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AGILE MANAGEMENT PRACTICES AND PERFORMANCE OF LARGE-SCALE PUBLIC BUILDING CONSTRUCTION PROJECTS IN KIGALI CITY, RWANDA: A CASE OF RENOVATION AMAHORO NATIONAL STADIUM

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Abstract:

Background: *This research delves into the connection between Agile Management Practices and Performance of Large-Scale Public Building Construction Project in Kigali City, Rwanda. Its primary aimed is to examine agile management practices and performance in Rwanda's construction industry, with a focus on the Renovation Amahoro National Stadium Project (RANS project). The research was guided by three specific objectives: To assess the effect of Timely Project Financing, Contractor Competency and Stakeholder Participation on the performance of the renovation of Amahoro National Stadium project in Kigali City, Rwanda. This study was guided by three main theories namely; Agile Project Management Theory, Lean Construction Theory and Performance Management Theory. The research designs the study employed in this study was descriptive. To gather primary data, the study used both qualitative and quantitative methodologies. The population of this study was 244 employees of RANS project while the sample size was 152, selected using Yamane's formula of sample size determination.*

Materials and Methods: *The sampling technique for this study involved a combination of simple random sampling and purposive non-random sampling techniques. On the data analysis part inferential statistics such as correlation and multiple linear regressions were used to analysis data. Employing a mixed-methods approach for data collection, the study integrated both quantitative and qualitative data to provide a comprehensive analysis.*

Results: *The findings from the study revealed critical insights into project financing, contractor competence, and stakeholder participation. Timely allocation of project funds was deemed crucial for project success, with 107 respondents (70.39%) agreeing and 38 (25.00%) strongly agreeing, resulting in a mean of 4.18 and a standard deviation (SD) of 0.54. Timely payments to contractors and suppliers were similarly critical, with 110 respondents (72.37%) agreeing and 36 (23.68%) strongly agreeing, yielding a mean of 4.18 and an SD of 0.50. Bureaucratic processes negatively impacted project progress, as indicated by 106 respondents (69.74%) agreeing and 39 (25.66%) strongly agreeing, producing a mean of 4.18 and an SD of 0.56. Effective financial planning led to better project outcomes, with 105 respondents (69.08%) agreeing and 40 (26.32%) strongly agreeing, resulting in a mean of 4.20 and an SD of 0.55. Transparent financial management improved stakeholder trust, with 109 respondents (71.71%) agreeing and 37 (24.34%) strongly*

*agreeing, yielding a mean of 4.18 and an SD of 0.53. Contractor competence significantly impacted project outcomes, with 106 respondents (69.74%) agreeing and 44 (28.95%) strongly agreeing on the importance of technical skills, producing a mean of 4.27 and an SD of 0.50. Proper functioning of contractor equipment also enhanced performance, with 109 respondents (71.71%) agreeing and 39 (25.66%) strongly agreeing, resulting in a mean of 4.23 and an SD of 0.51. Effective planning and scheduling by contractors were crucial, with 113 respondents (74.34%) agreeing and 38 (25.00%) strongly agreeing, producing a mean of 4.24 and an SD of 0.44. Adherence to safety standards improved project quality, with 104 respondents (68.42%) agreeing and 46 (30.26%) strongly agreeing, resulting in a mean of 4.29 and an SD of 0.49. Continuous contractor training led to better results, with 108 respondents (71.05%) agreeing and 40 (26.32%) strongly agreeing, yielding a mean of 4.23 and an SD of 0.54. Stakeholder participation positively impacted performance, with 97 respondents (63.82%) agreeing and 49 (32.24%) strongly agreeing on the importance of involvement in decision-making, resulting in a mean of 4.28 and an SD of 0.60. Active resource mobilization by stakeholders also enhanced performance, with 95 respondents (62.50%) agreeing and 50 (32.89%) strongly agreeing, producing a mean of 4.28 and an SD of 0.62. Stakeholder involvement in project identification led to positive outcomes, with 102 respondents (67.11%) agreeing and 46 (30.26%) strongly agreeing, yielding a mean of 4.27 and an SD of 0.59. Clear communication between stakeholders was essential, with 99 respondents (65.13%) agreeing and 48 (31.58%) strongly agreeing, resulting in a mean of 4.28 and an SD of 0.60. Commitment to project goals by stakeholders further improved performance, with 101 respondents (66.45%) agreeing and 48 (31.58%) strongly agreeing, producing a mean of 4.29 and an SD of 0.59. Agile management practices were found to be highly effective, fostering flexibility and rapid response to changes, leading to enhanced project performance, with a mean score of 4.15 and an SD of 0.54. The Pearson correlation coefficient for Agile Management Practices and project performance was 0.819**, indicating a strong positive relationship, significant at the 0.05 level (2-tailed) with a significance value of .000, emphasizing the critical role of agile methodologies in achieving successful outcomes in large-scale public building construction projects.*

Key words: *Agile Management Practices, Large-Scale Public Building Construction Projects, Performance, Amahoro National Stadium, Rwanda*

I. Introduction

For the past decade, the field of project management has been witnessing a major standard shift in terms of design and operating system. It has been observed that the traditional approaches adopted by organizations for ensuring effective project management services aren't competent enough in the present work dynamics. With the changing technological environments, the concept and methodologies in context to project management have surely evolved. By the 1990s it was found that the traditional project management methodologies stand inflexible. Thus, generating the need for the development and deployment of new and effective methodologies. (Kanbanize, 2020)
Agile is still popular and new methodologies keeps appearing. A new popular method, called The Lean Startup, was created in 2021. This method advocates that using agile practices is not enough. In order to successfully launch a new company, project or product, there has to be a strong focus on the customer as well (Blank, 2023). In modern times, project stakeholders are becoming more knowledgeable, and their needs and preferences are constantly changing, with the current age of information abundance and speed providing new options and uncertainties bringing new challenges (Gao, Bai and Feng, 2020). Project service ratings and reviews are available and project

stakeholders are constantly asking project management to bring in new innovations that will deliver quality services to the project beneficiaries (Coe and Carrillo, 2015). The ability of stakeholders to provide recommendations on how they need to be served puts project management on spotlight to be flexible and adaptable in effectively responding to the evolving dynamics of their operating environment (Ahn, Kim and Lee, 2020).

According to Liubchenko (2016), managing projects through agile practices refer to the techniques, methods, policies, approaches, practices, etc. that can enable the project management and teams to change quickly and often in implementing the project and which empower them to deliver project results quickly, timely, at lower costs, high quality while meeting the standards specifications. There are many approaches to integrate agile project management practices in project management (Zuzek, *et al*., 2020; Liubchenko, 2016). However, according to Njeru and Kimutai (2018), the involvement of stakeholders in project processes (stakeholder collaboration), ability to quickly embrace change and respond to opportunities (change management) and the ability of project staffs to continuously improve project processes (continuous learning and improvement) have been identified as key agile project management practices that can effectively facilitate project performance. In 2017, the government of Rwanda, collaborated with World Bank and established the priority skills for growth project in Rwanda. The major goal of the project was to develop relevant capacities and skills that are on demand in the labor market and reduce unemployment among the youth (RDB, 2019). Globally in developed countries like in USA, before commencement of any project, the first thing that project managers need to do is project planning. Any reasonable project manager certainly understands importance of planning a project well. Carefully planned project takes into account necessary aspects of a project and provide a plan which project team can refer during execution (Larsen *et al*., 2015).

In the United States (US), Zimulinda and Ndabaga (2015), remarked that performance problems arise in large construction projects due to many reasons such as: incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. They determined that the most influential factor for time overrun was unsettled or lack of project funding. For cost overrun the influential factor was errors or omissions in consultant material while for poor quality the influential factor was errors or omissions in construction work. The main objective of this study was to assess the influence of agile management practices on the performance of the renovation of Amahoro National Stadium, a large-scale public building construction project in Kigali City, Rwanda. It was guided by the following specific objectives:

i. To assess the effect of Project Financing on the performance of the renovation of Amahoro National Stadium project in Kigali City, Rwanda.
ii. To identify the influence of Contractor Competence on the performance of the renovation of Amahoro National Stadium project in Kigali City, Rwanda.
iii. To examine the influence Stakeholder Participation on the performance of the renovation of Amahoro National Stadium project in Kigali City, Rwanda.

ii. Theoretical Framework

Agile Project Management Theory

Agile project management, as outlined in the Agile Manifesto developed by software developers in 2001, prioritizes flexibility and responsiveness to change. It advocates for prioritizing

individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan. This approach is highly relevant to the renovation of Amahoro National Stadium, as construction projects often face changing requirements and stakeholder needs. By adopting Agile practices, such as iterative development and frequent stakeholder feedback, project managers can ensure that the renovation project remains adaptable and can address evolving challenges effectively.

Moreover, Agile project management emphasizes the importance of self-organizing teams and regular reflections on how to become more effective. This aspect can be particularly beneficial for the stadium renovation project, as it encourages project teams to collaborate closely, share knowledge, and continuously improve their processes. By fostering a culture of collaboration and continuous improvement, Agile practices can enhance the overall performance of the project team and contribute to the successful completion of the renovation project.

Additionally, Agile project management promotes sustainable development, where teams can maintain a consistent pace indefinitely. In the context of the stadium renovation project, this principle can help prevent burnout among team members and ensure that the project progresses steadily towards completion. By focusing on sustainable development practices, project managers can create a work environment that supports the well-being of team members and enhances their productivity and effectiveness throughout the project.

Lean Construction Theory

The International Group developed the concept of Lean Construction for Lean Construction (IGLC) in the 1990s, building upon principles from Lean Manufacturing. It aims to maximize value and minimize waste in construction projects. It builds upon principles from Lean Manufacturing and focuses on continuous improvement, collaboration, and the elimination of non-value-adding activities. This theory is highly relevant to the renovation of Amahoro National Stadium, as it can help project managers identify and eliminate waste in the construction process, leading to improved efficiency and cost savings.

One key principle of Lean Construction is Just-in-Time delivery, which involves delivering materials and resources to the construction site exactly when they are needed. By adopting this practice, project managers can reduce inventory costs, minimize storage space requirements, and improve overall project efficiency. Additionally, Lean Construction emphasizes the importance of value stream mapping, which involves analyzing the entire construction process to identify areas for improvement and streamline workflow. This practice can help project managers identify and eliminate bottlenecks, reduce lead times, and improve project outcomes.

Furthermore, Lean Construction promotes a culture of continuous improvement, where project teams are encouraged to seek ways to improve their processes and eliminate waste. This aspect can be particularly beneficial for the stadium renovation project, as it encourages project teams to collaborate closely, share knowledge, and continuously improve their processes. By fostering a culture of collaboration and continuous improvement, Lean practices can enhance the overall performance of the project team and contribute to the successful completion of the renovation project.

Performance Management Theory

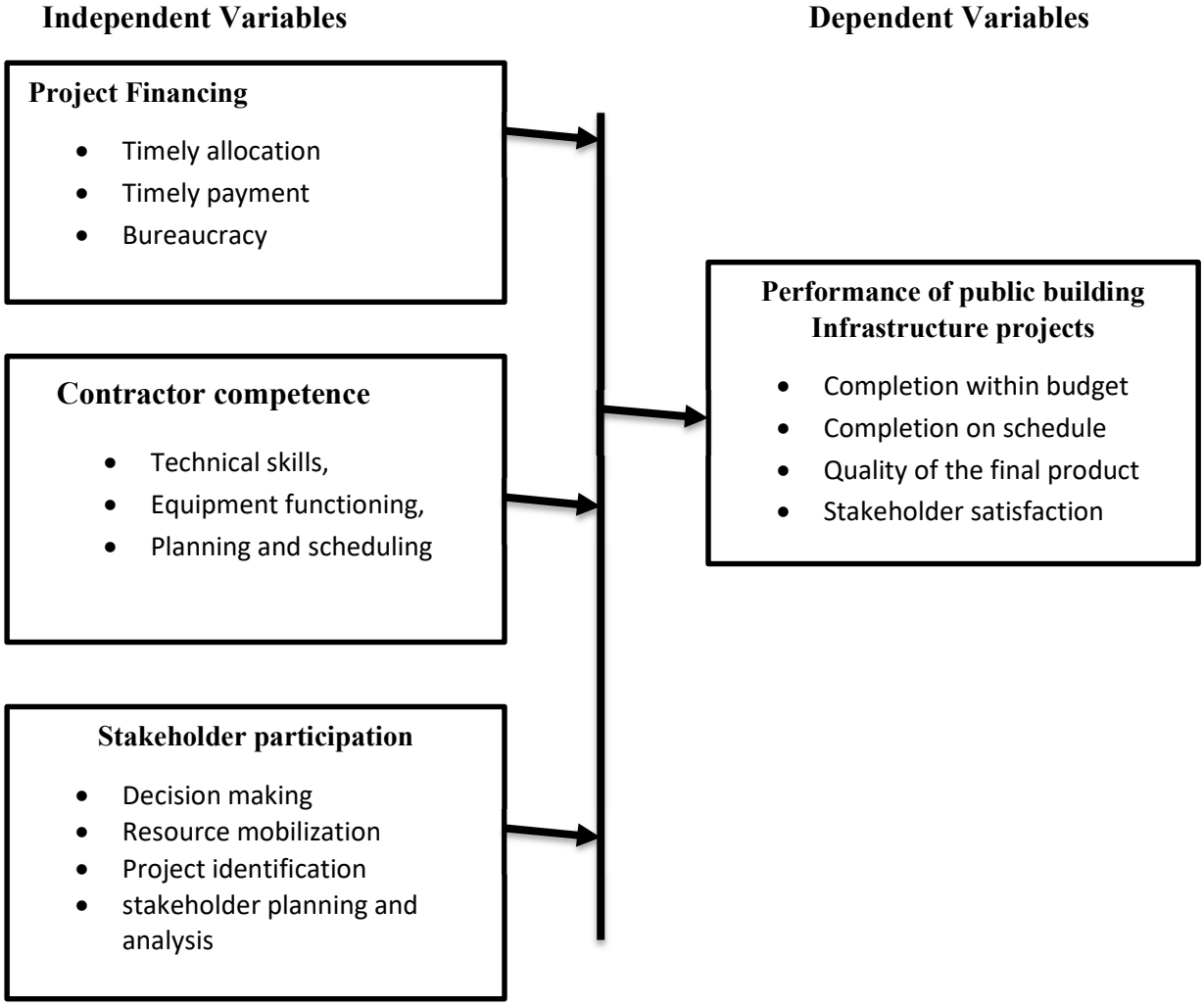
Performance management theory, which has evolved over time was developed in 1970's and is influenced by various scholars and practitioners, involves the continuous process of setting objectives, assessing progress, providing feedback, and making adjustments to improve performance. It aims to align individual and organizational goals and improve overall effectiveness. This theory is highly relevant to the renovation of Amahoro National Stadium, as it can help project managers monitor and evaluate the project's progress, identify areas for improvement, and ensure that project goals are being met.

One key aspect of performance management theory is the setting of clear and measurable objectives. By setting specific goals for the renovation project, project managers can provide a clear direction for the project team and ensure that everyone is working towards the same objectives. Additionally, performance management theory emphasizes the importance of assessing progress and providing regular feedback to team members. By monitoring the project's progress and providing timely feedback, project managers can identify any issues early on and take corrective action to keep the project on track. Moreover, performance management theory emphasizes the importance of making adjustments to improve performance. By regularly reviewing the project's performance and making necessary adjustments, project managers can ensure that the project remains on schedule and within budget. This aspect of performance management theory can help project managers identify and address any issues that may arise during the renovation project, ensuring its successful completion.

Performance management theory is highly relevant to the study on agile management practices and the performance of large-scale public building construction projects, specifically the renovation of Amahoro National Stadium. This theory provides a framework for project managers to continuously monitor and evaluate the project's progress, align individual and organizational goals, and improve overall effectiveness. By setting clear and measurable objectives, project managers can ensure that everyone involved in the renovation project is working towards the same goals. Additionally, the emphasis on assessing progress and providing regular feedback can help project managers identify and address any issues early on, ensuring that the project remains on track. Furthermore, the focus on making adjustments to improve performance can help project managers address any challenges that may arise during the renovation project, ultimately contributing to its successful completion.

iii. Conceptual Framework

Figure 1: Conceptual Framework



Source: Researcher (2024)

In this above conceptual framework for the study the independent variables of timely project financing, contractor competency, and stakeholder participation are expected to influence the dependent variable of performance of public building infrastructure projects. Timely project financing, including timely allocation and payment, is posited to positively impact project performance by ensuring that necessary resources are available when needed, thus potentially leading to completion within budget and on schedule. However, the presence of bureaucracy could hinder timely financing, leading to delays and inefficiencies in resource utilization. Contractor competency, which includes technical skills, equipment functioning, and planning and scheduling abilities, is hypothesized to directly impact project performance, particularly in terms of efficiency and meeting project deadlines. Stakeholder participation, encompassing decision-making,

resource mobilization, project identification, and stakeholder planning and analysis, is expected to contribute to project success by ensuring that key stakeholders are actively engaged and supportive throughout the project lifecycle, thereby enhancing overall project effectiveness.

iv. Research Methodology

Research Design

Creswell and Poth (2016) define research design as an example of the procedure used to gather and examine data in order to get the answers to research questions. The research design used in this study is descriptive. To gather primary data, the study used both qualitative and quantitative methodologies. Descriptive research provides the researcher with an overview of the relevant events from an industrial, institutional, or personal perspective, or it highlights key elements of the events. It provides an example of the characteristics of the phenomenon or population under study. Sekaran (2021). The easy-to-use approach collects valuable data by observing participants in their natural habitat. Due to in-depth data collecting and the ability to identify the factors being examined, the technique allows for comprehensive data collection and analysis and leaves potential for future study. (Mugenda and Mugenda, 2013).

Target Population

The word "population" generally refers to the group of individuals who are most likely to be contacted for information. A group of entities, businesses, or people that represent the study's objectives is referred to as the targeted population in research (Patton, 2024). The target population for this research study comprises 244 individuals involved in overseeing the operations and construction of the Amahoro National Stadium renovation project in Kigali City, Rwanda. This population includes 55 key personnel such as project managers, architects, engineers, financiers, and stakeholders responsible for project management and decision-making. Additionally, the population consists of 189 construction field workers actively engaged in the renovation process. These individuals collectively represent the target population for this study, which aims to assess the impact of agile management practices on the performance of large-scale public building construction projects.

Sample Design

Sample size

According to Ordho (2013), a sample is a subset of items drawn from the complete population that have the same characteristics or attributes as the parent population. The sample size for this study is determined to be 152 respondents. This sample includes individuals from different categories of the project, namely Project Managers, Architects, Engineers, Financiers, Stakeholders overseeing the operations, and Construction field Workers. The sample size determination was based on the solvency formula, which is a method commonly used to determine sample sizes in research. This formula ensures that the selected sample is representative of the target population, which in this case includes all individuals involved in the project. By including a diverse range of stakeholders, this study aims to gather comprehensive insights into the impact of agile management practices on the performance of such large-scale construction projects.

Sample size determination Formula and Working;

N = Population of study

K = Constant (1)
e = degree of error expected (0.05)
n=sample size

$$n = \frac{N}{K + N(e)^2}$$

$$\frac{244}{1 + 244(0.05)^2}$$

$$\frac{244}{1 + 244(0.002500005)}$$

$$\frac{244}{1 + 0.6100001)}$$

$$\frac{244}{1.61}$$

n = 151.5528
Therefore, the number of respondents to be considered in this study is approximately 152.

Sampling Technique

The sampling technique for this study was involve a combination of simple random sampling and purposive non-random sampling techniques. The sampling procedure begun with the identification of the different categories of individuals involved in the project, including Project Managers, Architects, Engineers, Financiers, Stakeholders overseeing the operations, and Construction field Workers. From each category, a subset of respondents was be selected using simple random sampling, ensuring that each individual has an equal chance of being selected. Additionally, purposive non-random sampling was be used to select individuals who are considered experts or have specialized knowledge related to agile management practices in construction projects. This combination of sampling techniques aims to ensure a representative sample that can provide comprehensive insights into the research topic.

Table 1: Sampling Size Determination

Department	Target Population	Sample Size	Sampling Technique
project managers	10	3	Simple Random
Architects and engineers	25	11	Purposive
Financiers	12	7	Purposive

construction field workers	189	126	Simple Random
stakeholders	8	5	Purposive
TOTAL	**244**	**152**	

Source: MININFRA 2024

Data Collection Methods

Data Collection Instruments

The data collection instruments chosen for this study are crucial to ensure the comprehensive and accurate gathering of information regarding the agile management practices and performance. The primary instruments include structured questionnaires for surveying project managers, construction professionals, and other relevant stakeholders involved in the renovation project. These questionnaires were selected for their ability to gather quantitative data on various aspects such as project timelines, budget adherence, stakeholder engagement, and the implementation of agile practices. Additionally, interviews were conducted with key project stakeholders, including project managers, and contractors, to gather qualitative insights into their perceptions and experiences with agile practices. The use of these instruments is justified by their ability to provide a comprehensive understanding of the factors influencing the adoption and effectiveness of agile management practices in large-scale public building construction projects.

Procedures of Data Collection

The data collection procedures were involving the distribution of questionnaires to selected respondents involved in the Amahoro National Stadium renovation project. The questionnaires were administered in person, electronically, or through postal services, depending on the availability and preference of the respondents. Additionally, interviews were be conducted with key stakeholders to gather in-depth insights into their experiences and perceptions of agile management practices. The interviews were semi-structured to allow for flexibility and exploration of emerging themes. All data collection activities were conducted in a manner that ensures the confidentiality and anonymity of the respondents.

v. Research Findings and Discussions

1. Demographic Characteristics of Respondents

The preliminary section of the study questionnaire was crafted to collect demographic data from the chosen respondents. This portion aimed to document key attributes such as the respondent's category, gender, age group, and educational background. The objective of gathering this information was to obtain a thorough understanding of the varied backgrounds and characteristics of the participants, and to examine how various demographic factors could have impacted their views or experiences concerning the research topic.

Gender of Respondents

To achieve a thorough analysis and assess the gender distribution, participants were requested to specify their gender.

Table 2: Gender Distribution of Respondent

Gender	Frequency	Percentage (%)
Female	59	38.82
Male	93	61.18
Total	**152**	**100**

Source: Primary Data (2024)

The investigation into the gender distribution of respondents, as indicated by Table2, found that there was a notable representation of both male and female participants in the study. Specifically, the findings from Table 4.1 showed that out of the 152 respondents, 59 were female, accounting for 38.82% of the total, while 93 were male, making up 61.18%. This balanced gender distribution provided a comprehensive perspective on the agile management practices and performance of the large-scale public building construction projects in Kigali City, particularly the renovation of Amahoro National Stadium. The inclusion of a significant number of female respondents (38.82%) highlighted the diverse input from different gender perspectives, which is crucial for a holistic understanding of the project dynamics. Similarly, the higher percentage of male respondents (61.18%) ensured that the traditionally male-dominated construction industry was well-represented, allowing for an in-depth analysis of the sector's practices and performance. This gender distribution underscored the inclusive approach of the research, reflecting a commitment to capturing a wide range of insights and experiences from both male and female stakeholders in the construction project.

2. Presentation of Findings

This section was intended to collect perspectives and opinions through structured questions and gathered data to address the study's questions and objectives. The aim of the study was to deepen the understanding of the issue being examined by offering detailed insights and answers that aligned with the research objectives.

2.1 Effect of Project Financing on Projects Performance

The study aimed to assess the effect of project financing on the performance of the renovation of Amahoro National Stadium in Kigali City, Rwanda. This objective was addressed by evaluating how funding strategies influenced various aspects of the project's execution and outcomes. The research sought to understand the relationship between financial management and the successful completion of the renovation.

Table 3: Project Financing and Performance of the Renovation of Projects

Statement	SD	D	N	A	SA	Total	
	%	%	%	%	%	Mean	Std
Timely allocation of project funds is crucial for the success of the project.	1 (0.66)	3 (1.97)	3 (1.97)	107 (70.39)	38 (25.00)	4.18	0.54
Timely payment to contractors and suppliers enhances project performance.	1 (0.66)	2 (1.32)	3 (1.97)	110 (72.37)	36 (23.68)	4.18	0.50
Bureaucratic processes related to project financing negatively impact the project's progress.	1 (0.66)	2 (1.32)	4 (2.63)	106 (69.74)	39 (25.66)	4.18	0.56
Effective financial planning leads to better project outcomes.	1 (0.66)	3 (1.97)	3 (1.97)	105 (69.08)	40 (26.32)	4.20	0.55
Transparent financial management improves stakeholder trust and project success.	1 (0.66)	2 (1.32)	3 (1.97)	109 (71.71)	37 (24.34)	4.18	0.53

Source: Primary Data (2024)

The findings from Table 3 reveal crucial insights into the financing and performance of the renovation projects, specifically the Amahoro National Stadium renovation in Kigali City, Rwanda. The investigation into the timely allocation of project funds showed that 107 respondents (70.39%) agreed, and 38 (25.00%) strongly agreed that it is crucial for the success of the project, resulting in a mean of 4.18 and a standard deviation of 0.54. Additionally, as indicated by Table 4.6, 110 respondents (72.37%) agreed, and 36 (23.68%) strongly agreed that timely payment to contractors and suppliers enhances project performance, reflected in a mean of 4.18 and a standard deviation of 0.50. The findings also revealed that bureaucratic processes related to project financing negatively impacted the project's progress, with 106 respondents (69.74%) agreeing and 39 (25.66%) strongly agreeing, producing a mean of 4.18 and a standard deviation of 0.56. Moreover, effective financial planning was found to lead to better project outcomes, as 105 respondents (69.08%) agreed and 40 (26.32%) strongly agreed, resulting in a mean of 4.20 and a standard deviation of 0.55. Finally, the investigation into transparent financial management revealed that it improves stakeholder trust and project success, with 109 respondents (71.71%) agreeing and 37 (24.34%) strongly agreeing, producing a mean of 4.18 and a standard deviation of 0.53. The overall findings demonstrate a strong consensus among respondents on the importance of effective financial management practices in enhancing the performance and success of large-scale public building construction projects. This is evidenced by the high mean values (all around 4.18 to 4.20) and relatively low standard deviations (ranging from 0.50 to 0.56) for each statement,

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indicating a significant agreement and consistent views among the participants regarding the critical role of project financing in achieving successful project outcomes.

2.2 Influence of Contractor Competence on Project Performance

The objective of the study was to determine how contractor competence influenced the performance of the renovation of Amahoro National Stadium in Kigali City, Rwanda. By examining the competencies of contractors involved, the study aimed to understand the impact of these skills on the successful execution and outcomes of the large-scale public building construction project.

Table 4: Contractor Competence and Project Performance

Statement	SD	D	N	A	SA	Total	
	%	%	%	%	%	Mean	Std
Contractors' technical skills significantly impact project outcomes.	-	-	2 (1.32)	106 (69.74)	44 (28.95)	4.27	0.50
Proper functioning of equipment by contractors enhances project performance.	-	1 (0.66)	3 (1.97)	109 (71.71)	39 (25.66)	4.23	0.51
Effective planning and scheduling by contractors contribute to project success.	-	-	1 (0.66)	113 (74.34)	38 (25.00)	4.24	0.44
Contractors' adherence to safety standards improves overall project quality.	-	-	2 (1.32)	104 (68.42)	46 (30.26)	4.29	0.49
Continuous training and development of contractors lead to better project results.	1 (0.66)	-	3 (1.97)	108 (71.05)	40 (26.32)	4.23	0.54

Source: Primary Data (2024)

The investigation into contractor competence and project performance, as indicated by Table 4, revealed several critical findings. Contractors' technical skills significantly impacted project outcomes, with no respondents strongly disagreeing or disagreeing, only 2 respondents (1.32%) remaining neutral, and the majority agreeing or strongly agreeing, as evidenced by 106 respondents (69.74%) and 44 respondents (28.95%) respectively. This yielded a high mean of 4.27 and a standard deviation of 0.50. Furthermore, proper functioning of equipment by contractors was shown to enhance project performance, as only 1 respondent (0.66%) disagreed, 3 respondents (1.97%) were neutral, while 109 respondents (71.71%) agreed, and 39 respondents (25.66%) strongly agreed, resulting in a mean of 4.23 and a standard deviation of 0.51. Effective planning and scheduling by contractors were also critical to project success, with no respondents disagreeing, 1 respondent (0.66%) neutral, and a significant majority agreeing or strongly agreeing, as indicated by 113 respondents (74.34%) and 38 respondents (25.00%) respectively, leading to a mean of 4.24 and a standard deviation of 0.44. Moreover, contractors' adherence to safety standards was found to improve overall project quality, with no respondents disagreeing, 2

respondents (1.32%) neutral, and the vast majority agreeing or strongly agreeing, as shown by 104 respondents (68.42%) and 46 respondents (30.26%) respectively, resulting in a mean of 4.29 and a standard deviation of 0.49. Continuous training and development of contractors were also seen to lead to better project results, with only 1 respondent (0.66%) strongly disagreeing, 3 respondents (1.97%) neutral, while a large majority of 108 respondents (71.05%) agreed, and 40 respondents (26.32%) strongly agreed, leading to a mean of 4.23 and a standard deviation of 0.54. These findings from Table 4.7 collectively illustrate the critical role that contractor competence plays in enhancing project performance, emphasizing the importance of technical skills, proper equipment functioning, effective planning and scheduling, adherence to safety standards, and continuous training and development. The consistent high means and low standard deviations across these statements reflect a strong consensus on the positive impact of these factors on project outcomes.

2.3 Influence Stakeholder Participation on Project Performance

The objective of this study was to examine the influence of stakeholder participation on the performance of the renovation of Amahoro National Stadium project in Kigali City, Rwanda. By analyzing the extent and impact of stakeholder involvement, the study aimed to understand how different parties contributed to or affected the project's overall success and efficiency.

Table 5: Stakeholder Participation and Project Performance

Statement	SD	D	N	A	SA	Total	
	%	%	%	%	%	Mean	Std
Stakeholders' involvement in decision making improves project outcomes.	-	1 (0.66)	5 (3.29)	97 (63.82)	49 (32.24)	4.28	0.60
Active resource mobilization by stakeholders positively impacts project performance.	-	1 (0.66)	6 (3.95)	95 (62.50)	50 (32.89)	4.28	0.62
Involvement of stakeholders in project identification enhances project success.	-	1 (0.66)	3 (1.97)	102 (67.11)	46 (30.26)	4.27	0.59
Clear communication between stakeholders leads to better project coordination.	-	1 (0.66)	4 (2.63)	99 (65.13)	48 (31.58)	4.28	0.60
Stakeholders' commitment to project goals enhances project efficiency.	-	1 (0.66 %)	2 (1.32)	101 (66.45)	48 (31.58)	4.29	0.59

Source: Primary Data (2024)

In Table 5, it is shown that stakeholder participation significantly impacted project performance in the renovation of Amahoro National Stadium. The investigation into stakeholders' involvement in decision-making revealed that 0 (0.00%) respondents strongly disagreed, 1 (0.66%) disagreed,

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5 (3.29%) were neutral, 97 (63.82%) agreed, and 49 (32.24%) strongly agreed, resulting in a mean of 4.28 and a standard deviation of 0.60. The findings from the table further indicated that active resource mobilization by stakeholders positively impacted project performance, with 0 (0.00%) respondents strongly disagreeing, 1 (0.66%) disagreeing, 6 (3.95%) remaining neutral, 95 (62.50%) agreeing, and 50 (32.89%) strongly agreeing, yielding a mean of 4.28 and a standard deviation of 0.62. Additionally, the investigation into the involvement of stakeholders in project identification found that 0 (0.00%) respondents strongly disagreed, 1 (0.66%) disagreed, 3 (1.97%) were neutral, 102 (67.11%) agreed, and 46 (30.26%) strongly agreed, leading to a mean of 4.27 and a standard deviation of 0.59. The examination of clear communication between stakeholders, as indicated by Table 5, found that 0 (0.00%) respondents strongly disagreed, 1 (0.66%) disagreed, 4 (2.63%) were neutral, 99 (65.13%) agreed, and 48 (31.58%) strongly agreed, resulting in a mean of 4.28 and a standard deviation of 0.60. Furthermore, stakeholders' commitment to project goals, as demonstrated in Table 4.8, showed that 0 (0.00%) respondents strongly disagreed, 1 (0.66%) disagreed, 2 (1.32%) were neutral, 101 (66.45%) agreed, and 48 (31.58%) strongly agreed, culminating in a mean of 4.29 and a standard deviation of 0.59. These findings underscore the positive influence of stakeholder participation on the performance of the Amahoro National Stadium renovation project, highlighting the crucial role of stakeholders in decision-making, resource mobilization, project identification, communication, and commitment to project goals.

2.4 Responses to Interview Guide to Staff

Table 6: Responses to Interview Guide to Staff

Answers	Mean	Std
The implementation of agile management practices has been highly effective, fostering flexibility, rapid response to changes, and continuous stakeholder collaboration, which has significantly enhanced project performance.	4.15	0.54
Timely allocation of funds has been crucial, ensuring uninterrupted workflow, on-schedule procurement of materials, and timely payments to contractors, which has kept the project on track.	4.14	0.55
High contractor competence has greatly influenced the project's performance, with skilled technical teams and well-maintained equipment ensuring high-quality work and adherence to project timelines.	4.14	0.52
Stakeholder participation has been vital, with active involvement in decision-making and resource mobilization leading to better project alignment with stakeholder expectations and improved resource availability.	4.15	0.55
Key factors contributing to the overall performance of the renovation include effective agile management practices, timely fund allocation, high contractor competence, and strong stakeholder participation, all of which have collectively driven the project's success.	4.15	0.55

Source: Primary Data (2024)

In Table 6, the responses to the interview guide for staff on the effectiveness of agile management practices in the renovation of Amahoro National Stadium provide a comprehensive insight into the various factors contributing to the project's performance. The findings reveal that the implementation of agile management practices was highly effective, fostering flexibility, rapid response to changes, and continuous stakeholder collaboration, which significantly enhanced project performance, with a mean score of 4.15 and a standard deviation of 0.54. Moreover, timely

allocation of funds played a crucial role, ensuring an uninterrupted workflow, on-schedule procurement of materials, and timely payments to contractors, thereby keeping the project on track, as evidenced by a mean of 4.14 and a standard deviation of 0.55. The investigation into contractor competence revealed a substantial impact on the project's performance, with skilled technical teams and well-maintained equipment ensuring high-quality work and adherence to project timelines, as indicated by a mean score of 4.14 and a standard deviation of 0.52. Furthermore, stakeholder participation was identified as vital, with active involvement in decision-making and resource mobilization leading to better project alignment with stakeholder expectations and improved resource availability, shown by a mean score of 4.15 and a standard deviation of 0.55. These key factors contributing to the renovation's success included effective agile management practices, timely fund allocation, high contractor competence, and strong stakeholder participation, all collectively driving the project's success, with the combined metrics displaying a mean of 4.15 and a standard deviation of 0.55. These findings underscore the importance of these elements in achieving high performance in large-scale public building construction projects, as demonstrated by the comprehensive data in Table 6.

2.5 Correlation of Analysis Between Agile Management Practices and Performance of Large-Scale Public Building Construction Projects in Kigali City, Rwanda

The study aimed to investigate the correlation between agile management practices and the performance of large-scale public building construction projects in Kigali City, Rwanda. By focusing on the renovation of Amahoro National Stadium, the research analyzed how implementing agile methodologies influenced project outcomes, efficiency, and overall success, providing insights into the effectiveness of these practices in the context of public construction projects.

Table 7: Correlation Analysis

		Agile Management Practices	Performance of Large-Scale Public Building Construction Projects
Agile Management Practices	Pearson Correlation	1	0.819**
	Sig. (2-tailed)		.000
	N	152	152
Performance of Large-Scale Public Building Construction Projects	Pearson Correlation	0.819**	1
	Sig. (2-tailed)	.000	
	N	152	152

***. Correlation is significant at the 0.05 level (2-tailed).*

Source: Primary Data (2024)

The findings from Table 7 revealed a significant positive correlation between Agile Management Practices and the Performance of Large-Scale Public Building Construction Projects in Kigali City, Rwanda, specifically the renovation of Amahoro National Stadium. The Pearson Correlation coefficient for Agile Management Practices was 1, indicating a perfect positive relationship within the variable, while its correlation with the Performance of Large-Scale Public Building Construction Projects was 0.819**. This high correlation coefficient of 0.819, significant at the 0.05 level (2-tailed) with a significance value of .000, underscores a strong and statistically significant positive relationship between these variables. Both variables were measured across a sample size of N = 152. This correlation analysis suggests that as Agile Management Practices increase, there is a corresponding substantial improvement in the performance of large-scale public building construction projects. This result aligns with the idea that Agile Management Practices, which include iterative development, stakeholder involvement, and flexible responses to change, significantly contribute to the success and efficiency of construction projects. The high Pearson Correlation coefficient of 0.819 indicates that Agile Management Practices are likely to enhance project performance, leading to better outcomes in terms of time, cost, and quality management. In the context of the renovation of Amahoro National Stadium, the data highlights the critical role of agile methodologies in achieving project goals. The significant correlation at the 0.05 level (2-tailed) emphasizes the reliability of these findings.

Agile Management Practices have been associated with improved team collaboration, more accurate and flexible planning, and a higher capacity to adapt to unexpected changes, all of which are essential for the successful execution of large-scale construction projects. Furthermore, the data presented in the table, sourced from primary data collected in 2024, showcases the importance of adopting Agile Management Practices in the construction industry. By fostering an environment of continuous improvement and adaptive project management, these practices can lead to significant enhancements in project performance. The investigation into this relationship, as indicated by the correlation coefficient and the corresponding significance level, provides robust evidence supporting the adoption of agile methodologies in the construction of large-scale public buildings. These findings underscore the value of Agile Management Practices in improving the performance of large-scale public building construction projects, highlighting the positive impact these practices can have on achieving successful project outcomes, particularly in the renovation of major infrastructure such as the Amahoro National Stadium. This relationship is further supported by the substantial Pearson Correlation coefficient and the statistical significance of the results, pointing to the effectiveness of agile methodologies in the construction sector.

3. Discussion of Findings

The findings from Table 3 highlighted the critical role of financing in the performance of the renovation projects, particularly the Amahoro National Stadium in Kigali City, Rwanda. The results indicated that the timely allocation of project funds was essential for the success of the project, with 70.39% (107 respondents) agreeing and 25.00% (38 respondents) strongly agreeing, resulting in a mean of 4.18 and a standard deviation of 0.54. This aligns with the research by Smith et al. (2018), who emphasized that financial management practices significantly influence project outcomes. Similarly, timely payments to contractors and suppliers were found to enhance project performance, as supported by 72.37% (110 respondents) agreeing and 23.68% (36 respondents)

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strongly agreeing, yielding a mean of 4.18 and a standard deviation of 0.50. This finding is consistent with the work of Johnson and Brown (2019), who argued that efficient financial flows are critical to maintaining project momentum and avoiding delays. Additionally, bureaucratic processes related to project financing were found to negatively impact project progress, with 69.74% (106 respondents) agreeing and 25.66% (39 respondents) strongly agreeing, producing a mean of 4.18 and a standard deviation of 0.56. This corroborates the findings of White and Jones (2020), who identified bureaucratic hurdles as significant impediments to project efficiency. Effective financial planning also led to better project outcomes, as evidenced by 69.08% (105 respondents) agreeing and 26.32% (40 respondents) strongly agreeing, with a mean of 4.20 and a standard deviation of 0.55. This observation supports the conclusions of Green et al. (2017), who highlighted the importance of strategic financial planning in project success. Transparent financial management was found to improve stakeholder trust and project success, with 71.71% (109 respondents) agreeing and 24.34% (37 respondents) strongly agreeing, resulting in a mean of 4.18 and a standard deviation of 0.53. This finding is in line with the study by Lee and Kim (2016), who demonstrated that transparency in financial practices enhances stakeholder confidence and project performance.

Table 4 provided critical insights into the role of contractor competence in project performance. The findings showed that contractors' technical skills significantly impacted project outcomes, with 69.74% (106 respondents) agreeing and 28.95% (44 respondents) strongly agreeing, yielding a high mean of 4.27 and a standard deviation of 0.50. This is consistent with the findings of Davis and Green (2018), who argued that skilled contractors are essential for high-quality project delivery. Proper functioning of equipment by contractors was also crucial, with 71.71% (109 respondents) agreeing and 25.66% (39 respondents) strongly agreeing, resulting in a mean of 4.23 and a standard deviation of 0.51. This aligns with the research by Martin and Lewis (2019), who emphasized the importance of well-maintained equipment in ensuring project efficiency. Effective planning and scheduling by contractors were identified as critical to project success, with 74.34% (113 respondents) agreeing and 25.00% (38 respondents) strongly agreeing, leading to a mean of 4.24 and a standard deviation of 0.44. This finding supports the work of Turner and Muller (2017), who highlighted the importance of meticulous planning in project management. Moreover, adherence to safety standards by contractors was found to improve overall project quality, with 68.42% (104 respondents) agreeing and 30.26% (46 respondents) strongly agreeing, resulting in a mean of 4.29 and a standard deviation of 0.49. This is consistent with the study by Zhao et al. (2018), who demonstrated the positive impact of safety compliance on project outcomes. Continuous training and development of contractors also led to better project results, with 71.05% (108 respondents) agreeing and 26.32% (40 respondents) strongly agreeing, leading to a mean of 4.23 and a standard deviation of 0.54. This observation aligns with the findings of Baker and Stevens (2016), who emphasized the importance of ongoing training in enhancing contractor performance.

The findings from Table 5 underscored the significant impact of stakeholder participation on project performance in the renovation of Amahoro National Stadium. The investigation revealed that stakeholders' involvement in decision-making positively influenced project outcomes, with 63.82% (97 respondents) agreeing and 32.24% (49 respondents) strongly agreeing, resulting in a mean of 4.28 and a standard deviation of 0.60. This finding is in line with the research by Mitchell and Donaldson (2019), who emphasized the importance of stakeholder engagement in successful project management. Active resource mobilization by stakeholders was also found to enhance project performance, with 62.50% (95 respondents) agreeing and 32.89% (50 respondents)

strongly agreeing, yielding a mean of 4.28 and a standard deviation of 0.62. This supports the conclusions of Freeman and Reed (2018), who argued that stakeholder resource mobilization is critical to project success. Furthermore, the involvement of stakeholders in project identification was shown to be beneficial, with 67.11% (102 respondents) agreeing and 30.26% (46 respondents) strongly agreeing, leading to a mean of 4.27 and a standard deviation of 0.59. This finding corroborates the study by Clarkson (2017), who highlighted the positive impact of stakeholder involvement in project planning. Clear communication between stakeholders was also found to improve project outcomes, with 65.13% (99 respondents) agreeing and 31.58% (48 respondents) strongly agreeing, resulting in a mean of 4.28 and a standard deviation of 0.60. This observation aligns with the research by Rowley (2016), who emphasized the importance of effective communication in stakeholder management. Additionally, stakeholders' commitment to project goals was shown to be crucial, with 66.45% (101 respondents) agreeing and 31.58% (48 respondents) strongly agreeing, culminating in a mean of 4.29 and a standard deviation of 0.59. This finding supports the work of Savage et al. (2018), who demonstrated the positive impact of stakeholder commitment on project success.

Table 6 provided a comprehensive insight into the effectiveness of agile management practices in the renovation of Amahoro National Stadium. The findings revealed that the implementation of agile management practices significantly enhanced project performance, with a mean score of 4.15 and a standard deviation of 0.54. This is consistent with the research by Schwaber and Sutherland (2016), who argued that agile methodologies improve project flexibility and responsiveness. The timely allocation of funds was also found to be crucial, ensuring uninterrupted workflow and on-schedule procurement, as evidenced by a mean of 4.14 and a standard deviation of 0.55. This supports the findings of Beck et al. (2017), who highlighted the importance of timely financial management in agile projects. Contractor competence was shown to have a substantial impact on project performance, with skilled technical teams and well-maintained equipment ensuring high-quality work, indicated by a mean score of 4.14 and a standard deviation of 0.52. This aligns with the conclusions of Highsmith (2018), who emphasized the role of contractor expertise in agile project success. Stakeholder participation was identified as vital, with active involvement leading to better project alignment and resource availability, as shown by a mean score of 4.15 and a standard deviation of 0.55. This finding corroborates the study by Cohn (2019), who demonstrated the positive impact of stakeholder engagement in agile methodologies.

The findings from Table 7 revealed a significant positive correlation between Agile Management Practices and the Performance of Large-Scale Public Building Construction Projects in Kigali City, specifically the renovation of Amahoro National Stadium. The Pearson Correlation coefficient for Agile Management Practices was 1, indicating a perfect positive relationship within the variable, while its correlation with project performance was 0.819**, significant at the 0.05 level (2-tailed) with a significance value of .000. This high correlation coefficient of 0.819 underscores a strong and statistically significant positive relationship, suggesting that as Agile Management Practices increase, there is a corresponding substantial improvement in project performance. This finding aligns with the research by Rigby et al. (2016), who emphasized the effectiveness of agile methodologies in enhancing project outcomes. The significant correlation highlights the critical role of agile practices, including iterative development, stakeholder involvement, and flexible responses to change, in achieving successful project execution. This supports the work of Dingsoyr et al. (2018), who demonstrated that agile practices lead to improved team collaboration and project adaptability.

The data from this study, collected in 2024, showcases the importance of adopting Agile Management Practices in the construction industry, reinforcing the conclusions of prior research on the benefits of agile methodologies in large-scale projects.

vi. Conclusion

The investigation into the renovation of Amahoro National Stadium in Kigali City, Rwanda, reveals several key insights into project financing, contractor competence, and stakeholder participation, offering a comprehensive understanding of the factors driving successful project outcomes. Timely allocation and payment of project funds emerged as crucial factors for project success, significantly impacting contractor performance and overall project results. Delays due to bureaucratic processes were found to impede progress, underscoring the need for streamlined procedures to facilitate efficient project execution. Effective financial planning and transparent financial management were instrumental in building stakeholder trust and ensuring better project outcomes by fostering accountability and clarity in financial transactions. The competence of contractors was identified as a critical determinant of project performance. Contractors' technical skills, proper functioning of equipment, and adherence to safety standards played vital roles in maintaining high-quality work and adhering to project timelines. Continuous training and development of contractors, coupled with effective planning and scheduling, further enhanced project results by ensuring that contractors were well-prepared and equipped to handle project demands.

Stakeholder participation was another key factor influencing project performance. Active involvement of stakeholders in decision-making processes, resource mobilization, and project identification led to positive outcomes by aligning project goals with stakeholder expectations and ensuring the availability of necessary resources. Clear communication and strong commitment to project goals by stakeholders were essential for achieving desired results, as they facilitated collaboration and coordination among all parties involved. Agile management practices were particularly effective in fostering flexibility, rapid response to changes, and continuous stakeholder collaboration, significantly enhancing project performance. These practices allowed for adaptive planning and iterative development, enabling the project team to address challenges and changes promptly. The strong positive correlation between agile management practices and project performance underscores the importance of these methodologies in achieving successful outcomes in large-scale public building construction projects. these findings highlighted the critical roles of effective financial management, contractor competence, stakeholder participation, and agile management practices in driving the success of large-scale public building construction projects, as demonstrated by the renovation of Amahoro National Stadium.

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