ISSN: 2524-1354 (Online), ISSN: 2519-7851 (Print)
Africa Habitat Review Journal
Volume 20 Issue 1 (April 2025)
http://uonjournals.uonbi.ac.ke/ojs/index.php/ahr

Adopting Feedback Loops to Enhance Performance in Construction Projects

***Paul Muthoka Mutinda, James Okaka and Shadrack Mutungi Simon**

Received on 6th January, 2025; Received in revised form 28th January, 2025; Accepted on 17th February, 2025.

Abstract

Affordable Housing Projects (AHP) in Kenya face persistent challenges, including scope creep, cost overruns, time delays, and inadequate community participation, which hinder their performance and sustainability. This study examines the adoption of feedback loops as a solution to enhance AHP performance by addressing these issues. Out of 80 survey respondents, 63 provided feedback (78.7%), and 7 out of 9 interview participants responded (77.8%), reflecting robust engagement. Performance metrics such as project scope, cost, time, and community participation were assessed, with community involvement identified as the most critical factor for success. Despite moderate cost overruns (6-10%) and time delays, minimal reworks (74.2%) were observed, emphasizing the need for improved resource management. The study reveals that integrating feedback loops significantly improves performance, particularly in managing scope, cost, and time. Activities such as sourcing case studies, creating visual diagrams, validating insights, and adopting feedback mechanisms at every project stage are instrumental. Feedback loops are most effectively implemented during construction for real-time adjustments, with the operations and maintenance phases benefiting from user feedback. A proposed framework prioritizes early community engagement, regular scope reviews, budget monitoring, and real-time progress tracking, fostering responsive project management and enhancing cost and time efficiency. While concerns about potential delays and resource wastage exist, the advantages—such as early problem identification, timely issue resolution, and stakeholder engagement—outweigh the drawbacks. Key recommendations include strengthening community engagement, providing training for project teams, utilizing technology for real-time feedback, and integrating feedback loops into risk management plans. This research contributes to the understanding of feedback loop adoption in construction, offering a practical model to improve the performance of Kenya's affordable housing sector and ensuring more effective and sustainable project outcomes.

Keywords: Affordable Housing Programme (AHP), National Construction Authority (NCA), Project Management Plan (PMP), DfA (Design for Assembly), DfM (Design for Manufacturing)

INTRODUCTION

Construction projects are undertaken with specific objectives, such as timely completion, adherence to budget, and maintenance of quality standards, which serve as benchmarks for success, (Faisal, 2015). The performance of a project significantly influences its success or failure. According to Ogunsemi (2006), the critical parameters for assessing project success in management include time, cost, quality, and stakeholder satisfaction. To effectively measure project performance, Key Performance Indicators (KPIs) such as cost, time, quality, and customer satisfaction are employed, (Ogunsemi, 2006). Project performance encapsulates whether objectives related to scope, cost, and schedule are met, with periodic measurements taken during monitoring phases to identify variances from the Project Management Plan (PMP) for proactive mitigation.

In the face of growing competitive pressure and various initiatives to enhance productivity, quality, and efficiency, construction organizations are increasingly re-evaluating their processes. The aim is to leverage technology and re-engineer construction practices to achieve superior quality while optimizing resource use. To tackle the challenges faced in construction projects,

**Corresponding author:*
Paul M. Mutinda *Department of Construction Management, School of Architecture & Building Sciences, Jomo Kenyatta University of Agriculture & Technology, Kenya*
Email: paul07mutinda@gmail.com

AFRICA HABITAT REVIEW 20(1) 2025

management tools such as feedback loops must be integrated. A feedback loop, defined as a system where the output informs future operations, is crucial across industries, including construction, (Fitzgibbons, 2019). Effective feedback mechanisms enable project managers to monitor execution and adjust resources and strategies accordingly, enhancing overall project performance.

The construction industry in Kenya faces significant challenges, particularly in affordable housing projects, where poor performance has led to delays and cost overruns. The country requires approximately 200,000 new housing units annually but only manages to complete 50,000, resulting in a growing deficit of 150,000 units each year, (KNBS, 2017). Factors contributing to this poor performance include unqualified technicians, incompetent contractors, and inadequate quality control measures. A recent report reveals that out of eleven affordable housing projects, only two were fully delivered, underscoring the urgent need for studies aimed at addressing non-performance in this sector, (Kieti, 2020). This study proposes a framework for adopting feedback loops to enhance the performance of construction projects under the affordable housing program, aligning with the objectives outlined in Article 43(1)(b) of the Constitution of Kenya.

THEORY

The construction industry is characterized by complex projects that require efficient performance measurement to ensure successful outcomes. This section reviews various frameworks and metrics that have been developed to assess project performance, particularly in the context of affordable housing projects in Kenya.

Project Performance

According to the RIBA Plan of Work (2013), project performance encompasses the effectiveness of a project as determined by feedback mechanisms, which include the performance of the project team and the constructed building against predetermined outcomes. Key dimensions of construction project performance include unit costs, delivery times, and client satisfaction, (Ling, 2004).

Performance measurement is crucial for organizations as it serves as a barometer for assessing whether activities and outputs meet specified objectives. Historical roots of performance measurement can be traced back to the planning and control procedures employed by U.S. railroads in the late 19th century. Neely (2002) emphasizes that performance measures reflect organizational priorities and guide employee behavior to maximize outcomes, (Neely, 2002).

Performance Measurement Frameworks in Construction Projects

Various frameworks have been developed to evaluate performance in construction projects, each with distinct methodologies and focuses, in this study Key Performance Indicators (KPI) will be adopted because they are the most commonly applied measurement framework used to evaluate performance in AHP construction projects in Kenya.

Key Performance Indicators (KPI)

Originating in the late 1990s, Key Performance Indicators (KPIs) have become fundamental in measuring performance within the construction industry. They are derived from the 5-4-7 model introduced in the UK's Egan Report (1998), which set forth improvement objectives for the sector. KPIs emphasize critical factors such as construction cost, project duration, client satisfaction, and productivity, thereby fostering both outcome-oriented and process-oriented perspectives, (Takim, 2002). In addition, secondary indicators, which are categorized into operational and diagnostic types, play an essential role in comprehensively understanding performance nuances, (Costa & Lima, 2004). This research will primarily employ KPIs as the framework for performance evaluation.

Feedback Loops

Adopting feedback loops to improve performance in construction projects has gained attention as a valuable approach for enhancing efficiency and quality across the project lifecycle. In construction, feedback loops serve as a systematic approach to collecting, analyzing, and responding to project performance data to foster continuous improvement, (Lee & Pena-Mora, 2017). The integration of feedback mechanisms within construction projects, especially in complex sectors like affordable housing, has been shown to address persistent challenges such as delays,

cost overruns, and quality concerns, (Love, Holt, & Shen, 2002). This literature review examines existing studies on the application of feedback loops in construction, particularly as they relate to affordable housing programs, and explores the unique challenges and benefits within the Kenyan context.

Feedback loops operate by continuously cycling through stages of data collection, analysis, feedback provision, and corrective action. This process allows for real-time adjustments and accountability, particularly valuable in construction where dynamic, often unpredictable factors impact project outcomes, (Love & Smith, 2000). Studies on performance enhancement in construction projects highlight the importance of implementing feedback as an active, ongoing process rather than a static, one-time evaluation. According to Kerzner (2009), effective feedback loops provide project teams with actionable insights that improve decision-making, resource allocation, and adherence to project timelines, thus directly contributing to better project outcomes.

The need for feedback systems is particularly pronounced in affordable housing projects, where cost efficiency and time management are crucial (Wells, 2001). In affordable housing construction, resource limitations and tight budgets necessitate a high degree of efficiency and adaptability. Additionally, affordable housing programs in developing countries such as Kenya often face unique constraints, including limited access to materials, skilled labor shortages, and bureaucratic delays, (World Bank, 2020). In this context, feedback loops can enable stakeholders to adapt to project-specific constraints by identifying and rectifying performance issues as they arise, thereby improving both short-term and long-term outcomes.

One of the primary challenges in implementing feedback loops in Kenyan construction projects, particularly in affordable housing, is the lack of standardized frameworks for data collection and analysis, (Ochieng, 2010). Many Kenyan construction projects rely on informal, ad hoc methods of performance assessment that lack the systematic rigor of structured feedback loops. Research by Muriithi and Crawford (2003) underscores the need for culturally and contextually adapted feedback mechanisms, as methods developed for Western contexts may not adequately address the unique operational realities of Kenyan construction projects, (Muriithi, 2003). Incorporating local knowledge and expertise into feedback systems is essential for achieving sustainable improvements in project performance.

Another critical factor is stakeholder involvement, which is fundamental to the effectiveness of feedback systems in construction. In Kenya's affordable housing sector, effective feedback loops require active participation from government bodies, contractors, and the communities served by these projects. According to Davis and Walker (2009), involving a range of stakeholders ensures that feedback mechanisms align with the diverse goals and needs of the project's beneficiaries, (Davis, 2009). Community engagement, in particular, can play a vital role in ensuring that the housing solutions provided are both sustainable and aligned with end-user expectations.

In conclusion, feedback loops offer a promising approach to enhancing performance in Kenya's affordable housing projects. By fostering an adaptive, responsive project management environment, feedback systems can help mitigate some of the common challenges associated with construction in developing contexts. However, the success of such systems depends on the development of standardized feedback frameworks and active stakeholder involvement, tailored to the specific needs of Kenya's affordable housing sector. As Kenyan construction projects grow in scope and complexity, the integration of feedback loops may provide a pathway to more effective and resilient project outcomes.

RESEARCH METHODS

The study adopted both qualitative and quantitative research approaches, utilizing qualitative methods to gather descriptive data and quantitative methods to address statistical questions. A case study design was utilized, focusing on affordable housing projects in Kenya to explore project feedback loops and their impact on performance. This approach allowed for an intensive examination of each project while also functioning as a survey research design through the use of questionnaires and structured interviews. The target population comprised ongoing affordable housing projects in Kenya, totaling 46,027 units across nine sites

AFRICA HABITAT REVIEW 20(1) 2025

(Boma Yangu). A census sampling technique was employed, involving all nine construction sites to ensure comprehensive data collection. Data were gathered using self-administered questionnaires featuring both open and closed-ended questions aimed at facilitating clear responses and efficient analysis. Pretesting of the questionnaire was conducted to refine questions and ensure clarity. Data underwent cleaning, categorization, and summarization before analysis using both SPSS for quantitative data and thematic analysis for qualitative data. Data were presented using tables and graphs for clarity in conclusions.

RESULTS

Sixty-three (63) out of the eighty (80) respondents contacted provided feedback which translates to seventy-eight (78.7%) response rate. Regarding the interviews, seven (7) out of nine (9) respondents provided feedback which translates to a 77.8% response rate. This implies that the responses provided were adequate for addressing the research objectives and laying the foundation for further research in this area.

Performance of Affordable Housing Construction Projects in Kenya

A questionnaire assessed various performance metrics, including project scope, cost, time, and community participation. The results indicated that community participation was deemed the most critical factor influencing project success, followed by project scope, cost management, and timely completion as shown in **Table 1**. While most respondents provided positive feedback about the projects' performance, highlighting successful cost management and sustainability, areas such as communication and resource management were identified as needing improvement. The analysis showed that variations in project parameters were generally minimal, with over half of the projects experiencing variations of 0-5%.

In terms of reworks, a significant majority of projects (74.2%) experienced minimal reworks of 0-10%, reflecting effective initial planning and quality control. The data also revealed that many projects faced moderate cost overruns of 6-10%, suggesting that while budget management was effective, unexpected expenses still arose. Time overruns varied, with the largest proportion experiencing delays of 6-10%. Overall, the findings suggest that prioritizing community engagement, clearly defining project scopes, maintaining cost control, and enhancing time management strategies are essential for improving the performance of affordable housing projects in Kenya. This information will guide the development of a framework for adopting feedback loops to address the identified challenges and enhance project outcomes.

Extent of Adoption of Feedback Loops in AHP in Kenya

As shown in **Table 2**, the highest-ranked aspect involves identifying relevant case studies and concepts, which ensures that valuable lessons are continuously integrated into the projects. This is followed by the evaluation of these case studies, creating visual diagrams, and developing bidirectional feedback loops to translate qualitative data into actionable insights. The validation and iteration of learnings are crucial for forming provisional feedback mechanisms before their implementation in the actual project execution phase. Interviews confirm that best practices, ranging from technical improvements to strategic approaches, are documented and utilized in projects, significantly contributing to project performance. However, inconsistent application of these practices can hinder effectiveness,

TABLE 1
Performance of AHP project

Performance of AHP Project	RII	Rank
Project Scope	59.5%	2
Project Cost	56.1%	3
Project Time	41.9%	4
Community Participation	60.0%	1

Source: Survey, 2025

TABLE 2
Case studies application in the adoption of feedback loops in AHP

Case Studies Application in AHP Projects	RII	Rank
Case studies applicable or feedback loops concept are sourced during the life cycle of AHP Construction Projects	0.70968	1
Case Studies sourced are evaluated and visual diagrams and bidirectional loops created	0.69032	2
Learnings from case studies identified are validated and iterated and provisional feedback loops and structures are formed	0.67742	3
Feedback loops are adopted in the implementation of AHP construction projects in Kenya	0.60645	4

Source: Survey, 2025

indicating the need for improved consistency in documentation and implementation.

Feedback loops are more likely to be adopted during the construction phase of AHP projects, as indicated by the Relative Importance Index (RII), due to the dynamic nature of activities requiring real-time feedback for enhanced performance. The operation stage follows, where continuous user feedback informs maintenance and future improvements, while the design stage is critical for incorporating early feedback to optimize project specifications. The initiation stage ranks lowest, yet initial feedback remains valuable for establishing project goals and feasibility. The analysis underscores the varying likelihood of feedback loop adoption across different project stages and emphasizes the importance of strategically applying feedback mechanisms throughout the project life cycle. This approach aims to refine processes and improve overall project performance, leading to continuous improvement in AHP initiatives in Kenya.

Effect of Adoption of Feedback Loops on the Performance of AHP in Kenya

The adoption of feedback loops significantly enhances the performance of Affordable Housing Projects (AHP) in Kenya, particularly in the areas of scope, time, and cost management. As shown in **Table 3,** the most considerable impact is seen in scope management, where feedback loops facilitate the continuous assessment and refinement of project scope, ensuring alignment with stakeholder expectations and reducing the risk of scope creep. Time management follows closely, as real-time feedback allows for the prompt identification of delays and proactive adjustments, which are crucial for meeting project timelines. Additionally, feedback loops aid cost management by enabling ongoing monitoring of expenses and identifying cost-saving opportunities, which helps maintain financial discipline. Although, community participation ranks fourth, feedback loops are still vital in engaging local stakeholders, fostering communication, and addressing community needs, leading to greater project satisfaction.

TABLE 3
Impact of adoption of feedback loops on performance of AHP Projects

Impact of Adoption of Feedback Loops likely to be Adopted in the Various Stages of AHP Projects	RII	Rank
Adopting feedback loops aids scope management in AHP construction projects	0.85161	1
Adopting feedback loops aids cost management in AHP construction projects	0.8	3
Adopting feedback loops aids time management in AHP construction projects	0.83871	2
Adopting feedback loops aids community participation	0.7871	4

Source: Survey, 2025

AFRICA HABITAT REVIEW 20(1) 2025

Furthermore, the broader effects of feedback loops in construction projects reveal a strong consensus among stakeholders regarding their positive impact on performance and the facilitation of continuous improvement as shown in **Table 4**. The highest-ranked aspects include the recognition that feedback loops enhance project outcomes by allowing for early issue identification and timely adjustments. Similarly, the role of feedback loops in supporting continuous improvement processes is highlighted, as they enable regular evaluation and refinement of construction practices, thereby contributing to increased efficiency and quality. Despite some skepticism about feedback loops being a waste of time or resources, the overall sentiment is that their benefits outweigh potential drawbacks. This positive perception suggests that with effective implementation and demonstration of successful case studies, the broader adoption of feedback loops can be achieved, ultimately improving project performance across the construction industry in Kenya.

Framework for Adopting Feedback Loops to Enhance Performance in AHP Projects in Kenya

To enhance performance in affordable housing projects (AHP) in Kenya, a comprehensive framework for adopting feedback loops has been developed based on data analysis of various performance metrics. The framework emphasizes the importance of community participation, project scope management, cost and time management, and the minimization of variations and reworks. Engaging the community from the outset allows for the collection of essential feedback regarding needs and expectations, which should be continually incorporated through regular forums and surveys. This engagement enables project teams to adjust plans and operations in alignment with stakeholder input, fostering a sense of ownership and satisfaction within the community.

Key components of the framework include establishing clear project objectives and deliverables through effective scope management. Regular stakeholder meetings and scope reviews help ensure alignment with initial goals, allowing for the integration of feedback that may necessitate adjustments without significantly affecting timelines or budgets. Financial oversight is also crucial, involving the development of detailed cost estimates, continuous monitoring of expenditures, and proactive adjustments based on feedback. Similarly, time management strategies include creating detailed project schedules with milestones and utilizing digital tools for real-time progress tracking, enabling quick responses to delays and helping to maintain project momentum.

The framework further highlights the necessity of managing public complaints and fostering a culture of continuous improvement. By keeping communication channels open with the public and implementing feedback systems like hotlines and suggestion boxes, project teams can address concerns swiftly, enhancing community relations and project acceptance. Continuous improvement is encouraged by training project teams on the significance of feedback loops and promoting iterative enhancements throughout the project lifecycle. Regular monitoring and evaluation using key performance metrics enable stakeholders to identify patterns, implement improvements, and ensure that feedback is effectively integrated into future project strategies. This holistic approach aims to enhance the overall performance of AHP projects in Kenya by creating a responsive and

TABLE 4
Effects of feedback loops in construction projects

Effects of Feedback Loops in Construction Projects	RII	Rank
Feedback loops have a positive impact on performance in construction projects	0.82581	1
Feedback loops are a waste of time and resources and have little or no impact on performance in construction projects	0.3871	3
Feedback loops aid continuous improvement approaches in construction projects	0.82581	1
Scale of impacts and size of delays caused by feedback loops outweigh its potential benefits	0.34839	4

Source: Survey, 2025

adaptive project environment.

DISCUSSION

The findings of this study indicate a strong engagement from respondents, with a response rate of 78.7% for the questionnaires and 77.8% for interviews, providing a solid foundation for understanding the performance of affordable housing projects (AHP) in Kenya. The analysis reveals that community participation is regarded as the most crucial factor influencing project success, closely followed by project scope, cost management, and timely completion. This emphasis on community engagement aligns with previous studies, such as those by Olawale and Sun (2010), which highlighted that stakeholder involvement is vital for project success in construction contexts. While most respondents reported positive project performance, challenges such as communication and resource management remain areas for improvement, echoing findings from similar research that underscores the significance of effective communication strategies in achieving project goals, (Olawale, 2010).

The study further shows that a significant proportion of projects (74.2%) experienced minimal reworks, indicating effective initial planning and quality control measures. However, moderate cost overruns of 6-10% were reported, which suggests that while budget management is generally effective, unexpected expenses still occur. These results align with findings from Turner and Zolin (2012), who noted that cost overruns are common in construction projects and are often linked to inadequate planning and unforeseen challenges, (Turner, 2012). The variation in project delays, with many experiencing 6-10% overruns, highlights the need for enhanced time management strategies. The data suggest that prioritizing community engagement, clearly defining project scopes, maintaining cost control, and refining time management practices are essential for improving AHP performance in Kenya.

In terms of feedback loop adoption, the study reveals that integrating feedback mechanisms significantly enhances project performance across various metrics, particularly in scope, time, and cost management. This finding aligns with previous research by Lehtinen et al. (2021), which emphasized that feedback loops are crucial for continuous improvement in construction projects. The study indicates that while feedback loops are more likely to be adopted during the construction phase, their application across all stages of a project life cycle is essential for maximizing performance, (Lehtinen & Laitinen, 2021). The positive sentiment regarding the impact of feedback loops on construction practices, despite some skepticism about their effectiveness, supports the notion that with proper implementation and demonstration of successful case studies, broader adoption can be achieved, ultimately leading to improved project outcomes in the Kenyan construction industry.

CONCLUSION

From the research findings, these conclusions can be made as follows;
The first objective was to describe performance of affordable housing construction projects in Kenya. The performance of affordable housing construction projects in Kenya is bolstered by strong community participation, effective scope definition, and budget management, while time management poses notable challenges. High ratings for community involvement underscore its importance for project success, while stable scope and moderate cost control reflect efficient planning and budget adherence. Minimal variations and reworks indicate effective quality management, yet frequent time overruns reveal the need for better resource management and contingency planning to address unforeseen delays. Overall, the framework highlights the potential of feedback loops to address these areas, with particular focus on improving timelines to achieve consistent project outcomes.

The second objective was to establish the extent of adoption of feedback loops in affordable housing construction projects in Kenya. The study concludes that in Kenya's Affordable Housing Program (AHP), structured adoption of feedback loops throughout project stages notably enhances project outcomes. Starting with case studies to gather insights, the process advances through visualizing feedback mechanisms, validating learnings, and integrating them into execution. Feedback loops are most frequently applied during the construction stage for real-time responsiveness and in the operation stage to guide maintenance through user feedback.

AFRICA HABITAT REVIEW 20(1) 2025

Interview insights confirm that feedback loops drive process refinement, timely issue resolution, and continuous improvement across design, construction, and operation. This strategic use of feedback loops is shown to elevate performance in AHP projects in Kenya.

The third objective was to establish the effect of adoption of feedback loops on the performance of affordable housing construction projects in Kenya. In summary, the adoption of feedback loops in Kenya's Affordable Housing Program (AHP) has significantly improved project performance, particularly in scope management, ensuring alignment with objectives. They enhance time management through real-time monitoring and allow for proactive adjustments to stay on schedule. Cost management is also strengthened by continuous expense tracking, while community participation benefits from increased engagement, leading to greater satisfaction. Overall, feedback loops are viewed as essential tools for continuous improvement in construction projects, enabling early issue identification and process refinement. Despite some concerns about delays or resource waste, their advantages clearly outweigh potential drawbacks, highlighting their importance in driving sustainable improvements in AHP projects.

The final objective was to formulate a framework for adopting feedback loops to enhance performance in affordable housing construction projects in Kenya. As shown in **Figure 1**, the framework for adopting feedback loops in Kenya's (AHP) aims to enhance performance through community engagement, effective management of scope, cost, and time, and ongoing improvement. It involves early community involvement for gathering needs and feedback, regular scope reviews, and detailed budgets with contingencies. Quality control and early design feedback minimize rework and variations, while continuous monitoring helps mitigate cost and time overruns. Open communication addresses public complaints, and real-time feedback systems facilitate proactive adjustments during construction. Lastly, fostering a culture of continuous improvement and regular performance evaluations ensures sustained project enhancements.

RECOMMENDATIONS

In order to increase the adoption of feedback loops to enhance performance in affordable housing construction projects in Kenya, the following recommendations can be made from this study;

i) Strengthen Community Engagement: Implement regular community meetings and feedback sessions throughout the project lifecycle to ensure that residents' needs and expectations are continuously integrated into project planning and execution. This aligns with the framework's emphasis on early community engagement and regular scope reviews.
ii) Training and Capacity Building: Provide training for project teams on the importance and implementation of feedback loops. Emphasize skills related to communication, problem-solving, and adaptability to foster a culture that values feedback. This supports the framework's focus on continuous improvement and iterative enhancements.
iii) Develop Clear Guidelines for Feedback Implementation: Create comprehensive guidelines for the adoption and use of feedback loops at every project stage, detailing specific processes for collecting, analyzing, and acting on feedback This aligns with the framework's structured approach to feedback loop adoption.
iv) Utilize Technology for Real-Time Feedback: Leverage digital tools and platforms to facilitate real-time feedback collection and monitoring during construction. This can enhance responsiveness to issues as they arise. This can enhance responsiveness to issues as they arise, supporting the framework's emphasis on real-time progress tracking.
v) Establish Metrics for Success: Develop key performance indicators (KPIs) to measure the effectiveness of feedback loops in project management. Regularly evaluate these metrics to identify areas for improvement and celebrate successes. This aligns with the framework's focus on continuous monitoring and evaluation.
vi) Encourage Cross-Disciplinary Collaboration: Foster collaboration between stakeholders, including contractors, community members, and local authorities, to ensure diverse perspectives are considered in the feedback process. This supports the framework's

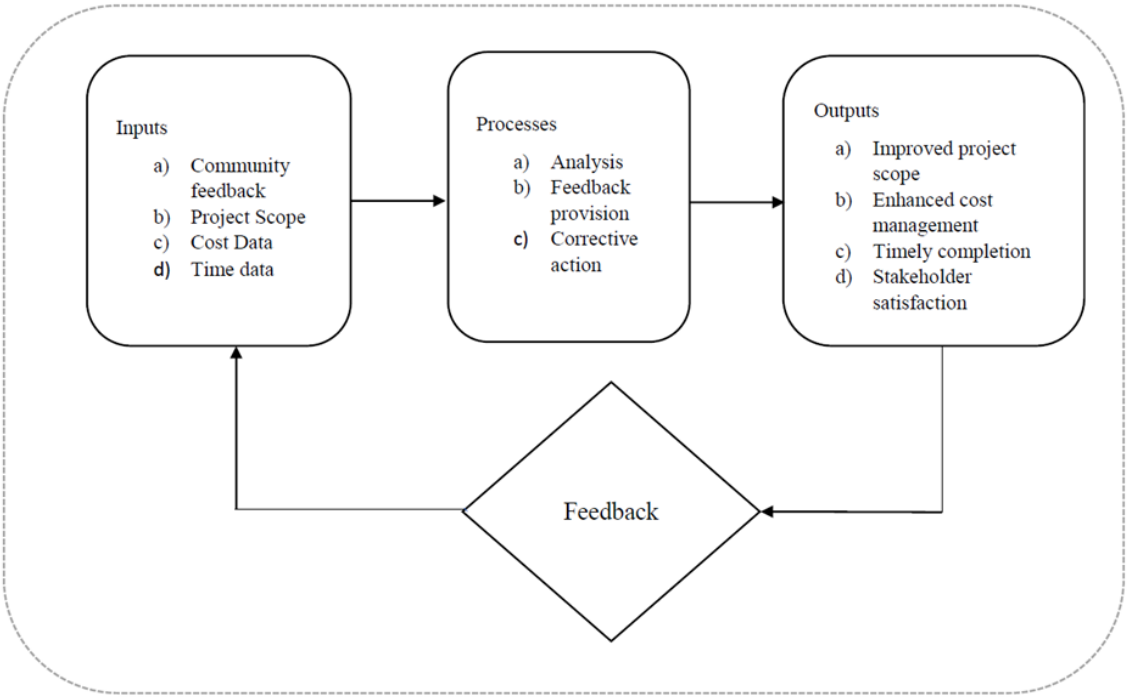

FIGURE 1
Proposed framework for adopting feedback loops to enhance performance in affordable construction projects
Source: Field survey, 2024

emphasis on stakeholder involvement.

vii) Implement Pilot Programs: Test the feedback loop framework in a few pilot projects to refine the approach and demonstrate its benefits, which can encourage broader adoption across future projects. This aligns with the framework's iterative approach to feedback loop implementation.

viii) Incorporate Feedback into Risk Management Plans: Ensure that feedback is integrated into risk management strategies to proactively address potential challenges and enhance project resilience. This supports the framework's focus on proactive adjustments and risk mitigation.

CITED REFERENCES

Anthony Baker, J. W. (2022). Feedback loops: Mapping transformative. *Digital Promise*. Retrieved from https://digitalpromise.org

Costa, D., & Lima, A. (2004). Performance measurement in construction: A conceptual framework. *Construction Management and Economics,* 22(1), 1-15.

Davis, P. (2009). Building capability in construction projects: A relational approach. *Engineering, Construction and Architectural Management, 16(5),* 459-472.

Faisal, A. (2015). Factors effecting performance of projects. *International Journal of Scientific and Engineering Research*, 6(3), 650–670.

Fitzgibbons, L. (2019). Implementing feedback loops in construction project management. *Construction Project Management Journal,* 1(1), 1–10.

Hive, T. (2023). The role of feedback loops in project management platforms. *Hive*. Retrieved from https://hive.com/blog

Kerzner, H. (2009). Project Management: A Systems Approach to Planning, Scheduling, and Controlling (10th ed.). Hoboken, NJ: John Wiley & Sons.

Kieti, J. (2020). *Affordable Housing Project Performance Report*. Nairobi: Government Printers.

KNBS. (2017). *Economic Survey 2017.* Nairobi: KNBS.

Lee, S., & Pena-Mora, F. (2017). Dynamic planning and control methodolody for strategic and operational construction project management. *Automation in Construction*, 75(1), 121-134.

Lehtinen, P., & Laitinen, J. (2021). Using feedback loops to improve construction project management. *Construction Management and Economics*, 39(4), 297-309.

Ling, F. (2004). The effectiveness of performance measurement in construction: A review of the literature. *Construction Management and Economics,* 22(2), 217-227.

Love, P., & Smith, J. (2000). Some empirica observations of service quality in construction. *Engineering Construction and Architectural Management,* 7(2), 191-201.

Love, P., Holt, G., & Shen, L. (2002). Using systems dynamics to better understand change and rework in construction project management systems. *International Journal of Proejct Management, 20(6),* 425-436.

Muriithi, N. (2003). Approaches to project management in africa: implications for international development projects. *International Journal of Project Management*, 21(5), 309-319.

Neely, A. (2002). *Business Performance Measurement: Unifying theories and integrating practice.* Cambridge, UK: Cambridge University Press.

Ochieng, E. (2010). managing cross-cultural communication in multicultural construction project teams: The case of Kenya and UK. *International Journal of Project Management, 28(5),* 449-460.

Ogunsemi, J. (2006). Time Cost Model for building projects in Nigeria. *Construction Managment and Economics*, 24(1), 40–58.

Olawale, A. (2010). Cost and time control of construction projects. *International Journal of Project Management,* 28(5), 487-497.

Takim, R. (2002). Performance indicators for successful construction project performance. *Journal of Construction Management and Economics,* 20(6), 546-557.

Takim, R., & Parsa, A. (2003). Performance measurement in construction: A review of frameworks. *Journal of Construction Management*, 21(3), 235-247.

Turner, J. (2012). Forecasting for projects: A review of the Literature. *International Journal of Project Management,* 30(4), 391-402.

Wells, J. (2001). *Construction and Development: A Global Perspective.* London: Routledge.

World Bank. (2020). *Affordable Housing in Kenya: Current Status and Future Opportunities. Washington, DC*: World bank group.