Journal of Entrepreneurship & Project Management

Effect of Project Planning on Environmental Project Performance: A Case of Flood Management in the Volcano Region Project in Musanze District, Rwanda

Innocent Twagirimana & Dr. Jean de Dieu Dushimimana

ISSN: 2616-8464

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

Effect of Project Planning on Environmental Project Performance: A Case of Flood Management in the Volcano Region Project in Musanze District, Rwanda

Innocent Twagirimana[1] & Dr. Jean de Dieu Dushimimana[2]
[1]Master of Project Management, University of Kigali, Rwanda
[2] Senior Lecturer, University of Kigali, Rwanda

***How to cite this article*: Twagirimana I. & Dushimimana J., D. (2023). Effect of Project Planning on Environmental Project Performance: A Case of Flood Management in the Volcano Region Project in Musanze District, Rwanda. *Journal of Entrepreneurship & Project Management. Vol* 7(12) pp. 58-68 https://doi.org/10.53819/81018102t2231**

Abstract

The general objective of this research was to find out the effect of project planning on the performance environmental projects in Musanze District. Specifically the study guided by the following objectives to find out the effect of scope planning on performance of flood management in the volcano region project in Musanze District, determine the effect of cost planning on performance of flood management in the volcano region project in Musanze District, investigate the effect of human resource planning on performance of flood management in the volcano region project in Musanze District and assess the effect of risk planning on performance of flood management in the volcano region project in Musanze District. The population of this study was 328 people including Project staff, District staff, Sector staff in surrounding volcanoes and flood management in the volcano region project beneficiaries' representatives. This study used a sample of 180 participants which chosen using Slovin's formula. The researcher relied on document analysis, questionnaires, and interviews in collecting data. Statistical Package for Social Sciences (SPSS) used in the study. Descriptive and inferential statistics used to analyse data. The R value of 0.849 indicates a strong relationship between the predictors and the outcome variable. The R Square value of 0.721 indicates that approximately 72.1% of the variability in the outcome variable can be explained by the predictors in the model. Specifically, Scope planning has a coefficient (β= 0.444, t=7.388, p value=0.000), Cost planning has a coefficient (β= 0.363, t=4.533, p value=0.000), Human resource planning has a coefficient (β= 0.419, t=3.192, p value=0.002), and Risk planning has a coefficient (β= 0.333, t=2.494, p value=0.002). All these coefficients are statistically significant on performance of flood management in the volcano region project in Musanze District, as indicated by their associated Sig. values below 0.05. Flood management in the volcano region project should focus on strengthening its definition and control processes for scope changes. This will help in clearly defining and managing alterations to the project's objectives, activities, and deliverables, ensuring a more efficient and successful flood management project.

Key words: *Project Planning, Scope Planning, Cost Planning, Human Resource Planning, Risk Planning and Project Performance*

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

1. Introduction

Numerous projects in developing nations have faced challenges in achieving their overarching goal, which is to address socioeconomic issues among their beneficiaries in a sustainable manner. Regrettably, a considerable proportion of these endeavours have secured funding from both domestic and international donors, but have failed to translate this financial support into socioeconomic empowerment due to inadequacies in project management practices (Kaluai, 2020).

In Rwandan rural areas, about 85% of people use wood, like charcoal, for cooking. This causes a big problem: too many trees are being cut down. With each occurrence of rainfall, a notable phenomenon unfolds wherein an escalating quantity of the uppermost layer of soil undergoes erosion and subsequently finds its way into the river, thereby engendering the formation of profound and rugged gullies. The consequential occurrence of landslides not only leads to the devastating destruction of agricultural lands but also poses a significant risk to human lives (Eustache, 2020).

The findings from the past studies show that a number of projects in Rwanda fail for a variety of reasons, such as poor risk management, a lack of resources, and poor communication. The results of the research have shown that focusing on key performance indicators, like stakeholder engagement, monitoring, and decision-making, shows that the project will be successful when the tools and procedures needed to keep the project from failing are taken into account (Mukeshimana, 2021).

There have been a few studies on project management techniques and project performance in the region. For example, Gahigana (2019) evaluated the factors that influence project success. Samuel (2018) investigated the relationship between project management techniques and the performance of projects for non-governmental organizations. Kobusingye*et al.* (2017) examined the relationship between project management techniques and the performance of agricultural projects. Sibonama *et al.* (2020) investigated the relationship between project management techniques and the performance of infrastructure projects.

The aforementioned research did not concentrate on effect of project planning on the performance environmental projects in Musanze District. Hence, the need for this study to be carried out to specifically address the academic parity gap in understanding the critical role of scope planning, cost planning, human resource planning and risk planning on the performance of flood management in the volcano region project in Musanze District.

1.2 Objectives of the Study

The objective of this research was to find out the effect of project planning on the performance environmental projects in Musanze District.

Specifically, the study guided by the following objectives:

i. To find out the effect of scope planning on performance of flood management in the volcano region project in Musanze District.
ii. To determine the effect of cost planning on performance of flood management in the volcano region project in Musanze District.
iii. To investigate the effect of human resource planning on performance of flood management in the volcano region project in Musanze District.
iv. To assess the effect of risk planning on performance of flood management in the volcano region project in Musanze District.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

1.3 Research hypotheses

The study guided by the following hypotheses.

Ho1: There is no significant effect of scope planning on performance of flood management in the volcano region project in Musanze District.

Ho2: Cost planning has no significant effect on performance of flood management in the volcano region project in Musanze District.

Ho3: There is no significant effect of human resource planning on performance of flood management in the volcano region project in Musanze District.

Ho4: Risk planning practice has no significant effect of risk planning on performance of flood management in the volcano region project in Musanze District.

2. Literature review

2.1. Theoretical framework

The main theory underlying this study are theory of change and goal setting theory. Details on theory are reviewed in the following section.

Goal setting theory

The Goal Setting Theory, formulated by psychologist Edwin Locke and management researcher Gary Latham during the late 1960s and early 1970s, posits that setting specific and challenging objectives can enhance performance and motivation for both individuals and teams. Their argument revolves around the idea that having precise, measurable, achievable, relevant, and time-bound (SMART) goals can effectively stimulate individuals to best (Latham & Locke, 2019).

Goal setting theory is a management theory that proposes that setting specific and challenging goals can lead to increased motivation, performance, and achievement. According to the theory, individuals and teams perform better when they have clear goals to work towards and a sense of purpose and direction. Critics of goal setting theory argue that it can lead to unintended consequences, such as unethical behaviour or a focus on short-term goals at the expense of long-term goals. However, advocates of the theory argue that these risks can be mitigated by careful goal setting and management. Goal setting theory has had a significant impact on management practice and continues to be an important area of research and development in the field of organizational behaviour (Seijts & Latham, 2020).

The Goal Setting Theory posited that setting clear and specific goals can enhance performance. In the context of research, effective scope planning involves defining clear project objectives and boundaries. When project goals and scope are well-defined, it provides a clear direction for the project team.

Theory of change

This was made by the Aspen Institute Roundtable on Community Change in the 1990s as a way to model and measure the activities of exhaustive networks. The Theory of Change is a full picture and explanation of how and why a change that is wanted is expected to happen. This is why ToC must be considered in project management practices because when you plan, you set changes that you want to realize or you determine what you want to achieve, how it will be achieved, and when it will be realized. The performance of the project is measured according to the indicators of changes that you have planned for ((Adema, Malietso & Anyanje, 2020).

Even when you have a firm grasp on the problem and know exactly what you want to achieve, project management can feel insurmountable. You can use a Theory of Change to map out your course of action as you go from the current state to your desired future state of affairs. The Theory of Change (ToC) provides an explanation for why and how a given change process will occur. The rationale lays forth the assumptions that underpin the proposed intervention and demonstrates the causal relationships between the short-, intermediate-, and long-term outcomes (Vogel, 2012).

The researcher used the theory of change to find out how project planning practices affect project performance. The researcher did this by looking at how well the project was set up to make the changes that were wanted and whether or not those changes were made. Researchers can also tell if the changes they wanted to see happened by measuring how well the project did. This is because the theory of change in project management practices can be seen as inputs whose results can be seen in how well the project did.

Cost-Benefit Analysis Theory

Cost-Benefit Analysis Theory is a method of assessing the resource costs and benefits of any project. Jules Dupuit, a French engineer and economist, conducted the first known CBA on bridge building in the 1840s. A cost-benefit analysis is a decision-making tool that compares the costs of a project with the potential advantages it can create. Cost-benefit analysis (CBA), as a standard tool in the decision-making process on how to allocate financial resources, has been widely employed in numerous study areas and in practically all countries throughout the world (Jiang & Marggraf, 2021).

This theory indicated how effective cost planning and management are crucial for ensuring that project resources are allocated optimally, and that the benefits derived from the project balance its costs. It is essential to understand the financial implications of different decisions and prioritize investments that offer the best value for money.

Resource-Based View (RBV) Theory

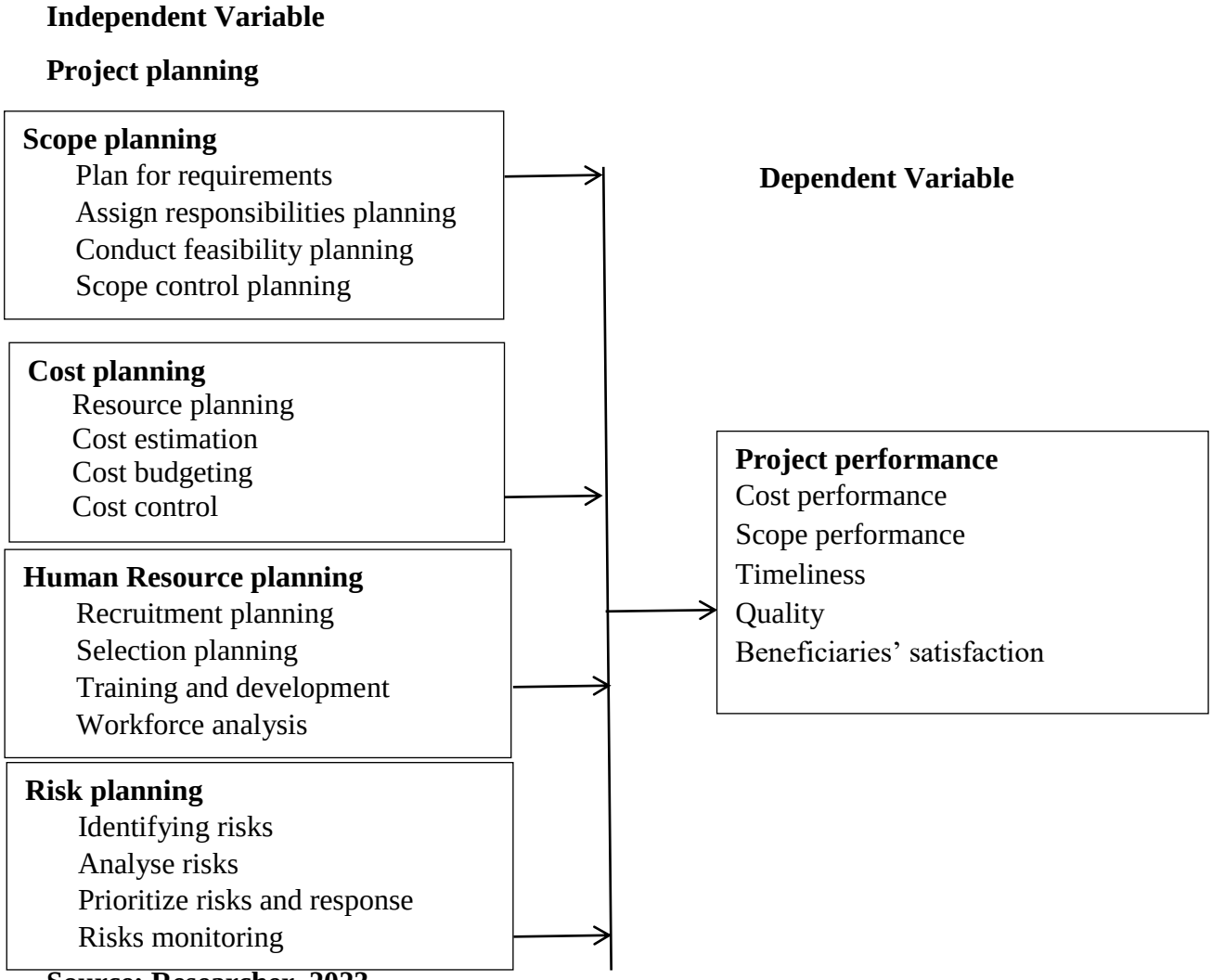
The Resource-Based View (RBV) Theory, first introduced by Birger Wernerfelt (1984) and later extended and modified by Jay B. Barney (1991) and other scholars, has achieved widespread acceptance in the business literature. The firm's resources and capabilities determine its competitive advantage, which is a key idea of resource-based theory. The Resource-Based View theory focuses on how a firm's unique resources and capabilities contribute to its competitive advantage and overall performance (Larsson & Larsson, 2020).

In the context of this research, this theory described how human resource planning plays a critical role in identifying, acquiring, and managing the right talent for the project. Effective human resource planning ensures that the project team possesses the necessary skills, experience, and expertise, which in turn enhances project performance.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

2.2 Conceptual framework

A conceptual framework is used to map out the important ideas, variables, and relationships in this the study. In other words, a conceptual framework is a strategy for organizing concepts in order to achieve a set of research objectives.



Source: Researcher, 2023

Figure 1: Conceptual framework

The independent variable is project planning, with its sub variables including scope planning, cost planning, human resource planning, and risk planning. These variables represent different aspects of project planning practices that can influence the outcome of a project. The dependent variable is project performance, which encompasses several indicators such as the quality of deliverables, adherence to schedule, budget compliance, and achievement of project goals. The connection between the independent variables and the dependent variable is that the implementation and effectiveness of these planning practices can directly impact the likelihood of achieving project performance.

By implementing these planning effectively, project managers can increase the likelihood of achieving project performance in terms of delivering high-quality outcomes, adhering to the project schedule, complying with the allocated budget, and achieving project goals. However, it is important to note that project success is influenced by various other factors, and these planning practices are just a part of the overall project management process.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

3. Research methodology

Research design

The researcher conducted both descriptive and correlational studies. Descriptive survey research use surveys to collect information on a variety of issues, quantitative approach used for data collected with questionnaire while qualitative approach used for interview response and correlational studies research design examined at the links that exist between variables under the study.

Population and sample size

The term population is used to describe the whole group of individuals under whose data is collected. A population consists of all the people, things, or quantities that share a set of characteristics that can be seen (Taherdoost, 2018).

The population of this study was 328 people including Project staff, District staff, Sector staff in surrounding Volcanoes area and beneficiaries' representatives.

Slovin's formula enabled researchers to sample the community with the appropriate degree of precision, while studying the complete population is impossible owing to lack resources and time. Using Slovin's formula, researcher estimate how big of a sample they needed to get reliable findings.

$$n = \frac{N}{1 + (Ne^2)}$$

n= Number of samples or sample size

N= Total population

e = Error tolerance

$$n = \frac{328}{1 + (328x0.05^2)}$$

$$n = \frac{328}{1 + (328x0.0025)}$$

$$n = \frac{328}{1 + 0.82}$$

$$n = \frac{328}{1.82}$$

$$n = 180.2 \cong 180$$

Data collection and data analysis

The researcher relied on document analysis, questionnaire and interviews to compile the data. The researcher more easily displayed the findings in the form of numbers and statistics, giving the reader a more holistic understanding of the findings. Statistical Package for Social Sciences (SPSS) used in the study.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

4. Research findings

The findings, analysis, and discussions on the research objectives were presented using descriptive (percentage, mean, and standard deviation) and inferential (regression and correlation) analysis with the assistance of the Statistical Package for Social Sciences (SPSS).

Table 1: Response rate

Questionnaires	Frequency	Percent
Returned	166	92.2
Unreturned	10	5.6
Incomplete	4	2.2
Total	180	100.00

Table 1 presents the response rate for the questionnaires distributed in the study. Out of a total of 180 questionnaires distributed, 166 were returned, constituting the majority of the responses. This accounts for a response rate of approximately 92.2%. There were 10 questionnaires that remained unreturned, representing a non-response rate of approximately 5.6%. Additionally, 4 questionnaires were returned incomplete, making up around 2.2% of the total distributed. The high rate of returned questionnaires indicates a strong engagement and participation of the respondents in the study, contributing to the reliability of the data collected.

Table 2: Correlations matrix

		Scope planning	Cost planning	Human resource planning	Risk planning	Project performance
Scope planning	Pearson Correlation	1	.707**	.658**	.640**	.784**
	Sig. (2-tailed)		.000	.000	.000	.000
	N		166	166	166	166
Cost planning	Pearson Correlation		1	.811**	.797**	.779**
	Sig. (2-tailed)			.000	.000	.000
	N			166	166	166
Human resource planning	Pearson Correlation			1	.908**	.708**
	Sig. (2-tailed)				.000	.000
	N				166	166
Risk planning	Pearson Correlation				1	.699**
	Sig. (2-tailed)					.000
	N					166
Project performance	Pearson Correlation					1
	Sig. (2-tailed)					
	N					166

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

Source: Field data (2023)

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

In Table 2, strong positive correlations are evident between various planning factors and Project performance. Scope planning exhibits a strong positive correlation of 0.784, highlighting that well-structured scope planning is closely linked to better project performance. Similarly, Cost planning shows a strong positive correlation of 0.779, indicating that effective cost management contributes significantly to improved project performance. Human resource planning demonstrates a positive correlation of 0.708, emphasizing the importance of resource allocation and management in project success. Risk planning displays a significant positive correlation of 0.699, indicating the role of proactive risk identification and mitigation in achieving better project performance. These correlations, all statistically significant at the 0.05 level, collectively indicates that enhancements in Scope planning, Cost planning, Human resource planning, and Risk planning are associated with improved overall performance of flood management in the volcano region project in Musanze District.

The findings, supported by Larsson and Larsson (2020) emphasis on projects as generators of returns in monetary or non-monetary terms, underscore the crucial link between effective planning factors (Scope, Cost, Human resource, Risk) and Project performance. Strong positive correlations in Table 2 affirm that well-structured planning in these domains enhances a project's ability to meet its objectives and deliver desired outcomes throughout its lifecycle. This aligns with the understanding that some projects face challenges like unmet beneficiary interests, unachieved goals, late implementation, and unexpected results (Larsson & Larsson, 2020). Thus, the study's results emphasize the pivotal role of strategic planning in achieving project success and realizing intended returns.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849[a]	.721	.714	.35872

a. Predictors: (Constant), Risk planning, Scope planning, Cost planning, Human resource planning

Source: Field data (2023)

Table 3 presents the model summary for a regression analysis. The model includes predictors such as Risk planning, Scope planning, Cost planning, and Human resource planning. The R value of 0.849 indicates a strong relationship between the predictors and the outcome variable. The R Square value of 0.721 indicates that approximately 72.1% of the variability in the outcome variable can be explained by the predictors in the model. Overall, this model summary indicates a significant relationship between the planning factors and the outcome variable performance of flood management in the volcano region project in Musanze District, with a good fit to the data.

The findings, supported by Bahadorestani (2020) perspective on project planning practices, underscore the pivotal role of structured and systematic planning approaches in project management. The strong relationship revealed in Table 4.13 between planning factors (Risk planning, Scope planning, Cost planning, Human resource planning) and project outcomes aligns with the essence of project planning practices. These practices encompass a comprehensive roadmap that includes defining project objectives, scoping, task allocation, resource management, scheduling, and oversight (Bahadorestani, 2020). By adhering to these practices, projects not only achieve success but also ensure efficient resource utilization, adherence to timelines, and quality standards. This reaffirms the centrality of well-structured planning as a cornerstone for effective project execution and management.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Entrepreneurship & Project Management
Volume 7||Issue 12||Page 58-68 ||October||2023|
Email: info@stratfordjournals.org ISSN: 2616-8464

Table 4: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	53.605	4	13.401	104.144	.000[b]
	Residual	20.718	161	.129		
	Total	74.323	165			

a. Dependent Variable: Project performance
b. Predictors: (Constant), Risk planning, Scope planning, Cost planning, Human resource planning

Source: Field data (2023)

The F-statistic in Table 4, with a value of 104.144, indicates the results of an Analysis of Variance (ANOVA) for the regression model. The associated significance level (Sig.), denoted as .000, is less than the typical significance threshold of 0.05. This implies that the overall model, which includes predictors like Risk planning, Scope planning, Cost planning, and Human resource planning, is statistically significant. In simpler terms, there is strong evidence to assume that at least one of the predictors in the model has a significant impact on the dependent variable, performance of flood management in the volcano region project in Musanze District. This indicates the importance of these planning factors in influencing project performance outcomes.

The findings, in line with Dubois and Silvius (2020) perspective on project planning practices, strongly support the crucial role of established planning methods in effective project management. The highly significant F-statistic and Sig. value in Table 4.14 indicates that integrating planning factors significantly influences Project performance. This aligns with the essence of project planning practices, which aim to ensure successful project completion within defined resource constraints, timelines, and quality standards. This empirical evidence highlights the fundamental importance of rigorous planning practices in achieving project success and meeting project objectives while adhering to limitations.

Table 5: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.320	.162		1.982	.049
	Scope planning	.444	.060	.445	7.388	.000
	Cost planning	.363	.080	.359	4.533	.000
	Human resource planning	.419	.131	.414	3.192	.002
	Risk planning	.333	.133	.324	2.494	.014

a. Dependent Variable: Project performance

Source: Field data (2023)

In Table 5, the constant term, representing the estimated intercept of the regression model, has an unstandardized coefficient of 0.320 with a standard error of 0.162, and it is statistically significant with a Sig. value of 0.049. The unstandardized coefficients for the predictor variables reveal their individual impacts on Project performance. Specifically, Scope planning has a coefficient of (β= 0.444, t=7.388, p value=0.000), Cost planning has a coefficient of (β= 0.363, t=4.533, p value=0.000), Human resource planning has a coefficient of (β= 0.419, t=3.192, p value=0.002), and Risk planning has a coefficient of (β= 0.333, t=2.494, p value=0.002). All these coefficients are statistically significant on performance of flood management in the volcano region project in Musanze District, as indicated by their

associated Sig. values below 0.05. The findings, as supported by Muute (2019) significance of planning practices in meeting beneficiary needs, ensuring efficiency, effectiveness, and stakeholder satisfaction, crucial for project success. This highlights the pivotal role of planning practices in project performance.

5. Conclusion

The study assessed the influence of planning tools on the performance of environmental projects in Musanze District, with a focus on scope planning, cost planning, human resource planning, and risk planning. The findings reveal valuable observations into the effectiveness of these project management tools.

Scope planning was found to significantly impact the performance of flood management in the volcano region project. It effectively outlined project requirements and defined responsibilities, contributing to better coordination and resource allocation. Cost planning played a crucial role in resource allocation for flood management, and its meticulous budgeting positively influenced project performance. Human resource planning, through recruitment, selection, training, and development, enhanced personnel competency, positively impacting project outcomes. Risk planning practice, including risk identification, categorization, and response strategies, significantly mitigated potential issues, enhancing project performance. The coefficients for these planning practices were statistically significant ($p<0.05$), supporting their positive influence on project performance. The study rejects the null hypotheses (Ho1, Ho2, Ho3, and Ho4) means that these planning practices have a substantial effect on achieving project goals.

6. Recommendations

Flood management in the volcano region project should focus on strengthening its definition and control processes for scope changes. This will help in clearly defining and managing alterations to the project's objectives, activities, and deliverables, ensuring a more efficient and successful flood management project.

Flood management in the volcano region project should maintain a comprehensive cost budgeting process that considers various resource requirements, including potential cost variations due to unforeseen factors.

References

Adedayo, O. O., Sunday, O. A., & Titilayo, O. O. (2018). Application of project scope management practices on project success among telecommunication organizations in Nigeria. *International Journal of Development and Sustainability*

Bahadorestani, A., Naderpajouh N., & Sadiq R. (2020). Planning for sustainable stakeholder engagement based on the assessment of conflicting interests in projects. *Journal of Cleaner Production*, 242, 118402.

Chawla, V., Chanda, A., Angra, S., & Chawla, G. (2018). The sustainable project management: A review and future possibilities. *Journal of Project Management*, 3(3), 157–170.

Dubois, O., & Silvius, G. (2020). The relation between sustainable project management and project success. *International Journal of Management and Sustainability*, 9(4), 218–238.

Goel, A., Ganesh, L. S., & Kaur, A. (2019). Sustainability integration in the management of construction projects: A morphological analysis of over two decades' research literature. *Journal of Cleaner Production*, 236, 1–21.

Khalifeh, A., Farrell, P., & Al-edenat, M. (2019). The impact of project sustainability management (PSM) on project success: A systematic literature review. *Journal of Management Development*, 39(4), 453–474.

Owuori P, J., Ngala, M., &Obwatho S. (2020): Project Management Practices, Corporate Governance and Sustainability: A Critical Literature Review. *Journal of Human Resource &Leadership*, Vol 4(2) pp. 30-47

Umulisa, A., Mbabazize, M., & Shukla, J. (2015). Effects of Project Resource Planning Practices on Project Performance of Agaseke Project in Kigali, Rwanda. *International Journal of Business and Management Review*, *3*(5), 29–51.