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EFFECT OF PROJECT INITIATION ON PERFORMANCE OF ENERGY INFRASTRUCTURE PROJECTS IN RWANDA. CASE STUDY OF KICUKIRO DISTRICT

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ABSTRACT

Energy infrastructure projects play a pivotal role in shaping the economic and social development of nations, particularly in emerging economies like Rwanda. Effective project initiation, encompassing the identification, planning, and launch phases, is a critical determinant of project success. This study aims to investigate the impact of project initiation on the performance of energy infrastructure projects in Rwanda, with a focus on the energy sector's pivotal role in the nation's sustainable development. The study employed a research design characterized as descriptive survey research. The study sample consisted of 124 individuals that are currently employed as project workers at Rwanda Energy Group. The research employed a census methodology. The principal tools utilized for data collection in this project consist of questionnaires that utilize a five-point Likert scale format, comprising of closed-ended questions. Various sources were utilized to gather secondary data, whereas the participants were requested to diligently respond to the offered questionnaires in order to obtain the necessary information. A preliminary inquiry was conducted, utilizing a sample size including 13 participants. The evaluation of reliability was conducted utilizing Cronbach's Alpha. The assessment of instrument validity was conducted by a panel of subject matter experts in the field of project management who has expertise in the specific area under investigation. The data analysis involved the utilization of both qualitative and quantitative methodologies, employing the SPSS software version 21. The results of the correlation analysis provide valuable insights into the relationship between different phases of project management and the performance of energy infrastructure projects in Rwanda. Specifically, the statistically significant positive correlation between project initiation and project performance ($r = 0.411$, $p < 0.01$). The regression analysis conducted in this study aimed to examine the impact of project initiation on the performance of energy infrastructure projects in Rwanda. The model revealed that project initiation significantly influences project performance, as evidenced by an R-squared value of 0.169, indicating that project initiation explains 16.9% of the variation in the performance of energy infrastructure projects. The ANOVA results further support the model's significance, with an F-statistic of 19.909 and a p-value of < 0.001, leading to the rejection of the null hypothesis (HO1). The regression equation, Performance of energy infrastructure projects = 2.333 + 0.468 Project initiation, demonstrates that for every one-unit increase in project initiation, there is a corresponding increase of 0.468 units in project performance. The standardized coefficient (Beta) of 0.411 underscores the importance of project initiation in explaining variations in project

performance. Thus, this analysis underscored the substantial impact of project initiation on energy infrastructure project performance, indicating that higher levels of project initiation are associated with improved project outcomes in Rwanda. Respondents exhibited a remarkable consensus, with an overwhelming majority strongly concurring on various aspects of project initiation. Particularly noteworthy is the unanimous recognition of the pivotal role of project design in specifying commercial and technical terms, signifying its fundamental purpose. Similarly, the substantial agreement regarding the need for realistic and attainable project scopes and milestones underscores their crucial importance. The strong emphasis on feasibility studies and the delineation of stakeholder responsibilities further solidifies the central role of well-defined stakeholder roles. Additionally, the high regard for performance measurement standards and comprehensive project scopes highlights their critical contribution to project initiation.

Keywords: *Project initiation, Project management process, Energy infrastructure projects, Rwanda*

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BACKGROUND OF THE STUDY

Globally energy industry shows great interest in explaining the workplace motivation and causes of good behavior that leads to improved productivity and performance of organization (Chauke, et al., 2022). Mwangi and Ngugi (2018) assessed the global performance of the construction projects and ways of delivering construction costs. The study linked the energy infrastructure projects performance with other continents. The results showed that construction projects that had increased rapidly all over the world experienced similar challenges in delivery of the energy infrastructure projects. According to Mwangi & Ngugi (2018) in developed nations the United Kingdom and Australia have records of making achievements in managing the development of government energy projects. Ogohi (2019) study on effective energy infrastructure projects indicated that rapid economic development improved globally on the demand of energy projects and service. According to a recent study conducted by Asfoor, AL-Jandeel, Igorevich, and Ivanovna (2022), it was observed that employee performance in New York was significantly greater among those who reported higher levels of happiness and job satisfaction. Furthermore, the management in this context demonstrated an ability to effectively push high-performing employees towards achieving organizational aims.

Stakeholder participation is a crucial element of project management in the African context. Energy infrastructure projects in Africa encompass a diverse range of stakeholders, comprising governmental bodies, private sector organizations, and local populations. According to Chileshe (2017), the implementation of stakeholder engagement strategies helps in identification of project requirements, fostering trust and collaboration among stakeholders, and ultimately improving project outcomes. Building Information Modeling facilitates efficient collaboration across project teams, leading to a reduction in rework and an enhancement of project outcomes (Oti et al., 2019). In contrast, lean construction endeavors to minimize inefficiencies, enhance project value, and optimize project efficiency (Jarkas et al., 2019).

The nation has established ambitious objectives to enhance electricity accessibility and advance the utilization of renewable energy sources. The efficacy of energy initiatives in Rwanda is contingent upon the implementation of a proficient project management framework. In order to ensure their survival and maintain a competitive edge, firms have

been compelled to consistently adjust and respond to evolving business environments.

The success of infrastructure projects in Rwanda is heavily influenced by the implementation of efficient energy project management methods, as highlighted in the research conducted by Ntirenganya and Hsu (2020). The research revealed that project management techniques in Rwanda encompass various essential elements such as meticulous planning, budget allocation, scheduling, risk mitigation, quality assurance, stakeholder involvement, and proficient communication. These methods contribute to the timely completion, adherence to budgetary constraints, and fulfillment of the necessary quality standards of infrastructure projects. The utilization of contemporary technology, including Building Information Modeling and Geographic Information System, is a significant determinant in the achievement of effective project management in Rwanda. These technologies contribute to enhancing the precision of project data and enabling more effective decision-making.

Efficient project management is crucial in ensuring the timely, budgetary, and scope-related completion of projects, while also adhering to the necessary quality standards. The project management process encompasses several distinct phases, namely planning, execution, monitoring, and control. The significance of project management in guaranteeing the achievement of renewable energy projects has been emphasized by the International Renewable Energy Agency (IRENA) (2019).

1.2 Statement of the Research Problem

The energy sector in Rwanda is marked by project delays, cost overruns, and quality issues, all of which have adverse effects on project performance (Nshimiyimana & Bouchard, 2021). Several challenges have hindered the successful execution of energy projects in Rwanda (Ndayisaba & Shukla, 2020). Managerial and organizational issues that can obstruct project success include inadequate stakeholder management, insufficient coordination leading to inefficiencies and cost overruns, suboptimal project design, delays in project execution, and deferred project initiation post-identification (Turner & Zolin, 2018). Karangwa and Habimana (2020) conducted a study suggesting that the adoption of appropriate energy project management methodologies within Rwanda's energy sector can lead to timely project completion, cost-effective delivery, and overall project success.

Therefore, it is crucial to do a comprehensive analysis of the impact imposed by project management processes on the performance results of energy projects in Rwanda. As noted by Kajombo, Munyongani, and Manyala (2017), energy infrastructure projects in developing countries, including Rwanda, often face challenges related to delays, cost overruns, and quality issues. These issues can be attributed, in part, to deficiencies in project management processes. As suggested by a study by Cennamo and Santoro (2019), the lack of essential skills within project teams can significantly elevate the risk of project failure, hindering the achievement of intended objectives. Furthermore, empirical evidence from numerous sources, including Nyemazi, Ntakirutimana, and Gatera (2017), indicates that recurring limitations within energy infrastructure projects are often the primary contributors to the failure to meet initial project goals. This research addresses these issues by seeking to explore the influence of project management techniques on the overall performance of energy infrastructure projects in the context of Rwanda, contributing to a more profound understanding of the challenges and potential solutions in this crucial sector (Cennamo & Santoro, 2019; Nyemazi, Ntakirutimana, & Gatera, 2017). The primary objective of this research study is to examine the influence of project management techniques on the overall performance of energy infrastructure projects in the context of Rwanda.

LITERATURE REVIEW

Project Initiation

The initial stages of a project are crucial because they lay the groundwork for what followed. Project planning involves figuring out what needs to be

done, who needs to be involved, how much it costed, when it needs to be done, and how to do it in the most efficient way possible. The first stages of a project are crucial in laying the groundwork for future progress and guaranteeing that goals were met. Rivera *et al.,* (2017), revealed there exists a favorable correlation between the implementation of effective project initiation methods and the achievement of project success. The research conducted has found a number of optimal strategies for commencing a project, which encompass the establishment of project boundaries, active engagement of relevant stakeholders, and the formulation of a comprehensive project blueprint.

During the beginning phase, the project timelines are established and the individuals accountable for each task are determined. According to the UK Government (2020), the culmination of the initiation process yields a project proposal that encompasses the recognition of a pre-existing issue, a proposed remedy, and a delineation of the implementation strategy. The deliverable is project charter, that serves the objective of delineating the business rationale, obtaining approval, and allocating dedicated resources. According to the PMI (2017), during this phase, the identification of stakeholders takes place, followed by the provision of comprehensive information while also considering and incorporating their respective expectations.

Geraldi *et al.*, (2019), discovered that the initiation phase of a project has a crucial role in determining its ultimate outcome, whether it be successful or unsuccessful. The research conducted revealed that successful project commencement necessitates the presence of unambiguous project objectives, a precisely delineated project scope, and a cohesive project team. The research moreover underscored the significance of stakeholder engagement and the necessity for proficient communication and cooperation among team constituents.

The project initiation phase establishes the fundamental framework for the project and verifies that the project is congruent with the strategic objectives of the company (Pinto & Slevin, 2019). The commencement of a project has a crucial role in determining its subsequent success or failure (Olawale & Sun, 2020). A well-executed project initiation phase establishes a solid foundation for the project's effective implementation, whereas a deficient initiation process frequently results in project failure. Energy projects are of paramount importance in facilitating sustainable development and addressing the escalating energy requirements of the global population. Ensuring the sustainability and long-term success of energy projects is contingent upon their performance. There are various aspects that exert an influence on the performance of energy projects, encompassing technological innovation, funding, government laws, and project management techniques (Kumar & Kumar, 2018). The efficacy of an energy project is significantly impacted by the caliber of project initiation. Insufficient project start can result in subpar planning, objectives that are not aligned, and unreasonable project expectations, ultimately leading to project delays and exceeding the allocated budget (Zayed, 2017). In contrast, project initiation that is executed effectively guarantees that the project is in accordance with the strategic objectives of the business, addresses the requirements of stakeholders, and is feasible in terms of project execution, ultimately leading to the successful delivery of the project (Olawale & Sun, 2020).

Numerous research investigations have substantiated the significance of project beginning in the achievement of energy initiatives. Hlupic et al. (2019), it was demonstrated that the initiation phase holds paramount significance in ensuring the successful execution of energy projects. To ensure the effective start and performance of energy projects, project managers should prioritize several key factors. These include the establishment of well-defined project objectives, the acquisition of stakeholder support establishing a strong foundation for project success by delineating project objectives, discerning key stakeholders, and formulating a detailed plan.

Resource Based Theory

Management theory known as resource-based theory places an emphasis on the resources and talents of an organization as a means to get a market advantage (Barney, 2021). The success of a project hinges, according to Resource-Based Theory, on how well its resources are managed. According to this school of thought, businesses can increase their chances of success by making strategic use of their special assets. The project management process is essential in the context of energy infrastructure projects since it helps maximize the efficiency with which resources are allocated and coordinated.

According to resource-based theory the availability and efficient use of essential resources including trained workers, machinery, money, and technology. Particularly resource-intensive are infrastructure projects, and their success or failure hinges in large part on how well those resources are managed.

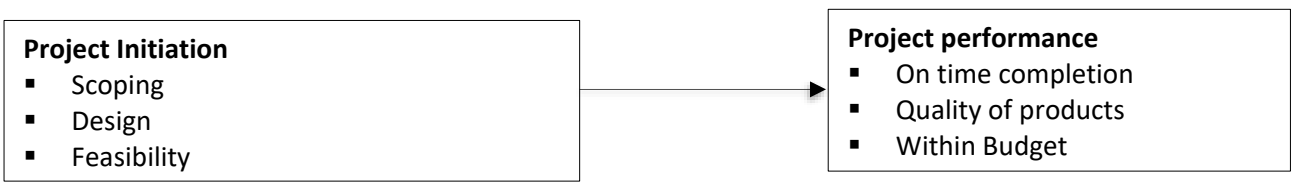
The impact of the resource-based theory on the management of infrastructure projects has been the subject of several studies. Akintoye and MacLeod (2017), for instance, used resource-based theory to assess the value of different approaches to procurement on building projects. The research concluded that a good procurement strategy may guarantee the availability and efficient use of critical resources, which in turn boosts project output.

In a similar vein, Li et al. (2018) effective project management strategies were determined to be crucial for project success and could assist assure the availability and efficient use of essential resources, such as risk management, stakeholder involvement, and resource allocation. One such study looked at how the project management process affected the success of renewable energy infrastructure projects and was conducted by Wu, Wang, and Wang (2020). Project performance indicators such as completion on time, adherence to budget, and stakeholder satisfaction were found to be positively influenced by a clearly defined project management process that included clear objectives, meticulous planning, efficient resource allocation, and effective coordination.

Project managers may boost performance and maintain a competitive edge by prioritizing the availability and efficient use of critical resources. This hypothesis addresses the impact of Rwanda's energy infrastructure project initiation procedure on subsequent project outcomes. Managers in Rwanda utilizes adaptability to deal with the frequent occurrence of uncertainty in the performance of infrastructure projects.

Conceptual Framework

Cooper and Schindler (2017) define a conceptual framework as a collection of concepts that are systematically arranged to serve as a foundation for the integration, presentation, and interpretation of information, hence providing a clear focus and justification. According to Bogdan and Biklen (2017), the presence of a well-constructed conceptual framework aids in elucidating potential relationships among variables. It's derived from the theoretical framework of this study: Resource based theory.



Independent Variable **Dependent variable**

Figure 1: Conceptual framework

Source: Researcher, 2023

METHODOLOGY

To effectively address the research inquiries posed in this study, it is essential for the researcher to establish a meticulously crafted course of action, commonly referred to as a research design (Copper & Schindler, 2017). The methodological approach

chosen for this research is a descriptive survey. Surveys, as outlined by Kothari (2017), are a valuable data gathering method and technique that enable researchers to obtain statistical insights about the characteristics of a given population. This method involves the systematic collection of data through the administration of questions to individuals who are part of the population under investigation. In the context of this study, the survey research design was chosen because of its suitability for capturing relevant data and correlations. It is particularly well-suited for investigating the intended relationships between project management processes (including Initiation,) and the success of energy projects in Rwanda. In a descriptive survey, researchers can systematically collect information from a wide range of participants, which in this case may include project managers, stakeholders, and other key individuals involved in energy infrastructure projects in Rwanda. The survey instrument, whether administered in a written or verbal format, provides a structured and standardized means of collecting data, ensuring consistency and comparability across responses. The research population consisted of five completed REG projects that were worked on by a total of 124 REG employees (REG, 2023) over the study's time frame.

Table 1: Target population

Area of operation	Population
Quality and Audit	24
Customer Care	20
Finance	12
Procurement	14
Business Market-Project Management	20
Engineers	34
Total	**124**

*Source: **HR Department REG Kicukiro branch**, 2023*

In this research, the sampling methodology was a crucial aspect of the study's design. Mugenda and Mugenda (2017) define sampling as the method of carefully choosing a portion of a larger population for study, with the objective of ensuring that this selected subset is a representative reflection of the entire population under investigation. To achieve this, the research utilized the approach of conducting a census, whereby the entire population of interest was examined. In this context, the population consisted of all energy infrastructure projects in Rwanda, particularly those within the Kicukiro District, during the study period.

By conducting a census, the research aimed to minimize the margin of error, enhance the validity and reliability of the findings, and ensure that the results could be confidently applied to the entire population of energy infrastructure projects in Rwanda.

Primary data collection was a fundamental aspect of this research. Surveys and structured interviews were conducted with project managers, government officials, and stakeholders directly involved in energy infrastructure projects in Rwanda, particularly in the Kicukiro District. These primary data sources were instrumental in gathering insights into the practical challenges faced during project management and their effects on project outcomes. Moreover, by engaging with key project participants, the research could delve deeper into the specific intricacies of project management processes and their role in shaping project success.

In essence, the integration of both primary and secondary data sources ensured the research's robustness and comprehensiveness. The primary data offered specific insights and real-world perspectives, while the secondary data provided the necessary depth and context to understand the broader implications of project management

processes on energy infrastructure projects in Rwanda. This mixed-method approach facilitated a holistic analysis, enabling the study to draw well-informed conclusions and recommendations for the benefit of project managers, policymakers, and the academic community interested in this critical domain of infrastructure development.

Primary data is information that has been acquired in a direct manner from respondents. Questionnaires were used as the major method of data collection in this investigation. Questionnaires contain questions designed to elicit certain answers from respondents. The creation, dissemination, and aggregation of data are all simplified by this approach. As a result, it increases objectivity by removing any remaining biases from the interview process.

The surveys are closed-ended and provide a 5-point knowledge scale for self-administration. The purpose of these questions is to elicit responses as quickly as possible. The drop and pick technique were used to gather completed surveys after they have been distributed. To prevent people from forgetting to fill out the surveys, we'll be following up with them on a regular basis.

In order to anticipate potential issues, the study conducted a pilot test of the data collection tools and methods. At RURA, put this to the test by giving each department's staff members a set of 13 questions to answer. After the questionnaires are filled out, they were analyzed for uniformity. To test the instruments for validity and reliability, a pilot study was required.

Cronbach alpha, is a measure of internal consistency, was used to examine the internal reliability of the questionnaire. The higher the mark, the more dependable the generated data is. (Nunnaly 2015) has indicated 0.7 to be an acceptable reliability thus it was considered adequate for this study. Based on the feedback from the pilot test, the questionnaire was modified and a final one developed.

Tables 2 below shows that all the scales were significant, having an alpha above the prescribed threshold of 0.7. The table provides information on the reliability of two key variables used in the study: "Project initiation" and "Performance of projects." These variables have been assessed for their reliability using the alpha (α) coefficient, a common measure of internal consistency or reliability in research. The alpha values for both variables are high, with "Project initiation" having an alpha of 0.899 and "Performance of projects" having an alpha of 0.795. These high alpha values suggest that both variables are internally consistent and reliable, indicating that the measurement instruments used to assess project initiation and project performance in the study are robust and dependable for the purposes of the research.

Table 2: Reliability Statistics

Variable	Alpha (α)	Comments
Project initiation	0.899	Reliable
Performance of projects	0.795	Reliable

Source: **Pilot Results**, (2023).

RESULTS AND FINDINGS

Descriptive Results on Project initiation

The research objective was to determine the effect of project initiation on performance of energy infrastructure projects in Rwanda. The table of findings provides insights into various aspects of project initiation with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The table includes statements related to project design, scope, feasibility studies, standards, and project stages. The respondents were given the following statements in order to determine the degree to which they agreed with each statement. The tabulation of the results can be found at table 3.

Table 3: Respondents views on project initiation

Statement on project initiation	1	2	3	4	5	Mean	Std Dev
Project design is done to determine commercial and technical terms	0.0%	0.0%	2.0%	39.0%	59.0%	4.57	.537
When scope of the project is prepared deliverables and milestones are reasonable and attainable	0.0%	2.0%	6.0%	37.0%	55.0%	4.45	.702
A feasibility study outlining responsibilities of all key stakeholders is signed	0.0%	1.0%	7.0%	25.0%	67.0%	4.58	.670
There are standards and goals designed for measuring performance are clear and attainable	0.0%	2.0%	8.0%	27.0%	63.0%	4.51	.732
Project scope outlines all projects stages up to closure	0.0%	0.0%	2.0%	45.0%	53.0%	4.51	.541
At feasibility study testing and acceptance parameters are defined in advance	0.0%	0.0%	5.0%	42.0%	53.0%	4.48	.594
Composite mean						**4.52**	

Source: **Primary data**, (2023).

According to Table 3, the purpose of project design, according to 59% of respondents, is to ascertain technical and commercial terms. This is consistent with the literature study and represents a sizable majority. Project design is frequently highlighted in the literature as an essential first stage that lays the foundation for a successful project's completion (Smith, 2017).

When preparing the project scope, the second row shows that 55% of respondents think that deliverables and milestones are acceptable and attainable. This is in line with research that highlights how crucial it is to create reasonable project goals while preparing the scope of the project (Turner, 2014).

According to the third row, 67% of respondents said that a feasibility study detailing the obligations of all significant parties is signed. This is in line with the literature, which emphasizes the necessity of a thorough feasibility assessment to evaluate the project's profitability and define stakeholder roles (Kerzner, 2013). According to the fourth row, 63% of respondents believe that performance standards and goals are reachable and unambiguous. This aligns with existing literature that emphasizes the significance of establishing unambiguous and attainable project standards and performance measures (Pinto & Slevin, 2018).

According to the fifth row, 53% of respondents said that the project scope includes all phases of the project up until closure. This result is consistent with the literature, which highlights the necessity of a thorough project scope document that details each phase of the project (Schwalbe, 2018).

According to the sixth row, 53% of respondents concur that testing and acceptance parameters are defined during the feasibility study phase. This result is consistent with previous research that emphasizes how crucial it is to define testing and acceptance criteria early on in the feasibility study in order to guarantee project success (Heagney, 2016). This contradicts the submission made by Hussain (2013), who stated that numerous committees that meet twice a year to debate important policy problems and decide on the right set of deliverables are part of Kenya's aid consultation, alignment, and harmonization procedures within the energy sector. It is evident that Rwanda Energy Group has given

project initiation top priority as a factor in successful project implementation given the high frequencies of affirmative responses to questions about positive aspects of project initiation and the high frequencies of non-affirmative responses to questions about negative aspects of project initiation.

Regression Results for Project initiation

The objective of the study was to determine the effect of project initiation on performance of energy infrastructure projects in Rwanda. Linear regression was used to test the relationship between project initiation and performance of energy infrastructure projects in Rwanda. Path coefficients were used to determine the direction and strength while T=statistics provided information on the significance of the relationships. The study null hypothesis was stated as;

H_{O1}: Project initiation has no significant effect on performance of energy infrastructure projects in Rwanda

The R^2 for the regression model between project initiation and performance of energy infrastructure projects in Rwanda was 0.169 meaning that project initiation in performance of energy infrastructure projects in Rwanda explained 16.9% variation in the performance of energy infrastructure projects in Rwanda while the remaining variation is explained by the error term as shown on table 4.

Table 4: Model summary for Project initiation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.411[a]	.169	.160	.26954

a. Predictors: (Constant), Project initiation

Source: **Primary data**, (2023).

Analysis of variance for regression tests the general significance of the regression model fitted. In a bivariate regression model with only one coefficient, the ANOVA tests whether the estimated coefficient is not equal to zero. The F-statistic is 19.909, and the associated p-value (Sig.) is extremely low ($p < 0.001$), indicating that the regression model is statistically significant. In other words, the inclusion of "Project initiation" as a predictor variable significantly contributes to explaining the variance in the performance of energy infrastructure projects. Hence rejecting the first null hypothesis.

Table 5: ANOVA results for Project initiation ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.446	1	1.446	19.909	.000[b]
	Residual	7.120	98	.073		
	Total	8.566	99			

a. Dependent Variable: Performance of energy infrastructure projects

b. Predictors: (Constant), Project initiation

Source: **Primary data,** (2023).

The regression model obtained from the output was;

Performance of energy infrastructure projects =2.33 +0.468 Project initiation

The "Constant" represents the intercept value, which is 2.333, indicating the estimated performance score when project initiation is zero. The unstandardized coefficient for "Project initiation" is 0.468, signifying that for every one-unit increase in project initiation, there is an associated increase of 0.468 units in the performance of energy infrastructure projects. The standardized coefficient (Beta) is 0.411, demonstrating the relative importance of project initiation in explaining variations in project performance. The t-value of 4.462 indicates that the relationship between project initiation and project performance is statistically significant at the 0.01 level (two-tailed), meaning that project initiation has a significant

impact on the performance of energy infrastructure projects. Overall, this analysis suggests that project initiation plays a substantial role in influencing the performance of such projects, with higher project initiation levels associated with improved project performance.

Table 6: Coefficient results for Project initiation Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.333	.474		4.925	.000
	Project initiation	.468	.105	.411	4.462	.000

a. Dependent Variable: Performance of energy infrastructure projects

Source: **Primary data**, (2023).

CONCLUSIONS AND RECOMMENDATIONS

The findings from the survey unequivocally stress the paramount significance of effective project initiation processes for the successful execution of energy infrastructure projects in Rwanda. Respondents exhibited a remarkable consensus, with an overwhelming majority strongly concurring on various aspects of project initiation. Particularly noteworthy is the unanimous recognition of the pivotal role of project design in specifying commercial and technical terms, signifying its fundamental purpose. Similarly, the substantial agreement regarding the need for realistic and attainable project scopes and milestones underscores their crucial importance. The strong emphasis on feasibility studies and the delineation of stakeholder responsibilities further solidifies the central role of well-defined stakeholder roles. Additionally, the high regard for performance measurement standards and comprehensive project scopes highlights their critical contribution to project initiation. The robust validation of these findings through regression analysis, where project initiation significantly influences energy infrastructure project performance, reinforces their importance. In summary, these results leave no room for doubt: effective project initiation stands as a linchpin for the success of energy infrastructure projects, a consensus firmly rooted in both survey responses and statistical analysis.

Based on the findings of this study, it is recommended that stakeholders involved in energy infrastructure projects in Rwanda place a significant emphasis on the project initiation phase. Recognizing the substantial impact of project initiation on the performance of energy infrastructure projects, policymakers, project managers, and investors should prioritize well-defined project scopes, active stakeholder involvement, and a supportive regulatory environment. Efforts should be made to mitigate challenges related to political instability, bureaucratic hurdles, and limited access to financial resources, while capitalizing on opportunities such as international collaborations and renewable energy incentives. By addressing these aspects of project initiation, Rwanda can further enhance the success and efficiency of its energy infrastructure projects, ultimately contributing to the nation's sustainable economic growth and development goals. This study's insights serve as a valuable guide for optimizing project initiation practices in the energy sector, ensuring long-term benefits for both the country and its citizens.

Suggestions for Further Studies

This study has provided valuable insights into the relationship between project initiation and the performance of energy infrastructure projects in Rwanda. However, there are several avenues for further research. Firstly, a longitudinal study could be conducted to assess the long-term impact of project initiation on project performance, providing a more comprehensive understanding of how these relationships evolve over time. Secondly,

investigating the specific factors and strategies within project initiation that have the most significant influence on project performance would offer more targeted guidance for project managers and policymakers. Additionally, a comparative analysis with other countries in the region or similar economic contexts could provide a broader perspective on the findings. Lastly, considering the role of sustainability practices and their integration into project initiation processes could be a promising direction, given the increasing global emphasis on sustainable energy infrastructure development.

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