

The Role of Agile Practices in Enhancing Project Performance in the Public Sector: Evidence from the Shule Bora Project in Tanzania

Mussa Andala Ligembe¹

Abstract

This study examines how Agile practices enhance project performance in the public sector in Dodoma City, Tanzania. A quantitative cross-sectional design was employed, and data from 198 project stakeholders were collected using a structured Likert-scale questionnaire measuring iterative planning, collaboration, flexibility, monitoring, and beneficiary focus. Structural Equation Modelling (SEM) was used to assess relationships between Agile practices and project performance indicators, including time efficiency, cost efficiency, quality, and stakeholder satisfaction. Results show that Agile practices significantly and positively influence project performance ($\beta = 1.09$, $p < 0.001$), with flexibility and continuous feedback identified as the most impactful dimensions. The study concludes that adopting adaptive, collaborative, and feedback-oriented management approaches substantially improves the efficiency, quality, and stakeholder satisfaction of public sector projects. It is recommended that government agencies prioritise the implementation of Agile methodologies, particularly by enhancing flexibility and monitoring mechanisms, to strengthen overall project outcomes and service delivery.

Keywords: *Agile Practices, Project Performance, Flexibility, Iterative Planning, Collaboration, Monitoring and Feedback, Beneficiary Focus*

1.0 Introduction

In recent decades, public sector organisations have undergone significant transformation driven by the need to improve efficiency, accountability, and service delivery. Despite these efforts, many public projects continue to face delays, cost overruns, and performance inefficiencies, particularly in developing countries (Abera, 2023; Urassa, 2021). Traditional project management approaches, which are often linear and rigid, limit organisations' ability to respond effectively to changing environments and stakeholder needs.

To address these challenges, there has been a growing shift toward adopting Agile project management practices. Agile approaches emphasise flexibility, iterative development, stakeholder collaboration, and continuous feedback, making them suitable for complex and dynamic project environments (Bianchi et al., 2020; Mergel et al., 2020).

¹ Tanzania Public Service College, Dar es Salaam, Tanzania mussa.lugembe@tpsc.go.tz

These characteristics enable organisations to respond quickly to uncertainties and improve project outcomes.

Previous studies have shown that Agile practices significantly improve project performance by enhancing stakeholder engagement, effective communication, flexibility, and iterative decision-making (Gemino et al., 2021; Tam et al., 2020). In public-sector settings, Agile governance has been associated with greater transparency and accountability (Mergel et al., 2020). Furthermore, advancements in artificial intelligence and digital technologies have strengthened Agile project management by improving decision-making, real-time monitoring, and adaptability (Holzinger et al., 2022; Shoushtari et al., 2024). However, most of these studies have focused on private-sector organisations and developed-country contexts, leaving limited evidence on the application of Agile practices in development projects within Tanzania. Despite ongoing reforms, Tanzanian projects continue to experience delays and inefficiencies (Kullaya et al., 2022; Matto, 2023), while existing interventions have largely emphasised structural reforms rather than adaptive management approaches (Mwakasege & Nyoni, 2023). Consequently, a knowledge gap remains regarding the influence of Agile practices on project performance in Tanzanian NGO-led projects. This study seeks to address this gap by examining the influence of Agile practices on project performance at Shule Bora.

Therefore, this study examines the role of Agile practices in enhancing project performance in the public sector. By focusing on the Tanzanian context, the study aims to provide empirical evidence on how Agile methodologies can address existing challenges and improve project outcomes.

2.0 Literature Review

This study is grounded in Complexity Theory, which provides a foundation for understanding Agile practices in dynamic project environments. Complexity Theory holds that organisations operate in unpredictable, constantly changing environments, requiring flexible, adaptive management approaches (Callaghan, 2022). In such contexts, traditional linear project management approaches become less effective because they cannot adequately address uncertainty and evolving stakeholder needs. Agile project management aligns closely with Complexity Theory by emphasising iterative processes, continuous feedback, and adaptability (Zeden, 2024). These characteristics enable organisations to respond effectively to complex project conditions. Similarly, modern project management theory emphasises flexibility, stakeholder engagement, and continuous improvement to achieve project success (Grey & Larson, 2021). Furthermore, the Agile Manifesto principles, as outlined in the Scrum Guide (Schwaber & Sutherland, 2020), emphasise collaboration, customer focus, and responsiveness to change. These principles support adaptive project environments and enhance performance outcomes by promoting continuous learning and stakeholder involvement.

Empirical evidence consistently shows that Agile practices improve project performance by enhancing flexibility, collaboration, and responsiveness. Agile methodologies support iterative planning and continuous feedback, enabling teams to align project outputs with

stakeholder expectations and adapt to changing requirements (Bianchi et al., 2020; Tam et al., 2020; Vidoni et al., 2021). Several studies highlight that Agile practices strengthen communication and coordination among project stakeholders, which are critical to successful project delivery. For instance, Agile adoption has been linked to improved teamwork, faster decision-making, and greater efficiency in project execution (Gemino et al., 2021; Bigirumwami et al., 2021; Gasemagha & Kowang, 2021). Similarly, Agile governance approaches enhance transparency and accountability in public sector organisations, thereby improving overall performance (Mergel et al., 2020; Newman et al., 2020).

Hybrid project management approaches that integrate Agile and traditional methods have gained attention for their ability to balance structure and flexibility. These approaches are particularly effective in complex projects, as they combine structured planning with adaptive execution (Brock et al., 2020; Cooper & Sommer, 2020; Lalmi et al., 2021; Zasa et al., 2021). Technological advancements further reinforce the relevance of Agile practices. The integration of artificial intelligence and digital systems enhances decision-making, efficiency, and adaptability in project environments (Holzinger et al., 2022; Shoushtari et al., 2024; Khoulenjani et al., 2024). Moreover, Agile practices have been shown to support innovation and strategic agility, which are essential for achieving sustainable project outcomes (Kaufmann et al., 2020; Kurniawan et al., 2020).

Despite these benefits, challenges remain in adopting Agile practices, particularly in public-sector contexts. Organisational resistance, rigid bureaucratic structures, and limited technical capacity hinder effective implementation (Getyengana, 2020; Akhwaba, 2020). These challenges are more pronounced in developing countries, where institutional constraints and resource limitations affect project performance.

3.0 Methodology

This study adopted a quantitative research approach to examine the role of Agile practices in enhancing project performance in the public sector. A cross-sectional research design was employed to collect data from project stakeholders at a single point in time, enabling the study to establish relationships between Agile practices and project performance. The study was conducted in Dodoma City, Tanzania, where numerous public sector projects are implemented. The target population included project managers, government officials, and implementation staff involved in public sector projects. Previous studies highlight the importance of stakeholder roles and management practices in determining project success (Gasemagha & Kowang, 2021).

A sample size of 198 respondents was determined to achieve a 5% margin of error, ensuring statistical reliability. A simple random sampling technique was used to select respondents, ensuring equal representation and minimising bias. Data were collected using a structured questionnaire with Likert-scale items measuring Agile practices, including iterative planning, collaboration, adaptability, and continuous feedback. Similar approaches have been widely used in Agile research to assess project performance (Ali et al., 2021; Gemino et al., 2021). For data analysis, both descriptive and inferential statistics were employed. Structural Equation Modelling (SEM) was used to examine the relationships between Agile

practices and project performance, allowing for simultaneous analysis of multiple variables. SEM is widely recognised as an effective method for analysing complex relationships in project management research (Hair et al., 2019).

Ethical considerations, including informed consent, confidentiality, and voluntary participation, were strictly observed throughout the study.

4.0 Findings and Discussion

This section presents and discusses the key findings, noting that both descriptive and inferential techniques were employed. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise respondents' demographic characteristics and perceptions of Agile practices. For inferential analysis, Structural Equation Modelling (SEM) was used to examine the relationships between Agile practices (latent constructs) and project performance, allowing simultaneous assessment of multiple indicators while accounting for measurement error.

4.1 Demographic Characteristics of Respondents (N = 198)

The study involved 198 respondents who participated in public-sector projects under the Shule Bora Project in Tanzania. Most respondents were male (60.0%), aged 45–54 years (40.0%), held a Master's degree (48.0%), and had 11–15 years of work experience (36.0%). These findings indicate that the respondents were highly educated and experienced professionals capable of understanding and implementing Agile practices. These characteristics are likely to support effective project execution through improved collaboration, adaptability, and decision-making.

Table 1: Demographic Characteristics of Respondents

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	119	60.0
	Female	79	40.0
Age Group (Years)	25–34	40	20.0
	35–44	55	28.0
	45–54	79	40.0
	55 and above	34	12.0
Level of Education	Bachelor's degree	79	40.0
	Master's degree	95	48.0
	Doctorate (PhD)	24	12.0
Years of Service	5–10 years	32	16.0
	11–15 years	71	36.0
	15–20 years	55	28.0
	Over 20 years	40	20.0

Source: Field Data (2025)

4.2 Summary Statistics for Project Performance Indicators (n = 198)

The descriptive results indicate that respondents generally rated project performance positively, with mean scores ranging from 3.65 to 4.02. Quality (M = 4.02, SD = 0.69) and stakeholder satisfaction (M = 3.91, SD = 0.77) received the highest ratings, while cost efficiency (M = 3.65, SD = 0.81) received the lowest rating.

Table 2: Project Performance Indicators (n = 198)

Indicator	Observations (n)	Mean	Std. Dev.	Min	Max
Time Efficiency	198	3.87	0.74	1	5
Cost Efficiency	198	3.65	0.81	1	5
Quality	198	4.02	0.69	2	5
Stakeholder Satisfaction	198	3.91	0.77	1	5
Overall Project Performance	198	3.86	0.63	2.1	4.9

Source: Field Data (2025)

4.3 Agile Practices and Project Performance (n = 198)

The distribution plot indicates that both agile practices and project performance scores are concentrated in the moderate-to-high range, suggesting positive perceptions among respondents. Beneficiary Focus and Monitoring & Feedback show higher concentrations around upper scores, reflecting stronger agreement and more consistent implementation, while Flexibility exhibits slightly greater variation.

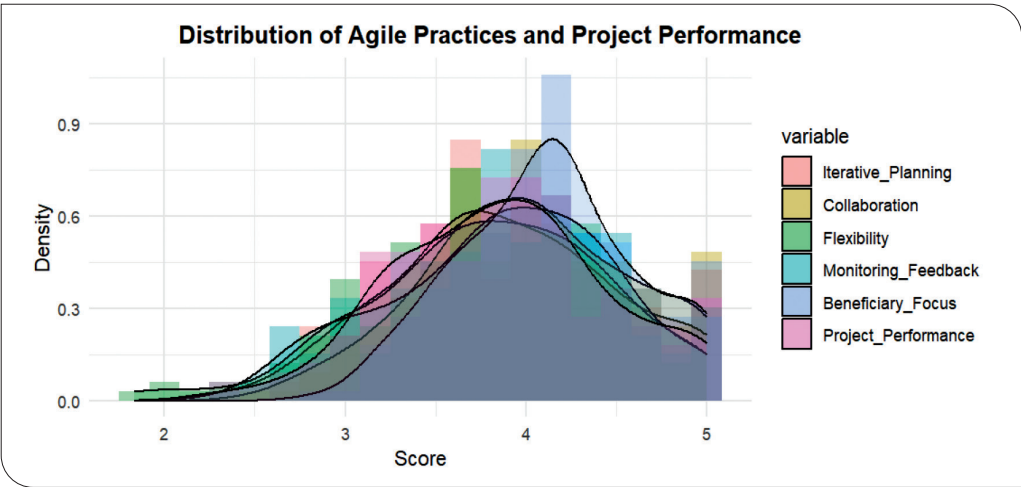


Figure 2: Distribution of Agile Practices and Project Performance

Source: Field Data (2025)

4.4 The Boxplot of Agile Practices indicators alongside Project Performance (n = 198)

The boxplot indicates that all Agile Practice indicators and Project Performance have relatively high median and mean scores, reflecting positive perceptions among respondents. Beneficiary Focus and Collaboration recorded the highest central values, while Flexibility showed greater variability and a few lower outliers, suggesting inconsistent implementation. Project Performance also exhibited high ratings with limited dispersion, indicating generally favourable outcomes. Overall, the results suggest that Agile Practices are well adopted and are associated with strong project performance within the Shule Bora Project.

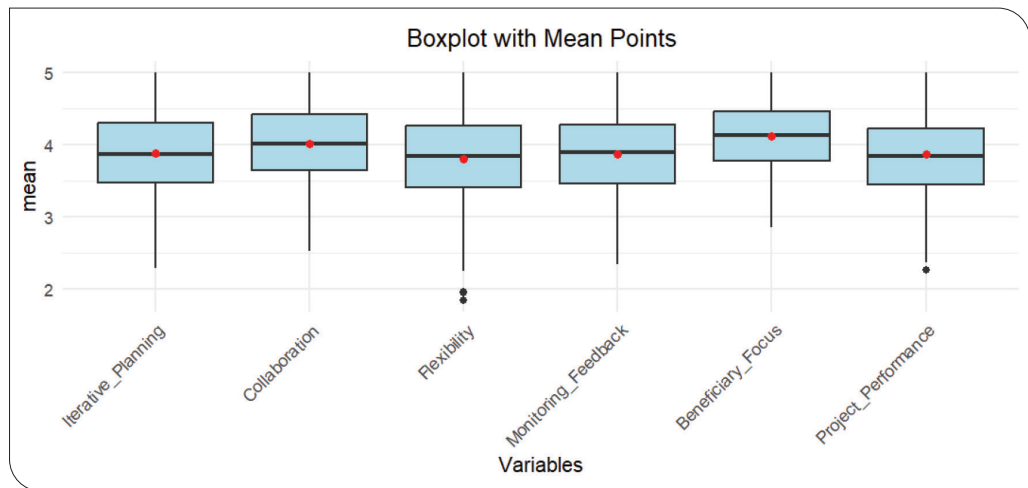


Figure 3: Agile Practices indicators alongside Project Performance

Source: Field Data (2025)

4.5 The Violin Plot of Agile Practices indicators alongside Project Performance (n = 198)

The violin plot shows that responses for Agile Practices and Project Performance are generally concentrated between scores of 3 and 5, indicating favourable perceptions among respondents. Beneficiary Focus and Collaboration exhibit the highest concentrations around higher scores, while Flexibility shows slightly greater variability, suggesting differences in its implementation across projects.

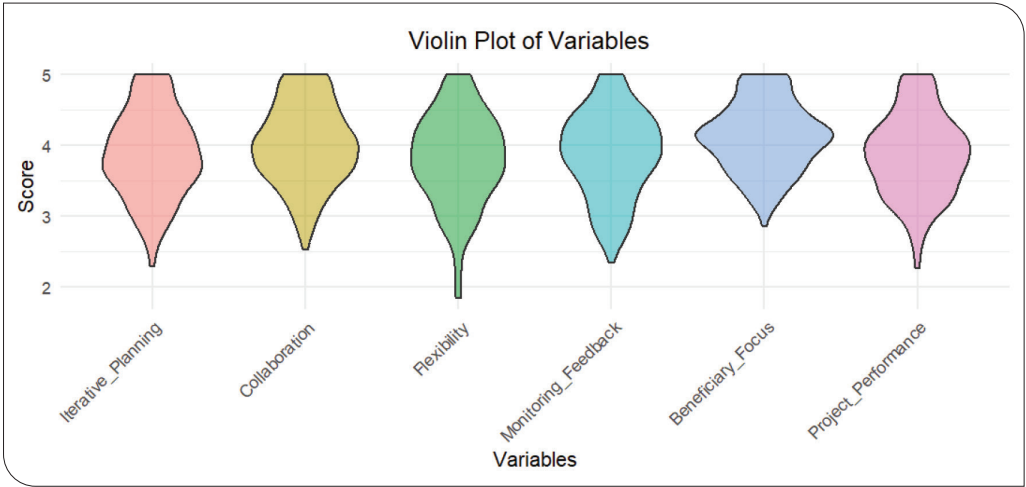


Figure 4: Agile Practices Indicators

Source: Field Data (2025)

4.6 The Correlation Matrix of Agile Practices Indicators and Project Performance

The correlation analysis reveals that Project Performance is positively associated with all Agile Practice indicators, with the strongest relationships observed for Flexibility ($r = 0.51$), Collaboration ($r = 0.50$), and Beneficiary Focus ($r = 0.49$). Monitoring and Feedback showed a moderate positive relationship ($r = 0.37$), while Iterative Planning exhibited a relatively weak association ($r = 0.16$). The generally low correlations among the independent variables indicate minimal multicollinearity, suggesting that each Agile Practice contributes uniquely to project performance.

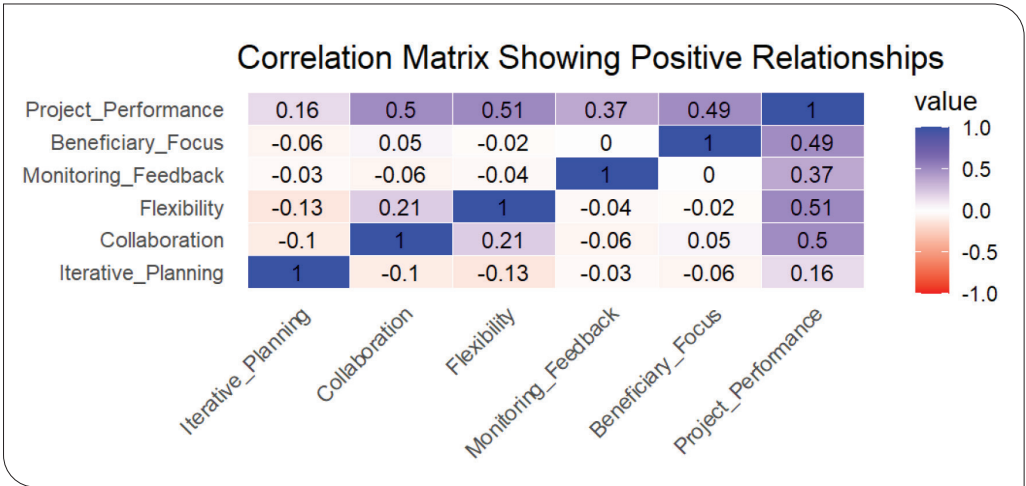


Figure 5: Correlation Matrix

Source: Field Data (2025)

4.8 The effect of Agile Practices on Project Performance in the Public Sector

4.8.1 Model Fit Indices

The model fit indices indicate that the Structural Equation Model achieved an acceptable overall fit to the data. The CFI (0.939), TLI (0.901), and SRMR (0.055) met the recommended thresholds, indicating good model fit and adequate representation of the observed relationships. Although the Chi-square statistic was significant and the RMSEA value (0.098) suggested a marginal fit, the robust RMSEA (0.005) indicated excellent model fit.

Table 3: Model Fit Indices

Fit Index	Standard Value	Scaled/Robust Value
Chi-square (χ^2)	484.608	505.790
Degrees of Freedom (df)	26	26
p-value	0.000	0.000
CFI	0.939	0.928
TLI	0.901	0.984
RMSEA	0.098	0.005
RMSEA (90% CI Lower)	0.076	0.082
RMSEA (90% CI Upper)	0.022	0.029
SRMR	0.055	0.055

Source: Field Data (2025)

4.8.2 Information Criteria

The log-likelihood results indicate that the proposed model provides a better fit to the data than the null model, demonstrating its ability to explain the relationships among the study variables. The AIC (2677.735), BIC (2740.212), and SABIC (2680.020) values suggest an acceptable balance between model fit and complexity. These information criteria are primarily useful for comparing alternative models, with lower values indicating a more parsimonious solution.

Table 4: Information Criteria

Criterion	Value
Log-likelihood (H0)	-1319.867
Log-likelihood (H1)	-1077.563
AIC	2677.735
BIC	2740.212
SABIC	2680.020

Source: Field Data (2025)

4.8.3 Measurement Model Factor Loadings (Latent Variables) on Agile Practices

The measurement model results indicate that most indicators significantly contribute to the Agile Practices construct. Flexibility (Std. Loading = 0.918) emerged as the strongest indicator, followed by Beneficiary Focus (Std. Loading = 0.858) and Collaboration (Std. Loading = 0.582), highlighting their importance in defining Agile Practices. Although Monitoring & Feedback showed the lowest standardised loading (0.422), it remained statistically significant and contributed meaningfully to the construct.

Table 5: Measurement Model on Agile Practices

Indicator	Estimate	Std. Error	z-value	p-value	Std.all
Iterative Planning	1.000	0.01	1.372	0.64	0.822
Collaboration	0.607	0.074	8.260	0.000	0.582
Flexibility	1.209	0.080	15.066	0.000	0.918
Monitoring & Feedback	0.466	0.086	5.453	0.000	0.422
Beneficiary Focus	0.987	0.078	12.592	0.000	0.858

Source: Field Data (2025)

The findings indicate that Flexibility and Beneficiary Focus are the most influential dimensions of Agile Practices, reflecting the importance of adaptability and stakeholder-centred approaches in enhancing project outcomes. These results are consistent with previous studies, which found that flexible project management practices improve responsiveness and performance, while strong beneficiary engagement enhances the effectiveness of service delivery. Although Monitoring & Feedback contributed comparatively less, its significance underscores the value of continuous assessment and feedback mechanisms in supporting project success.

4.8.4 Measurement Model Factor Loadings (Latent Variables) on Project Performance

Table 6 presents the measurement model results for Project Performance, indicating how well each observed indicator reflects the underlying construct. All indicators, Time Efficiency, Cost Efficiency, Quality, and Stakeholder Satisfaction, are statistically significant ($p = 0.000$), confirming that they are valid measures of Project Performance within the model.

Regarding contribution strength, Cost Efficiency (Std.all = 0.696) and Stakeholder Satisfaction (Std.all = 0.669) show relatively strong standardised loadings, suggesting they are the most influential indicators of Project Performance in this study. By contrast, Time Efficiency (Std.all = 0.365) and Quality (Std.all = 0.321) exhibit weaker loadings, indicating a lower contribution to the latent construct than the other indicators, although they remain statistically significant.

Table 6: Measurement Model on Project Performance

Indicator	Estimate	Std. Error	z-value	p-value	Std.all
Time Efficiency	1.030	0.322	4.017	0.000	0.365
Cost Efficiency	2.100	0.497	4.222	0.000	0.696
Quality	1.025	0.247	4.146	0.000	0.321
Stakeholder Satisfaction	2.128	0.510	4.175	0.000	0.669

Source: Field Data (2025)

The measurement model results indicate that Cost Efficiency (0.696) and Stakeholder Satisfaction (0.669) are the strongest contributors to Project Performance, consistent with the literature, which emphasises financial and stakeholder-oriented outcomes in public sector projects. For example, Kisobere and Badi (2026) and Matto (2023) show that efficient resource utilisation and the meeting of stakeholder expectations are critical drivers of project success in complex public-sector settings. The weaker loadings of Time Efficiency (0.365) and Quality (0.321) suggest that, while these factors are important, their relative influence may be context-specific, reflecting operational realities in Tanzanian public-sector projects (Mussa, Yeom, & Lee, 2023; Kullaya, Alemu, & Yeom, 2022). These findings reinforce the multidimensional nature of project performance, where financial prudence and stakeholder engagement often play more prominent roles in shaping outcomes.

4.8.5 Structural Model (Regression Path)

The structural model results indicate that Agile Practices have a positive, statistically significant effect on Project Performance ($\beta = 0.386$, $p < 0.001$). This indicates that increased adoption of Agile Practices is associated with improved project outcomes, including time efficiency, cost efficiency, quality, and stakeholder satisfaction. The strong standardised effect suggests that Agile Practices are a key determinant of project success within the Shule Bora Project.

Table 7: Structural Model (Regression Path)

Path	Estimate	Std. Error	z-value	p-value	Std.all
Agile Practices on Project Performance	0.386	0.078	4.931	0.000	1.094

Source: Field Data (2025)

The positive and statistically significant effect of Agile Practices on Project Performance (Estimate = 0.386, Std.all = 1.094) aligns with previous research linking adaptive management practices to improved project outcomes. Bigirumwami et al. (2021) emphasise that iterative, collaborative, and flexible approaches enhance efficiency and overall effectiveness in public sector projects. Similarly, Bagheri Khoulenjani, Talebi, and Karim Zadeh (2024) find that structured adoption of Agile methodologies improves project delivery and stakeholder satisfaction. The strong standardised coefficient observed in this study corroborates the findings of Bianchi, Marzi, and Guerini (2020), who demonstrate that implementing flexible processes and continuous collaboration substantially improves performance outcomes.

4.8.6 Structural Equation Model (SEM)

The SEM results indicate that Agile Practices have a strong and statistically significant positive effect on Project Performance ($\beta = 1.09$). Among the Agile Practice indicators, Flexibility (0.92) and Monitoring & Feedback (0.86) exhibited the highest factor loadings, followed by Iterative Planning (0.82), Collaboration (0.58), and Beneficiary Focus (0.42). For Project Performance, Cost Efficiency (0.70) and Quality (0.67) were the strongest contributors, while Time Efficiency (0.36) and Stakeholder Satisfaction (0.32) contributed relatively less.

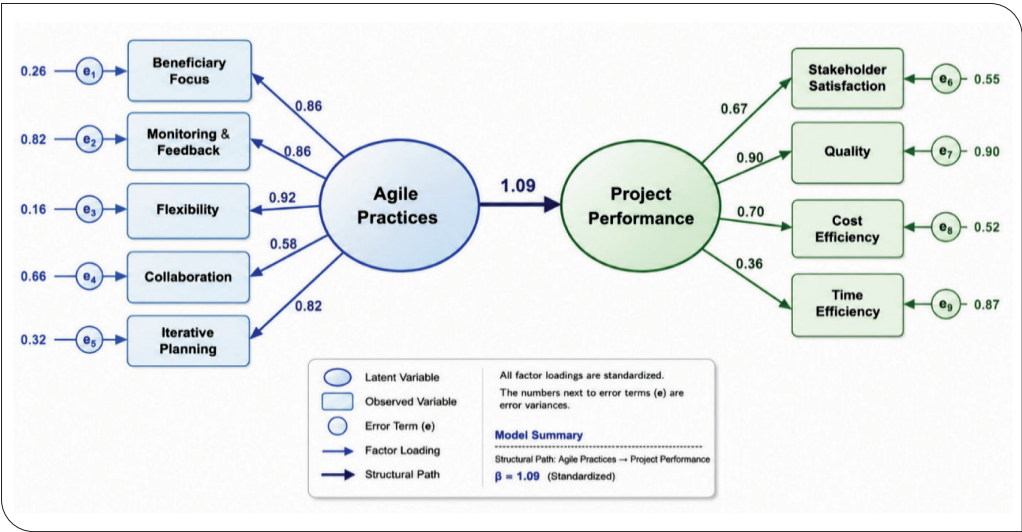


Figure 6: Structural Equation Model

Source: Field Data (2025)

The SEM results, showing a strong positive path ($\beta = 1.09$) from Agile Practices to Project Performance, are supported by the existing literature, which emphasises adaptive, feedback-oriented, and stakeholder-focused management approaches. Chaturanga et al. (2023) and Bigirumwami et al. (2021) suggest that collaborative practices and attention to beneficiary needs significantly enhance project outcomes in public service sectors. The high loadings for Flexibility (0.92) and Monitoring & Feedback (0.86) confirm the findings of Ali et al. (2021), indicating that flexible approaches and continuous feedback mechanisms are central to improving the effectiveness of project implementation. Moreover, the influence of Cost Efficiency and Quality on Project Performance aligns with observations by Kisobere and Badi (2026) and Matto (2023), who note that operational efficiency and quality management are key predictors of success in complex public-sector projects. Collectively, these studies corroborate the SEM findings, demonstrating that Agile methodologies substantially improve both process and outcome metrics in public-sector projects, such as the Shule Bora Project.

5.0 Conclusion

The findings from the Shule Bora Project in Tanzania indicate that Agile Practices have a significant and positive impact on Project Performance in the public sector. Distribution and boxplot analyses show that respondents generally rate the implementation of agile practices, particularly Beneficiary Focus and Collaboration, at moderate to high levels, which corresponds to similarly high ratings for project performance in time efficiency, cost efficiency, quality, and stakeholder satisfaction. Measurement model results confirm that most indicators of Agile Practices, especially Flexibility and Beneficiary Focus, reliably capture the construct, while Project Performance is most strongly represented by Cost Efficiency and Stakeholder Satisfaction. Structural model analysis further demonstrates a statistically significant positive relationship between Agile Practices and Project Performance, reinforcing the conclusion that effective adoption of agile methodologies enhances project outcomes in public sector initiatives.

The results have important implications for public sector project management. First, the strong association between Agile Practices and Project Performance suggests that public agencies should prioritise adopting agile methodologies, emphasising iterative planning, collaboration, and stakeholder engagement, to achieve higher efficiency, quality, and satisfaction. Second, the variability observed in Flexibility and the relatively weaker contribution of some performance indicators, such as Time Efficiency and Quality, highlight areas where targeted improvements could strengthen project outcomes. Finally, the study supports integrating continuous monitoring, feedback, and beneficiary-focused strategies into standard project management practices, indicating that these elements are critical for enhancing project effectiveness in public-sector contexts.

6.0 Recommendations

Based on the findings, it is recommended that public sector agencies implementing projects, such as the Shule Bora Project, systematically integrate Agile Practices into their project management processes. Specifically, project managers should strengthen Beneficiary Focus and Collaboration, as these practices showed the strongest impact on performance outcomes. Efforts should also be made to improve consistency in Flexibility and enhance weaker performance dimensions, such as Time Efficiency and Quality. Training programmes and capacity-building initiatives can be implemented to ensure that staff are proficient in agile methods, including iterative planning, monitoring, and feedback mechanisms. Additionally, policymakers should consider developing guidelines and frameworks to institutionalise agile principles in public-sector projects, promoting efficiency, cost-effectiveness, quality, and stakeholder satisfaction, ultimately leading to more successful, sustainable project outcomes.

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