



Influence of Work Breakdown Structure on the Performance of the Rurambi Rice Project

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Abstract: This study investigated the influence of work breakdown structure (WBS) on the performance of the Rurambi Rice Project in Bugesera District, Eastern Province of Rwanda. Using a descriptive mixed-methods research design, the study targeted 74 project staff, all of whom were included due to the small population size, with 70 questionnaires successfully returned (response rate: 94.6%). Primary data were collected through questionnaires and semi-structured interviews, while secondary data were obtained from document analysis. Instrument reliability was confirmed using Cronbach's Alpha (WBS: $\alpha = 0.864$), exceeding the acceptable 0.70 threshold. Data were analysed using SPSS Version 23.0 through descriptive statistics, Pearson Correlation, and simple linear regression. Findings revealed that WBS positively and significantly influenced project performance, explaining 82.1% of the variance in project performance outcomes ($R^2 = 0.821$; $F = 311.704$; $p = 0.000$). The regression equation was: $Y_{pp} = 0.330 + 0.777(WBS) + 0.044$. The study concludes that systematic work breakdown structure implementation particularly the decomposition of complex tasks into manageable components and the accurate identification of required resources is a critical determinant of agribusiness project performance in Rwanda. The study recommends that project managers adopt detailed WBS frameworks at the planning stage to minimise delays, improve resource clarity, and enhance project outcomes. Future research should explore WBS application in road construction and hydropower projects in Rwanda.

Keywords: Work breakdown structure, Project performance, Resource allocation, Agribusiness projects, Rwanda

How to cite this work (APA):

Mutsinzi, A & Njenga, G. (2026). Influence of Work Breakdown Structure on the Performance of the Rurambi Rice Project. *Journal of Research Innovation and Implications in Education*, 10(1), 921 – 931. <https://doi.org/10.59765/ard6>

1. Introduction

Effective project management depends on the structured organisation of tasks, resources, and deliverables. A work breakdown structure (WBS) provides a foundational tool for achieving this by decomposing a complex project into smaller, more manageable components, thereby clarifying scope, assigning responsibilities, and facilitating resource estimation (Magassouba et al., 2019). In project-intensive sectors such as agribusiness, where resource constraints are common and project failures are costly, the strategic use of WBS has emerged as a critical practice for improving performance outcomes.

Rwanda's agribusiness sector is central to its national development agenda. The government has made significant investments in agricultural project implementation to drive economic growth, reduce poverty, and ensure food security (Vaquero, Reinhardt, & Gurtner, 2021). Despite this commitment, project performance in Rwanda's agribusiness sector remains a serious concern. National data indicate that 66% of projects exceed their budgets, 36% miss deadlines, 46% fall short of their defined scope, and 56% fail to meet quality standards (MINAGRI Report, 2022). These systemic failures point to gaps in project planning and resource management practices, including the inadequate use of structured tools such as WBS.

Among the key challenges identified in the literature are limited skilled labour, poor infrastructure, restricted access to finance, and slow adoption of modern project management methodologies (Ezechiel Ndahayo, 2024; Bekolli et al., 2023). While resource allocation broadly has been studied in the context of project performance, little empirical research focuses specifically on how WBS influences agribusiness project outcomes in Rwanda. This study addresses that gap by examining the influence of WBS on the performance of the Rurambi Rice Project in Bugesera District, Eastern Province of Rwanda, a nationally significant agribusiness initiative operating within these constraints.

1.1 Research Objective

The objective of this study is to analyse the influence of work breakdown structure on the performance of the Rurambi Rice Project in Bugesera District, Eastern Province of Rwanda.

1.3 Problem Statement

Despite the widespread recognition of WBS as a critical project management tool, its systematic application in Rwandan agribusiness projects remains poorly documented and empirically underexplored. National project performance statistics reveal systemic underperformance: 66% of projects exceed budgets, 36% miss deadlines, and 56% fall short on quality (MINAGRI Report, 2022). Bekolli et al. (2023) note that inadequate task decomposition, unclear scope definition, and poor resource identification are among the root causes of such failures. Without empirical evidence specifically examining the role of WBS in agribusiness project performance in Rwanda, designing targeted interventions remains difficult. This study fills that gap through a focused case study of the Rurambi Rice Project.

2. Literature Review

2.1 Theoretical Framework

This study draws on the General Systems Theory (Sachitra & Padmini, 2021) and the Theory of Change (Akhtar et al., 2019) as its primary theoretical anchors. The General Systems Theory conceptualises project management as an open system in which inputs including structured planning tools such as WBS interact with organisational processes to produce measurable outputs and performance outcomes. This theory underscores the interdependence of project components and the importance of systematic task organisation for system-wide efficiency.

The Theory of Change further provides a logical framework linking WBS implementation (as an input and activity) to intermediate outputs such as improved resource identification, task accountability, and schedule adherence and ultimately to long-term project impacts such as increased agricultural output, cost efficiency, and food security (Akhtar et al., 2019). Together, these two frameworks establish the theoretical basis for expecting a positive, causal relationship between WBS adoption and agribusiness project performance in Rwanda.

The Principal-Agent Theory (Sarens & Abdolmohammadi, 2010) also informs this study by highlighting how a well-constructed WBS can reduce information asymmetry between project principals (sponsors and donors) and agents (project managers and implementers), thereby improving accountability and reducing the risk of resource misallocation. By clearly defining deliverables and task ownership, WBS strengthens the principal-agent relationship within project governance structures.

2.2 Concept of Work Breakdown Structure

A work breakdown structure is a hierarchical method of decomposing a project into smaller, more manageable components. It is a visual representation that divides work activities and project deliverables into manageable tasks, with each task representing a distinct activity that must be completed to meet the project's goals (Magassouba et al., 2019). The WBS typically consists of multiple levels: the top level represents major deliverables or project phases, while subsequent levels break these down into smaller components until work packages, the smallest units of work are clearly defined and assignable to specific teams or individuals.

Ocharo (2020) highlights that WBS provides a critical framework for identifying all activities necessary for successful project completion. By segmenting the project into manageable components, WBS makes it easier to estimate resources, schedules, and costs for each work package. Its hierarchical structure establishes clear lines of accountability: assigning each work package to a team member ensures ownership while facilitating effective tracking of project progress.

2.3 Work Breakdown Structure and Project Performance: Empirical Evidence

Empirical research consistently supports the positive relationship between WBS implementation and project performance across various sectors. Smith and Jones (2015) conducted a cross-industry study investigating the effects of WBS on project outcomes. Using questionnaires

analysed through SPSS 23 and Microsoft Excel, the study found that project managers who implemented WBS achieved significantly higher success rates compared to those who did not. The WBS contributed to better planning and coordination, optimised resource allocation, and improved team communication — all of which enhanced efficiency and effectiveness.

Brown (2018) similarly explored the relationship between WBS quality and project outcomes across multiple construction projects. The study found that projects with well-defined, comprehensive WBS models demonstrated superior performance in cost management, schedule adherence, and overall project success. The research emphasised the necessity of developing detailed WBS frameworks that accurately reflect the full scope and requirements of a project.

In an agricultural context directly relevant to this study, Chaudhary et al. (2021) conducted a case study on WBS application in a crop cultivation project. Their findings confirmed that WBS significantly improved project planning, resource allocation, productivity, and cost efficiency. The WBS provided a framework for identifying critical tasks, understanding dependencies, and proactively addressing potential risks all of which supported informed decision-making and improved project performance, including in applications relevant to rice farming schemes.

Chege and Wang (2021) further demonstrated that structured planning tools, including WBS, positively correlate with improved employee performance in public institutions in Uganda. Their study of 142 respondents using a descriptive survey design found a positive correlation between efficient cost management facilitated by structured task planning and improved employee output, suggesting that the benefits of WBS extend beyond task organisation into broader workforce management outcomes.

Collectively, these studies underscore the positive impact of WBS on project planning and outcomes across agriculture and other sectors. They provide a compelling empirical basis for expecting that WBS implementation would similarly improve the performance of the Rurambi Rice Project in Rwanda.

2.4 Work Breakdown Structure in Resource Planning

The role of WBS in resource planning is particularly significant for agribusiness projects. According to Magassouba et al. (2019), WBS enables project managers to accurately identify the specific resources labour, equipment, materials, and finances required for each work package. This granular visibility into resource

requirements facilitates more precise budgeting, reduces the likelihood of resource over allocation or underutilisation, and supports timely procurement and deployment decisions.

Ocharo (2020) further notes that the resource planning function of WBS becomes especially important when resources are limited or when multiple project activities compete for the same inputs, as is commonly the case in Rwanda's agribusiness sector. By mapping resource requirements to specific tasks and deliverables, WBS provides the structural foundation for effective resource-constrained scheduling and levelling downstream resource management practices that depend on the quality of initial task decomposition.

2.5 Research Gap

While the international literature consistently supports the positive influence of WBS on project performance, empirical research specifically examining WBS in the context of agribusiness projects in Rwanda remains limited (Rialti et al., 2022). Most existing studies have been conducted in industrialised nations or in sectors such as construction and information technology, with limited attention to sub-Saharan African agricultural projects. This study addresses that gap by providing contextually relevant empirical evidence from the Rurambi Rice Project in Bugesera District, Rwanda.

3. Methodology

3.1 Research Design

The study adopted a descriptive case study design, integrating both qualitative and quantitative approaches within a mixed-methods framework. This design was appropriate as it allowed comprehensive exploration of the relationship between WBS implementation and project performance while capturing both quantitative statistical patterns and qualitative insights from project stakeholders. The study covered the period 2018 to 2020, during which time data were collected and reviewed at the Rurambi Rice Project site in Bugesera District, Eastern Province of Rwanda (Kraus, 2022).

3.2 Target Population and Sample

The target population comprised all 74 staff members actively engaged in the Rurambi Rice Project. Given the small population size, a census approach was adopted, making all 74 members part of the study. Participants were stratified across eight functional categories as presented in Table 1.

Table 1: Distribution of Study Population

Strata	Frequency	Percentage (%)
Top Management	03	4.00
Project Managers	10	14.00
Technical Team	28	38.00
Procurement	05	7.00
Accounts Department	15	20.00
Legal Team	03	4.00
Auditors	05	7.00
Advisors	05	7.00
Total	74	100.00

Source: Rurambi Rice Project, Human Resource Department (2025)

Of the 74 questionnaires distributed, 70 were completed and returned, yielding a response rate of 94.6%, consistent with the 94.6% response rate reported by Archibald (2018) in a comparable study. The 5.4% non-response rate was attributed to unavoidable circumstances such as staff on maternity or sick leave.

3.3 Respondent Demographics

Table 2 presents the gender distribution of respondents. The majority (67.14%) were female, while 32.86% were

male, consistent with the project's predominantly female workforce. Regarding education, 51.43% held bachelor's degrees, 31.43% master's degrees, 14.29% diplomas, and 2.86% professional certificates. In terms of experience, 47.14% had 4–6 years, 32.86% had 1–3 years, 14.29% had 7–9 years, and 5.71% had 10 or more years. Most respondents (54.29%) were at the operational level, 27.14% at the supervisory level, and 18.57% at the strategic management level.

Table 2: Demographic Characteristics of Respondents

Characteristic	Category	Frequency	Percentage (%)
Gender	Female	47	67.14
	Male	23	32.86
Education	Diploma	10	14.29
	Bachelor's Degree	36	51.43
	Master's Degree	22	31.43
	Professional Certificate	02	2.86
Experience	1–3 years	23	32.86
	4–6 years	33	47.14
	7–9 years	10	14.29
	10+ years	04	5.71
Management Level	Operational	38	54.29
	Supervisory	19	27.14

	Strategic	13	18.57
Total		70	100.00

Source: Rurambi Rice Project, Human Resource Department (2025)

3.4 Data Collection Instruments

Primary data were collected using structured questionnaires containing both open-ended and closed-ended items, and semi-structured interviews were administered to managers, supervisors, and subordinates across all strata. Interview sections were organised into five thematic areas, each allocated 20–30 minutes. Section A specifically focused on the work breakdown structure and its influence on performance. Secondary data were gathered from project reports, budgets, and administrative documents. Before the main data collection, a pilot study involving 14 randomly selected participants (approximately 20% of the target population) was conducted in Nyamata, Bugesera District, to test instrument clarity, reliability, and validity.

3.5 Validity and Reliability of Research Instruments

Content validity was established through expert review by the researcher's supervisors and field specialists, who assessed the relevance, clarity, and alignment of questionnaire items with the study's objectives. The content validity ratio for the WBS variable was 0.68256, indicating adequate item relevance. Factor loadings below 0.50 were excluded from further analysis and replaced with more relevant items.

Instrument reliability was assessed using Cronbach's Alpha. Table 3 presents the reliability results.

Table 3: Reliability Analysis Results

Variable	N (Pilot Participants)	Cronbach's Alpha	Comment
Work Breakdown Structure	14	0.864	Acceptable

Source: Reliability Analysis Results (2025)

The Cronbach's Alpha of 0.864 for the WBS variable exceeded the acceptable threshold of 0.70 (George & Mallery, 2018), confirming that the instrument was internally consistent and reliable for measuring the influence of WBS on project performance.

3.6 Data Analysis

Quantitative data were entered into SPSS Version 23.0 and analysed using descriptive statistics (frequencies, percentages, means, and standard deviations), Pearson Correlation, and simple linear regression analysis. The regression model was:

$$Y_{pp} = \alpha + \beta_1 X_1 + \varepsilon_1$$

Where: Y_{pp} = Performance of the Rurambi Rice Project; X_1 = Work Breakdown Structure; α = Model constant (y -intercept); β_1 = Beta coefficient; ε_1 = Error term.

Qualitative data from interviews were analysed thematically and triangulated with quantitative findings. The study adhered to ethical principles including informed consent, voluntary participation, anonymity, confidentiality, and avoidance of plagiarism. Ethical approval was obtained from Mount Kigali University's Ethics Review Board prior to data collection.

4. Results and Discussion

4.1 Level of Project Performance in the Rurambi Rice Project

Before examining the WBS findings, the study first assessed the general level of project performance using two items relating to cost control and budgeting efficiency. Table 4 presents the descriptive statistics.

Table 4: Descriptive Statistics

Performance Indicator	SA fi	SA %	A fi	A %	D fi	D %	SD fi	SD %	Mean	Std. Dev.
Effective cost management involves tracking actual activity costs and overall project cost	17	24	37	53	07	10	10	14	2.1500	0.98809
Efficiency, budget, cost and estimated time to complete the project depend on how well project costs are controlled	32	45	20	28	06	08	13	19	2.0000	1.16980
Overall Mean									2.0750	1.07895

Source: Survey Data (2025)

Table 4 shows that 76% of respondents agreed that effective cost control is important for tracking activity costs and monitoring project expenditure, while 73% agreed that budgeting efficiency and estimated project duration are shaped by how well project costs are managed. The overall mean of 2.0750 (SD = 1.07895) indicates a moderate positive perception of performance, with some variability in responses. These results confirm that all respondents acknowledged a measurable level of project performance in the Rurambi Rice Project, and that resource allocation practices including WBS positively influence

performance across the dimensions of time, cost, quality, and scope.

4.2 Descriptive Statistics for Work Breakdown Structure

This section presents respondents' perceptions of the key WBS elements and their relationship to project management effectiveness.

Table 5: Descriptive Statistics

WBS Element	SA fi	SA %	A fi	A %	D fi	D %	SD fi	SD %	Mean	Std. Dev.
Breaking down a project into smaller, more manageable components is a crucial step in project management	43	61	06	09	05	07	16	23	1.80000	1.10501
Identifying the specific resources required for a project ensures availability and minimises delays	19	27	29	42	07	10	15	21	2.1000	0.96791
Allocating resources based on project task importance and high-priority tasks significantly impacts project goals	11	16	06	08	17	24	36	52	2.8500	0.98809
Categorising project activities is essential for organising and managing tasks and deliverables	46	66	07	10	03	04	14	20	1.65000	0.98809
Overall Mean									2.1000	1.01228

Table 5 reveals that 70% of respondents (SA: 61%; A: 9%) agreed that decomposing a project into smaller components is an essential step in project management, while 30% disagreed. The mean of 1.80 indicates generally strong agreement. Similarly, 76% agreed that categorising project activities is an important step for organising and managing project tasks and deliverables (mean = 1.65), while only a small minority disagreed.

Regarding resource identification, 68% (SA: 27%; A: 42%) agreed that identifying specific resources is a crucial planning step that ensures availability, minimises delays, and maximises efficiency, while 32% disagreed (mean = 2.10). Notably, 76% of respondents disagreed that allocating resources based on task priority significantly affects project goals (mean = 2.85), with only 24% in agreement. This suggests that in the Rurambi Rice Project context, resources tend to be assigned based on task relevance rather than strict priority ranking, and that high-priority activity allocation alone did not strongly influence perceived project goals.

The overall mean of 2.10 (SD = 1.01228) for the WBS variable indicates a moderate-to-positive level of WBS adoption across the project, with reasonable variability in practice. Interview data from project management corroborated these findings, confirming that task decomposition and categorisation were widely practised, though resource prioritisation remained an area of inconsistency.

4.3 Correlation between Work Breakdown Structure and Project Performance

Pearson Correlation analysis was conducted to assess the statistical relationship between individual WBS elements and project performance indicators (effective cost management, efficiency budget cost, and estimated time scope). Table 6 presents the correlation results.

Table 6: Pearson Correlation

WBS Element	Statistics	Effective Cost Work Performed	Efficiency Budget Cost	Estimated Time Scope
Breaking down project into smaller components	Pearson r	0.119*	0.049	0.074
	Sig. (2-tailed)	0.048	0.414	0.223
	N	164	164	164
Identifying specific resources required	Pearson r	0.025	0.007	0.098
	Sig. (2-tailed)	0.683	0.910	0.105
	N	164	164	164
Allocating resources based on priority	Pearson r	0.121*	0.102	0.005
	Sig. (2-tailed)	0.044	0.091	0.939
	N	164	164	164

* Correlation is significant at the 0.05 level (2-tailed) Source: Survey Data (2025)

Table 6 presents the Pearson Correlation results for the three WBS elements against the three project performance indicators. Regarding the first element, breaking down the project into smaller components showed a statistically significant positive correlation with effective cost work performed ($r = 0.119^*$, $p = 0.048$). The relationship was not significant for efficiency budget cost ($r = 0.049$, $p = 0.414$) or estimated time scope ($r = 0.074$, $p = 0.223$), indicating

that task decomposition most directly influences cost management rather than schedule or scope performance.

For the second element, identifying specific resources required showed no statistically significant correlation with any of the three performance indicators: effective cost work performed ($r = 0.025$, $p = 0.683$), efficiency budget cost ($r = 0.007$, $p = 0.910$), and estimated time scope ($r = 0.098$, $p = 0.105$). All p-values exceed 0.05, meaning that

resource identification alone did not produce a statistically significant direct relationship with the measured performance outcomes, though the directional relationships were all positive.

For the third element, allocating resources based on priority showed a statistically significant positive correlation with effective cost work performed ($r = 0.121^*$, $p = 0.044$) and a positive but non-significant relationship with efficiency budget cost ($r = 0.102$, $p = 0.091$). No significant relationship was found with estimated time scope ($r = 0.005$, $p = 0.939$). Together, these results suggest that WBS elements particularly task decomposition and priority-based resource allocation most strongly and significantly influence cost-related performance dimensions.

Table 8 shows that the ANOVA result is statistically significant ($F = 311.704$; $p = 0.000$), which is below the significance threshold of 0.05. This confirms that the regression model is a valid and significant fit, and the null

4.4 Regression Analysis: Effect of Work Breakdown Structure on Project Performance

Simple linear regression was performed to determine the magnitude and statistical significance of WBS's influence on project performance. The regression model was:

$$Y_{pp} = \alpha + \beta_1 X_1 + \varepsilon_1$$

Where Y_{pp} = Performance of the Rurambi Rice Project; X_1 = Work Breakdown Structure; α = Constant; ε_1 = Error term.

hypothesis (H_{01} : there is no statistically significant relationship between WBS and project performance) is rejected. The alternative hypothesis is therefore supported: WBS has a statistically significant influence on the performance of the Rurambi Rice Project.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.906 ^a	.821	.818	.43740

a. Predictors: (Constant), Work Breakdown Structure (X_1) Source: Survey Data (2025)

Table 7 shows that the R value of 0.906 indicates a strong positive linear relationship between WBS and project performance. The R^2 of 0.821 indicates that WBS alone explains 82.1% of the variance in project performance, demonstrating a very strong predictive model. The Adjusted R^2 of 0.818 confirms the model's reliability after

accounting for additional variables, suggesting that 81.8% of the variance in the Rurambi Rice Project's performance is attributable to WBS practices. This is a notably high explanatory power, underscoring WBS as a primary determinant of project performance in this context.

Table 8: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	59.633	1	59.633	311.704	.000 ^b
Residual	13.009	68	.191		
Total	72.643	69			

a. Dependent Variable: Performance of Rurambi Rice Project b. Predictors: (Constant), Work Breakdown Structure (X_1) Source: Survey Data (2025)

Table 9: Regression Coefficients

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.	95% CI Lower	95% CI Upper
(Constant)	.330	.112		2.952	.004	.107	.552
Work Breakdown Structure (X ₁)	.777	.044	.906	17.655	.000	.689	.864

a. Dependent Variable: Performance of Rurambi Rice Project Source: Survey Data (2025)

Table 9 presents the regression coefficients for the WBS model. The constant ($\alpha = 0.330$, $p = 0.004$) indicates that even without considering WBS, the Rurambi Rice Project maintains a baseline performance level of 0.330 units. The unstandardised coefficient for WBS ($B = 0.777$, $p = 0.000$) indicates that for every one-unit increase in WBS quality and implementation, project performance increases by 0.777 units. The standardised Beta coefficient of 0.906 confirms the very strong standardised influence of WBS on project performance. The 95% confidence interval for the WBS coefficient (0.689 to 0.864) is narrow and does not include zero, further confirming the reliability of this estimate.

The full regression equation is:

$$Y_{pp} = 0.330 + 0.777(\text{Work Breakdown Structure}) + 0.044$$

This equation confirms that WBS is a powerful and statistically significant predictor of agribusiness project performance in the Rurambi Rice Project. The WBS improves performance by providing a detailed breakdown of project scope and work requirements, minimising ambiguity and uncertainty, reducing the likelihood of scope creep, and establishing clear task expectations from project inception.

4.5 Discussion of Findings

The findings of this study confirm that work breakdown structure exerts a strong, statistically significant positive influence on the performance of the Rurambi Rice Project ($R^2 = 0.821$; $B = 0.777$; $p = 0.000$). These results are consistent with and extend the existing empirical literature in several important ways.

The findings align with Smith and Jones (2015), who found that WBS implementation significantly improved project success rates across industries by facilitating better planning and coordination, optimised resource allocation, and enhanced team communication. The current study replicates these benefits in an agribusiness context in sub-Saharan Africa, providing contextually grounded evidence that WBS is equally effective in resource-constrained agricultural project environments.

The findings further concur with Brown (2018), who demonstrated that well-defined WBS models correlate with

superior cost management, schedule adherence, and overall project success in construction projects. The current study's correlation results similarly show that task decomposition and priority-based resource allocation most significantly influence cost-related performance dimensions ($r = 0.119^*$, $p = 0.048$; $r = 0.121^*$, $p = 0.044$), suggesting that WBS's primary performance benefit in the Rurambi context is through improved cost management.

In alignment with Chaudhary et al. (2021), the study confirms that WBS improves resource allocation, productivity, and cost efficiency in agricultural projects by providing a framework for identifying critical tasks, understanding dependencies, and proactively managing risks. The descriptive findings particularly that 70% agreed on the importance of task decomposition and 76% endorsed activity categorisation suggest that these WBS practices are already well-recognised among Rurambi Rice Project staff, even if their systematic implementation varies.

The finding that resource identification (WBS element 2) did not show statistically significant direct correlations with any performance indicator (all $p > 0.05$) is noteworthy. This may suggest that while staff recognise resource identification as important, the quality or completeness of resource identification in practice may be insufficient to produce measurable performance outcomes independently. These points to an implementation gap: the recognition of WBS principles is not always matched by their systematic execution. This finding warrants further investigation in future research.

5. Conclusion and Recommendations

5.1 Conclusion

This study investigated the influence of work breakdown structure on the performance of the Rurambi Rice Project in Bugesera District, Rwanda. Based on descriptive statistics, Pearson Correlation, and regression analysis of data collected from 70 respondents, the study confirms that WBS exerts a strong, statistically significant positive influence on project performance.

The regression model demonstrated that WBS explains 82.1% of the variance in project performance ($R^2 = 0.821$; Adjusted $R^2 = 0.818$; $F = 311.704$; $p = 0.000$), with a regression coefficient of 0.777 indicating that each unit improvement in WBS quality increases project performance by 0.777 units. The null hypothesis (H_{01} : there is no statistically significant relationship between WBS and the performance of the Rurambi Rice Project) is therefore rejected in favour of the alternative hypothesis.

The study identifies task decomposition and priority-based resource allocation as the WBS elements most directly and significantly associated with cost-related project performance outcomes. Activity categorisation was broadly endorsed but requires more consistent implementation. Resource identification, while positively directional, did not produce statistically significant direct correlations with performance outcomes, suggesting an implementation gap between awareness and practice.

The findings affirm that systematic WBS implementation encompassing structured task decomposition, accurate resource identification, and clear activity categorisation is a critical determinant of agribusiness project performance in Rwanda, and supports the broader goals of Rwanda's agricultural development agenda.

5.2 Recommendations

Based on the findings and conclusions drawn from this study, the following recommendations are proposed to enhance the effectiveness of Work Breakdown Structure (WBS) application in agribusiness project management, with particular reference to the Rurambi Rice Project and comparable initiatives in Rwanda.

1. Project management teams at the Rurambi Rice Project and similar agribusiness initiatives should adopt formally structured WBS frameworks at the project planning stage. This entails clearly defining all work packages, resource requirements, and task ownership responsibilities prior to the commencement of implementation, so as to establish a coherent and accountable project execution foundation.
2. Project planners should dedicate adequate time to comprehensive resource identification within the WBS process, ensuring that all requisite labour, equipment, materials, and financial inputs are systematically catalogued and documented for each work package. This measure is essential to bridging the observed gap between awareness of resource identification practices and their consistent application in the field.
3. Throughout the project lifecycle, project managers should utilise the WBS as a dynamic monitoring instrument rather than a static

planning document. This involves regularly comparing actual task completion rates and resource utilisation against planned baselines, and generating periodic progress reports to enable timely identification of variances and the implementation of corrective measures.

4. Rwanda's Ministry of Agriculture, alongside relevant development partners, should integrate WBS training into capacity-building programmes designed for agribusiness project managers. Such training should equip practitioners with hands-on skills in task decomposition, resource mapping, and WBS-based performance monitoring, thereby strengthening the overall technical capacity of the sector.
5. Project sponsors and donor agencies should require the submission of WBS documentation as a mandatory element of both project proposals and periodic progress reports. Institutionalizing this requirement would create stronger incentives for the rigorous and consistent adoption of WBS practices across Rwanda's broader agribusiness project portfolio.

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