



Effect of Public-Private Partnership Initiatives on Success of ConnectRwanda 2.0 Project in Nyarugenge District, Rwanda

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Abstract: The purpose of this study was to evaluate the effect of Public-Private Partnership initiatives on project success, focusing on the ConnectRwanda 2.0 Project in Nyarugenge District. The study was grounded in Stakeholder Theory, Agency Theory, Resource-Based View and Institutional Theory. A descriptive and correlational research design was employed, from a population 457 stakeholders. The sample size was determined using the Krejcie and Morgan table, and 213 participants were selected through stratified and simple random sampling techniques. Data analysis was performed using SPSS Version 29 to generate descriptive and inferential statistics including multiple regression analysis. The findings showed that contractual governance had a significant positive effect on project success ($B = 0.451$, $t = 9.204$, $p = 0.000$); financing structure had a significant positive effect ($B = 0.269$, $t = 7.079$, $p = 0.000$); technical expertise had a significant positive effect ($B = 0.136$, $t = 4.533$, $p = 0.000$); and regulatory framework had a significant positive effect ($B = 0.149$, $t = 3.041$, $p = 0.003$). The regression model explained 89.7% of the variation in project success ($R^2 = 0.897$), while the overall model was statistically significant ($F = 423.824$, $p = 0.000$). The study concluded that contractual governance, financing structure, technical expertise, and regulatory framework all contribute to the success of ConnectRwanda 2.0 Project in Nyarugenge District. The study recommends strengthening contractual accountability, financing safeguards, technical capacity, and streamlined regulatory compliance to sustain project outcomes.

Keywords: Public-Private Partnership Initiatives, Contractual Governance, Financing Structure, Technical Expertise, Regulatory Framework, Project Success, ConnectRwanda 2.0 Project

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1. Introduction

Implementation of collaborative frameworks between the public and private sectors has become a primary strategy for addressing infrastructure deficits and enhancing service delivery across the globe. These arrangements allow governments to leverage private sector capital, innovation, and management expertise to meet increasing public demands while sharing the associated financial and operational risks. Global trends indicate that the success of such initiatives depends

heavily on the robustness of the underlying legal and financial structures established at the project's inception. Effective collaboration requires a clear alignment of goals and a commitment to transparency to ensure that the public interest is protected while allowing private entities to achieve reasonable returns (Osei-Kyei, 2022).

United Kingdom has seen a shift toward more stable partnership models that emphasize long-term social value in public infrastructure projects during the current decade. This approach seeks to refine how risks are shared by introducing mechanisms that allow the public sector to have a greater say in the management of the

asset while ensuring private financing remains attractive. Success of these projects in the European context is often attributed to a highly developed legal framework and a mature financial market that supports complex funding arrangements. Organizations continue to prioritize transparency and value for money to justify the continued use of private capital in public service delivery across various sectors (Hellowell, 2023).

Tanzania has recently updated its regulatory framework to encourage more private participation in the development of its transport and ICT sectors, specifically targeting improvements in the national fiber optic backbone. Government seeks to balance the need for rapid technological advancement with the requirement to maintain sovereignty over critical national infrastructure through carefully structured partnership agreements. These initiatives are designed to bring in foreign technical expertise while ensuring that local labor is trained and utilized throughout the project lifecycle. Success is often viewed through the lens of increased connectivity for rural populations and the overall reduction in the cost of digital services for citizens (Mrema, 2024).

Rwanda has established itself as a regional hub for digital innovation by actively pursuing partnerships to provide affordable digital tools to its citizens through integrated government programs. Success is measured by the number of devices distributed and the subsequent increase in the usage of digital platforms by the Rwandan population in both urban and rural areas. National strategies emphasize the importance of leveraging private sector efficiency to achieve the goals of a knowledge-based economy and social transformation. Constant evaluation of these partnerships is required to ensure that the intended socio-economic impact is realized for all segments of the population (Musabyimana, 2024).

Performance of public infrastructure projects in Rwanda faces significant challenges related to project success, with many initiatives experiencing substantial delays and budget overruns. Reports from the Office of the Auditor General frequently highlight that a high percentage of public-funded projects fail to meet their intended deadlines, resulting in a loss of value for the taxpayer. In 2023, it was noted that approximately 34% of infrastructure projects experienced delays exceeding twelve months, which disrupted the delivery of essential services to the public (Murenzi, 2024).

Project failures in the Rwandan context are often characterized by a lack of sustainability and poor maintenance after the initial implementation phase is completed. Statistics from relevant oversight bodies in 2022 indicated that 22% of digital inclusion projects struggled to maintain operational consistency after the first two years of rollout. This lack of longevity undermines the long-term goals of national development

and suggests a gap in how these initiatives are structured and managed (Habimana, 2022). Cost overruns remain a persistent issue in the Rwandan project landscape, where actual expenditures often exceed the initial estimates by significant margins. In 2024, an assessment of development projects revealed that 28% of these initiatives incurred costs that were at least 15% higher than the original budget allocations (Uwase, 2024).

Ndagijimana (2023) shows that in some districts, the adoption rate of subsidized digital tools was as low as 45% of the projected targets, indicating a significant gap between project goals and actual outcomes. None of the studies conducted on ConnectRwanda 2.0 Project in Nyarugenge District have specifically isolated the interaction between Public-Private Partnership initiatives and project success metrics. This study therefore evaluated the effect of Public-Private Partnership initiatives on project success in Rwanda, with specific focus on the ConnectRwanda 2.0 Project in Nyarugenge District.

1.1 Objectives of the Study

The general objective of this study was to evaluate the effect of Public-Private Partnership initiatives on project success in Rwanda, with specific reference to the ConnectRwanda 2.0 Project in Nyarugenge District.

1. To determine the effect of contractual governance on the success of the ConnectRwanda 2.0 Project in Nyarugenge District.
2. To assess the effect of financing structure on the success of the ConnectRwanda 2.0 Project in Nyarugenge District.
3. To evaluate the effect of technical expertise on the success of the ConnectRwanda 2.0 Project in Nyarugenge District.
4. To examine the effect of regulatory framework in the success of the ConnectRwanda 2.0 Project in Nyarugenge District.

2. Literature Review

2.1 Theoretical Review

This study was guided by Stakeholder Theory, Agency Theory, Resource-Based View and Institutional Theory. The theories explain the governance, financing, technical capability and regulatory dimensions through which Public-Private Partnership initiatives influence project success.

2.1.1 Stakeholder Theory

Stakeholder Theory suggests that the success of an organization or project depends on its ability to manage relationships with all individuals or groups who can

affect or are affected by its activities. It was first introduced by Freeman (1984) as a framework for corporate social responsibility and strategic management of complex organizations. The core idea is that a project should create value for all its stakeholders, including employees, customers, suppliers, and the community, rather than just its primary owners. In the context of partnerships, this theory emphasizes the need for a collaborative approach that balances the competing interests of diverse groups (Freeman, 2023).

The study linked Stakeholder Theory to the first specific objective concerning contractual governance. The theory guided the evaluation of how formal legal agreements managed expectations among different stakeholders to promote project stability. The study also examined whether dispute resolution clauses and performance clauses in the contract helped to balance the interests of the government and the private partner.

2.1.2 Agency Theory

Agency Theory provides a useful framework for understanding accountability, control, and performance relationships in Public-Private Partnership initiatives. The theory was originally advanced by Jensen and Meckling (1976), who explained the relationship between a principal and an agent, where one party delegates responsibilities to another to perform duties on its behalf. In the context of PPP projects, the government may act as the principal that entrusts private partners with responsibilities such as financing, technical implementation, service delivery, and operational management.

This research was linked to the second specific objective, which concerned the effect of financing structure on the success of the ConnectRwanda 2.0 Project in Nyarugenge District. Agency Theory guided the study in examining how financing agreements, cost-sharing mechanisms, financial accountability, risk allocation, and performance-based funding arrangements influenced the relevance, effectiveness, efficiency, impact, and sustainability of the project.

2.1.3 Resource-Based View (RBV)

The Resource-Based View is a strategic framework that focuses on the internal resources and capabilities of an organization as the primary source of its competitive advantage. It was popularized by Barney (1991), who argued that for a resource to provide a sustained advantage, it must be valuable, rare, inimitable, and non-substitutable. In a partnership context, this theory suggests that the success of a project is determined by the unique combination of resources brought by each partner. The government provides the regulatory and land resources, while the private partner contributes the financial capital and technical expertise (Barney, 2023).

The study linked the Resource-Based View to the third specific objective regarding technical expertise. The theory guided the examination of how specialized skills, labor competence, and technology integration provided by the private partner served as critical resources for project success. The study also investigated whether the unique combination of these technical assets provided a sustainable foundation for the expansion of the initiative in Nyarugenge District.

2.1.4 Institutional Theory

Institutional Theory examines how the social, political, and regulatory structures of an environment influence the behavior and performance of organizations within that setting. It suggests that organizations conform to institutional pressures and cultural expectations to gain legitimacy and ensure their long-term survival in the market. In the context of partnerships, this theory suggests that the success of a project is shaped by the prevailing laws and professional standards (DiMaggio, 2023).

This study linked Institutional Theory to the fourth specific objective regarding regulatory compliance. The theory guided the analysis of how national laws, safety standards, and reporting obligations exerted institutional pressure on project management to ensure project success. The study also determined how adherence to these structures influenced the legitimacy and outcomes of the initiative in Nyarugenge District.

2.2 Empirical Review

2.2.1 Contractual Governance and Project Success

Zhang (2023) evaluated the relationship between governance mechanisms and the success of transportation projects in China. Using a survey of 200 managers and structural equation modeling, the study found a strong positive correlation between strict contractual enforcement and timely completion of project milestones. The study concluded that clear dispute-resolution clauses reduce time lost during conflicts and strengthened project accountability.

Mukandori (2024) focused on the governance structures of rural electrification projects and their impact on operational effectiveness in Rwanda. The researcher used a descriptive research design, collecting data from 120 stakeholders through structured questionnaires and focused interviews. Findings revealed that projects with well-defined contractual governance mechanisms achieved a success rate that was 18% higher than those with vague agreements. The study concluded that the clarity of roles between the national energy group and private contractors was essential for achieving targets.

2.2.2 Financing Structure and Project Success

Dlamini (2024) focused on the impact of government-backed guarantees on the bankability of public-private transport initiatives in South Africa. Econometric analysis showed that the presence of sovereign guarantees increased the probability of project financial close. The study concluded that public financial support and rigorous risk-sharing models are important for mitigating the financial risks associated with large-scale infrastructure development.

Ngarambe (2024) evaluated the financing structure of agricultural development projects and its effect on the productivity of smallholder farmers in Rwanda. Methodology included a quantitative survey of 250 farmers and the use of ANOVA to compare different funding arrangements. Results demonstrated that projects with a blended finance approach combining grants and low-interest loans resulted in a 35% higher increase in crop yields. The study concluded that flexible financing models are more effective at addressing the specific needs of rural entrepreneurs in the Rwandan context.

2.2.3 Technical Expertise and Project Success

Lwanga (2024) analyzed the impact of technical training programs on the success of rural telecommunications expansion projects in Uganda. A survey of technical staff and correlation analysis showed a significant positive relationship between technical expertise and service reliability. The study concluded that continuous skill development is necessary for maintaining complex infrastructure and project uptime.

Tuyishime (2024) focused on the technical expertise required for the successful implementation of digital services platforms in Rwanda. The researcher used a descriptive research design, gathering data from 150 software developers and government officials through online questionnaires. Findings revealed that the project's success was largely due to the high level of coding and system integration skills provided. The study concluded that technical proficiency in digital security and user interface design was essential for gaining public trust and encouraging adoption.

2.2.4 Regulatory Framework and Project Success

Addison (2023) examined the influence of data-protection regulations on the success of digital financial inclusion projects in Ghana. Survey results showed that compliance with privacy laws increased user adoption of digital services. The study concluded that regulatory compliance is important in building public confidence in technology-led initiatives.

Mbabazi (2024) evaluated the impact of national telecommunications regulations on the quality of service provided by private internet providers in Rwanda. Methodology included a quantitative analysis of quality-

of-service reports and a survey of 300 internet subscribers in urban areas. Findings revealed that the threat of regulatory fines for poor performance led to a 20% improvement in network stability. The study concluded that effective regulatory enforcement is necessary to ensure that private partners meet their service obligations.

2.3 Research Gap

Based on the empirical review, there is substantial evidence that partnership variables such as contractual governance, financing structure, technical expertise, and regulatory framework influence project success across different sectors and countries. However, most of these studies are concentrated in sectors such as energy, transport, agriculture, and water infrastructure, with limited attention given to digital inclusion or telecommunications projects, particularly in Rwanda.

A geographical and contextual gap also exists regarding urban-specific dynamics in Nyarugenge District. Previous studies in Rwanda primarily focused on rural or sector-specific projects, with limited attention given to urban digital inclusion initiatives. This study bridged these gaps by providing localized quantitative evidence on how contractual governance, financing structure, technical expertise, and regulatory framework influenced the success of the ConnectRwanda 2.0 Project.

3. Methodology

3.1 Research Design

The study adopted a descriptive and correlational research design using both quantitative and qualitative approaches. The descriptive design was appropriate because it enabled the study to establish the existing nature and level of partnership initiatives and project success within the ConnectRwanda 2.0 Project. The correlational design was justified because it allowed the study to determine the direction and strength of the relationship between partnership initiatives and project success without manipulating the study variables.

3.2 Study Population

The target population for this study consisted of 457 individuals involved in the ConnectRwanda 2.0 Project in Nyarugenge District. This population included Ministry of ICT staff, ConnectRwanda staff, local government officials, and Airtel agents who had direct experience with the implementation of the initiative.

3.3 Sample Size and Sampling

Based on the Krejcie and Morgan (1970) table, a population of 457 required a sample size of 213 participants. This sample was proportionally distributed across the different categories of the target population to maintain the representativeness of the findings. The study used stratified and simple random sampling techniques to select participants for the survey. Stratified sampling divided the population into four distinct categories, while simple random sampling selected individuals within each category.

3.4 Data Collection

The study used primary data. Primary data were collected directly from respondents through structured questionnaires. A closed-ended questionnaire with a five-point Likert scale was distributed to the 213 sampled participants and focused on their perceptions of contractual governance, financing structure, technical expertise, and regulatory compliance. The study also conducted semi-structured interviews with 10 key informants, including senior managers from Airtel

Rwanda and the Ministry of ICT, to provide contextual explanations for the quantitative trends.

3.5 Pilot Study, Validity and Reliability

The study conducted a pilot test on 10% of the sample size, equal to approximately 21 individuals, in Kicukiro District, which shared similar socio-economic characteristics with the case study area. The pilot study was used to check the clarity of the questions and the reliability of the data collection instruments. Feedback from the participants was used to refine the wording of the questionnaire and ensure that the instructions were easily understood.

The study used Cronbach's Alpha coefficient to test the internal reliability of the questionnaire items during the pilot phase. A coefficient of 0.70 or higher was considered acceptable. The Content Validity Index of 0.86 was obtained through dividing 25 relevant items by a total of 29 items, exceeding the accepted threshold of 0.70.

Table 1: Reliability Statistics

Variables	Cronbach's Alpha	N of Items
Contractual Governance	0.824	5
Financing Structure	0.860	5
Technical Expertise	0.835	5
Regulatory Framework	0.850	5
Success of ConnectRwanda 2.0 Project	0.880	5

Source: Field Data, 2026

3.6 Data Analysis

The data were analyzed using SPSS Version 29 to generate both descriptive and inferential statistics for the study. Inferential analysis was conducted to test the research hypotheses and determine the relationships between the variables under study. Pearson's correlation was used to measure the strength and direction of the association between the four predictor variables and project success. Multiple linear regression was then applied to determine the extent to which variation in project success was explained through contractual governance, financing structure, technical expertise, and regulatory framework, using a significance level of $p < 0.05$.

The regression equation was: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$, where Y = Project success; β_0 = Constant; β_1 to β_4 = Regression coefficients; X_1 = Contractual governance; X_2 = Financing structure; X_3 = Technical expertise; X_4 = Regulatory framework; and ε = Error term.

3.7 Diagnostic Tests

The study assessed multicollinearity using Variance Inflation Factor (VIF) and Tolerance values, where VIF values below 10 and Tolerance values above 0.10 indicated that multicollinearity was not a significant concern. The Durbin-Watson test was used to assess autocorrelation in the residuals, with values between 1.5 and 2.5 considered acceptable for the regression model.

3.8 Ethical Considerations

The study adhered to high ethical standards throughout the research process to ensure the integrity of the findings and the safety of respondents. The researcher obtained formal permission from the University of Kigali and the management of Airtel Rwanda before commencing data collection. All participants were provided with clear information about the study and were asked to sign a consent form before participating. The data collected were stored securely, the questionnaires did not require participants to provide their names, and every participant had the right to withdraw from the study at any time without any negative consequences.

4. Results and Discussions

This section presents the response rate and inferential results used to determine the effect of Public-Private Partnership initiatives on the success of the ConnectRwanda 2.0 Project in Nyarugenge District.

4.1 Response Rate

The response rate represents the percentage of questionnaires successfully filled and returned to the researcher compared to the total number of instruments distributed.

Table 2: Response Rate

Questionnaires	Frequency	Percentage (%)
Returned Complete	204	95.8
Returned Incomplete	6	2.8
Unreturned	3	1.4
Total	213	100.0

Source: Field Data, 2026

Out of 213 total questionnaires administered, 204 copies representing 95.8% arrived completely filled out. Six questionnaires representing 2.8% arrived incomplete, and 3 copies representing 1.4% remained unreturned. This exceptionally high level of participation ensured that the gathered data contained adequate representation to evaluate the Public-Private Partnership initiatives effectively.

4.2 Inferential Statistics

Inferential statistics are applied in this study to draw meaningful conclusions, evaluate research hypotheses, and determine the predictive strength of the independent variables on the dependent variable. This analytical phase comprises Pearson correlation analysis to establish the nature, direction, and strength of the linear relationships, followed by multiple linear regression analysis to analyze the joint and individual effects of the

predictors. The independent variables under the specific objectives consist of contractual governance, financing structure, technical expertise, and regulatory framework, while the dependent variable is the success of the ConnectRwanda 2.0 Project in Nyarugenge District. The subsequent sub-sections interpret the gathered field data to explain how these specific dimensions interact and shape project execution outcomes.

4.2.1 Correlation Analysis

Pearson correlation analysis is utilized in this study to measure the direction and strength of the linear relationships between the independent variables and the dependent variable. The correlation matrix displayed in Table 2 provides the statistical associations between the independent variables and the dependent variable based on the field findings. The analysis measures these relationships using a standard two-tailed significance testing approach with an alpha level of 0.05.

Table 3: Correlation matrix

		Contractual Governance	Financing Structure	Technical Expertise	Regulatory Framework	Project Success
Contractual Governance	Pearson Correlation	1	.762**	.652**	.860**	.907**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	204	204	204	204	204
Financing Structure	Pearson Correlation	.762**	1	.612**	.695**	.825**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	204	204	204	204	204
Technical Expertise	Pearson Correlation	.652**	.612**	1	.769**	.750**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	204	204	204	204	204
Regulatory Framework	Pearson Correlation	.860**	.695**	.769**	1	.866**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	204	204	204	204	204
Project Success	Pearson Correlation	.907**	.825**	.750**	.866**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	204	204	204	204	204

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Field Data, 2026

The relationship between contractual governance and the success of the ConnectRwanda 2.0 Project in Nyarugenge District reveals a Pearson correlation coefficient of 0.907. This high statistical value indicates an extremely strong positive linear correlation between formal contracts and project achievements. Because the associated two-tailed significance value is 0.000, which is substantially lower than the standard statistical significance alpha level of 0.05, the relationship is highly significant. Consequently, enhanced enforcement of performance and dispute clauses corresponds directly to higher project implementation success.

The evaluation of the correlation between financing structure and the success of the ConnectRwanda 2.0 Project in Nyarugenge District yields a Pearson correlation coefficient of 0.825. This statistical coefficient indicates a strong positive linear relationship, demonstrating that sound capital structuring and risk-sharing mechanisms are vital to project execution. The two-tailed significance value is recorded as 0.000, which falls well below the 0.05 significance threshold, proving that the correlation is meaningful and not a result of chance. Therefore, stable funding models and consistent availability payments are securely associated with higher levels of project success within the district.

The data examining the relationship between technical expertise and the success of the ConnectRwanda 2.0 Project in Nyarugenge District produces a Pearson correlation coefficient of 0.750. This metric shows a strong positive association to project success. The calculated two-tailed significance value is 0.000, satisfying the condition of being less than the standard significance level of 0.05. This confirms that higher

technical capacity among implementers significantly links to the successful realization of digital infrastructure goals.

The relationship between the regulatory framework and the success of the ConnectRwanda 2.0 Project in Nyarugenge District shows a Pearson correlation coefficient of 0.866. This result represents a strong positive linear relationship, establishing that compliance with licensing and data privacy laws moves in tandem with successful project outcomes. Since the two-tailed significance value stands at 0.000, which is strictly less than the designated alpha level of 0.05, the link is confirmed to be statistically significant. It implies that strict adherence to national institutional mandates is strongly tied to project success.

The correlation analysis demonstrates that all four independent variables possess strong, positive, and statistically significant relationships with the dependent variable. Contractual governance exhibits the highest linear association with project success, followed closely by regulatory framework, financing structure, and technical expertise. These uniformly low significance values suggest that improvements in any of these managerial dimensions are inherently tied to better digital infrastructure implementation outcomes.

4.2.2 Regression Analysis

Multiple linear regression analysis was performed to determine the collective and individual predictive power of the independent variables on the dependent variable. This statistical procedure yields three essential outputs: the model summary which evaluates overall model fit and variance explanation, the analysis of variance

(ANOVA) which checks the statistical significance of the model, and the coefficients table which determines

individual variable contributions, collinearity issues, and hypothesis decisions.

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.947 ^a	.897	.895	.12872	1.626

a. Predictors: (Constant), Regulatory Framework, Financing Structure, Technical Expertise, Contractual Governance
b. Dependent Variable: Project Success

Source: Field Data, 2026

The model summary shown in Table 4 presents the overall explanatory capacity of the regression model for the current study. The coefficient of determination (R^2) is computed at 0.897, which means that the independent variables collectively explain 89.7% of the variance in the success of the ConnectRwanda 2.0 Project in Nyarugenge District, while the remaining 10.3% is

explained by factors outside this model. Furthermore, the Durbin-Watson statistic is recorded at 1.626, which falls within the acceptable range of 1.5 to 2.5, indicating the absence of significant autocorrelation among the residuals. This confirms that the model is highly stable and appropriate for making predictive inferences regarding project success.

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.818	4	7.205	423.824	.000 ^b
	Residual	3.297	199	.017		
	Total	32.115	203			

a. Dependent Variable: Project Success

b. Predictors: (Constant), Regulatory Framework, Financing Structure, Technical Expertise, Contractual Governance

Source: Field Data, 2026

The ANOVA summary shown in Table 5 determines the statistical acceptability and overall significance of the regression model. The analysis produces a regression sum of squares of 28.818 alongside a residual sum of squares of 3.297, reflecting that the model accounts for the vast majority of total variation. The calculated F-statistic stands at 423.824 with 4 degrees of freedom for regression and 199 degrees of freedom for residuals.

Crucially, the associated significance value is 0.000, which is far below the benchmark alpha value of 0.05, confirming that the overall model is highly significant. This indicates that the combination of contractual governance, financing structure, technical expertise, and regulatory framework is a reliable and significant predictor of project success.

Table 6: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	.006	.107		.056	.955		
Contractual Governance	.451	.049	.466	9.204	.000	.204	4.895
Financing Structure	.269	.038	.258	7.079	.000	.396	2.526
Technical Expertise	.136	.030	.165	4.533	.000	.392	2.552
Regulatory Framework	.149	.049	.160	3.041	.003	.185	5.414

a. Dependent Variable: Project Success

Source: Field Data, 2026

The coefficients presented in Table 6 show the regression weights, individual significance values, and collinearity statistics for each independent variable. The multiple linear regression model adopted for the analysis was formulated as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y represents the success of the ConnectRwanda 2.0 Project, β_0 represents the constant, X_1 represents contractual governance, X_2 represents financing

structure, X_3 represents technical expertise, X_4 represents regulatory framework, and ε represents the error term. Based on the unstandardized coefficients from the field results, the fitted regression equation was:

$$Y = 0.006 + 0.451X_1 + 0.269X_2 + 0.136X_3 + 0.149X_4$$

Contractual governance carries an unstandardized coefficient (B) of 0.451, which implies that a single-unit increase in contractual governance leads to a 0.451-unit increase in project success when other variables are held constant. The individual importance of this variable is supported by a t-statistic of 9.204 and a significance value of 0.000. Because this p-value is well below the 0.05 significance threshold, the effect of contractual governance on project success is highly significant. Based on these strong statistical parameters, the first null hypothesis (H_{01}) is rejected, concluding that contractual governance has a significant positive effect on project success. In terms of diagnostics, the tolerance value is 0.204 and the Variance Inflation Factor (VIF) is 4.895, both of which indicate that the variable is completely free from severe multicollinearity since the VIF remains below the conventional threshold of 10.

Financing structure demonstrates an unstandardized coefficient (B) of 0.269, meaning that every unit improvement in the financial model increases project success by 0.269 units, assuming all other conditions remain unchanged. This predictive contribution is verified by a t-statistic value of 7.079 and an associated significance of 0.000. Since this significance level is strictly less than the alpha level of 0.05, financing structure is confirmed as a significant individual predictor. Consequently, these empirical findings demand the rejection of the second null hypothesis (H_{02}), leading to the conclusion that financing structure significantly affects the success of the project. The collinearity diagnostics show a tolerance value of 0.396 and a VIF of 2.526, proving that multicollinearity is not an issue because the VIF sits comfortably below the threshold of 5.

Technical expertise possesses an unstandardized coefficient (B) of 0.136, showing that a unit change in technical capabilities results in a 0.136-unit increase in project success when other factors are held constant. The significance of this variable is validated by a calculated t-statistic of 4.533 and a significance value of 0.000. Given that this p-value is less than the standard significance parameter of 0.05, the variable exerts a statistically significant individual effect. Therefore, the third null hypothesis (H_{03}) is rejected, and it is established that technical expertise has a significant positive effect on the success of the digital project. The tolerance value is reported at 0.392 and the VIF is 2.552, which firmly indicates the absence of multicollinearity as the VIF is well below the critical value of 10.

Regulatory framework exhibits an unstandardized coefficient (B) of 0.149, which signifies that a one-unit increase in regulatory compliance increases project success by 0.149 units, provided other model predictors are fixed. This relationship is substantiated by a t-statistic of 3.041 and an empirical significance value of 0.003. Because this significance value is lower than the designated significance criterion of 0.05, the independent variable is confirmed to have a significant individual effect. As a result, the fourth null hypothesis (H_{04}) is formally rejected, demonstrating that the regulatory framework significantly affects project success. The collinearity statistics reveal a tolerance value of 0.185 and a VIF of 5.414, indicating that multicollinearity does not compromise the model since the VIF stays safely below the standard limit of 10.

The coefficient summary reveals that all four independent variables are positive and statistically significant contributors to the success of the ConnectRwanda 2.0 Project. Contractual governance emerges as the strongest individual predictor with the highest unstandardized coefficient and t-value, followed by financing structure, regulatory framework, and technical expertise. The collinearity diagnostics confirm the structural health of the model, as all VIF values remain well below the critical threshold of 10, meaning the individual coefficients are stable and reliable for institutional decision-making.

4.3 Discussion of the findings

This section discusses the study findings in relation to the four specific objectives and previous empirical and theoretical evidence. It focuses on how contractual governance, financing structure, technical expertise, and regulatory framework influenced the success of the ConnectRwanda 2.0 Project in Nyarugenge District.

4.3.1 Contractual Governance and Project Success

The inferential outcomes within the correlation matrix demonstrate that all independent variables maintain significant directional associations with project execution performance. For the contractual governance dimension, the positive linear trend aligns with the empirical analysis of Maina (2023), who discovered that contractual clarity and the transparent definition of roles account for a substantial variation in project sustainability metrics. The inferential regression coefficient outputs outline the individual predictive weights that each distinct independent dimension exerts on the project success variable. The individual predictive power of contractual governance aligns with the empirical conclusions of Zhang (2023), who established that rigorous legal enforcement acts as the primary driver of project accountability and performance milestones.

From a theoretical perspective, these baseline trends consent with Stakeholder Theory as articulated by

Freeman (2023), which posits that a structured collaborative approach manages multi-party expectations and balances conflicting public-private interests to ensure organizational stability.

4.3.2 Financing Structure and Project Success

Regarding the financing structure, the positive correlation results consent with the findings of Dlamini (2024), who proved that robust capital allocations and public financial backings dramatically improve the probability of successful project realization. Regarding the financing structure, the positive individual coefficient consents with the findings of Mlay (2023), who proved that localized financial involvement and community-inclusive funding models create a strong sense of ownership that guarantees long-term project success.

Theoretically, this financial consensus aligns with Agency Theory as popularized by Tipu and Yousaf (2022), which explains that clearly defined financial parameters and risk-sharing tools mitigate information asymmetry, reduce principal-agent friction, and curtail opportunistic behaviors.

4.3.3 Technical Expertise and Project Success

In terms of technical expertise, the directional alignment matches the observations of Lwanga (2024), who confirmed that continuous skill advancement and technical proficiency strongly correspond with structural reliability and network uptime. For the technical expertise variable, the significant coefficient matches the empirical stance of Tuyishime (2024), who verified that specialized digital capabilities and advanced system integration skills are essential for gaining public trust and enhancing service delivery effectiveness.

This empirical feedback is firmly anchored in the Resource-Based View framework supported by Barney (2023), which contends that a unique combination of valuable, rare, and non-substitutable internal assets, technical tools, and specialized human labor generates a sustainable foundation for optimal project performance.

4.3.4 Regulatory Framework and Project Success

The positive correlation for the regulatory framework variable resonates with the empirical work of Mbabazi (2024), who verified that active regulatory enforcement and oversight directly improve the operational quality of digital project outcomes. The positive regression

coefficient for the regulatory framework resonates with the empirical work of Addison (2023), who demonstrated that active compliance with regulatory requirements serves as a critical mechanism for building user confidence and accelerating technology adoption rates.

Theoretically, these outcomes are deeply rooted in Institutional Theory as expanded by DiMaggio (2023), which structures how external legal environments, coercive pressures, and standard reporting mandates influence organizations to comply with formal rules to achieve public trust and long-term survival.

The statistical outputs derived from the model summary reveal that the combined independent variables possess a substantial joint predictive capacity over the variance of the project success criterion. This collaborative effect aligns with the empirical deductions of Thompson (2024), who demonstrated that merging strong structural governance with performance-driven agreements generates an institutional synergy that optimizes service delivery quality. Furthermore, the high explanatory power shown in the model summary consents with the research of Ngarambe (2024), who verified that utilizing flexible, multi-dimensional execution setups is highly effective at addressing complex operational challenges and maximizing broad developmental impacts.

The inferential results for the analysis of variance confirm the statistical viability and overall fitness of the regression model in predicting project success. This structural validation shares common ground with the mixed-methods analysis of Oluwole (2022), who argued that the absence of integrated legal bodies and coherent structural frameworks leads to systematic execution delays and widespread project failure. Additionally, the model fitness validated by the variance analysis resonates with the observations of Karanja (2024), who proved that unaligned operational processes and structural bottlenecks create severe barriers that directly disrupt the broader execution goals of collaborative initiatives.

4.4 Summary of Hypotheses

This subsection summarizes the empirical decisions made regarding the four null hypotheses formulated for the study based on the regression results. Each hypothesis was evaluated at a 95% confidence level, comparing the calculated significance values against the standard alpha threshold of 0.05 to determine whether to accept or reject the null statements.

Table 7: Summary of null hypotheses decisions

Null Hypothesis	p-value	Decision
H ₀ 1: Contractual governance has no significant effect on the success of the ConnectRwanda 2.0 Project in Nyarugenge District.	0.000	Rejected
H ₀ 2: Financing structure does not significantly affect the success of the ConnectRwanda 2.0 Project in Nyarugenge District.	0.000	Rejected
H ₀ 3: Technical expertise has no significant effect on the success of the ConnectRwanda 2.0 Project in Nyarugenge District.	0.000	Rejected
H ₀ 4: Regulatory framework does not significantly affect the success of the ConnectRwanda 2.0 Project in Nyarugenge District.	0.003	Rejected

The comprehensive testing of the research hypotheses demonstrates that all four null hypotheses are completely rejected. The empirical data reveals that contractual governance, financing structure, technical expertise, and regulatory framework each maintain a low p-value that satisfies the rejection criteria under the 0.05 significance level.

5. Conclusions and Recommendations

5.1 Conclusion

Based on the findings, it is concluded that contractual governance is a fundamental pillar for ensuring project success. Establishing clear legal provisions, performance benchmarks, and dispute mechanisms provides a reliable framework for partner accountability. Effective contract enforcement minimizes operational ambiguities and directly enhances the smooth execution of digital infrastructure initiatives.

The study concludes that a well-designed financing structure is essential for the uninterrupted implementation of technology initiatives. Strategic risk-sharing models and stable capital commitments protect public-private deployments from severe budget constraints. Ensuring financial liquidity and timely resource mobilization remains vital to sustaining field operations and achieving intended goals.

Regarding technical expertise, the study concludes that high human resource competence is indispensable for translating project plans into concrete operational successes. Continuous training programs and specialized technical skills optimize the deployment and utilization of digital tools. Long-term project viability relies heavily on maintaining a team capable of handling complex technical challenges.

The study concludes that strict adherence to the regulatory framework is crucial for safeguarding the institutional legitimacy of technology projects. Aligning project activities with national policies, data protection

guidelines, and standard licensing rules minimizes legal risks. The ultimate success of public-private digital initiatives depends on a synchronized approach that combines robust contracts, stable funding models, expert human capital, and sound regulatory alignment.

5.2 Recommendations

1. The Ministry of ICT and Innovation should establish standardized performance-based templates for all public-private partnership agreements to reduce legal ambiguities during execution and ensure clear dispute-resolution pathways.

2. Technical team leaders should institutionalize comprehensive digital literacy training programs for local community beneficiaries and develop a decentralized network of hardware maintenance hubs to provide swift technical support across Nyarugenge District.

3. The Rwanda Utilities Regulatory Authority should streamline its licensing and compliance verification procedures for public digital inclusion initiatives.

5.3 Areas for Further Research

Future scholars should investigate the relationship between change management strategies and the performance of national digital inclusion projects. Future research could also examine the impact of cloud computing adoption on the operational efficiency of municipal administrative offices and the effect of stakeholder communication channels on the sustainability of rural telecommunication networks.

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