance quality, and special economic zone performance. *World Dev.* 2020, 128, 104857.
15. Frick, S.A.; Grimm, M.; Knorringer, P. Institutional quality, investment determinants, and sustainability in special economic zones. *World Dev.* 2023, 162, 106102.
16. Mwazighe, K. Industrial policy, special economic zones, and sustainable development in Kenya. *Afr. Dev. Rev.* 2023, 35, 412–426.
17. Wei, M.; Wang, Y.; Giamporcaro, S. The impact of ownership structure on environmental information disclosure: evidence from China. *J. Environ. Manag.* 2024, 352, 120100.
18. Xiao, Y.; Lin, M.; Wang, L. Impact of green digital finance on sustainable development: evidence from China's pilot zones. *Financ. Innov.* 2024, 10, 10..
19. Creswell, J.W.; Creswell, J.D. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 6th ed.; SAGE: Thousand Oaks, CA, USA, 2023.

20. Taherdoost, H. What is the best response scale for survey and questionnaire design; review of different lengths of rating scale/attitude scale/Likert scale. *Int. J. Acad. Res. Manag.* 2022, *11*(1), 1–10.
21. Watkins, M.W. Exploratory factor analysis: A guide to best practice. *J. Black Psychol.* 2023, *49*(3), 219–246.
22. Hair, J.F.; Hult, G.T.M.; Ringle, C.M.; Sarstedt, M. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 3rd ed.; Sage: Thousand Oaks, CA, USA, 2022.
23. Kim, H.Y. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restor. Dent. Endod.* 2013, *38*(1), 52–54.
24. Wooldridge, J.M. *Introductory Econometrics: A Modern Approach*, 7th ed.; Cengage Learning: Boston, MA, USA, 2020.

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