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John Kennedy Kibui & Dr. Agnes Njeru (PhD)

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Cost Control Mechanisms and The Performance of Digital Transformation Projects in Milk Processing Firms in Kenya

*¹John Kennedy Kibui & ²Dr. Agnes Njeru (PhD)

¹Student in Project Management, Jomo Kenyatta University of Agriculture and Technology

²Lecturer, Jomo Kenyatta University of Agriculture and Technology

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Abstract

The study aimed to assess how cost-control mechanisms influence the performance of digital transformation projects in milk-processing plants in Kenya. A descriptive research design was used, focusing on ICT staff, project managers, and finance officials in milk processing companies in Kenya. The study targeted 51 licensed milk processing plants in Kenya. The unit of observation was 561 individuals involved in digital transformation projects in milk processing in Kenya and a sample of 234 was used. The study cost control ($B = .438$, $\beta = .391$, $p < .001$) emerged as the strongest predictors of digital project performance, highlighting the importance of accurate forecasting and real-time monitoring in reducing overruns and enhancing efficiency. The study reinforces the Activity-Based Costing theory that cost allocation based on actual resource consumption by activities rather than traditional cost accounting. In addition, it emphasizes the need to adopt digital transformation in milk processing sector. Cost control is significant to ensure improved performance of digital transformation projects and all projects. Firms need to implement real-time financial tracking systems and performance dashboards to monitor expenditures throughout project lifecycles. Strengthening accountability through regular audits and variance analysis will enhance efficiency and minimize wastage.

Keywords: *Cost Control, Mechanisms, Performance, Digital Transformation, Projects, Milk Processing Firms, Kenya*

1.0 Introduction

The Kenyan milk processing industry faces a competitive challenge in producing low-cost products for a market population mostly below the poverty line. The industry's rivalry has been exacerbated by the import of processed milk products from Europe. The key question for processors is how to lower costs to achieve superior performance compared to competitors (Kimiti, 2020). Because great performance is so important, businesses must use certain strategies to deal with current performance issues, particularly excessive expenses. These are the tactics used to successfully direct businesses towards their performance goals. Dairy firms have adopted a cost leadership strategy through operational efficiency, economies of scale and scope. In recent years, milk processing firms in Kenya have increasingly embraced digital transformation to enhance operational efficiency, improve product quality, and remain competitive in a dynamic agribusiness environment (Kenya Dairy Board, 2024). Dairy firms are undergoing significant transformation due to the advent of technology. Automated Milking Systems (AMS) can significantly reduce labour costs and improve milking efficiency by allowing multiple daily milking (Bahr, 2020). Despite initial costs, the return on investment (ROI) can be substantial in terms of labour savings, efficiency, and milk production. One of Africa's oldest dairy processors and distributors' utilized technology to improve operational visibility, streamline processes, and prepare for the 21st-century digital economy despite facing outdated processes and a vision for growth (SAP news, 2020). In the United States, respondents opined that investments in digital transformation have produced better results than they had anticipated, especially in terms of increasing consumer engagement, reducing costs, and increasing employee productivity. It is believed by 56% of executives that the return on investment (ROI) from digital transformation initiatives has exceeded expectations (KPMG, 2023).

Cost management is also viewed as the strategic process for efficiency optimization and customer focus and relates to profitability (Albtoush et al, 2020). The global adoption of agile methodologies and artificial intelligence (AI) is transforming project management, with 79% of IT departments utilizing them for flexibility and collaboration. AI is projected to reduce project management workloads by 80% by 2030, improving efficiency and decision-making. An average of 11.4% of investments in IT projects worldwide are wasted as a result of unsuccessful initiatives brought on by inadequate cost control (Bennett, 2025). In Ethiopia, Debela (2019) found that cost estimating, cost control, resource planning, and cost budgeting are significantly associated with the success of the project of the Suzo industries. The company employs various techniques in resource planning, cost estimating, cost budgeting, and cost control. Historical information and resource pool descriptions are used for resource planning. Cost estimating tools include a chart of accounts maintaining and a cost management plan. Cost control systems, performance measurement, additional planning, and computerized tools are also employed.

1.1 Statement of the Problem

Kenyan dairy farmers face challenges in finding reliable buyers and dealing with unfair local traders. The introduction of EASYMA 6.0 in 2014, a digital scale and supply chain system, improved conditions for producers by partnering with USAID-funded programs. EASYMA 6.0 is a dairy industry reform that aims to improve the working conditions of Kenyan dairy farmers. The system also enhances transparency and record-keeping, providing over 22,000 Kenyan dairy farmers with access to farm extension services, financial products, and livestock insurance (Bahr, 2020). Kenya's dairy industry is pivotal in the national economy, contributing about 5-8% of the Gross Domestic Product (GDP) and providing livelihoods for over 1.8 million small-

scale farmers (Kenya Dairy Board, 2024). Even with these advances, many digital transformation projects still struggle to meet expectations because of weak project cost management practices. Several firms continue to face cost overruns, delays, and poor performance outcomes. High operational costs remain a major obstacle, slowing down profitability and putting some processors at risk in an increasingly competitive market (Njogu & Murigi, 2023). While solutions like EASYMA 6.0 have helped small-scale farmers by improving transparency and supply-chain efficiency, the adoption of similar technologies by larger milk processing firms has been uneven. As a result, potential gains from digital initiatives are often watered down by poor cost planning, inadequate cost control, and limited financial risk mitigation (Bahr, 2020).

1.2 Research Objective

The study sought to assess how cost-control mechanisms in project cost management influence the performance of digital transformation projects in milk-processing plants in Kenya.

2.0 Literature Review

2.1 Theoretical Review

The Activity-Based Costing (ABC) Theory was introduced by R. Cooper and R. Kaplan in the 1980s. The theory emphasizes cost allocation based on actual resource consumption by activities rather than traditional cost accounting (Cooper & Kaplan, 1998). ABC was developed to improve traditional cost management systems by identifying cause-and-effect relationships, thereby enhancing the objective assignment of overhead costs and the understanding of product and service profitability. It ensures that budgets are aligned with the actual needs of a project, improving cost efficiency and financial planning (Hooijer, 2024). ABC theory improves cost control in digital transformation programs for Kenyan milk processing facilities by allowing for accurate tracking of resource usage across particular technology implementations. Compared to previous techniques, ABC enables managers to more correctly allocate 74% of overhead expenditures by identifying cost drivers such as software integration, IoT sensor maintenance, or adoption of mobile payment systems such as M-Pesa integration (Biery, 2014). This level of detail makes it easier to maximize investments in digital solutions that support cost-leadership goals in the dairy processing industry, where profitability depends on economies of scale and operational efficiency (Kimiti, 2020).

2.2 Conceptual Framework

In this research, the dependent variable is the performance of digital transformation projects, while the independent variable is cost control.

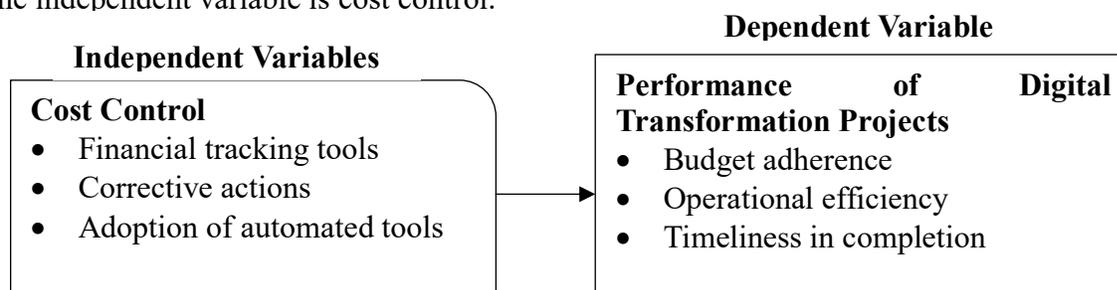


Figure 1: Conceptual Framework

2.2.1 Cost Control

Cost control involves managing project expenses, preparing for financial risks, and budget management (Bridges, 2024). Project managers are responsible for this task, which can save time and money by preparing for potential setbacks and unexpected expenses (PMI, 2021). For example, bargain for better prices if supplies or services turn out to be more costly than anticipated. Project cost control involves maintaining close tabs on and controlling all project expenses, including labour, supplies, machinery, services, and transportation, in order to keep them within the allocated budget (Neves, 2023). Additionally, it entails projecting future costs and locating opportunities for cost reduction or profitability. Financial tracking tools are crucial for monitoring project expenses and identifying variances between planned and actual costs. They provide transparency and accountability by enabling real-time tracking of expenditures, allowing managers to identify unfavourable variances early. Earned Value Management (EVM) automates performance measurement, allowing project managers to assess cost alignment with progress. Implementing these tools can improve budget adherence and reduce cost overruns by up to 20%, thereby enhancing cost control (Neves, 2023).

Corrective actions involve implementing changes to track costs, such as cost reduction, through change control processes and forecasting, involving negotiations with suppliers, project timeline adjustments, and resource allocation adjustments (Yarbrough, 2024). Automated tools such as budgeting, expense tracking, and forecasting streamline cost control by minimizing manual errors and improving efficiency. They enable real-time data visualization, anomaly detection, and predictive analytics for future cost trends (Goldfarb, 2025). Modern cost management is significantly aided by technology, including Artificial Intelligence (AI) and machine learning (ML). AI-driven tools can forecast costs based on historical data, optimize resource allocation, and identify inefficiencies (Hanna & Lutkevich, 2025).

2.3 Empirical Review

2.3.1 Cost Control and Project Performance

Alu et al. (2024) studied the impact of project cost control on the financial performance of the Nigerian construction industry. The study used a qualitative review method. According to the review, the main factors influencing project cost management in Nigeria include insufficient monitoring and control systems, poor project planning, and inefficient cost control tactics. The review also emphasises the necessity of adopting emerging technology in project cost management and moving towards more proactive and integrated cost control strategies. Project managers need a thorough understanding of project cost control, including accurate budgeting, risk management, cost tracking, and cost-saving measures. They must also effectively communicate cost performance to stakeholders to align with project financial objectives. To improve project cost control in Nigeria's construction industry, a comprehensive cost control plan should be developed, outlining financial goals, estimation methods, and management measures. A risk management strategy should be developed to identify and address potential project risks. The project team should be trained in cost control strategies and equipped with advanced project management tools. Regular monitoring of costs can help identify potential overruns and ensure project completion on time and within budget.

In Rwanda, Bwankarikari and Irechukwu (2022) determined the effect of project cost control and performance of Bugarama rice project. A case study descriptive design was used, 75 respondents were targeted, and a sample of 57 was used. Specifically, the study sought to examine how planning

project budget, keeping track of project costs, and managing project expenses affected the performance of Bugarama rice project. It was established that keeping track of project costs had a strong correlation ($r = 0.906$) with project performance and explained 82.1% variation in project performance of Bugarama rice project. Keeping track of project costs also had a positive significant association with project performance ($B = 0.777$, $\text{sig} = 0.000$). Planning project budget also had a strong correlation ($r = 0.915$) and explained 83.7% of the performance of Bugarama rice project. Planning project budget also had a positive significant association ($B = 0.832$, $\text{sig} = 0.000$) with the performance of Bugarama rice project. Lastly, managing project expenses had a strong correlation ($r = 0.931$) and explained 86.7% of the performance of Bugarama rice project. Managing project expenses also had a positive significant association ($B = 0.891$, $\text{sig} = 0.000$) with the performance of Bugarama rice project. The study also established that the joint project cost control strongly correlated with the performance of Bugarama rice project ($r = 0.937$) and explained 87.8% change in performance. The study suggests that tracking project costs, developing accurate cost estimates, and establishing a system for collecting and sharing information can help project managers manage unnecessary costs in Rwandan rice projects. Managing project expenses also increased project completion within quality work and expected period scop.

3.0 Research Methodology

The study used a mixed research design of descriptive and explanatory research. Descriptive research helped to identify and summarize the current state of project cost management practices in milk processing plants. In this study, explanatory research design helped in identifying the patterns and the relations between the independent variables (project cost management practices) and the dependent variable (performance of digital transformation projects in milk process plants). The study targeted digital transformation projects in 51 licensed milk processing plants in Kenya and the individuals directly involved in cost management and digital project implementation in Kenya's milk processing sector. This study focused on key stakeholders, including project managers, IT specialists, operations managers, senior executives, and finance officers. The unit of analysis was the digital transformation projects in the 51 licensed milk processing plants. The unit of observation was project managers, finance officers, IT specialists, and executives. There are about 561 key personnel as captured by Kenya diary Board (2025) and New KCC (2024). A sample of 234 was obtained using Taro Yamane's (1967) formula. The respondents were categorized based on their roles, i.e, project managers, finance officers, IT specialists, and executives from each milk processing firm. From each stratum, the respondents were randomly selected since they all had equal chances in the study. A purposive sampling was used in selecting individuals that have the relevant information needed for the study. Primary data was collected using structured questionnaires.

4.0 Research Findings

Out of 234 questionnaires distributed, 196 were returned, yielding a response rate of 83.8%, indicating strong respondent engagement and high data reliability.

4.1 Descriptive Statistics: Cost Control

This section presents the descriptive statistics for cost control mechanisms as perceived by respondents in milk processing firms in Kenya. The items were measured on a five-point Likert scale, and the results are summarized in Table 1 below.

Table 1: Descriptive Statistics for Cost Control

Cost Control	SD%	D%	N%	A%	SA%	MN	SDV
Project cost information is accessible in real time through financial tracking systems.	9.7	3.6	11.2	29.1	46.4	3.99	1.265
The accuracy of project cost estimates has improved due to the use of financial tracking tools.	9.7	2	19.4	30.1	38.8	3.86	1.235
Cost-related issues are addressed promptly during the implementation of digital projects.	9.7	20.9	20.4	21.4	27.6	3.36	1.338
Our project team implements corrective actions when project expenses exceed the budget.	0	19.9	20.9	38.8	20.4	3.60	1.026
Automated systems are used in our firm to support cost control in digital transformation projects.	12.2	18.4	27	20.4	21.9	3.21	1.311
The use of automated tools has reduced manual errors in project financial reporting.	1	26	10.2	30.1	32.7	3.67	1.209
Average Cost Control						3.64	.755

The overall mean score for cost control was 3.64 (SD = 0.755), suggesting that respondents generally agreed that cost control practices are moderately well implemented in their organizations. As shown in Table 1, the highest-rated item was real-time accessibility of project cost information (M = 3.99, SD = 1.265), with 75.5% of respondents in agreement, followed by improved accuracy of cost estimates through financial tracking tools (M = 3.86, SD = 1.235), agreed upon by 68.9% of respondents. Corrective actions when expenses exceeded budget scored moderately (M = 3.60, SD = 1.026), while the lowest-rated item was the use of automated systems in cost control (M = 3.21, SD = 1.311), with only 42.3% in agreement, indicating that automation remains underutilized across the firms studied.

4.2 Descriptive Statistics: Performance of Digital Transformation Projects

This section presents the descriptive statistics for the performance of digital transformation projects across milk processing firms in Kenya. Results are derived from respondent perceptions captured through a structured Likert-scale questionnaire and are summarized in Table 2 below.

Table 2: Performance of Digital Transformation Projects

Performance of Digital Transformation Projects	SD%	D%	N%	A%	SA%	MN	SDV
Our digital projects are usually completed within the allocated budget.	1	11.2	19.9	40.3	27.6	3.82	.994
Financial reporting and oversight help ensure projects stay within budget.	12.2	28.1	19.4	20.9	19.4	3.07	1.326
Digital transformation has improved the efficiency of our milk processing operations.	9.2	18.9	11.2	30.1	30.6	3.54	1.341
Project outcomes have led to reduced operational costs.	2	20.4	27.6	30.1	19.9	3.45	1.087
Digital transformation projects are usually completed within the scheduled timeline.	10.2	29.1	19.9	29.1	11.7	3.03	1.211
Timely risk identification and mitigation contribute to project completion on time.	10.2	10.2	12.2	20.9	46.4	3.83	1.376
Average Performance of Digital Transformation Projects						3.53	.846

The overall mean score for project performance was 3.53 (SD = 0.846), reflecting moderate agreement that digital transformation projects are performing reasonably well, though with notable weaknesses in timeliness and financial oversight. As shown in Table 2, the highest-rated items were timely risk identification and mitigation (M = 3.83, SD = 1.376), agreed upon by 67% of respondents, and budget adherence (M = 3.82, SD = 0.994), confirmed by 68% of respondents. Improved milk processing efficiency was also acknowledged by over 60% of respondents (M = 3.54, SD = 1.341). However, project completion within scheduled timelines received the lowest rating (M = 3.03, SD = 1.211), with only 40.8% in agreement and 39.3% disagreeing, while financial oversight was equally divided, with 40.3% agreeing and a comparable proportion disagreeing (M = 3.07, SD = 1.326), pointing to persistent governance and schedule management challenges.

4.3 Correlation Analysis

Pearson correlation analysis was conducted to examine the relationship between cost control and the performance of digital transformation projects. The results are presented in Table 3 below.

Table 3: Correlation Coefficients

	Performance of Digital Transformation Projects
Performance of Digital Transformation Projects – Pearson Correlation	1
N	196
Cost Control – Pearson Correlation	.674**
Sig. (2-tailed)	.000
N	196

The correlation results revealed a strong positive and statistically significant relationship between cost control and the performance of digital transformation projects ($r = .674, p < .001$), indicating that milk processing firms that implement more rigorous cost monitoring, accurate cost estimation,

and proactive expenditure management are significantly more likely to achieve better project performance outcomes, consistent with the findings of Meredith et al. (2021) and PMI (2021), which emphasize that robust financial planning mechanisms substantially reduce budget overruns and improve resource utilization efficiency.

4.4 Regression Analysis

Simple linear regression analysis was conducted to determine the predictive influence of cost control on the performance of digital transformation projects in milk processing firms in Kenya. The regression coefficients are presented in Table 4 below.

Table 4: Regression Coefficients

Model	B	Std. Error	Beta	T	Sig.
(Constant)	-.585	.259		-2.262	.025
Cost Control	.438	.063	.391	6.911	.000

The regression results confirmed that cost control is a strong and statistically significant predictor of digital transformation project performance ($B = .438$, $\beta = .391$, $t = 6.911$, $p < .001$), meaning that for every unit increase in cost control practices, project performance improves by 0.438 units, as expressed by the fitted model $Y = -0.585 + 0.438X$. This underscores that continuous expense monitoring, real-time financial tracking, and proactive corrective actions are the most critical determinants of successful digital transformation project delivery in Kenya's milk processing sector.

5.0 Conclusion

The study concluded that cost control is a significant and critical driver of digital transformation project performance in Kenya's milk processing firms, with regression results confirming its strong predictive influence ($B = .438$, $\beta = .391$, $p < .001$). While firms demonstrated moderately strong cost control practices, particularly in real-time financial tracking and budget adherence, key gaps remain in the areas of automation, prompt issue resolution, schedule management, and financial oversight, all of which constrain the full realization of digital transformation benefits and must be systematically addressed to enhance project efficiency, sustainability, and value for money.

6.0 Recommendations

Milk processing firms in Kenya should institutionalize real-time financial tracking systems, performance dashboards, and automated cost reconciliation tools to strengthen monitoring across project lifecycles, while also establishing cross-functional oversight committees comprising finance, ICT, and operations teams to conduct regular variance analyses, enforce accountability, and ensure that corrective actions are implemented promptly whenever project expenditures deviate from approved budgets.

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