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Governance Mechanisms and Performance of the Peat Power Plant Project in Gisagara District, Rwanda

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Abstract

This study examined the associations between stakeholder management, project control, regulatory practices, and the perceived performance of the Peat Power Plant Project in Gisagara District, Rwanda. A descriptive, cross-sectional research design incorporating quantitative and qualitative approaches was adopted. Data were collected using structured questionnaires, with 138 valid responses obtained from 150 distributed questionnaires, representing a response rate of 92.0%. Quantitative data were analysed using descriptive statistics, Pearson correlation, and multiple linear regression in SPSS version 25. The findings revealed significant positive correlations between perceived project performance and stakeholder management ($r = .865$), project control ($r = .646$), and regulatory practices ($r = .870$), all $p < .001$. Multiple regression analysis, controlling for project accountability, indicated positive associations between project performance and stakeholder management ($\beta = .311$), project control ($\beta = .179$), and regulatory practices ($\beta = .301$), all $p < .001$. The four-predictor regression model explained 85.6% of the variance in perceived project performance ($R^2 = .856$). The study concluded that stakeholder management, project control, and regulatory practices were significantly associated with perceived project performance. It recommends strengthening stakeholder engagement, systematic project monitoring, and regulatory coordination to support effective governance of energy infrastructure projects.

Keywords: *Stakeholder management, project control, regulatory practices, project performance, peat power plant, Rwanda*

1.0 Introduction

Energy infrastructure projects contribute significantly to economic development, energy security, and industrial growth. However, their successful implementation depends on effective governance mechanisms that address stakeholder expectations, project implementation challenges, and regulatory requirements. Globally, inadequate stakeholder engagement, weak project control, and ineffective regulatory oversight may contribute to project delays, cost overruns, and poor performance (Project Management Institute [PMI], 2021). Stakeholder management promotes effective communication, participation, and coordination among project actors, consistent with stakeholder theory (Freeman, 1984). Project control facilitates the monitoring of schedules, costs, resources, and risks to support timely corrective action (PMI, 2021). Similarly, regulatory practices strengthen compliance with environmental, safety, and operational standards through institutional oversight and accountability (Baldwin et al., 2012).

In sub-Saharan Africa, energy infrastructure projects face governance challenges associated with institutional capacity constraints, competing stakeholder interests, and regulatory coordination. In Rwanda, the Peat Power Plant Project in Gisagara District provides a relevant context for examining these mechanisms because its implementation involves technical operations, environmental obligations, and interactions among project stakeholders. Despite the recognised importance of governance in infrastructure development, limited project-specific empirical evidence exists regarding the distinct associations between stakeholder management, project control, regulatory practices, and the performance of peat-based energy projects in Rwanda. Therefore, this study examined the relationships between these three governance mechanisms and the perceived performance of the Peat Power Plant Project in Gisagara District, Rwanda, to inform improvements in project governance and implementation.

1.1 Statement of the Problem

Effective governance is essential for ensuring that energy infrastructure projects achieve their intended objectives within established timelines, budgets, and quality standards. However, inadequate stakeholder engagement, weak project control, and ineffective regulatory practices may undermine project performance through implementation delays, inefficient resource utilisation, and compliance challenges (Project Management Institute [PMI], 2021). These concerns are particularly relevant to the Peat Power Plant Project in Gisagara District, Rwanda, where technical implementation, community interests, and regulatory obligations require effective coordination. Although governance mechanisms have received considerable attention in project management literature, limited project-specific empirical evidence exists regarding the distinct associations of stakeholder management, project control, and regulatory practices with the performance of peat-based energy infrastructure in Rwanda. This knowledge gap limits understanding of how these governance mechanisms relate to project outcomes in the Gisagara context. Therefore, this study examined the associations between stakeholder management, project control, regulatory practices, and the perceived performance of the Peat Power Plant Project in Gisagara District, Rwanda, to generate evidence for strengthening project governance and improving infrastructure project management.

1.2 Research Objectives

i. To determine the association between stakeholder management and perceived performance of the peat power plant project in Gisagara District, Rwanda.

ii. To examine the association between project control and perceived performance of the peat power plant project in Gisagara District, Rwanda.
iii. To evaluate the association between regulatory practices and perceived performance of the peat power plant project in Gisagara District, Rwanda.

1.3 Research Hypotheses

H_{01}: Stakeholder management has no statistically significant association with perceived project performance.

H_{02}: Project control has no statistically significant association with perceived project performance.

H_{03}: Regulatory practices have no statistically significant association with perceived project performance.

2.0 Literature Review

2.1 Stakeholder Management

Stakeholder management involves identifying, engaging, communicating with, and addressing the concerns of individuals and groups affected by project activities. Stakeholder theory emphasises the importance of recognising stakeholder interests in organisational decision-making and performance (Freeman, 1984). Similarly, the Project Management Institute (PMI, 2021) identifies continuous stakeholder engagement as an important component of effective project management. In energy infrastructure projects, stakeholder participation may facilitate information sharing, conflict resolution, and coordination among communities, contractors, government institutions, and project sponsors. However, competing stakeholder interests and inadequate communication may complicate project implementation. This study therefore examined the association between stakeholder management practices and the perceived performance of the Peat Power Plant Project in Gisagara District, Rwanda.

2.2 Project Control

Project control refers to the systematic monitoring and evaluation of project activities against established schedules, budgets, quality standards, and resource requirements. According to PMI (2021), effective project management involves performance measurement, risk management, and timely responses to implementation deviations. In energy infrastructure projects, project control supports the monitoring of construction milestones, procurement processes, resource utilisation, and operational risks. Inadequate monitoring and delayed corrective actions may contribute to implementation inefficiencies and difficulties in achieving project objectives. Nevertheless, the effectiveness of project control depends on reliable information, management capacity, and timely decision-making. Accordingly, this study investigated the association between project control practices and the perceived performance of the Peat Power Plant Project.

2.3 Regulatory Practices

Regulatory practices involve compliance with established legal, environmental, safety, and operational requirements governing project implementation. Baldwin et al. (2012) emphasised that effective regulatory governance depends on appropriate institutional arrangements, clear rules, enforcement mechanisms, and accountability. In energy infrastructure development, regulatory oversight is particularly important because project activities may involve environmental risks,

land-use considerations, and public safety obligations. Effective coordination between project implementers and regulatory institutions may support compliance, reduce administrative uncertainty, and strengthen stakeholder confidence. However, unclear requirements, inconsistent enforcement, and limited institutional coordination may create implementation challenges. Therefore, this study examined the association between regulatory practices and the perceived performance of the Peat Power Plant Project in Gisagara District, Rwanda.

2.4 Theoretical Integration and Research Gap

The three governance mechanisms address different interfaces: stakeholder management concerns relationships, project control concerns internal execution, and regulatory practices concern formal obligations. Stakeholder theory (Freeman, 1984) supports the first, project management guidance (PMI, 2021) informs the second, and regulatory governance scholarship (Baldwin et al., 2012) informs the third. The study contributes a project-specific comparison of their partial associations with perceived performance while adjusting for project accountability. It does not claim to test the theories directly.

3.0 Methodology

A descriptive mixed-methods design was used for the Gisagara peat power plant project, with the thesis specifying a 2019-2024 study context. The target population was 267 stakeholders, and a planned sample of 160 was selected through stratified random and purposive approaches. Of 150 questionnaires administered, 138 were completed (92.0% response rate). Interview guides were prepared for 10 key informants. Although the thesis describes interview responses, it does not give an auditable count of completed interviews; therefore, 10 is reported as the planned number rather than a confirmed achieved number. Each of the five constructs stakeholder management, project control, regulatory practices, project accountability and perceived project performance was assessed using five questionnaire items. The five-point Likert response options were 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. The thesis reports Cronbach's alpha values of .842, .816, .857, .835 and .801 for these constructs, respectively (overall $\alpha = .830$). Project performance items concerned perceived budget adherence, resource efficiency, output quality, stakeholder satisfaction and prospective long-term benefits; they were not independently audited delivery measures. Quantitative data were analysed using descriptive statistics, Pearson correlations and multiple linear regression in SPSS version 25. The original regression contained all four predictors, including project accountability as a covariate. Reported SPSS significance values of .000 are presented as $p < .001$. The thesis states that interviews were transcribed and analysed thematically and includes qualitative accounts under the study variables. Because the interview count, coding audit trail and theme frequencies are not documented sufficiently, the qualitative synthesis below is descriptive and does not assert saturation or theme prevalence beyond the thesis narrative.

4.0 Results and Discussion

4.1 Descriptive Findings

Respondents rated the governance practices favourably, with grand means of 4.19 (SD = .76) for stakeholder management, 4.16 (SD = .79) for project control, 4.18 (SD = .76) for regulatory practices and 4.22 (SD = .73) for perceived project performance. These ratings describe stakeholder perceptions, not independently measured outcomes.

Table 1. Descriptive Statistics

Statements	M	SD
Stakeholder Management	4.19	0.76
Stakeholders have been actively engaged throughout the planning and implementation of the project	4.21	0.74
The interaction between project managers and stakeholders has been effective in addressing project needs	4.18	0.78
Communication channels between stakeholders and the project team are clear and consistent	4.12	0.81
Stakeholder feedback has been taken into consideration in decision-making processes	4.15	0.76
Effective stakeholder engagement has positively influenced the overall performance of the project	4.30	0.69
Project Control	4.16	0.79
The project schedule is well planned and adhered to throughout the project	4.18	0.76
Resources (financial, human and material) are adequately available for timely project execution	4.11	0.81
Risks affecting project performance are properly identified, assessed and mitigated	4.15	0.79
Project control mechanisms ensure that delays and cost overruns are minimised	4.09	0.84
Effective project control contributes positively to achieving the project objectives	4.27	0.73
Regulatory Practices	4.18	0.76
The project consistently complies with all relevant regulations and standards	4.24	0.72
Regulatory enforcement mechanisms are effective in guiding project activities	4.17	0.77
Information regarding regulatory requirements is transparent and easily accessible to stakeholders	4.10	0.83
Compliance with regulations has positively influenced the performance of the project	4.22	0.74
Regulatory practices are adequately monitored to ensure accountability and efficiency	4.19	0.76
Project Performance	4.22	0.73
The project is completed within the allocated budget	4.17	0.77
Project resources are used efficiently to minimise costs	4.20	0.74
The outputs of the project meet the expected quality standards	4.25	0.71
Stakeholders have expressed satisfaction with the progress and performance of the project to date	4.18	0.76
The project shows promising potential to deliver sustainable and long-term benefits upon completion	4.31	0.68

Note. N = 138; M = mean; SD = standard deviation. Higher scores indicate greater agreement.

4.2 Correlation Analysis

The correlations with perceived performance were positive for stakeholder management ($r = .865$), project control ($r = .646$) and regulatory practices ($r = .870$), all $p < .001$. Project accountability also correlated with perceived performance ($r = .832$, $p < .001$). Stakeholder management and regulatory practices were highly correlated ($r = .883$), indicating substantial shared variance and requiring caution when interpreting their partial regression coefficients.

Table 2. Pearson Correlations

	SM	PC	RP	PA	PP
Stakeholder Management	1				
Project Control	.513**	1			
Regulatory Practices	.883**	.543**	1		
Project Accountability	.778**	.569**	.783**	1	
Project Performance	.865**	.646**	.870**	.832**	1
Sig. (2-tailed)	.000	.000	.000	.000	
N	138	138	138	138	138

Note. N = 138. SM = stakeholder management; PC = project control; RP = regulatory practices; PA = project accountability; PP = perceived project performance. ** p < .01 (two-tailed).

4.3 Multiple Regression Analysis

The original four-predictor model explained 85.6% of variation in perceived project performance ($R = .925$, $R^2 = .856$, adjusted $R^2 = .852$), $F(4, 133) = 198.143$, $p < .001$. Adjusting for project accountability, stakeholder management ($\beta = .311$, $t = 4.248$), project control ($\beta = .179$, $t = 4.389$) and regulatory practices ($\beta = .301$, $t = 4.036$) were each statistically significant (all $p < .001$); the three null hypotheses were rejected. Project accountability also had a positive coefficient ($\beta = .252$, $p < .001$). These are conditional associations from the four-predictor model, not results from a newly estimated three-predictor model.

Table 3. Multiple Regression of Perceived Project Performance

Model	R	R Square	Adjusted R Square	Adjusted R Square	Std. Error of the Estimate	Std. Error of the Estimate
1	.925	.856	.852	.852	.15442	.15442
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.899	4	4.725	198.143	.000
	Residual	3.171	133	.024		
	Total	22.070	137			
Model		B	Std. Error	Beta (β)	t	Sig.
1	(Constant)	.084	.155		.541	.589
	Stakeholder Management	.285	.067	.311	4.248	.000
	Project Control	.192	.044	.179	4.389	.000
	Regulatory Practices	.265	.066	.301	4.036	.000
	Project Accountability	.298	–	.252	–	.000

Note. Dependent variable: perceived project performance. Project accountability is retained as a control variable. The source thesis reports the fitted equation PP = 0.084 + 0.285SM + 0.192PC +

0.265RP + 0.298PA. Coefficients should be verified against original SPSS output before submission.

4.4 Qualitative Findings

The thesis narratively reports key-informant views across the study constructs. For stakeholder management, informants described consultations, regular meetings, communication channels and the consideration of stakeholder feedback. For project control, the reported accounts emphasised milestone reviews, schedule and budget monitoring, resource allocation and risk identification. For regulatory practices, the narrative highlighted adherence to government and environmental standards, regulatory inspections and communication of compliance requirements. These accounts broadly contextualise the survey patterns but cannot establish independent corroboration because the thesis does not specify the number of completed interviews or provide a traceable theme-by-participant matrix. No direct quotations or participant frequencies are attributed here.

4.5 Discussion

The positive association of stakeholder management with perceived performance is consistent with the relational emphasis of stakeholder theory (Freeman, 1984). Project control likewise aligns with the PMI (2021) emphasis on measurement, project work and uncertainty management. The regulatory association is interpretable through institutional oversight and compliance processes (Baldwin et al., 2012). However, strong intercorrelation between stakeholder management and regulatory practices ($r = .883$) means that the apparent ranking of standardised coefficients should not be treated as a definitive ordering of causal importance. Common-method measurement and the cross-sectional design further limit inference.

5.0 Conclusion

The study concluded that stakeholder management, project control, and regulatory practices were positively associated with the perceived performance of the Peat Power Plant Project in Gisagara District, Rwanda, even after controlling for project accountability. The regression model explained 85.6% of the variance in perceived project performance. These findings highlight the importance of effective stakeholder engagement, systematic project monitoring, and regulatory compliance in project governance. However, given the cross-sectional and self-reported nature of the data, the findings establish associations rather than causal relationships and do not independently verify improvements in project costs, schedules, or operational outcomes.

6.0 Recommendations

Based on the findings, the following recommendations are made:

i. Stakeholder Management: Project managers should strengthen stakeholder mapping, regular consultations, and documented grievance-resolution mechanisms to enhance stakeholder participation and coordination.
ii. Project Control: Project managers should improve milestone monitoring, risk management, and timely implementation of corrective actions to strengthen project performance.
iii. Regulatory Practices: Project managers should collaborate with regulatory authorities to ensure compliance with environmental, safety, and operational requirements.

The study was limited to a single project and relied primarily on cross-sectional, self-reported data, restricting generalizability and causal interpretation. Potential common-method bias and overlap between governance and performance measures may have influenced the findings. Furthermore,

the number of completed interviews and detailed qualitative coding records could not be verified, while the strong correlation between stakeholder management and regulatory practices suggests possible multicollinearity. Future research should employ longitudinal, multi-project designs, independently verified performance indicators, and appropriate multicollinearity diagnostics to strengthen the validity and applicability of the findings.

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