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Project Environment and Performance of Kiambu Dairy Project, Kenya

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Abstract: ***Unfavorable project environments are arguably a major contributor to poor project performance in the dairy sector in Kenya. This study examines how project environmental factors-namely structure, culture, governance, and technological advancement-influence the performance of the Kiambu Dairy Project in Kenya. Drawing on contingency, systems, and goal-setting theories, the research employs both exploratory and descriptive designs using a census method targeting 94 project participants. Data was collected through semi-structured questionnaires and analyzed using descriptive statistics, Pearson correlation, and regression analysis. Findings revealed that technological advancement had the most substantial impact on performance, followed by project structure and culture, while governance played a moderate role. The study concludes by recommending a flexible project structure, enhanced cultural practices, better governance mechanisms, and broader adoption of technology to improve project outcomes.***

Keywords: Project environment, Project performance

1. Introduction

The dairy industry plays a significant role in global food production and security, as well as economic development. Dairy projects encompass several activities including milk production and marketing. Many players, from smallholder farms to large-scale operations are active in this sector, which enhances continued growth and sustainability. However, successful execution of these dairy projects depends on both stakeholders' skills, and collective performance of project teams. Efficient dairy project management is essential for optimizing production and ensuring product quality. According to [21], dairy project teams, composed of diverse professionals and stakeholders, play a pivotal role in ensuring efficient operations, product quality, and overall project success.

China, and India are among the leading countries globally with regards to successful dairy projects execution. China specifically believes in project team collaboration to enhance project success as demonstrated by a three-year project, where dairy companies collaborated on greenhouse gas (GHG) emissions reduction program [25]. The collaboration between Chinese Academy of Agricultural Sciences (CAAS) and the Chinese Ministry of Ecology and Environment management teams strengthened significantly. As a result, the number of dairy projects in China increased by 30 percent with a success rate of 99.8 percent.

The dairy sector in India on the other hand [2] is a study in how successful cooperatives with good governance structures comprising capable and committed management teams as well as highly qualified and trained project teams have enhanced dairy projects success. The Indian dairy cooperative culture places a high premium on qualified, elected leaders to provide proper guidance without external manipulation. They are entrusted to recruit competent employees to man dairy projects and specialized training is provided to the teams to enhance their skills and expertise in management and project roles, leading to high project performance.

In Africa however, the dairy sector is yet to make an impact in terms of both production and consumption due to various challenges among them being inadequate numbers of trained professionals such as veterinarians, animal scientists, nutritionists, and business analysts. Unlike countries like India and China, where dairy projects are embraced as vehicles for development of rural areas, the developing economies of Africa adopt them primarily as a means of improving nutritional status and generating income at individual family level [10].

In Kenya, many dairy projects perform poorly as revealed by [12]. A good example is the Kiambu Dairy Project. The project was a collaborative endeavor between the World Bank, Limuru Dairy Farmers' Cooperative Society, the national government under National Agricultural and Rural Inclusive Project (NARIP) and the Kiambu County Government. It aimed to install an Ultra Heat Treatment (UHT) milk plant, worth Ksh 145 million, to process the milk the cooperative collected from its members. This would in turn increase returns of the dairy farmers via value addition as per [18]. In this partnership, the World Bank gave a grant of Ksh 100 million, the Limuru dairy farmers contributed Ksh 15 million, and the Kiambu County Government was to contribute Ksh 30 million to cater for the installation costs. The project was faced with hurdles from the initiation stage, ranging from awarding of the tender to incompetent suppliers, to failure of the county government to support by raising their Ksh 30 million share of the project fund. This led to conflicts, low productivity and discouraged creativity, leading to delays in the execution of the project.

1.1 Statement of the Problem

According to Turner (2019), the performance of a project is critical as it impacts project stakeholders. Besides, high performing projects translate to improved productivity, high

levels of creativity and innovation, enhanced employee engagement and high client satisfaction. Looking at the dairy sector in Kenya, Kiambu County is well positioned due to its favorable cool and wet climate, availability of good pasture, good infrastructure, and market accessibility.

Despite such good conditions, the Kiambu Dairy Project launched in 2021 has delayed past its due date and has not delivered its intended benefits to date which invites scrutiny or research to establish what could have gone wrong. A few researchers have touched on the project in their studies, but no one has conducted an in-depth investigation to validate these claims, hence the reason for this research study. [17] in their study on milk quality & adulteration in the Kenya dairy industry identified high levels of conflict among project stakeholders, reluctance to adopt modern technology, lack of project culture, and socio-economic factors as possible reasons for the poor performance of this project but did not go in-depth to ascertain these claims.

This knowledge gap poses a critical problem as it impedes the ability of project actors to make informed decisions and develop strategic plans to optimize project outcomes effectively. Without an understanding of these environmental influences, stakeholders struggle to identify areas for improvement and where to implement necessary changes to ensure projects' success and long-term sustainability. This study, therefore, sought to address these existing gaps by evaluating the influence of project environmental factors, namely project culture, project structure, project governance and technological advancement on performance of Kiambu Dairy Project.

1.2 Specific Objectives of the Study

1) To determine the influence of project structure on performance of Kiambu Dairy Project, Kenya.
2) To determine the influence of project culture on performance of Kiambu Dairy Project, Kenya.
3) To determine the influence of project governance on performance of Kiambu Dairy Project, Kenya.
4) To determine the influence of technological advancement on performance of Kiambu Dairy Project, Kenya.

1.3 Significance of the Study

The study's findings equip policymakers and county governments with evidence-based insights for designing and implementing dairy projects more effectively, ensuring transparency, accountability, and better allocation of resources. The research also benefits project managers and practitioners by highlighting practical strategies for improving teamwork, communication, conflict resolution, and adoption of modern technologies, thereby enhancing efficiency and outcomes. The study also enriches academic knowledge by filling existing gaps in empirical and theoretical literature on project environment and performance, serving as a reference for future research. Finally, it has socio-economic significance as improving project performance in the dairy sector translates into higher productivity, value addition, farmer incomes, job creation, and food security, thereby contributing to Kenya's overall economic development.

2. Theoretical Review

This section provides the theories that underpin the research project.

Contingency Theory

Contingency Theory, initially developed by Fred Fiedler in 1964, is a significant management and organizational structure as per [4]. It argues against a uniform management style, structure, or strategy for all situations. Instead, it asserts that the most effective approach to management is determined by the different factors faced by a project or organization. [4] revealed that this theory emphasizes the need to tailor management practices to align with the unique internal and external factors affecting project or an organization.

The theory acknowledges that what works well in one situation may not be effective in another due to variations in factors such as industry, organizational culture, technology, or market conditions. In 1965, Joan Woodward extended the theory by exploring the relationship between different types of technology and their influence on organizational structures, illustrating how the choice of technology impacts an organization's structural design. Subsequently, in 1967, Burns and Stalker made significant contributions to understanding the link between the structure of an organization and its external environment.

However, [13] pointed out that applying contingency theory in practice can be challenging due to its reliance on extensive data and the need to assess multiple contingencies. The foundational work of the theory was established in a different era and may not fully account for the rapid changes in technology, globalization, and evolving stakeholder expectations observed in today's organizations. Addressing these emerging challenges may require contemporary adaptations and integrations with other theories.

As revealed by [19], Contingency theory emphasizes that there is no universal approach to project management, and that the effectiveness of environmental factors such as project structure, culture, governance, and technological advancement. Project structure should be chosen based on project size, complexity, and industry, ensuring that roles and responsibilities are clear, and decision-making is streamlined. This can result in enhanced team performance. Culture within a project needs to match with the goals of the project, fostering better communication, cooperation, and commitment among team members. Project governance mechanisms should be tailored to the project's requirements, ensuring efficient processes and decision-making. Technological advancements should be applied to enable project teams to work more effectively and efficiently, thus speeding up project implementation. Contingency theory promotes flexibility and adaptability therefore allowing project leaders to modify internal factors to the project's specific needs, ultimately leading to more successful outcomes.

System Theory

In 1940, Hungarian scientist Ludwig introduced System Theory, a multidisciplinary framework designed to comprehend intricate systems, their behavior, and the intricate relationships among their components [8]. The theory regards

a system as a collective of interconnected elements working together to achieve a shared objective or function. It postulates that a system's behavior is not solely determined by individual components but by the interplay among them. It seeks to elucidate how modifications in one component can have cascading effects on the entire system.

System Theory is essential in the realm of project management as it provides a framework for understanding and managing complex projects [14]. The approach facilitates a holistic view of projects, allowing for the identification of emergent properties and patterns that may impact project outcomes. Moreover, System Theory assists in the identification of potential bottlenecks, risks, and opportunities within projects, thereby aiding in the development of effective strategies for planning, implementation, and control of a project. However, [24] suggested that it is pivotal for project managers to recognize the limitations of System Theory, particularly its tendency to oversimplify complex project dynamics and its potential neglect of external influences such as political, economic, and social factors. Integrating System Theory with other project management methodologies and approaches can enhance its applicability and effectiveness in addressing the multifaceted challenges inherent in project environments.

In Kiambu Dairy Project, feedback loops describe how information is shared among team members regarding project structure, culture, and governance. This information exchange influences decision-making and adjustments within the project system, potentially leading to improved project performance. In relation to this, System theory recognizes the emergence of complex behaviors and patterns resulting from interactions between the project's internal factors. Understanding how project culture, governance, and technological advancement interact and lead to emergent behaviors is essential for optimizing team performance within the Kiambu Dairy Project.

2.1 Goal Setting Theory

Goal Setting Theory is an approach developed by Edwin Locke in 1968. The theory highlights the significance of setting clear and challenging objectives in improving individual and group performance [22]. The theory posits that setting goals motivates project teams to work more diligently, stay focused, and enhance their performance. When applied to project management, this theory becomes a valuable tool for ensuring project team success. It has however faced criticism for potentially leading to overemphasis on goals at the expense of other essential aspects of work, contributing to stress and burnout, being inflexible in dynamic environments, encouraging short-term thinking, and posing risks of unethical goal pursuit.

Moreover, [11], states that Goal Setting Theory offers several key insights including project governance which reveals strategic direction and overseeing project execution within a project. Incorporating clear and challenging project goals into the governance framework helps project leaders to effectively achieve project objectives. The process begins with establishing objectives that are not only ambitious but also attainable within the given constraints. These goals need to be communicated clearly to all stakeholders.

A well-structured project clearly defines roles and responsibilities [6]. This alignment between structure, governance, and goals promotes greater team cohesion, and reduces role ambiguity. As a result, project teams strive to meet the challenging goals set by the governance structure and ultimately achieve better project outcomes. In the context of enhancing the performance of the Kiambu Dairy Project goal setting theory would apply in defining project goals. Setting clear and challenging goals helps project leaders to motivate the team, foster accountability, monitor progress, and drive continuous improvement. This approach creates a strong foundation for achieving the objectives, as well as ensuring overall success.

2.2 Conceptual Framework

A conceptual framework is a diagrammatical structure that guides the research process and helps to organize and interpret information. It serves as a conceptual map to guide researchers in understanding the relationship and discussing the findings. In relation to this study, it shows the relationship between project environment and performance of Kiambu Dairy Project.

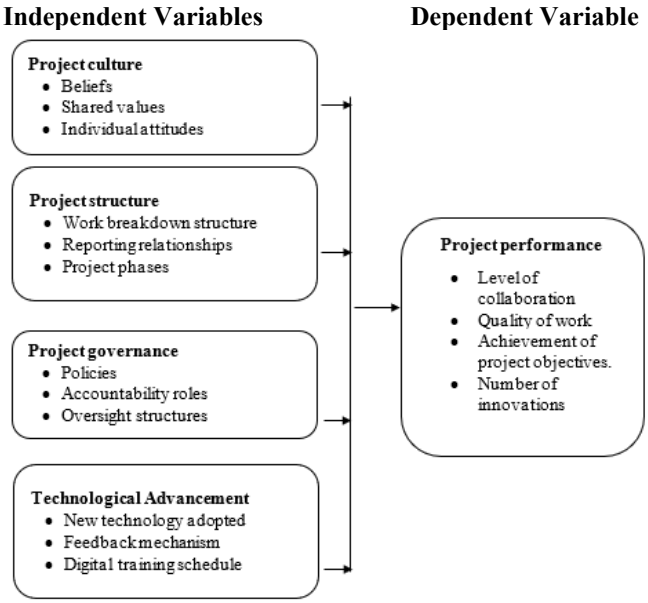

Figure 1: Conceptual Framework
Source: Researcher (2025)

3. Research Methodology

It is a structured approach that guides the research process and validates knowledge claims. It encompasses elements such as the research design, target population, and the tool for data collection utilized in this study. Additionally, the chapter delved into data analysis approaches and underscores the importance of research ethics in ensuring the integrity of the research process.

3.1 Research Design

A research design is a framework that outlines the approach for data collection and analysis [1]. In line with this definition, the current study adopted both descriptive and exploratory research designs. Descriptive research aimed to address questions regarding what, when, where, and how phenomena occur. Conversely, exploratory research design, as elucidated by [1], aims to establish causal relationships between variables. The selection of these research designs was guided by the study's objective to delineate various aspects of project environment and project performance.

3.2 Target Population, Sample Size, and Sampling Technique

A target population is a specific group of individuals that are intended to be studied by a researcher [23]. The group represents the larger population from which the researcher seeks to draw conclusions or make inferences based on the findings of the study. This study targeted the Kiambu Dairy Project- an ongoing dairy project in Kiambu County, Kenya. Additionally, the researcher selected Kiambu Dairy Project for a research study due to its significance in economic development, the collaborative nature of the initiative, technological innovation, government and international involvement, potential replicability, and the opportunity to capture community and stakeholder perspectives.

The study's target respondents comprised of 74 employees (top management and staff members) of Limuru Dairy Farmers Co-operative Society, 10 representatives from National Agricultural and Rural Inclusive Project, 5 representatives from Ministry of Agriculture, Livestock and Fisheries, and 5 representatives from World Bank involved in the installation of UHT sterilization unit [16]. Due to the low number of participants, the researcher used Census, which allows entire population to be included in the research as sample size.

3.3 Data Collection Instrument

The primary data collection involved the utilization of a semi-structured questionnaire. It involved use of both closed and open-ended questions, thereby allowing both quantitative and qualitative data collection. Additionally, the tool allowed participants to articulate detailed responses on their terms. The semi-structured questionnaire provided adaptability, which was valuable in descriptive research. This dynamic format promoted a more personal interaction between researchers and participants and yielded a holistic view of the research subject.

3.4 Data Collection Procedure

The study involved administering Semi-structured questionnaires physically. In instances where respondents were unavailable or away from their office, arrangements were made to leave the questionnaires with them for completion. Subsequently, the filled questionnaires were collected at a mutually agreed-upon time. This approach ensured that participants had adequate time to respond thoughtfully to the survey items without feeling rushed.

3.5 Validity and Reliability of the Instrument

Validity reveals the extent to which a measurement tool sufficiently covers the subject being studied. To ensure that, consultations and discussions with the supervisor were considered. On the other hand, reliability pertains to the extent of consistency exhibited by the instrument or tool across multiple trials. The Cronbach's Alpha approach was applied to assess data reliability 0.7 and above are regarded as acceptable.

Table 1: Reliability Statistics

Variable	Cronbach's Alpha	N of Items
Project culture	.815	9
Project structure	.803	8
Project governance	.757	9
Technological advancement	.843	9
Project performance	.771	8

Source: Researcher (2024)

Measures for all the variables exhibited high reliability, with the Cronbach's alpha values above 0.7, reflecting a consistent set of items that robustly capture the intended constructs.

3.6 Data Analysis

Following the data collection phase, a process of cleaning, sorting, and entry into the Statistical Package for Social Science software was done. Later, preceded to the analysis. The quantitative aspect of the data underwent a descriptive analysis, including measures of means, percentages, frequencies, and standard deviations. Concurrently, the qualitative data underwent analysis through content analysis, to identify major themes from the collected information.

Moreover, the research investigated the relationship between study variables through Pearson correlation as well as regression analysis was determined. A multiple regression model was used to gauge the magnitude of influence and interaction among the different project environmental factors and their effects on the performance of the Kiambu dairy project. The model structure was outlined below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;
Y = Project team performance
X_1 = Project culture
X_2= Project structure
X_3= Project governance
X_4= Technological advancement
β_0 = Interception coefficient
$\beta_1, \beta_2, \beta_3, \beta_4$ = Variable coefficients
ε = error term.

However, before conducting inferential analysis, diagnostic tests such as normality and homoscedasticity were performed.

3.7 Research Ethics

This research commenced by obtaining approval letter and obtaining an authorization permit from Kenyatta University and the National Commission for Science, Technology and Innovation (NACOSTI) respectively. More so, prior to the administration of questionnaires, participants received

information regarding the study. This includes the purpose of the study, expectations, potential benefits, and associated risks. Informed consent was obtained through participants providing a written signature, signifying their voluntary agreement to participate. The researcher also upheld the confidentiality of the data shared by participants.

4. Research Findings

4.1 Response Rate

The sample size for the study was 94. Out of 94 targeted respondents, 83 participated in the study successfully. This yielded a response rate of 88.3 percent. The high response rate was attributed to effective follow-up strategies, clear communication of the study's objectives, and the relevance of the research to the target respondents.

4.2 Descriptive Analysis

The section provides a detailed descriptive statistical analysis, which includes means and standard deviations to summarize and interpret the data on key variables. The analysis highlights central tendencies and variability within these constructs, offering insights into the prevailing practices, perceptions, and adherence to standards within the project environment.

Table 2: Project culture

		Statistic
Shared values and beliefs guide decision-making within the project.	N	80
	Minimum	1
	Maximum	5
	Mean	4.34
	Std. Deviation	.856
Open communication is encouraged and valued within the project.	N	80
	Minimum	1
	Maximum	5
	Mean	4.04
	Std. Deviation	.803
Project leaders actively promote and embody the project's cultural values.	N	80
	Minimum	3
	Maximum	5
	Mean	4.53
	Std. Deviation	.595
The project is committed to fostering a positive and inclusive culture.	N	80
	Minimum	3
	Maximum	5
	Mean	4.17
	Std. Deviation	.591
Valid N (listwise)	N	80

Source: Researcher (2025)

The descriptive statistical analysis of project culture in Table 2 indicated that project leaders actively promote and embody the project's cultural values as agreed by the respondents. This is demonstrated by the highest mean (4.53) with a low standard deviation (0.595), indicating strong consensus among respondents on the significant function of leadership in influencing project culture. Similarly, respondents agree that the shared values and beliefs guide decision-making within the project as exhibited by a high mean (4.34) and relatively low variability (Std. Dev. = 0.856). The finding underscores the importance of a unified value system in driving effective decision-making processes.

The findings further highlight the significance of fostering open communication (Mean = 4.04) and promoting a positive and inclusive culture (Mean = 4.17), as these factors contribute to collaborative and cohesive project environments.

Table 3: Project Structure

		Statistic
The project's work breakdown structure is clear and effectively communicates project tasks to be achieved.	N	82
	Minimum	3
	Maximum	5
	Mean	4.48
	Std. Deviation	.633
Reporting relationships are well-defined.	N	82
	Minimum	2
	Maximum	5
	Mean	3.95
	Std. Deviation	.646
A well-defined and communicated project structure that aligns with project goals.	N	82
	Minimum	3
	Maximum	5
	Mean	4.16
	Std. Deviation	.618
The project's work is organized into clear and manageable sub-activities.	N	82
	Minimum	1
	Maximum	5
	Mean	3.78
	Std. Deviation	.956
Team members have a clear understanding of their roles within the project structure.	N	82
	Minimum	3
	Maximum	5
	Mean	4.00
	Std. Deviation	.544
Valid N (listwise)	N	82

Source: Researcher (2025)

The findings in Table 3 revealed that the project's work breakdown structure is clear and effectively communicates project tasks, as indicated by a mean of 4.48 with a low standard deviation (0.633). This suggests a strong consensus among respondents about the clarity of task delineation, which supports effective project execution. The clarity of reporting relationships within the project team (Mean = 3.95) and the alignment of the project structure with project goals (Mean = 4.16), further emphasize the importance of structured communication and goal-oriented organization.

However, the moderate mean scores for organizing work into manageable sub-activities (Mean = 3.78), indicate areas where improvements must be made. The finding suggested a moderately enhanced adaptability and milestone-based planning.

The clear understanding of roles within the project structure, as demonstrated by a mean of 4.00 and a low standard deviation (0.544), underscores the importance of role clarity in fostering project cohesion and accountability. This aligns with the findings of [5], who argued that well-defined roles reduce conflict and enhance team performance. Collectively, the findings highlight the critical role of clear communication, structured organization, and adaptability in effective project management.

Table 4: Project governance

		Statistic
Project governance policies are clearly defined and communicated within the project.	N	82
	Minimum	1
	Maximum	5
	Mean	4.23
	Std. Deviation	.851
The project governance framework includes effective oversight structures.	N	82
	Minimum	1
	Maximum	5
	Mean	3.89
	Std. Deviation	.703
Project governance ensures alignment between project goals and organizational objectives.	N	82
	Minimum	2
	Maximum	5
	Mean	4.07
	Std. Deviation	.699
Project governance policies are regularly reviewed and updated to adapt to changing project needs.	N	82
	Minimum	2
	Maximum	5
	Mean	4.09
	Std. Deviation	.849
Valid N (listwise)	N	82

Source: Researcher (2025)

Table 4 presents findings that reveal that project governance policies are generally well-defined and communicated, as evidenced by the level of agreement with a mean of 4.23 and relatively low standard deviation (0.851). This highlights a strong consensus among respondents regarding the clarity of governance frameworks, which is critical for establishing a structured approach to project execution. Additionally, governance policies' alignment with organizational objectives, as indicated by a mean of 4.07, underscores the importance of strategic alignment in attaining project goals.

The moderate mean values for and the effectiveness of oversight structures (3.89) indicate that while governance mechanisms are generally functional, there is room for improvement in role definition and oversight efficiency. The findings resonate with [3] study findings, which highlighted the necessity of precise accountability structures to foster transparency and streamline project operations. The high mean for regular policy reviews (4.09) indicates a recognition of the dynamic nature of projects and the importance of adapting governance frameworks to changing needs.

Table 5: Technological advancement

		Statistic
Adopting modern dairy farming technologies has significantly improved the overall productivity of the Kiambu Dairy Project.	N	77
	Minimum	2
	Maximum	5
	Mean	4.05
	Std. Deviation	.742
The use of advanced cooling and storage technologies has helped to maintain the quality and freshness of milk produced at the Kiambu Dairy Project.	N	77
	Minimum	2
	Maximum	5
	Mean	3.91
	Std. Deviation	.566
Technological innovations in feed processing and ration formulation have contributed to improved animal nutrition and health outcomes at the Kiambu Dairy Project.	N	77
	Minimum	1
	Maximum	5
	Mean	4.35
	Std. Deviation	.703
The implementation of automated monitoring and alert systems has helped to detect and address potential issues in dairy production proactively at the Kiambu Dairy Project.	N	77
	Minimum	2
	Maximum	5
	Mean	4.42
	Std. Deviation	.732
The utilization of data analytics and predictive modeling has helped in optimizing dairy herd management practices and decision-making at the Kiambu Dairy Project.	N	77
	Minimum	2
	Maximum	5
	Mean	3.99
	Std. Deviation	.835
Valid N (listwise)	N	77

Source: Researcher (2025)

The findings in Table 5 reveal a positive impact of technological advancements on dairy production efficiency, productivity, and quality. The modern dairy technologies have significantly boosted productivity (M=4.05, SD=0.742). These results suggest that technological innovations have become instrumental in enhancing operational performance in dairy farming.

The implications of these findings are significant for the agricultural sector. The automated monitoring tools (M=4.42, SD=0.732) highlight how data-driven approaches can improve herd health management and proactive issue resolution. Additionally, the use of advanced cooling and storage technologies (M=3.91, SD=0.566) underscores the importance of maintaining milk quality, which can lead to better market competitiveness.

Furthermore, the study also found that technological innovations in feed processing (M=4.35, SD=0.703) and data analytics for herd optimization (M=3.99, SD=0.835) have contributed to improved animal health and decision-making. These findings are consistent with prior research by [20], who noted that precision feeding technologies enhance livestock nutrition and performance outcomes.

4.4 Diagnostic Tests

The researcher conducted diagnostic tests such as normality tests to assess whether the data distribution followed a normal curve, multicollinearity tests to check for interdependence among independent variables, and homoscedasticity tests to evaluate the consistency of variance across residuals. The diagnostic procedures were crucial for confirming that the data met the assumptions required for inferential statistical analysis, thereby ensuring the credibility and accuracy of the study's findings.

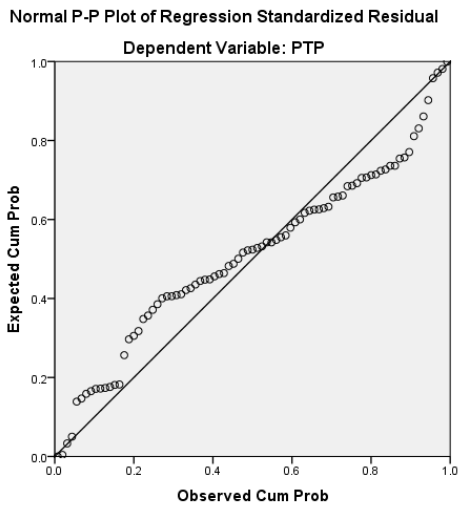

Figure 2: Normal P-P Plot
Source: Researcher (2025)

The data points closely align with the diagonal line, suggesting that the normality assumption for the residuals is met. This is critical for the validity of regression analysis, as normality ensures that statistical tests, such as significance tests for coefficients, provide reliable results. Deviations from the diagonal line are minimal, further reinforcing the robustness of the model. The finding implies that the regression model is well-specified, and its predictions are not biased due to non-normal residuals. The alignment supports the credibility of the results and enhances confidence in using the model for inference and decision-making.

Table 6: Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Project culture	.870	1.150
	Project structure	.681	1.469
	Project governance	.950	1.053
	Technological advancement	.747	1.339
a. Dependent Variable: Project Performance			

Source: Researcher (2025)

In this model table 6, all the VIF values are well below 10: project culture (VIF = 1.150), project structure (VIF = 1.469), project governance (VIF = 1.053), and technological advancement (VIF = 1.339). The results confirm that multicollinearity is not a concern, as the predictors are not highly correlated. The result implies that each independent variable contributes uniquely to the variation in the dependent variable. Thus, the lack of multicollinearity ensures that the regression coefficients are stable and reliable, allowing for an accurate interpretation of the effects of each variable.

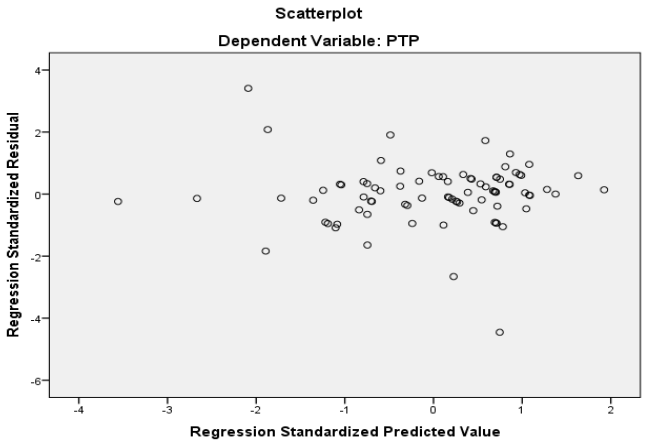

Figure 3: Scatter Plot
Source: Researcher (2025)

The scatter plot illustrates the relationship between the regression standardized residuals, and the regression standardized predicted values, serving as a test for homoscedasticity. In this plot, the residuals appear randomly dispersed around the horizontal axis (y = 0) with no discernible pattern or systematic clustering, suggesting that the assumption of homoscedasticity is likely satisfied. The implication of meeting the homoscedasticity assumption is that the regression model produces consistent and unbiased estimates of the coefficients.

4.5 Inferential Statistics

This section presents the inferential statistical analysis used to test the relationships between the independent and the dependent variables. The analysis includes multiple regression to determine the significance and strength of these predictors on project team performance. ANOVA analysis on the other hand assesses the overall model fit and explains the variance in the dependent variable attributable to the independent variables. Lastly, Pearson correlation was conducted to evaluate the strength and direction of the linear relationships between project culture, project structure, project governance, technological advancement, and project performance.

4.5.1 Pearson Correlations

Table 7: Pearson correlations

		PC	PS	PG	TA	PP
PC	Pearson Correlation	1	.331**	-.078	.205	.347**
	Sig. (2-tailed)		.002	.485	.063	.001
	N		83	83	83	83
PS	Pearson Correlation		1	.164	.499**	.627**
	Sig. (2-tailed)			.138	.000	.000
	N			83	83	83
PG	Pearson Correlation			1	.129	.217*
	Sig. (2-tailed)				.245	.049
	N				83	83
TA	Pearson Correlation				1	.786**
	Sig. (2-tailed)					.000
	N					83
PP	Pearson Correlation					1
	Sig. (2-tailed)					
	N					

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

*. Correlation is significant at the 0.05 level (2-tailed).
Key: Project Culture (PC), Project Structure (PS), Project Governance (PG), Technological Advancement (TA), Project Performance (PP).
Source: Researcher (2025)

The Pearson correlation analysis presented in Table 7 reveals significant relationships between the predictors and project performance. Project culture shows a positive moderate correlation with project performance (r = .347, p = .001), indicating that a strong project culture contributes to improved project performance. This finding aligns with [15], which emphasized the importance of shared values in enhancing project cohesion and productivity. Additionally, project structure demonstrates a strong positive correlation with project performance (r = .627, p = .000), suggesting that a well-defined structure facilitates clarity, efficiency, and better team outcomes.

Technological advancement exhibits the strongest correlation with project performance (r = .786, p = .000). This underscores their critical role in fostering a secure and productive working environment. Conversely, project governance shows a weaker but statistically significant positive correlation with project team performance (r = .217, p = .049). This suggests that while governance frameworks are important, their influence on performance is less direct, as noted in the works of [20] who emphasized governance as a support mechanism for decision-making and alignment with project objectives.

4.5.2 Regression Analysis

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.847[a]	.717	.703	.25301

a. Predictors: (Constant), Project Culture, Project Structure, Project Governance, Technological Advancement
b. Dependent Variable: Project Performance
Source: Researcher (2025)

The model summary findings in Table 8 indicate a strong relationship between the predictors (project culture, project structure, project governance, and technological advancement) and the dependent variable (project performance). The R-value of .847 signifies a high degree of correlation, suggesting that the combined effect of these predictors explains a significant portion of the variability in project performance. The R Squared value of .717 indicates that 71.7percent of the variance in project performance can be explained by the predictors included in the model.

The Adjusted R Squared value of .703, is just slightly lower than the R Squared which is 0.717, confirming that the model remains robust and reliable. The standard error of the estimate (0.25301) represents the average deviation of the observed values from the predicted values. A lower standard error suggested that the model's predictions are precise, further supporting the effectiveness of the predictors in explaining project performance.

Table 9: ANOVA Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.666	4	3.167	49.465	.000[b]
	Residual	4.993	78	.064		
	Total	17.659	82			

a. Dependent Variable: Project Performance
b. Predictors: (Constant), Project Culture, Project Structure, Project Governance, Technological Advancement
Source: Researcher (2025)

The F-value measures the overall fit of the regression model, comparing the variance explained by the predictors (Regression Sum of Squares) to the unexplained variance (Residual Sum of Squares). In this case, the F-value in the ANOVA analysis for this regression model is 49.465, which is significantly high, and the corresponding p-value is .000, indicating statistical significance at the 1percent level. The high F-value suggests that the independent variables (project culture, project structure, project governance, and technological advancement) collectively explain a significant portion of the variance in project performance.

Table 10: Multi-regression Coefficients

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
1	(Constant)	-.330	.382	-.864	.390
	Project Culture	.137	.061	2.244	.028
	Project Structure	.241	.069	3.482	.001
	Project Governance	.110	.064	1.727	.088
	Technological advancement	.594	.067	8.843	.000
a. Dependent Variable: Project Performance					

Source: Researcher (2025)

Table 10 shows regression analysis findings. The independent variables have varying levels of influence on project performance. The unstandardized coefficients show the expected change in the dependent variable for a one-unit increase in each predictor. The constant term indicates the expected value of the dependent variable when all the independent variables are held at zero. In this case, the negative value suggests that the baseline project performance would be slightly negative if all predictor variables were constant. However, the statistical significance of the constant, with a calculated p-value of 0.390, indicates it is not significant at the conventional levels ($p < 0.05$). This implies the constant term does not contribute meaningfully to explaining project performance on its own.

Project culture, however, has a coefficient of 0.137, suggesting that a one-unit improvement in project culture leads to a 0.137-unit increase in project performance. This underscores the importance of fostering a positive project culture characterized by mutual respect, collaboration, and effective communication. This finding aligns with [7] study, which emphasized the role of shared beliefs and values in enhancing project cohesion and productivity.

Project structure also demonstrated a coefficient of 0.241, indicating that a one-unit improvement in the structural elements of the project, such as clearly defined roles,

responsibilities, and workflows, results in a 0.241-unit increase in project performance. This highlights the critical role of organizational clarity and structural alignment in achieving project success. The result is consistent with [9] work, which identified well-defined project structures as fundamental to successful project implementation.

Project governance has a coefficient of 0.110, reflecting a modest positive effect on project performance. However, the significance level ($p = 0.088$) suggests that governance has a relatively lesser influence compared to other predictors. This implies that while governance practices, oversight and accountability contribute to project performance, its impact varies depending on the effectiveness of its implementation. This aligns with [26] who found that governance influences project success in a specific context.

Lastly, technological advancement exhibits the highest coefficient at 0.594, showing that a one-unit improvement in technological advancement leads to a substantial 0.594-unit increase in project performance. This underscores the pivotal role of technology in creating a supportive working environment, thus enhancing project productivity. The finding resonates with [20] research on technology adoption, which highlights critical contributions to team performance and project outcomes.

4.6 Content Analysis

Respondents revealed how project culture influences Kiambu Dairy project performance. Sixty-six percent of the respondents highlighted that a strong project culture fosters collaboration and teamwork. Another thirty-six percent noted that a culture emphasizing transparency and mutual respect encourages the exchange of ideas and fosters process of decision-making. Forty-eight percent also pointed out that a positive project culture nurtures motivation and engagement among project team members.

Additionally, participants themed several initiatives and practices that can be implemented to enhance project culture. Seventy-eight percent indicated regular team-building activities strengthen relationships and align team values with project goals. Forty-six percent of the participants recommended continuous professional development through mentorship, training sessions, and knowledge-sharing platforms to encourage a culture of learning and adaptability. Establishing clear conflict resolution mechanisms and promoting fairness in decision-making processes, further, solidify a positive working environment as sixty one percent of the participants revealed.

On the other hand, the project's structure contributes to efficient communication by establishing clear lines of authority, defined roles, and formal channels for information flow as eighty percent of the respondents indicated. Sixty-two percent also revealed that a well-structured project ensures that team members understand their responsibilities and reporting relationships. Additionally, fifty two percent of the respondents indicated that a well-structured framework promotes the use of standardized tools and platforms, such as project management information systems, which facilitate real-time updates and collaboration.

Fifty-nine percent of the respondents revealed that adopting a more flexible and adaptive framework to accommodate evolving project needs enhances the project's performance. More so, fifty one percent acknowledged the introduction of cross-functional teams fosters collaboration across departments, breaking down silos and improving knowledge sharing. Clarifying roles and responsibilities through detailed job descriptions and regular updates reduces confusion and ensures accountability as sixty-four percent of the respondents indicated. Additionally, thirty nine percent revealed that integrating technology-driven tools for project management, like collaborative software and real-time dashboards, can streamline communication and task tracking.

Besides well-planned Kiambu Dairy project governance, respondents highlighted several challenges they have encountered in their daily project activities. Fifty percent of the respondents indicated unclear accountability and decision-making processes, leading to confusion among team members. Inadequate communication of governance policies as revealed by seventy three percent results in deviation from the project's main goals and objectives. Additionally, the absence of regular policy reviews and updates has caused governance frameworks to become outdated, forty nine percent of the respondents indicated. Sixty-six percent highlighted that insufficient stakeholder involvement in governance decisions has hindered transparency and inclusiveness. To curb project governance challenges, sixty-five percent of the respondents recommended the establishment of clear governance frameworks for all project stakeholders. Forty-three percent championed regular training and capacity-building programs to ensure an understanding of governance policies and their importance in project success.

Enhancing project performance requires the adoption of innovative tools and systems that promote efficiency and collaboration as revealed by participants. Sixty-four percent necessitated integration of advanced project management software equipped with real-time collaboration features to streamline task allocation, progress tracking, and team communication. Forty-eight percent specifically suggested the implementation of data analytics tools to support performance monitoring, providing valuable insights for informed decision-making and proactive risk management. Additionally, fifty eight percent revealed that enhanced automation technologies, such as AI-driven scheduling and resource optimization tools, minimize manual errors and improve overall operational efficiency.

5.1 Conclusion

In conclusion, the study identified project structure is a key factor influencing the performance of Kiambu Dairy Project. A well-defined work breakdown structure, role clarity, and streamlined reporting relationships have proven essential in enhancing project efficiency and fostering collaboration among team members. The elements ensure that tasks are communicated, responsibilities are well understood, and project milestones are precisely met. The insights emphasize that a structured project environment is not merely about task delegation but about empowering teams with clarity and confidence to execute their roles effectively.

Project culture, especially one that fosters open communication, was found to be important for Kiambu Dairy Project as well. Communication fosters trust, while leadership models cultural values, thus inspiring accountability and mutual respect.

The study also found that project governance has moderate yet important function in the Kiambu Dairy Project performance. Effective governance was characterized by clearly defined policies, alignment with organizational objectives, and structured oversight. A clear governance framework sets the foundation for accountability and strategic direction and is essential for ensuring project activities remain focused and decision making is clear contributing positively to overall project performance.

Finally, technological advancement was identified as the most significant factor influencing the performance of the Kiambu Dairy Project. Modern tools such as automated milking systems, digital record-keeping, and data analytics greatly enhance productivity, quality control, and cost efficiency. Technological adoption improves decision-making, risk management, and financial performance. The adoption of advanced tools enables the project team to work smarter, reducing manual labor while increasing precision and output.

5.2 Recommendations

Project structure, culture, governance, and technological advancement have not been practiced exhaustively at the Kiambu Dairy Project, limiting its performance. To strengthen the influence of project structure on the Kiambu Dairy Project' performance, the management team needs to embrace a more flexible and responsive framework. The study, therefore, recommends regular review of the work breakdown structure to ensure it evolves with changing project demands. Resource allocation processes should be fine-tuned to prevent bottlenecks and ensure optimal use of available assets, reducing conflicts and promoting smoother operations. Additionally, the project team should adopt standardized project management tools, such as collaborative dashboards and real-time tracking systems, to help clarify task assignments and reporting relationships, fostering better teamwork, transparency, and accountability across all project phases.

Cultivating a positive and empowering project culture is equally important for the success of the Kiambu Dairy Project. The project management should nurture an environment where open communication, inclusivity, and shared accountability thrive. Regular team-building activities, mentorship programs, and professional development workshops help reinforce shared values and a culture of continuous learning. Leadership must continue to model the project's core values while promoting initiatives such as peer feedback systems and performance scorecards to inspire a stronger sense of responsibility among team members. Project management should also encourage collaboration, personal growth, and mutual respect to create a motivated workforce, driving better project results.

On the other hand, for project governance to be more effective, the Kiambu Dairy Project team should prioritize clarity in accountability and decision-making processes. The study recommends that governance policies be documented and routinely reviewed to remain relevant and aligned with the project's evolving objectives. The study also recommends active involvement of stakeholders through participatory planning sessions and maintaining open communication channels. This is to promote inclusiveness and trust. Furthermore, regular training on governance policies and decision-making frameworks should be initiated to equip the team with the knowledge needed to instill confidence in their roles, thus reducing ambiguity, enhancing policy compliance, and fostering a more cohesive project environment.

Further, to fully harness the benefits of technological advancements, the Kiambu Dairy Project team should focus on integrating modern digital tools and automation technologies that simplify and enhance operations. Additionally, the team should implement data analytics platforms and predictive modeling tools to provide deeper insights for informed decision-making and proactive risk management. Automation tools like AI-driven scheduling systems and real-time performance monitoring platforms streamline task allocation and operational efficiency. The management should also invest in ongoing capacity-building initiatives, ensuring all team members are well-equipped to utilize the adopted innovations effectively, leading to sustained performance improvements and long-term success.

5.2 Suggestions for Further Studies

Future research on the project environment and performance could explore several critical areas to deepen understanding and improve project outcomes. One area worth investigating is the impact of stakeholder engagement on project performance, focusing on how varying levels of involvement influence decision-making processes, accountability, and overall project success. Additionally, examining the role of capacity building and continuous professional development, such as mentorship programs and skills training, could provide insights into workforce preparedness and its correlation with improved project performance. Further studies could also assess the long-term effects of technological innovations, including automation, data analytics, and digital tools, on sustainability, and agricultural project profitability.

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