Empirical Influence of Social Acceptance Risks on the Performance of Public-Private Partnership Renewable Energy Projects in Kenya

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ABSTRACT

Public-private partnerships (PPPs) are widely considered a prudent response to the problem of limited public funding in energy infrastructure development. However, social acceptance risks represent a major inhibiting factor that negatively affects the performance and subsequent financing of renewable energy projects. This study investigated how social acceptance risks influence the performance of PPP renewable energy projects in Kenya, focusing specifically on geothermal energy projects. Steered by a pragmatic paradigm, the research integrates a quantitative survey of institutional project managers (N = 207, 78.7% response rate) with qualitative Key Informant Interviews (KIIs = 12) and Focus Group Discussions (FGDs = 6) across host pastoralist communities, civil society representatives, and local land administration committees. Linear regression modeling reveals that social acceptance risks exert a statistically significant negative influence on project performance, $F(1, 205) = 96.135$, $p < 0.001$, accounting for 31.9% of performance variance ($R^2 = 0.319$; $\beta = -0.562$). A gap analysis comparing institutional survey metrics with community qualitative data reveals severe perception asymmetries: public-sector managers under-indexed the risk of baseline informational vacuums (Mean = 2.478) and procedural exclusion (Mean = 2.551), whereas host communities identified top-down consultation, opaque land valuation under the Community Land Act, and unmitigated socio-environmental disruptions as primary drivers of localized hostility. The study concludes that neglecting grassroots social license mechanisms converts manageable operational challenges into structural institutional gridlocks. Recommendations advocate for embedding legally binding, participatory governance protocols, transparent land valuation auditing, and institutionalized benefit-sharing frameworks into early-stage PPP procurement.

Keywords: Public-Private Partnerships (PPP), Social Acceptance Risks, Geothermal Renewable Energy, Multi-Stakeholder Triangulation, Perception Gap Analysis, Olkaria Complex, Stakeholder Theory.

INTRODUCTION

The realization of sustainable macroeconomic growth in developing economies is intrinsically tethered to the quality, reliability, and scale of their public infrastructure networks. Historically, the provision of large-scale infrastructure—ranging from transportation corridors to energy grids—has been the exclusive domain of the state. However, contemporary fiscal realities, characterized by widening sovereign debt margins, budgetary deficits, and competing public sector expenditures, have severely constrained direct state-funded capital investments. To bridge this infrastructural deficit without exacerbating macro-fiscal vulnerabilities, governments globally have increasingly pivoted toward Public-Private Partnerships (PPPs) (Babatunde et al., 2021;Osei-Kyei & Chan, 2018).

Conceptually, a PPP represents a long-term, legally binding contractual governance structure where project risks, responsibilities, and rewards are strategically allocated between public and private actors based on their respective comparative advantages. The private counterparty injects financial agility, entrepreneurial dynamism, managerial expertise, and cutting-edge technical innovation, while the public entity provides regulatory anchor, social legitimacy, and macro-policy stewardship. Empirically, project risk allocation must align with the stakeholder best positioned to absorb and mitigate that specific vector, safeguarding structural efficiency throughout the project lifecycle (Osei-Kyei & Chan, 2018).

In the global energy landscape, PPPs have emerged as a primary mechanism for financing capital-intensive renewable energy infrastructure. This transition is heavily driven by international climate mandates, such as the Paris Agreement and United Nations Sustainable Development Goal 7 (Affordable and Clean Energy) (Eberhard et al., 2016; Eberhard et al., 2017). Project financing within these frameworks typically relies on project-finance structures utilizing Special Purpose Vehicles (SPVs). These ring-fenced legal entities are insulated from the balance sheets of both the parent private corporations and the host government, leveraging high debt-to-equity ratios. Capital expenditure (CapEx) amortization and operational returns are subsequently secured through long-term Power Purchase Agreements (PPAs) with state off-takers or structured user-fee collection frameworks (Eberhard et al., 2016). This dynamic allows essential public development to circumvent the immediate balance-sheet constraints of host nations.

Despite the theoretical robustness of PPP models, empirical literature indicates that infrastructure delivery is frequently plagued by systemic performance bottlenecks (Babatunde et al., 2021). While early-generation PPP scholarship heavily concentrated on physical, commercial, and financial risk vectors—such as macroeconomic fluctuations, construction delays, and interest rate volatility—modern project management discourse highlights a shift toward non-technical operational vulnerabilities. Among these, social acceptance risk has emerged as a critical, yet under-researched, determinant of project performance (Wüstenhagen et al., 2007).

Social acceptance risk encapsulates the level of friction, resistance, or endorsement a project encounters from host communities and local stakeholders (Wüstenhagen et al., 2007). In the context of renewable energy—particularly geothermal extraction—social acceptance is not merely a peripheral ethical consideration; it is a core operational risk. Geothermal developments are highly place-bound, capital-dense, and ecologically invasive during their exploration and drilling phases, often requiring extensive land acquisition, involuntary resettlement, and resource reallocation (Mariita, 2002). Consequently, a lack of local alignment frequently culminates in public protests, litigation, project suspension, and severe cost overruns, fundamentally undermining the contractual and financial viability of the underlying PPP framework (Koissaba, 2018; Sovacool et al., 2023).

Global, Regional, and Local Context

Globally, the friction between renewable energy infrastructure deployment and localized social acceptance is well-documented. Scholars note that even in developed markets with robust regulatory frameworks, green energy projects encounter severe NIMBYism ('Not In My Back Yard') and systemic pushback when local communities perceive an asymmetrical distribution of risks and benefits (Komendantova & Battaglini, 2019). For instance, wind and solar arrays across the European Union and North America have frequently faced legal injunctions due to landscape preservation claims and perceived marginalization of community consultations (Komendantova & Battaglini, 2019; Wüstenhagen et al., 2007).

Regionally, sub-Saharan Africa faces a monumental infrastructure funding gap. Sub-Saharan economies require substantial annual investments to achieve universal energy access, a deficit increasingly addressed via Independent Power Producer (IPP) frameworks and PPPs (Eberhard et al., 2016; Eberhard et al., 2017). However, regional execution is often complicated by complex land tenure systems, historical marginalization of indigenous communities, and weak institutional frameworks for community engagement, turning social alignment into a volatile operational wildcard (Sovacool et al., 2023).

Locally, Kenya stands out as a regional pioneer in renewable energy diversification, guided by its Vision 2030 economic blueprint. The country's energy policy heavily prioritizes geothermal energy, managed primarily via the Kenya Electricity Generating Company Limited (KenGen) within the geologically active Rift Valley region. As the country strives to meet an escalating industrial electricity demand requiring substantial annual capital investments, private capital enrollment via PPPs is imperative (Osei-Kyei & Chan, 2017; Schilling et al., 2018). However, these geothermal fields are deeply embedded within sensitive socio-ecological landscapes, often inhabited by indigenous pastoralist communities. This geographical and cultural intersection makes Kenyan geothermal PPPs highly susceptible to social acceptance risks, where communication gaps or misaligned benefit-sharing models can lead to costly operational disruptions (Koissaba, 2018; Mariita, 2002).

Problem Statement

Despite the strategic deployment of Public-Private Partnerships (PPPs) to mitigate Kenya's energy infrastructure financing deficit, the operational performance of these renewable energy projects remains highly volatile (Osei-Kyei & Chan, 2017; Schilling et al., 2018). Traditional risk management frameworks deployed by public entities like KenGen and their private counterparties have systematically over-indexed on financial, technical, and macroeconomic risk variables. Concurrently, they have marginalized non-technical operational vulnerabilities—specifically social acceptance risks (Schilling et al., 2018).

The fundamental problem is that while geothermal PPP projects may be financially viable on paper and technically sound in design, they consistently encounter severe execution bottlenecks, protracted litigations, costly schedule overruns, and localized hostility (Koissaba, 2018). This resistance stems from perceived socio-economic marginalization, inadequate community engagement, land tenure disputes, and asymmetrical benefit-sharing arrangements (Mariita, 2002). When local communities perceive that public-private structures exploit indigenous resources without generating localized equity, structural gridlocks occur (Sovacool et al., 2023).

Existing empirical literature demonstrates a significant conceptual and contextual gap. The vast majority of PPP performance studies focus on transportation and waste-management infrastructure within developed economies, leaving the socio-political dynamics of capital-intensive renewable energy projects in East Africa largely under-theorized (Babatunde et al., 2021; Sovacool et al., 2023). By failing to systematically measure how local community resistance, cultural friction, and trust deficits translate into quantifiable project delays and financial losses, project managers lack empirically validated frameworks to de-risk these investments. This study directly addresses this gap by investigating the empirical influence of social acceptance risks on the performance of public-private partnership renewable energy projects within KenGen's portfolio in Kenya.

Research Objectives & Hypothesis

The primary objective of this study is to empirically investigate the influence of social acceptance risks on the performance of public-private partnership (PPP) renewable energy projects in Kenya.

H0: There is no statistically significant empirical influence of social acceptance risks on the performance of public-private partnership (PPP) renewable energy projects in Kenya.

Significance of the Study

The empirical insights generated by this study offer vital theoretical and practical contributions across the renewable energy ecosystem. For public policy makers and government agencies—including the Kenyan Ministry of Energy, the National Treasury's PPP Directorate, and KenGen—this research delivers a data-driven framework essential for refining infrastructure procurement, designing socially sustainable bidding documents, and formalizing stakeholder participation guidelines (Osei-Kyei & Chan, 2017). Beyond state actors, the study equips private investors, institutional financiers, and SPV managers with a granular understanding of non-technical risk profiles within the Kenyan energy market. This commercial utility enables accurate risk pricing and the mitigation of costly operational delays prior to capital deployment (Schilling et al., 2018). Concurrently, this inquiry carries profound implications for host communities and civil society by championing the integration of local voices into project designs, providing the empirical leverage needed to advocate for institutionalized, equitable benefit-sharing models over ad-hoc corporate social responsibility initiatives (Koissaba, 2018; Sovacool et al., 2023). Finally, this study fosters critical academic advancement by bridging a localized literature gap regarding infrastructure delivery in sub-Saharan Africa, ultimately expanding the analytical boundaries of Project Management and Stakeholder Theories through rigorous social risk quantification.

Scope of the Study

This study investigated the empirical relationship between social acceptance risk parameters and Public-Private Partnership (PPP) project performance metrics across active geothermal facilities in Nakuru County's Olkaria Geothermal Complex. To achieve methodological triangulation and eliminate bias, the research spanned two analytical strata. The institutional public-sector stratum collected organizational appraisals, risk protocols, and performance metrics from 207 KenGen management staff. The community and civil society stratum evaluated grassroots perspectives, land grievances, and consultation experiences through 12 Key Informant Interviews with local administrators, Community Land Management Committee leaders, and civil society actors, alongside six Focus Group Discussions with pastoralists. Temporally, the study covered project execution, resettlement, and operational monitoring data.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

This study is theoretically grounded in Stakeholder Theory, pioneered by Freeman (1984), which conceptualizes an organization or complex project as an interconnected network of internal and external groups whose interests, expectations, and operational capabilities directly influence overall performance. Within the lifecycle of a renewable energy Public-Private Partnership (PPP), stakeholders are highly diverse and structurally characterized by asymmetric information, varying risk appetites, and divergent motivations. The classical Principal-Agent dynamic is prominent within this framework: the public sector operates as the principal contracting the private expert agent, and both actors must navigate an expansive socio-technical ecosystem that includes financiers, engineers, regulatory authorities, and, crucially, the host community (Osei-Kyei & Chan, 2018). Stakeholder Theory underscores that long-term project success is inherently dependent on the strategic management of these social interactions. Consequently, any severe misalignment of community values, poorly structured grievance redress mechanisms, or asymmetric communication flows will inevitably generate localized resistance, causing severe information friction, moral hazards, and adversarial socio-political mobilization that threatens project continuity.

Proponents of Stakeholder Theory in mega-infrastructure development argue that external stakeholder integration should be treated as a necessary, proactive risk-mitigation strategy rather than a peripheral or discretionary corporate social responsibility (CSR) obligation. Scholars such as Mok et al. (2015) assert that because mega-projects operate within highly visible and sensitive socio-political spheres, the instrumentalities of stakeholder salience—namely power, legitimacy, and urgency—must be carefully balanced to prevent systemic operational gridlocks. In the specific realm of capital-intensive PPPs, empirical studies by Ng et al. (2019) demonstrate that early, transparent engagement with local community stakeholders establishes a critical 'social license to operate' (SLO). This informal yet powerful license dramatically reduces the transactional costs of contract enforcement, asset protection, and legal disputes. By systematically addressing local expectations, project vehicles convert potential external disruptors into collaborative long-term partners, reinforcing the institutional stability required to successfully amortize multi-decade capital expenditure investments (Osei-Kyei & Chan, 2018).

Conversely, a robust counter-narrative within neoclassical economic and project management literature challenges the universal applicability of Stakeholder Theory to infrastructure efficiency. Adhering strictly to the classical property-rights paradigm, Jensen (2001) argues that over-indexing on multi-stakeholder satisfaction creates a condition of 'politicized management,' wherein project executives face deeply conflicting, unquantifiable, and shifting objectives. Within the rigid contractual and financial architecture of a PPP, attempts to maximize local stakeholder utility often result in extensive 'scope creep,' which introduces severe fiscal instability and cost overruns into the Special Purpose Vehicle (SPV) model. Furthermore, Flyvbjerg (2014) contends that severe project delivery bottlenecks and delays are primarily driven by technical, political, and financial 'strategic misrepresentation' and 'optimism bias' among elite institutional actors, rather than localized community resistance. From this critical perspective, focusing heavily on community concerns misidentifies the true root cause of project failure, which instead stems from the structural underestimation of capital costs and the systematic overestimation of long-term operational revenues by the principal and agent during the initial planning phases (Flyvbjerg, 2014; Jensen, 2001). Ultimately, this theoretical tension highlights the necessity of empirically testing how social acceptance risks actively interface with the contractual and performance metrics of Kenyan renewable energy PPPs, allowing this study to bridge the gap between stakeholder management and neoclassical economic efficiency.

Review of Empirical Literature on Social Acceptance Risks

Renewable energy infrastructure heavily alters the socio-spatial, environmental, and economic matrices of host communities. Although renewable energy receives broad macroeconomic and socio-political endorsement, actual project delivery frequently encounters localized resistance—a phenomenon conceptually defined as the Not-In-My-Backyard (NIMBY) syndrome (Wüstenhagen et al., 2007).

Social acceptance risks are inherently multidimensional, spanning socio-political, market, and community spheres. Empirical studies show that high levels of social acceptance are positively correlated with participatory planning, symmetric communication, and equitable socio-economic alignment. Conversely, when projects fail to fulfill the normative values or livelihood expectations of host communities, localized resistance manifests through litigation, political agitation, or direct civil disruption. Recent global evidence emphasizes that relative to traditional procurement models, low-carbon and climate-resilient partnerships operate within a vast network of unique stakeholders, meaning that their ultimate performance metrics are increasingly defined by social acceptance and procedural transparency rather than technical benchmarks alone (Casady et al., 2024).

The nature of this resistance often varies across modalities, as different renewable energy systems face specific socio-technical opposition. For instance, wind power projects face scrutiny regarding noise levels, aesthetic disruption, and local ecological impacts, while large-scale hydropower projects trigger resistance due to forced resettlement and altered river biodiversity (Sovacool et al., 2023). Geothermal projects, while highly stable, introduce perceived risks regarding land-use disruption, environmental emissions, and structural land stability (Mariita, 2002). Real-world precedents underscore the severity of these dynamics; the Bujagali hydropower project in Uganda faced execution delays due to socio-environmental pushback (Eberhard et al., 2016; Eberhard et al., 2017), while the Kinangop Wind Park project in Kenya was completely abandoned due to unresolved community concerns, land disputes, and informational vacuums (Lemaire & Price, 2017; Schilling et al., 2018). This highlights that social acceptance risk must be rigorously managed as a core metric within project due diligence frameworks, particularly since capital-intensive green mega-projects frequently alter household livelihoods by restricting access to natural resources like land and water, thereby triggering local resistance.

A significant body of peer-reviewed empirical literature further affirms this necessity, confirming that mismanaging community acceptance functions as a definitive catalyst for project failure. Komendantova and Battaglini (2019) investigated renewable energy transitions in developing contexts and determined that technical and financial feasibility are entirely subordinate to localized socio-political risks. Their empirical analysis showed that cost overruns are directly linked to procedural injustices—specifically, top-down communication styles that alienate indigenous populations. In sub-Saharan Africa, Sovacool et al. (2023) examined green mega-projects and documented how land acquisition missing transparent compensation models converts local land tenure systems into volatile risk factors. Within Kenya specifically, Koissaba (2018) established that geothermal exploration by KenGen in the Olkaria fields frequently intersected with Maasai pastoralist land rights. This study demonstrated that when community consultations are viewed as merely a regulatory checkbox rather than a deep partnership, it results in expensive litigation and physical blockades of drilling fields, directly degrading project performance and timeline adherence. This top-down corporate approach fundamentally disrupts meaningful localized engagement, reinforcing the critical need for integrative participatory governance models that combine Corporate Social Responsibility (CSR) mechanisms with structural PPP contracts to eliminate societal grievances over asset delivery.

In contrast, an alternative body of empirical research suggests that social acceptance risks are often overemphasized or function merely as symptoms of much deeper institutional and macroeconomic defects. Eberhard et al. (2017) argue that localized community resistance is rarely a standalone cause of project failure; rather, it is a lagging indicator of poor macro-policy design and regulatory insolvency by the state. In their analysis of public procurement frameworks, research indicates that if state entities provide ironclad, legally backed sovereign guarantees and comprehensive political risk insurance (PRI) to the private concessionaire, localized disruptions fail to impact the SPV's ultimate financial performance or internal rate of return (IRR). Additionally, a study by Akrofi and Okitasari (2022) on African utility-scale transitions suggests that technological variables—such as grid absorption capacity, baseline resource volatility, and currency devaluation—exert a statistically higher magnitude of influence on project performance variance than community-level friction. Consequently, this school of thought posits that while social acceptance risks are highly visible and politically sensitive, dedicating scarce capital to mitigate them yields a lower marginal return on project performance than optimizing macro-commercial risk insulation.

RESEARCH METHODOLOGY

This study adopted a pragmatic research paradigm, enabling the operational integration of both descriptive and correlational survey research designs within a mixed-methods structural framework. The macro target population comprised 2,407 institutional employees of the Kenya Electricity Generating Company Limited (KenGen). To maintain localized construct validity, the target population was strictly narrowed to 769 employees directly assigned to geothermal renewable energy projects in Kenya. To capture structural variations across organizational hierarchies, the population was stratified into three distinct socio-technical layers: 98

senior managers, 259 middle-level managers, and 412 lower-level managers.

Applying the Yamane sample selection formula, $n = N / [1 + N(e)^2]$, where $N = 769$ and the precision level $e = 0.05$, a statistically representative sample size of 263 respondents was derived. Stratified random sampling was executed to distribute the sample proportionally across the organizational layers. Primary quantitative data was generated via structured, five-point Likert-scale self-administered questionnaires, which were pre-tested through a pilot study involving 27 randomly selected employees at KenGen's Western Hydro facility to establish tool reliability. The statistical reliability testing yielded a robust Cronbach's Alpha coefficient of 0.850, confirming strong internal tool consistency. The field data collection achieved an effective return rate of 78.7%, with 207 questionnaires fully completed and returned for formal statistical processing.

Table 1: Sampling Frame and Questionnaire Response Rates Staff Stratum

	Target Population (N)	Sample Target (n)	Responsive Sample (n)	Stratum Proportion (%)
Senior Management	98	33	21	10.1%
Middle-Level Management	259	88	76	36.7%
Lower-Level Management	412	141	110	53.1%
Total	**769**	**263**	**207**	**100.0%**

To achieve methodological triangulation and eliminate single-source bias, the analytical framework encompassed two complementary strata: an institutional public-sector stratum and a community/civil society stratum. The temporal boundary covered project execution, resettlement, and operational monitoring data.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

The operational metrics of the independent variable (Social Acceptance Risks) were evaluated utilizing item-level mean scores and standard deviations calibrated against an equidistance scale interval rule of 0.8 (Not at all: 1.0–1.8; Small extent: 1.8–2.6; Moderate extent: 2.6–3.4; Large extent: 3.4–4.2; Very large extent: 4.2–5.0). The empirical metrics are detailed in Table 2.

Table 2: Perceptions on Social Acceptance Risk Factors

RISK EVALUATION PARAMETER STATEMENT (N = 207)	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	MEAN	STD. DEV
1. Socioeconomic position of society contributes to project support.	2.9%	69.1%	11.6%	13.0%	3.4%	2.4493	0.8792
2. Community education status enhances local project backing.	2.4%	54.1%	17.4%	12.1%	14.0%	2.8116	1.1356
3. Low project awareness triggers immediate local rejection.	1.0%	73.4%	2.4%	23.2%	0.0%	2.4783	0.8580

4. Community indifference stems from structural awareness deficits.	5.8%	44.9%	22.2%	17.9%	9.2%	2.7971	1.0916
5. General project acceptance is dependent on community participation.	7.2%	55.5%	15.5%	18.4%	3.4%	2.5507	0.9834
6. Absolute lack of participation causes local project rejection.	16.4%	35.4%	28.0%	13.0%	7.2%	2.5942	1.1276
7. Environmental pollution is a severe channel of local conflict.	1.0%	52.2%	19.8%	16.9%	10.1%	2.8309	1.0545
8. Agitation by local environmental action groups delays timelines.	1.9%	53.1%	9.7%	34.3%	1.0%	2.7923	0.9756
9. Resettlement compensation issues take excessive time to resolve.	0.5%	48.3%	0.5%	45.4%	5.3%	3.0676	1.0817
10. Displaced community members report no compensation friction.	1.4%	42.5%	28.0%	16.5%	11.6%	2.9420	1.0551
COMPOSITE MATRIX METRIC SUMMARY						**2.7314**	**0.7296**

Note: Scale definitions: 1 = Not at all, 2 = Small extent, 3 = Moderate extent, 4 = Large extent, 5 = Very large extent.

The descriptive analysis revealed an aggregate composite mean score of 2.7314 (***SD = 0.7296***), demonstrating that the institutional respondents moderately agreed that social acceptance risk constructs exert an important operational influence on Public-Private Partnership (PPP) performance. Statement 1 ("Socioeconomic position") posted a mean of 2.4493, which falls below the composite mean baseline, indicating that the low baseline socioeconomic status of the surrounding community negatively restrains project absorption capacity. Conversely, community educational advancement (Statement 2, ***M = 2.8116***) showed a positive relationship with project support, confirming that formal education reduces asymmetric friction and enhances the absorption rate of renewable innovations.

Awareness and participation dynamics emerged as critical drivers of project risk. Low baseline awareness levels (Statement 3, ***M = 2.4783***) were strongly linked to community pushback, which indicates that informational deficits generate risk. Community participation parameters (Statement 5, ***M = 2.5507***, and Statement 6, ***M = 2.5942***) fell below the composite average, highlighting that inadequate public engagement acts as a primary institutional vulnerability. Environmental friction (Statement 7, ***M = 2.8309***) and environmental advocacy group resistance (Statement 8, ***M = 2.7923***) both exceeded the composite baseline, confirming that localized environmental degradation concerns significantly disrupt project delivery timelines. Finally, land resettlement and property compensation issues generated the highest risk scores (Statement 9, ***M = 3.0676***), illustrating that delays in financial and land settlement are major drivers of non-technical project delays.

Contextualization and Literature Justification of Descriptive Findings

The empirical findings obtained from the descriptive analysis find strong corroboration within contemporary socio-technical literature, while simultaneously showing nuanced divergence from certain traditional economic paradigms. The composite mean score (M = 2.7314) reinforces the conceptual framework popularized by Wüstenhagen et al. (2007), which identifies community acceptance as an equal and often more volatile pillar of renewable energy execution than market or socio-political acceptance. In the context of East Africa, and Kenya specifically, this moderate-to-high risk profile matches the historical trajectory of major capital investments.

The findings regarding the socioeconomic position (M = 2.4493) and education status (M = 2.8116) align cleanly

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with empirical observations across African infrastructure transitions (Akrofi & Okitasari, 2022; Upham et al., 2015). These scholars observe that rural communities adjacent to large-scale greenfield investments (such as geothermal fields in Naivasha or wind farms in northern Kenya) often possess restricted techno-economic absorption capacities. A low socioeconomic baseline limits immediate localized economic windfalls, transforming local community expectations into structural frustration. Conversely, the higher risk response for community education status underscores the findings of Upham et al. (2015), who demonstrate that higher community literacy rates lower information asymmetry, enabling developers to engage in structured negotiations rather than encountering generalized anxiety and defensive hostility.

However, a notable body of literature contrasts with these findings. Scholars such as Batel (2020) and Devine-Wright (2014) argue against the 'deficit model,' which attributes community resistance solely to a lack of education or socio-economic backwardness. They contend that local opposition is frequently a rational, place-protective response to corporate intrusion rather than an intellectual failure or a symptom of low educational status. This viewpoint suggests that framing local opposition as an educational deficit overlooks deeper structural disparities in how benefits are distributed within PPP architectures.

The low participation metrics (M = 2.5507 and M = 2.5942) and the significant impact of informational deficits (M = 2.4783) provide an empirical mirror to one of Kenya's most visible infrastructure challenges: the cancellation of the Kinangop Wind Park Project. As documented by Lemaire and Price (2017) and Schilling et al. (2018), the fatal vulnerability of the Kinangop project was a top-down informational vacuum and tokenistic community engagement, which exactly matches the low scores and structural vulnerabilities identified in Statements 5 and 6 of this study. This pattern is further corroborated by the global meta-analysis of Osei-Kyei and Chan (2015), which ranks effective public management and stakeholder consensus as the foremost critical success factors in multi-stakeholder PPPs.

The high risk values assigned to resettlement compensation (M = 3.0676) and environmental friction (M = 2.8309) are corroborated by complex land tenure dynamics in Kenya. Under the Community Land Act of 2016, land is intricately tied to indigenous identity and communal livelihood. The findings match the work of Koissaba (2018) and Schilling et al. (2018) regarding Kenyan energy projects, where protracted legal and community battles emerged over the acquisition of communal land. The high mean score for Statement 9 confirms that land compensation remains the primary non-technical bottleneck for infrastructure execution in Kenya.

In contrast, international literature from fully institutionalized economies (e.g., Zhao et al., 2021) often demonstrates that in countries with mature, digitized land title regimes and automated compensation legal paths, land acquisition risks rank lower than financial market volatility or regulatory tariff revisions. This variance highlights that social acceptance risks are highly sensitive to local institutional contexts, with land and environmental grievances acting as primary amplifiers of project failure within developing nations.

Inferential Statistical Analysis and Hypothesis Testing

To quantify the empirical relationship, a linear regression analysis was executed with social acceptance risks operationalized as the predictor variable and PPP project performance as the dependent outcome metric. The mathematical model was defined as:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Table 3: Regression Modeling Output Matrix

MODEL SUMMARY				
MODEL	**R**	**R SQUARE**	**ADJUSTED R SQUARE**	**STD. ERROR OF THE ESTIMATE**
1	0.565[a]	0.319	0.316	0.23294

ANALYSIS OF VARIANCE (ANOVA[A])				
MODEL	**SUM OF SQUARES**	**DF**	**MEAN SQUARE**	**F (SIG.)**
1 Regression	5.216	1	5.216	96.135 (0.000[b])
Residual	11.123	205	0.054	
Total	16.340	206		
REGRESSION COEFFICIENTS[A]				
MODEL VECTOR ELEMENT	**UNSTANDARDIZED COEFFICIENTS**		**STANDARDIZED COEFF.**	**T (SIG.)**
	B	**STD. ERROR**	**BETA**	
1 (Constant)	0.790	0.033		23.720 (0.000)
Social Acceptance Risks	-0.562	0.057	-0.565	-9.805 (0.000)

[a] Dependent Variable: Performance of Public-Private Partnerships.

[b] Predictors: (Constant), Social Acceptance Risks. Collinearity Diagnostics: Tolerance = 1.000; VIF = *1.000.*

The inferential modeling output demonstrated a strong correlation between the variables (***r = 0.565***). The coefficient of determination (***R² = 0.319***) established that social acceptance risk factors account for approximately 31.9% of the variance in the performance of PPP renewable energy projects in Kenya. The overarching analysis of variance was highly significant, ***F(1, 205) = 96.135***, ***p < 0.001***, providing strong statistical justification to reject the null hypothesis (H_0) and adopt the alternative hypothesis. Thus, social acceptance risks significantly influence the performance metrics of PPP renewable energy investments.

The unstandardized regression coefficient for social acceptance risks was negative and statistically significant ($\beta_1 = -0.562$, ***t = -9.805***, ***p < 0.001***). This indicates that a one-unit increase in unmitigated social acceptance risk leads to a 0.562-unit drop in the performance efficiency of a PPP project. The collinearity diagnostics (***Tolerance = 1.000***, ***VIF = 1.000***) verified the structural stability of the single-predictor model, confirming that the negative impact of localized opposition, informational isolation, and compensation friction directly degrades operational performance metrics, leading to schedule delays and budget inflation.

The inferential results provide empirical confirmation of the severe penalties that social friction imposes on infrastructure performance. The finding that social acceptance risks account for 31.9% of the performance variance (***R² = 0.319***) and the significant negative coefficient ($\beta_1 = -0.562$) match the contemporary literature on project management and infrastructure economics in emerging markets. For instance, Sovacool et al. (2020), in an expansive global evaluation of energy infrastructure projects, discovered that non-technical risks—specifically social and environmental friction—surpassed procurement and technical errors as the primary drivers of cost overruns and operational delays.

The negative slope coefficient ($\beta_1 = -0.562$) is supported by the Transaction Cost Economics (TCE) framework applied to large-scale projects (Williamson, 1998; Winch, 2001). When community resistance, environmental friction, or compensation disputes occur, the project's transaction costs increase. In a PPP context, these costs appear as legal fees, prolonged security expenditures, idle machinery costs, and interest during extended construction phases.

This dynamic is visible in the Kenyan context; as demonstrated by detailed studies on Olkaria's geothermal expansions (Koissaba, 2018), unmitigated social friction over community relocation directly compromised project schedules, converting expected returns into losses for private concessionaires and public entities alike.

Conversely, a distinct stream of literature offers a *contrasting* perspective regarding the explanatory dominance of social variables. Traditional corporate finance and infrastructure economic models (e.g., Flyvbjerg, 2014; Osei-Kyei & Chan, 2017) frequently argue that project performance variance is fundamentally explained by economic and technical parameters, such as macroeconomic inflation, currency conversion fluctuations, incorrect geological mapping, and engineering design defects.

These authors suggest that while social acceptance risks are real, their statistical significance often absorbs variance that actually stems from poor initial feasibility assessments or political rent-seeking.

Furthermore, some scholars in institutional theory (e.g., Ng et al., 2012) present an alternative interpretation of the negative beta coefficient. They suggest that the negative impact of social acceptance risks is not an inherent attribute of community interactions, but rather an indicator of weak institutional frameworks within the host government.

From this perspective, if the public partner in a PPP establishes clear, predictable land acquisition policies and robust statutory social safety nets prior to procurement, the private investor is insulated from community friction. Therefore, the negative coefficient ($\beta_1 = -0.562$) can be interpreted as an empirical reflection of institutional gaps in the state's role as negotiator, rather than an unresolvable conflict between community preservation and clean energy expansion.

Multi-Stakeholder Triangulation & Perception Gap Analysis

By triangulating the quantitative survey responses from KenGen staff with qualitative insights from host-community KIIs and FGDs, a critical **institutional perception gap** emerges across key operational domains:

Table 4: Multi-Stakeholder Perception Gap Analysis

Risk Dimension	Institutional Perspective (KenGen Staff Survey)	Community & Civil Society Perspective (KIIs & FGDs)	Analytical Triangulation Synthesis
Project Awareness & Information Flow	Rated as a low-to-moderate risk driver (***M* = 2.4783**). Staff perceive public sensitization campaigns as sufficient.	FGDs report severe informational vacuums, noting that technical disclosures are presented in non-native languages and high-level legal jargon.	**Asymmetric Information:** Public managers view awareness as a procedural checkbox, whereas host communities experience structural exclusion.
Community Participation Depth	Participation metrics scored below composite average (***M* = 2.5507**), viewed as an administrative overhead.	Community leaders emphasize "tokenistic consultation" where local inputs fail to influence pipeline routing or plant placement.	**Procedural Injustice:** Lack of shared decision-making transforms community sentiment from passive apathy into active obstructionism.
Resettlement & Land Rights	Identified as the highest operational risk (***M* = 3.0676**), but attributed mainly to bureaucratic delays.	KIIs highlight historical land grievances, unfulfilled communal compensation promises, and land tenure insecurity under the Community Land Act.	**Core Conflict Driver:** Both strata validate land as the primary operational bottleneck, but community data reveals deep structural trust deficits.
Environmental & Livelihood Impact	Environmental friction scored moderately (***M* = 2.8309**), framed as managed ecological compliance.	Pastoralists express deep anxieties regarding hydrogen sulfide emissions, acoustic disruption, and restricted access to traditional grazing corridors.	**Livelihood Disruption:** Physical footprint directly alters pastoralist survival mechanisms, fueling localized protests.

In capturing the operational dynamics on the ground, respondents highlighted significant breakdown in public participation and institutional transparency:

"*The company representatives come to meetings with pre-signed maps and technical terms. They ask us to agree to things that take away our ancestral grazing routes without offering permanent legal land titles or direct energy access to our manyattas. That is not consultation; that is a directive."*

— **Key Informant 02, Civil Society Representative**

"These company people only think about monetary compensation and project deadlines, but for us, this land is our life and our home. They promise us title deeds and relocation assistance, but all these remain unfulfilled. They simply continue working on the projects as if nothing has been raised."

— **Key Informant 03, Pastoralist Community Leader**

"These project officers come with notebooks filled with complex English and legal jargon that we cannot understand. They claim they are coming to consult with us, but in reality, they are simply informing us where they will install their equipment. When we ask how our livestock will access grazing land, they merely show us maps that do not make sense to us."

— **Key Informant 04, Community Land Management Committee Representative, Naivasha**

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The empirical evidence synthesized in this study definitively demonstrates that social acceptance risks do not merely constitute external externalities, but rather function as core deterministic variables impacting the structural performance, operational timeline, and financial stability of public-private partnership (PPP) renewable energy projects in Kenya. By validating the critical intersections between localized community dynamics and infrastructure delivery, the findings confirm that the asset performance of green energy mega-projects is intrinsically bound to the socio-political endorsement of host communities. Methodologically, the study illustrates that systematic deficits in early stakeholder engagement, asymmetric information dissemination, perceived ecological threats, and protracted, non-transparent resettlement compensation workflows coalesce to generate acute socio-political friction. This friction culminates in severe operational bottlenecks, transaction cost inflation, and contractual gridlocks—as empirically exemplified by the historic abandonment of the Kinangop Wind Farm and the prolonged litigations within KenGen’s Olkaria geothermal fields. Ultimately, the study concludes that neglecting the micro-level socio-economic expectations of host populations undermines the macro-level viability of renewable energy investments, shifting the risk profile from manageable technical challenges to catastrophic institutional failures.

Policy and Managerial Recommendations

To mitigate these systemic vulnerabilities and align Kenyan infrastructure procurement with high-level international benchmarks, this study advocates for a paradigm shift from traditional, top-down technocratic mandates toward a highly integrative, "People-First" PPP framework. First, state agencies and private concessionaires must operationalize mandatory participatory planning protocols by embedding structured, legally binding community engagement mechanisms deep within the pre-feasibility and bidding phases of the project lifecycle, thereby aligning commercial objectives with indigenous socio-spatial values. Second, project special purpose vehicles (SPVs) must institute institutionalized, symmetric communication frameworks that employ culturally resonant, transparent outreach channels to eradicate information asymmetries, alleviate public apprehension, and clearly articulate the localized, multi-decade socio-economic return on investment. Third, the National Treasury's PPP Directorate and localized authorities must reform land tenure transitions through proactive compensation protocols; this requires streamlining land valuation metrics and property resettlement procedures via independent, third-party auditing bodies to eliminate the bureaucratic delays and historical injustices that typically fuel community displacement disputes. Finally, project developers must cultivate comprehensive environmental compliance systems by co-designing joint sustainability and localized monitoring initiatives with host community representatives, thereby proactively neutralizing anxieties surrounding ecological disruption and structural land stability while securing a resilient, long-term social license to operate.

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