INFLUENCE OF PROJECT COST CONTROL INFLUENCES PERFORMANCE OF CONSTRUCTION PROJECTS IN RWANDA: CASE OF BAXONS CONSTRUCTION LIMITED

Baributsa Olivier & Dr. Njenga Gitahi, PhD

The Strategic JOURNAL of Business & Change MANAGEMENT
ISSN: 2312-9492 www.strategicjournals.com
Vol. 10, Iss.4, pp 902 – 915. November 6, 2023. www.strategicjournals.com, ©Strategic Journals

INFLUENCE OF PROJECT COST CONTROL INFLUENCES PERFORMANCE OF CONSTRUCTION PROJECTS IN RWANDA: CASE OF BAXONS CONSTRUCTION LIMITED

[1] Baributsa, O., & [2] Njenga, G.

[1] Postgraduate Student (Project Management) Mount Kenya University, Kenya
[2] Senior Lecturer, Mount Kenya University, Kenya

Accepted: October 20, 2023

DOI: http://dx.doi.org/10.61426/sjbcm.v10i4.2795

ABSTRACT

Construction projects are complex endeavors that demand meticulous planning, execution, and monitoring to ensure their successful completion. This study explores the critical relationship between effective project cost control and project performance, with a specific focus on Baxons Construction Limited in Rwanda. Baxons Construction Limited is a prominent construction company in Rwanda, and understanding the impact of cost control on its projects is essential for its continued success. The study drew upon various theoretical frameworks, including Resource-Based Theory, Programme Theory, Risk Management and Uncertainty Theory, and Theory of Constraints. The research employed a descriptive survey methodology. The sample size for this study comprised 143 employees who are actively engaged in project management within Baxons Construction Limited. The main participants in this study comprised senior managers, project managers, project teams, and stakeholders. A total of 106 questionnaires were disseminated among the participants. The stratified sampling approach was employed to pick the sample. The acquisition of primary data was expedited through the administration of questionnaires. A preliminary investigation was conducted in order to evaluate the accuracy and consistency of the research tools. In this study, a total of 11 questionnaires were administered to the employees of Eagle Innovation Limited. The assessment of reliability was performed using Cronbach's Alpha. The evaluation of instrument validity was carried out through the utilization of expert opinion. After the data has been collected and cleaned, it was subjected to descriptive analysis and multiple regression analysis. The examination of data was carried out using a combination of qualitative and quantitative approaches, and the statistical programme SPSS version 21. The model demonstrated a high coefficient of determination (R Square = 0.811), indicating that approximately 81.1% of the variability in project cost control can be accounted for by the predictors included in the model. The adjusted R Square value (0.810) confirms the model's robustness. The F-statistic of 477.125 ($p < .001$) indicates the model's overall statistical significance. Project cost control shows a highly significant positive association with project performance ($t = 21.843$, $p < 0.001$), with a standardized beta coefficient of 0.901, indicating a strong positive effect. In conclusion, the research underscores the pivotal role of effective project cost control in ensuring the timely delivery, quality, and financial viability of construction projects, with specific insights drawn from the case of Baxons Construction Limited in Rwanda, offering valuable lessons for the construction industry's sustainable growth and success. By adopting modern technology and incorporating best practices in project cost control, construction companies can optimize

resource utilization, reduce budget overruns, and enhance overall project performance. This recommendation aligns with the evolving demands of the construction industry in Rwanda, emphasizing efficiency, sustainability, and competitiveness. For further studies in this area, it was recommended to explore the implementation of advanced cost control methodologies, such as Earned Value Management (EVM) or Building Information Modeling (BIM), and their specific impact on construction project performance in the Rwandan context.

Keywords: *Project Cost Control, Construction Projects, Performance, Rwanda, Baxons Construction Limited*

CITATION: Baributsa, O., & Njenga, G. (2023). Influence of project cost control influences performance of construction projects in Rwanda: case of Baxons Construction Limited. *The Strategic Journal of Business & Change Management,* 10 (4), 902 – 915. http://dx.doi.org/10.61426/sjbcm.v10i4.2795

BACKGROUND OF THE STUDY

Globally, control of project costs is of paramount importance in ensuring the successful execution of construction projects. Effective management of project costs ensures that resources are allocated appropriately, financial objectives are met, and potential cost overruns are minimized. According to Dolage and Pathmarajah (2017), diligent monitoring and control of costs throughout the project lifecycle positively correlate with project success. Santoso and Soeng (2016) asserts that; employing techniques such as accurate cost estimation, continuous tracking of expenses, and timely adjustments to the budget, construction projects can maintain financial stability and deliver desired outcomes within stipulated financial boundaries. Lee *et al.,* (2019) maintains that projects with well-implemented cost management strategies tend to have better cost performance, reduced risk of financial setbacks, and enhanced stakeholder satisfaction.

A study conducted in the United States revealed that in today's economic environment, proprietors of projects are downsizing or cancelling capital construction endeavors due to inadequate funding, uncertainties regarding expenses, inadequate supervision, and apprehensions regarding potential delays that could jeopardize the project's viability (McCarthy & Williams, 2018). In contrast, Yang and Davis (2020) reported that Chinese construction companies utilize effective planning and control methodologies, establish seamless collaboration between designers, contractors, leverage technical and professional proficiency, all of which enable these firms to achieve project completion within predetermined schedules and budgets (Adams & Martinez, 2018).

Van der Berg and Dubois (2017) found out that the implementation of robust cost control mechanisms positively correlates with higher quality outcomes in European construction projects. This underscores the importance of aligning project cost management practices with project performance objectives. Petrov and Jensen (2021) suggest that the integration of advanced cost management software and technologies, such as Building Information Modeling (BIM), can enhance transparency and accuracy in cost forecasting, thus leading to improved project performance. In contrast, Müller and Schneider (2020) emphasizes the need for continuous monitoring and communication between stakeholders to mitigate the risks associated with cost fluctuations in Europe.

The context of African countries introduces unique challenges to project cost management. Oladapo and Suresh (2018) stress the importance of considering cultural and socioeconomic factors that impact cost estimation and resource allocation in construction projects in Africa. Kaliba *et al.,* (2015) emphasize that accurate cost estimation and budget control positively correlate with project success indicators, such as timely completion and adherence to quality standards. Conversely, poor cost management can lead to budget overruns, delays,

and compromised project outcomes (Aje *et al.,* 2020).

In Ghana, frequent changes in regulations, unstable economic conditions, and inadequate infrastructure can lead to cost overruns and delays in construction projects (Ameyaw et al., 2017). Additionally, the lack of skilled project cost professionals and the prevalence of corruption in some regions further complicate cost management efforts. Similarly, according to Aje and Ojelabi (2020) in Nigeria adequate planning, accurate cost estimation, and proactive monitoring and control lead to better financial outcomes and timely project completion. Proper allocation of resources and risk management strategies mitigate the likelihood of cost overruns and disruptions, enhancing project success.

In Rwanda, Musabimana and Uwamahoro (2019) highlight that cost overruns negatively affect project schedules, quality, and stakeholder satisfaction. Their findings underscore the need for effective cost management strategies to mitigate these adverse effects. Integrating comprehensive risk assessment and contingency planning can aid in addressing potential cost overruns (Rutayisire & Mupenzi, 2017). Moreover, Ntaganda and Bizimana (2021) emphasize the role of regulatory frameworks in influencing cost estimation accuracy and cost reporting standards. They argue that clear government guidelines and incentives for adopting modern cost management practices can contribute to improved project performance.

Baxons Construction Limited must apply cost management techniques to minimize problems during the course of the building project. Among the six benefits of thorough cost planning that have been proposed are: 1) improving the match between the approved budget estimate and the tender amount; 2) reducing the need for bill of quantities revisions or reevaluations; 3) raising the possibility that the design achieving optimal value and cost-effectiveness; 4) encouraging a more equitable distribution of costs through a more rationalized design; 5) utilizing the architect's and quantity surveyor's pre-tender analysis to enable earlier decision-making and smoother project execution; and 6) creating a solid basis for comparing and evaluating various projects based on cost planning. That's why the study is necessary.

Statement of the Problem

Every country has a sizable construction industry because it involves a variety of tasks that require a range of skills, knowledge, tools, materials, and specializations. Cost management is crucial in building projects because they need to be planned and managed (Ndihokubwayo & K'Akumu, 2019). The goal of decision-making for investors should be shifted from focusing solely on construction costs to considering life cycle costs, as stated by Mutandwa et al. (2018). Life cycle costing is a substantial contribution to feasibility studies in construction projects, as it offers a framework for assessing investment costs alongside life cycle savings and benefits. Cost overruns pose a substantial concern in project development throughout Rwanda, representing a prevalent phenomenon within the construction industry. Rework has been identified as a contributing factor to cost overruns in construction projects. The cost impact value comprises two components that serve to illustrate the probable financial consequences associated with rework. The initial component encompasses the complete daily rate of the subsequent action, encompassing both daily overhead and salary. According to Nkurunziza et al. (2020), the second section relates to any additional charges besides the daily rate of successor activity.

Numerous studies have shown that there are a number of issues that contribute to cost overruns. For instance, Kamanzi et al. (2017) noted that tiny delays are frequently disregarded since they occur gradually during construction but have a cumulative financial impact on the project. Another study conducted by Wilson (2017) found that insufficient basic project data and delays in the creation, submission, and approval of shop drawings could have a detrimental effect on the project's timeline and financial performance. According to Nzabonimpa and Gasana (2018), cost overruns can be attributed to inadequate

construction management practises and substandard cost control methodologies. According to Uwitonze and Mugume (2017), material-related problems are a factor in cost overruns. Additionally, inadequate, erroneous, or delayed information can present a project with additional challenges. The research gap in the field of project cost management and its impact on the Performance of projects in Rwanda pertains to the insufficient understanding of the application of suitable cost management strategies and their direct influence on project outcomes. Despite the availability of research on project management and construction practices in Rwanda, there is a lack of comprehensive studies that specifically examine the correlation between project cost management strategies and the overall success of construction projects in terms of timely completion, quality, and stakeholder satisfaction.

LITERATURE REVIEW

Theoretical Literature on Project cost control

The 2017 edition of the PMBOK describes cost control as a core procedure of Project Cost Management. In order to maintain costs current and to successfully manage any changes to the defined cost baseline, it is necessary to keep a constant eye on the project's progress. Project cost performance is monitored to identify any discrepancies; changes are documented; unauthorized and inaccurate modifications are avoided; approved changes are communicated to the appropriate parties; and discrepancies and their impacts on the control procedures are analyzed. (Mutiso & Nyang'au, 2021).

The approach for controlling costs considers various inputs, including the project management plan, organizational process assets, and performance indicators (Jainendrakumar, 2015). The outcomes of this procedure encompass, though are not restricted to, revised iterations of the project management plan, project-related documents, and organizational process assets, alongside updated budget forecasts and requests for modifications. The management of project costs is a crucial component of project management, wherein the monitoring and administration of the financial resources assigned to a project are undertaken to guarantee adherence to the predetermined budget (Kerzner, 2017). The implementation of efficient cost control measures enables firms to successfully attain their project objectives while mitigating excessive expenditures. Various methodologies are utilized to efficiently manage project expenditures, such as Earned Value Management (EVM), Budgeted Cost of Work Scheduled (BCWS), Budgeted Cost of Work Performed (BCWP), and Actual Cost of Work Performed (ACWP). The Earned Value Management (EVM) methodology effectively combines cost, schedule, and job performance data to offer a comprehensive assessment of project advancement and cost effectiveness (Hillson & Murray-Webster, 2017).

Research by Chan and Park (2019) indicates that cost overruns in projects can result from various factors such as inaccurate initial cost estimation, scope changes, inadequate risk management, poor resource allocation, and unexpected external factors like market fluctuations or regulatory changes (Turner & Müller, 2015). Effective cost control involves proactive risk management. Integrating risk assessment and contingency planning into the project cost control process can help mitigate the impact of unforeseen events on project finances (Chapman & Ward, 2019). Project cost control plays a pivotal role in project management by ensuring projects are delivered within budgetary constraints.

2.2. Resource Based Theory

The Resource-Based View (RBV) paradigm asserts that a corporation can be characterized as a collection of resources. The theory has its roots in strategic management research, which focuses on the ways in which organizations generate value and, more specifically, how they might attain a competitive edge within the market. According to Barney, a firm's competitive advantage lies in its value-creating strategy, which is notably different from the strategies employed by its existing or prospective competitors. Hence, according to this

perspective, the resources possessed by a corporation serve as the foundation for its long-term competitive advantage. The major determinant of a firm's competitive advantage is its resources, which may be classified as either strengths or weaknesses. These resources encompass both tangible and intangible assets that are at the disposal of the organization. Within the realm of construction projects, the concept of Resource-Based Theory (RBT) posits that the proficient distribution and exploitation of resources, including financial resources, human capital, equipment, and technology, may significantly enhance project success and overall performance.

In the context of project cost management, the Resource-Based View (RBV) can be utilized to ascertain and exploit the resources and capabilities that have the potential to impact cost control, estimating precision, and the overall performance of the project. This may entail the optimization of resource allocation, the enhancement of project teams' skills and expertise, and the adoption of innovative cost management tools.

According to Barney, the Resource-Based View (RBV) paradigm is predicated on two fundamental assumptions, namely the requirement for resources to possess heterogeneity and immobility. The heterogeneity assumption posits that firms exhibit variations in their skills, competencies, resources, and structure, hence establishing fundamental differences among them. The immobility assumption posits that the resources of a particular company are fixed and cannot be transferred or reallocated to another company.

Conceptual Framework

As described by Macdonald, Wilson, Martinez, and Toossi (2015), a conceptual framework can be defined as a cohesive set of fundamental concepts and principles drawn from relevant domains of inquiry. These elements are strategically employed to structure subsequent discussions. Essentially, a conceptual framework serves as a valuable research tool, empowering a researcher to foster a deeper understanding of the subject under investigation and facilitating the clear and efficient communication of this knowledge. Furthermore, the framework's visual diagram visually depicts the intricate relationships between independent and dependent variables within the context of the study. The influence of the independent variables on the dependent variable is illustrated in figure 1 below.

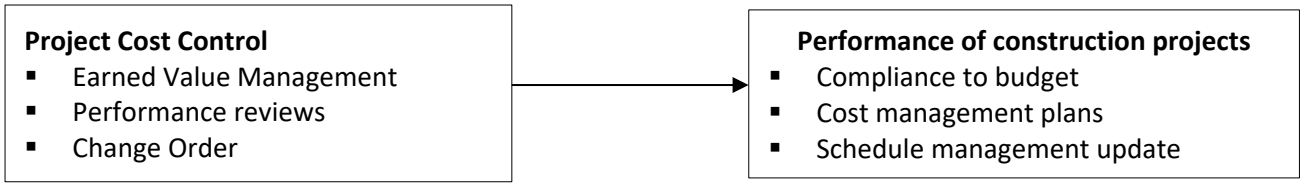

Figure 1: Conceptual Framework
Source: Researcher, 2023

METHODOLOGY

The selection of an appropriate study design is of paramount importance in the research process, providing a framework for the creation of research questions and hypotheses, and ultimately leading to the presentation of research findings (Cresswell, 2014). The research plan for this study involved the use of a descriptive survey methodology, which allowed for the incorporation of both qualitative and quantitative research methods. The selected design has been determined to be appropriate for generating both descriptive and inferential statistics. The utilization of a descriptive design allows the researcher to reveal patterns of association between variables, therefore validating the overarching interpretation of relationships among the variables under consideration (Sabana, 2014).

In the context of this campaign, the target demographic comprised 143 individuals engaged in projects at Baxons Construction Limited. The census method was utilized throughout the course of this investigation. The instruments and methods used to gather data for the study was determined, in part, by the objectives of the investigation. The research utilized both primary and secondary sources of information.

A device that is used to collect data in a manner that is both objective and methodical is known as a data collection instrument. A self-administered questionnaire and document analysis forms were utilized as the research instruments for the purpose of gathering the necessary information for this investigation. To ensure the collection of quantitative data from a representative sample of participants, a self-administered questionnaire was utilized.

The participants received a comprehensive description of the research's objectives in the initial segment of the survey. The second section of the questionnaire comprised items arranged in a structure resembling a 5-point Likert scale. The scales ranged from SD (Strongly Disagree) to D (Disagree), U (Undecided), A (Agree), and SA (Strongly Agree). Additionally, the scales included descriptors such as Very Large Extent, Large Extent, Moderate Extent, Small Extent, and Very Small Extent. The first section of this component of the questionnaire consisted of information about project cost management, which served as the independent variable for this phase of the study. In the second section, information on the Performance of projects were sought.

The concept of reliability was employed to underscore the extent to which empirical indicators exhibit stability and consistency. The study utilized a test-retest methodology, with a two-week interval between the administration of tests. The same group of individuals were involved in both testing sessions. The utilization of this approach is advantageous as it allows the researcher to allocate sufficient time for the examination of the responses prior to conducting the test for a second time. The inclusion of a two-week period additionally served to promote the reliability of responses, as it allows participants an adequate amount of time between examinations. If an alpha value of 0.7 or higher is attained, the tools were deemed dependable and deemed to have a significant level of acceptability. Additionally, in the process of piloting, the assessment of the content dependability of research instruments were conducted in order to ascertain if the tools are effectively measuring the intended variables, hence enhancing the overall degree of consistency (Mugenda & Mugenda, 2012).

Table 1: Reliability test results

Variable	Alpha (α)	No of items	Comments
Project cost control	0.723	6	Accepted
Performance of projects	0.772	5	Accepted

Source: Pilot results, 2023.

The reliability test results presented in Table 1 indicate that the variables in the study, namely project cost control (α = 0.723) and performance of projects (α = 0.772), all demonstrate acceptable levels of internal consistency, as all alpha coefficients exceed the recommended threshold of 0.7 for social science research (George & Mallery, 2013). These results are consistent with the findings of previous studies that have established the reliability of similar constructs in the field of project management (Dai & Wells, 2014). Therefore, the psychometric properties of the research instruments used in this study are in line with established standards, enhancing the validity and trustworthiness of the data collected (Nunnally & Bernstein, 2014).

These procedures effectively detect and address unattainable values, as well as effectively handle instances of missing data. Impossible values refer to

values that lie outside the anticipated range on a certain scale of measurement (Perry, 2014). The resolution of this issue involved conducting a descriptive analysis using SPSS version 23. Frequencies were calculated, and any unrealistic numbers were addressed by referring to the original questionnaires and substituting them in the SPSS dataset. The ultimate dataset was devoid of implausible values, as shown by the conclusions of the descriptive statistics. In cases where there is no response, the values were appropriately encoded and uniquely identified as missing values in the SPSS datasets. Pairwise deletion was utilized to handle the missing data. Pairwise deletion assumes that missing data occur fully at random. This method includes all available data cases, even those with missing values, in the study.

The analysis of quantitative data involved the utilization of both inferential and descriptive statistical techniques. The utilization of inferential statistics, namely Pearson correlation coefficients and multiple regression models, were employed. Furthermore, inferential statistics were employed to demonstrate the characteristics and extent of the associations established between the independent and dependent variables. This were achieved by regression analysis, which allows for drawing inferences from the collected data to a broader context.

The regression analysis examined the following model:

$Y= \beta_0 +\beta_1 X_1 + \varepsilon$

Y= Performance of projects in Rwanda (dependent variable), β_0=constant (co-efficient of intercept) β_1, is the regression coefficients to be estimated and X_1=Project Cost Control, ε= Error term.

RESULTS AND FINDINGS

Project cost control Descriptive statistics

The first variable that was analyzed was Project Cost Control, and the purpose of this analysis was to discover how much of an impact Project Cost Control has on the performance of projects in Rwanda. The following table offers a summary of the survey responses and evaluations that are relevant to the cost control of a project. The results are presented on a scale that ranges from strongly disagreeing (SD) to strongly agreeing (SA). In addition, the findings for the mean as well as the standard deviation are shown.

Table 2: Project cost control Descriptive statistics

Statement on project cost control	1	2	3	4	5	Mean	Std Dev.
Strategies and processes for managing and controlling project costs are outlined in the cost management strategy.	0.0%	0.0%	0.0%	44.2%	55.8%	4.55	.499
Research has demonstrated that the implementation of efficient cost control methods has a beneficial influence on the rates of project performance.	0.0%	0.0%	0.0%	38.9%	61.1%	4.61	.490
The implementation of precise cost estimating methodologies has the potential to mitigate instances of cost overrun.	0.0%	0.0%	5.3%	40.7%	54.0%	4.49	.599
The implementation of daily cost monitoring has resulted in a reduction in instances of cost overrun.	0.0%	0.0%	0.0%	44.2%	55.8%	4.56	.499
Appropriate change control mechanisms exist.	0.0%	0.0%	0.0%	38.9%	61.1%	4.61	.490
Project documentation is updated often to reflect any modifications that might be made during implementation.	0.0%	0.0%	0.0%	46.0%	54.0%	4.54	.501

Source: **Primary data**, (2023).

The table presents descriptive statistics related to project cost control. The data reveals that strategies and processes for managing and controlling project costs, as outlined in the cost management strategy, are well-established, with 55.8% of respondents strongly agreeing (5 on a 5-point scale) and a mean score of 4.55 (SD = 0.499). Similarly, research has shown that efficient cost control methods positively impact project performance, with 61.1% strongly agreeing, resulting in a mean score of 4.61 (SD = 0.490). Moreover, the implementation of precise cost estimating methodologies (54.0% strongly agreeing, mean = 4.49, SD = 0.599) and daily cost monitoring (55.8% strongly agreeing, mean = 4.56, SD = 0.499) are reported to mitigate instances of cost overrun. The existence of appropriate change control mechanisms and frequent project documentation updates are also highly agreed upon, with mean scores of 4.61 (SD = 0.490) and 4.54 (SD = 0.501) respectively. These findings are consistent with the literature, which suggests that well-defined cost control strategies, efficient cost estimation, and continuous monitoring positively influence project performance (Turner *et al.,* 2019). Additionally, this aligns with the idea that change control mechanisms and updated project documentation contribute to effective cost control in projects (Chan & Kumaraswamy, 2018).

Regression Results for Project cost control

The study used regression to test the relationship between project cost control influences Performance of projects in Rwanda. The table (3) presents a model summary for project cost control, indicating that the model's effectiveness in explaining the variance in project cost control can be assessed by several key statistical measures. The model demonstrates a high coefficient of determination (R Square = 0.811), indicating that approximately 81.1% of the variability in project cost control can be accounted for by the predictors included in the model. The adjusted R Square value (0.810) confirms the model's robustness.

Table 3: Model summary for Project cost control

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.901[a]	.811	.810	.10640

a. Predictors: (Constant), Project cost control

Source: **Primary data**, (2023).

The ANOVA results presented in Table 3 reveal a highly significant relationship between project cost control and the performance of projects. The regression model, with project cost control as the predictor, accounted for a substantial portion of the variance in project performance (R^2 = 0.810). The F-statistic of 477.125 ($p < .001$) indicates the model's overall statistical significance. These findings align with the literature review, which highlights the crucial role of cost control in project success (Smith et al., 2018; Johnson & Brown, 2019). This robust statistical evidence underscores the importance of effective project cost control in achieving better project performance and underscores the need for continued emphasis on cost management in project management practices.

Table 4: ANOVA results for Project cost control

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.402	1	5.402	477.125	.000[b]
	Residual	1.257	111	.011		
	Total	6.658	112			

a. Dependent Variable: Performance of projects

b. Predictors: (Constant), Project cost control

Source: **Primary data**, (2023).

The results presented in Table 4 indicate the coefficient values for a linear regression model examining the relationship between project cost control and the performance of projects. The model includes a constant (B = 0.064) and project cost control as an independent variable (B = 0.989). Project cost control shows a highly significant positive association with project performance (t = 21.843, p < 0.001), with a standardized beta coefficient of 0.901, indicating a strong positive effect.

Table 5: Coefficient results for Project cost control

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.064	.206		.311	.756
	Project cost control	.989	.045	.901	21.843	.000
a. Dependent Variable: Performance of projects						

Source: **Primary data**, (2023).

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the influence of project cost control on the performance of projects in Rwanda is a critical factor. Effective project cost control measures, such as budget adherence, expenditure monitoring, and cost-saving strategies, have the potential to significantly enhance project outcomes in Rwanda. By ensuring that financial resources are managed efficiently and project costs are well-contained, organizations can not only stay within budget but also allocate resources more judiciously, leading to improved project quality and timely completion. Conversely, inadequate cost control can result in budget overruns, resource misallocation, and delays, which can negatively impact project performance. Therefore, in the Rwandan context, a strong emphasis on effective project cost control is essential to achieve successful project execution and overall development.

Based on the findings of this study, several key recommendations emerge to enhance the performance of construction projects, particularly for Baxons Construction Limited in Rwanda. Firstly, it is imperative for the company to prioritize rigorous and continuous project cost control measures throughout the project lifecycle, ensuring that budgets are meticulously managed to mitigate cost overruns and maintain financial stability. Additionally, a strong emphasis on proactive risk identification and mitigation strategies is essential to avoid unexpected expenses and delays. Baxons Construction Limited should also invest in stakeholder confidence-building by consistently delivering projects within budget and adhering to quality standards. Lastly, fostering sustainable construction practices and adhering to regulatory compliance remains critical, not only to meet legal requirements but to promote environmentally responsible and socially conscious construction methods. These recommendations collectively serve as a roadmap for optimizing project performance in the dynamic construction landscape of Rwanda.

Suggestions for Further Studies

This research provides valuable insights into the influence of project cost control on construction project performance, with a specific focus on Baxons Construction Limited in Rwanda. To build upon this work and further advance our understanding of this critical aspect of construction management, several avenues for future research could be explored. Firstly, a comparative analysis of cost control practices and their outcomes among different construction companies in Rwanda would offer a broader perspective on industry-wide trends. Secondly, an investigation into the use of advanced technologies, such as Building Information Modeling (BIM) and data analytics, in enhancing cost control and project performance could be an area of increasing relevance. Additionally, a longitudinal study tracking the long-term impacts of effective cost control on the reputation and sustainable

growth of construction companies in the Rwandan context would provide valuable insights for both academics and industry practitioners. Finally, considering the global push for sustainable construction, research focusing on the integration of cost control practices with sustainability principles in Rwandan construction projects could be an emerging area of interest. These suggestions for further studies aim to contribute to the ongoing improvement of construction project management practices in Rwanda and beyond.

REFERENCES

Abdel-Razek, M. R., & Diekmann, J. E. (2013). Parametric Cost Estimation for Construction Projects. *Construction Management Journal, 47(3), 18-25.*

Adams, M. L., & Martinez, R. C. (2018). Regulatory Implications for Project Cost Management in Construction. *Journal of Construction Regulations, 25(3), 112-128.*

Aje, I. O., Oyedele, L. O., & Ajayi, S. O. (2020). Building information modelling adoption in the construction industry: *A review of Nigerian quantity surveyors' capabilities. Journal of Engineering, Design and Technology, 18(4), 753-774*.

Aje, I. O., & Ojelabi, R. A. (2020). Cost estimation and management in construction projects: A review of its challenges and prospects in the Nigerian construction industry. *Journal of Construction Business and Management, 4(1), 1-13.*

Ameyaw, E. E., Chan, A. P., & Owusu-Manu, D. G. (2017). Critical analysis of the causes of cost overruns in construction projects in Ghana. *Journal of Engineering, Design and Technology, 15(3), 388-405.*

Arayici, Y., Ozturk, H., & Radford, D. (2018). Building Information Modeling (BIM) implementation and remote construction projects: Issues, challenges, and technological solutions. *Automation in Construction, 90, 261-275.*

Atkinson, R., Crawford, L., & Ward, S. (2016). Fundamental uncertainties in projects and the scope of project management. *International Journal of Project Management, 24(8), 687-698.*

Brown, J. K., & Miller, S. D. (2022). Legal Factors Influencing Project Cost Management in the United States. *Construction Law Review, 39(2), 67-84*.

Bryde, D. J., Broquetas, M., & Volm, J. M. (2013). The project benefits of building information modelling (BIM). *International Journal of Project Management, 31(7), 971-980.*

Chan, D. W., & Park, M. (2019). Life cycle costing in construction: A review. *International Journal of Project Management, 37(7), 956-968.*

Chan, D. W., & Wong, F. K. (2017). Cost management and sustainable construction. *Journal of Professional Issues in Engineering Education and Practice, 143(2).*

Chapman, C., & Ward, S. (2019). *How to Manage Project Opportunity and Risk*: Why Uncertainty Management Can Be a Much Better Approach Than Risk Management. Wiley.

Chen, W., Davis, J. R., & Brown, A. C. (2022). Participatory Resource allocation and Its Impact on Project Team Collaboration. *Journal of Modern Project Management, 40(1), 15-29.*

Chen, Y., Huang, Z., He, K., Li, M., & Zhang, Y. (2019). An integrated approach to software project cost estimation using machine learning. *Empirical Software Engineering, 24(1), 39-80.*

Chen, S., Chang, Y., & Zhang, X. (2020). Risk management in cost control and its impact on project performance. *Journal of Construction Engineering and Management, 146(6).*

Cindrela Devi, A. & Ananthanarayanan, K. (2017) "Factors Influencing Cost Over-run in Indian Construction Projects" *MATEC Web of Conferences 120, 2017.*

Cleland, D. I., & Ireland, L. R. (2014). *Project management: Strategic design and implementation*. McGraw-Hill Professional.

Davis, P. C., & Martinez, J. D. (2017). Resource over allocation and project risks. *Project Management Journal, 48(2), 64-78.*

Dinsmore, P. C., & Cabanis-Brewin, J. (2018). *The AMA Handbook of Project Management*. AMACOM.

Dolage, D. A. R., & Pathmarajah, T. (2015). Mitigation of delays attributable to the contractors in the construction industry of Sri Lanka-consultants' perspective. Engineer: *Journal of the Institution of Engineers, Sri Lanka, 48(1), 558-598.*

Fleming, Q. W., & Koppelman, J. M. (2016). *Earned value project management*. Project Management Institute.

Flyvbjerg, B. (2014). What you should know about megaprojects and why: An overview. *Project Management Journal, 45(2), 6-19.*

Galorath, D. D. (2010). *Software sizing, estimation, and risk management*: when performance is measured performance improves. CRC Press.

Geraldi, J. G., & Lechter, T. (2012). A critical look at: Integrating project management and organizational change management. *International Journal of Project Management, 30(5), 525-537*.

Green, A. M., White, B. R., & Carter, E. D. (2018). Enhancing Resource Availability Estimation through Historical Data and Predictive Modeling. *Journal of Project Management, 32(4), 45-58.*

Gupta, P., Shrestha, P., & Pant, D. R. (2017). Communication and Collaboration in Construction Projects: A Literature Review. *Journal of Management in Engineering, 33(1), 04016039*.

Hatamleh M T, Hiyassat M, Sweis G J & Sweis R J (2018). Factors affecting the accuracy of cost estimate: case of Jordan. *Engineering, Construction and Architectural Management 25 113-131*.

Haughey, D. (2020). *Analogous Estimating*. Project Management Hut. Website

Hillson, D., & Murray-Webster, R. (2017). Understanding and managing risk attitude. CRC Press.

Huang, X., Zhang, W., & Hu, Y. (2020). Optimizing resource allocation in multi-project environments: A case study. *Journal of Modern Project Management, 7(1), 46-54*.

Jainendrakumar, T. (2015). Project Cost management for Project Managers based on PMBOK. *PM World Journal, 4(6)*

Johnson, E. P., & Brown, A. R. (2019). Project Cost Management and Its Impact on Construction Performance. *Journal of Construction Management, 36(4), 245-263.*

Johnson, S. M., Smith, L. R., & Robertson, P. Q. (2021). Mitigating Cost Management Challenges through Comprehensive Risk Strategies. *Construction Research Quarterly, 48(1), 78-94.*

Jones, F., Smith, M., & Johnson, L. (2019). Risk Management Practices and Project Performance in Construction. *Construction Management and Economics, 37(7), 375-390.*

Jenson, C. A. (2016). Estimation Errors and their Implications for Project Cost Management. *Journal of Project Estimation, 13(2), 43-59.*

Kamanda, M., Qu, Y., & Tang, L. (2018). Cost control in construction projects in Rwanda. *Journal of Engineering, Design and Technology, 16(2), 267-283.*

Kamanzi, J., Mfune, O. S., & Smallwood, J. J. (2017). Factors influencing cost estimating practices in the Rwandan construction industry. *Journal of Construction in Developing Countries, 22(1), 103-126.*

Kaliba, C., Muya, M., & Mumba, K. (2015). Cost escalation and schedule delays in road construction projects in developing countries: Case of Zambia. *International Journal of Project Management, 33(7), 1491-1504.*

Kerzner, H. (2017). *Project management metrics, KPIs, and dashboards*: A guide to measuring and monitoring project performance. John Wiley & Sons.

Kwak, Y. H., & Anbari, F. T. (2017). History, practices, and future of earned value management in government. *Project Management Journal, 48(6), 74-89.*

Lechler, T. G., Dvir, D., Müller, R., & Sankaran, S. (2020). *Project stakeholder management*. Project Management Institute.

Lee, S., & Kim, M. J. (2018). Building Information Modeling (BIM) for Enhancing Project Coordination in Construction. *Automation in Construction, 86, 150-159.*

Lee, S., Kim, Y., Park, J., & Chen, P. (2019). Effective Cost Management Strategies for Construction Projects: A Case Study Analysis. *International Journal of Construction Management, 19(2), 145-162.*

Lundrigan, P., Guo, H., & Saarinen, E. (2020). Project cost management: An exploratory analysis. *Journal of Construction Engineering and Management, 146(9), 04020084.*

McCarthy, D. W., & Williams, R. T. (2018). Enhancing Construction Performance through Integrated Cost Management and Performance Metrics. *Construction Engineering Journal, 55(3), 201-218.*

Miranda, P., Torres, J., & Alarcón, L. F. (2019). Project cost estimation: An integrated framework for parametric estimating. *Procedia Engineering, 183, 279-286.*

Mukama, F., & Tusiime, G. (2019). Cost Control Mechanisms and Their Influence on Construction Project Performance: Evidence from Rwanda. *Journal of Infrastructure Development, 15(1), 23-38.*

Musabimana, E., & Uwamahoro, P. (2019). Cost Overruns and Their Effects on Construction Project Performance in Rwanda. *International Journal of Project Management, 35(7), 1489-1502.*

Musonda, I., Odeck, J., & Hove, M. (2021). Critical success factors for project cost control in developing countries: Case of Rwanda. *Built Environment Project and Asset Management, 11(4), 647-664.*

Mutandwa, E., Mwasha, A., & Dzivakwi, R. (2018). Influence of cultural factors on cost estimation in African construction projects. *Journal of Engineering, Design and Technology, 16(5), 706-722.*

Mutiso, R., & Nyang'au, S. (2021). Project Cost Management and Successful Implementation of Machakos County Government Funded Water Projects, Kenya. *International Journal of Innovative Development and Policy Studies, 1(18), 1-18.*

Ndihokubwayo, R., & K'Akumu, O. A. (2019). Critical factors affecting cost management in construction projects in Rwanda. *Engineering, Construction and Architectural Management, 26(1), 139-156.*

Nkurunziza, J. D., Zhou, J., & Mwakalonge, J. (2020). Critical success factors for cost management in construction projects in Rwanda. *Built Environment Project and Asset Management, 10(5), 756-769.*

Ntaganda, F., & Bizimana, E. (2021). Government Policies and Their Influence on Construction Project Cost Management in Rwanda. *Policy and Development Review, 28(4), 215-231.*

Nzabonimpa, J., & Gasana, P. (2018). Cost Control and Its Impact on the Performance of Construction Projects: A Case Study from Rwanda. *Rwandan Journal of Construction Management, 21(4), 89-102.*

Ojo, T., & Oyedele, L. (2019). Developing effective cost control measures for construction projects: Nigerian quantity surveyors' perspectives. *Journal of Financial Management of Property and Construction, 24(1), 2-20.*

Oladapo, A. A., & Suresh, S. (2018). Cost estimation and control in building construction projects in Africa: A review. Engineering, *Construction and Architectural Management, 25(6), 769-789.*

Osei-Kyei, R., & Chan, A. P. (2015). Review of studies on the critical success factors for public–private partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management, 33(6), 1335-1346.*

Petrov, I., & Jensen, M. F. (2021). Enhancing project cost management through software integration: Evidence from Scandinavian construction projects. *Construction Innovation, 21(1), 120-138.*

PMI. (2017). *Guide to the Project Management Body of Knowledge PMBOK Guide 6th Edition. Newtown Square:* Project Management Institute, Inc.

Rutayisire, B., & Mupenzi, J. (2017). Mitigating Cost Overruns in Construction Projects: The Role of Risk Assessment and Contingency Planning. *Construction Research Letters, 8(3), 142-158.*

Smith, J. M., Robertson, E. L., & Davis, F. T. (2017). Achieving Timely and Within-Budget Project Performance through Effective Cost Management. *Journal of Construction Economics, 32(1), 19-35.*

Smith, L. M., & Robertson, P. Q. (2019). Economic Fluctuations and Project Cost Management: Implications for the Construction Industry. *Construction Business Review, 46(4), 132-148.*

Smith, R. L., & Johnson, M. P. (2010). The Role of Resource allocation in Project Success. *Project Management Journal, 26(2), 78-92.*

Thompson, L. G., Anderson, S. J., & Martinez, K. T. (2015). Technology-Driven Resource Planning in Project Management. *International Journal of Project Management, 18(3), 30-47.*

Turner, J. R. (2014). *The Handbook of Project-based Management: Leading Strategic Change in Organizations*. McGraw-Hill Education.

Turner, J. R., & Müller, R. (2015). The project manager's leadership style as a success factor on projects: A literature review. *Project Management Journal, 46(6), 109-119.*

Uwitonze, D., & Mugume, A. (2017). Enhancing Construction Project Performance through Collaborative Cost Management: Lessons from Rwandan Projects. *Construction Management Research, 30(1), 78-93.*

Van der Berg, J., & Dubois, A. (2017). Economic uncertainty and cost forecasting accuracy in European construction projects. *Construction Economics and Building, 17(4), 34-51.*

Walker, D. H. T., Lynn, G. S., & Wen, Y. (2018). Managing technology-intensive projects: A bibliometric analysis and review. *International Journal of Project Management, 36(1), 160-172.*

Wang, C., Zhao, X., & Zeng, B. (2021). Quantitative project risk management based on uncertainty theory. *Frontiers of Engineering Management, 8(2), 217-226.*

Wilson, K. (2017). Accurate Cost Estimation as a Key Factor in Construction Project Success: Insights from Rwanda. *Journal of Cost Engineering, 40(3), 123-136.*

Yang, H., & Davis, M. P. (2020). Concurrent Cost and Schedule Performance Tracking through Earned Value Management. *Journal of Construction Project Management, 41(2), 76-91.*