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Performance of Mortgage-Financed Construction Projects in Kenya:
Empirical Evidence from Developers

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Abstract

Mortgage-financed construction projects (MFCPs) in Kenya are widely perceived to underperform, yet empirical evidence specific to mortgage-financed delivery remains scarce. This study evaluates MFCP performance across five indicators, cost, schedule, quality, safety, and cash flow, using a cross-sectional survey of 171 developers drawn from 1,063 mortgages initiated in FY 2021/2022. Results show 67.5% of projects exceed budgets (mean overrun 9.9%) and 65% are behind schedule (mean overrun 9.4%); 59.3% meet quality expectations with a mean rework cost of 6.1%; nearly 18% report serious safety incidents; and cash-flow constraints are moderate on average. These findings substantiate a persistent performance gap in mortgage-backed delivery relative to benchmarks in the wider construction sector. Practically, the study recommends performance-based lender monitoring, targeted products for the "missing middle" (KSh 21–100M), and developer investment in digital cost/schedule control and safety/quality training. Policy-wise, results inform the Affordable Housing Programme by linking financing models to delivery risks. Originality lies in isolating MFCPs as a distinct financing modality and quantifying their KPI profile to guide lenders, regulators, and developers.

Keywords: Construction project performance; mortgage finance; cost and schedule overruns; quality and safety; cash-flow management; affordable housing; survey research; Kenya

INTRODUCTION

Anecdotal evidence has associated Mortgage-financed construction projects in Kenya (MFCPs) with dismal performance, even though such performance has not been empirically assessed. These projects have been riddled with cost and schedule overruns, among other challenges. A number of studies have been carried out to generally evaluate the performance of construction projects with no particular focus on the mode of financing, despite it being a critical aspect in project delivery (Kuria, 2019; Muthuri & Tumuti, 2019; Ndavi, 2019; and Onchoke, 2012). According to Musyoka et al. (2017), schedule and cost overruns have been the norm rather than the exception. Malala (2015), found out that 88% of projects in the Kikuyu constituency suffered delays, 12% of the projects were on time, while no project (0%) was ahead of schedule. Mue (2015) reported schedule overruns of 33.3%. According to Ongòndo et al. (2019), on average, 35-73% of construction projects in Kenya overrun their schedule. In another study, Lukale (2018) reported cost overruns of up to 24.92%. There is also further evidence that the time and cost performance of projects is to the extent that over 70% of projects initiated are likely to escalate with time by more than 50% and over 50% of projects are likely to escalate in cost by more than 20% (Nyangilo, 2012). Unlike the previous studies which focus generally on construction projects, this research is focused on evaluating the performance of MFCPs. While Kenyan studies document chronic overruns in public and privately financed projects, evidence specific to mortgage-financed delivery is limited, despite mortgages shaping disbursement cadence, risk exposure, and cash-flow dynamics. This study addresses that gap by: (i) profiling MFCPs and developer/project characteristics; (ii) measuring MFCP

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performance on cost, schedule, quality, safety, and cash flow; and (iii) deriving implications for developers, lenders, and regulators to improve delivery under mortgage financing.

THEORY

Construction Project Performance

Project success can be defined as the achievement of project-specific goals. As a result, a successful project is one that has met its technical and other objectives. The construction industry usually makes use of performance parameters in the form of key performance indicators (KPIs) to evaluate the project's performance (Project Management Institute, 2017). Often, project success and outcome depend on the primary parameters of cost, quality, time, and health and safety. These parameters are principal factors to project success. It is instructive to note that the performance of these parameters is related to each other; for instance, quality failures may result in time and cost overruns. These performance parameters are supported by other key performance indicators such as client satisfaction-product, client satisfaction-service, profitability, and productivity.

The number of KPIs used to evaluate construction project performance vary from author to author. Meshram et al. (2020) established the following KPIs; time, cost, safety, quality, productivity, satisfaction, people, knowledge, service, risk management, and legal. For every indicator, the authors provided a list of measurable variables to determine project performance. Wandiri and James (2020), Onchoke (2012), and Ndavi (2019) used time, cost, and quality to determine project performances in their studies while Ashley et al. (1987) added safety as the fourth measurable indicator. Luvuga and Ngari (2019) relied on time, cost, quality, customer fulfilment, customer changes, business execution, and well-being and security while Silva et al. (2016) used cost, time, quality, safety, cashflow management, environmental performance, client satisfaction, employee satisfaction, profitability, and learning and development. **Table 1** presents a summary of these indicators from various researchers arranged chronologically. Notably, over the years, the indicators used to evaluate construction project performance have not changed much. We posit a financing–operations–performance pathway in MFCPs: mortgage financing structures

TABLE 1
Compilation of KPIs of construction project performance

Author	Key Performance Indicators
(Ashley et al., 1987)	Cost, schedule, quality, and safety
(Onchoke, 2012)	Time, cost, quality
(Gunathilaka et al., 2013)	Budget/finance/cost performance, schedule performance, technical performance, stakeholder satisfaction, customer satisfaction, time performance, user satisfaction, quality performance, and productivity/ efficiency
(Silva et al., 2016)	Cost, quality, time, safety, cashflow management, environmental performance, client satisfaction, employee satisfaction, profitability, and learning and development
(Ndavi, 2019)	Time, cost, quality
(Kuria, 2019)	Time, budget, scope
(Muthuri & Tumuti, 2019)	Time, cost
(Luvuga & Ngari, 2019)	Time, cost, quality, customer fulfilment, customer changes, business execution, well-being and security
(Wandiri & James, 2020)	Time, cost, quality
(Meshram et al., 2020)	Time, cost, safety, quality, productivity, satisfaction, people, knowledge, service, risk management, legal

Source: Author's analysis (2025)

(disbursement timing, collateralisation, eligibility) condition cash-flow cadence and risk allocation, which shape planning, procurement, supervision, and safety/quality controls, ultimately determining KPI outcomes in cost, time, quality, safety, and cash flow. The survey instrument operationalises these KPIs with standard categorical and percentage measures, enabling direct comparison to prior project-performance studies while isolating the mortgage-finance context.

Table 1 summarizes key performance indicators (KPIs) commonly used by scholars to evaluate construction project success across studies, highlighting the evolution from traditional cost–time–quality metrics to multidimensional performance frameworks integrating stakeholder satisfaction, safety, and sustainability.

Time, cost, and quality remain the undisputed conventional mandatory indicators of project performance. However, among the sampled studies, safety was the next most commonly used indicator. Additionally, cash flow management was found to be the next most relevant indicator for this study, given its focus on the mode of financing and its implications on the performance of construction projects. Therefore, this study relies on these five KPIs to establish the level of project performance; cost, quality, time, safety, and cash flow management. They represent measures of project success both as a product and the process of delivering the project. They have been discussed further in the following sections.

Performance of Construction Projects in Kenya

The performance of projects in Kenya over the years has been abysmal. Munano (2012) noted that most public sector projects are not finished on schedule. For instance, the Kenyan government's project completion rates for the four years leading up to the 2010–2011 fiscal years were, in order, 37.97%, 47.53%, 33.14%, and 21.88%. This indicates a 35.6% average completion rate. According to Mbawi and Muchelule (2015), over 50% of the started projects experience cost overruns, indicating that public university initiatives perform poorly when it comes to cost. Additionally, according to Malala (2015), as of 2014, 88% of CDF Projects in the Kikuyu Constituency were behind schedule. Only 12% of the projects were completed on time, while 0% were completed ahead of schedule. All of the CDF construction projects in this constituency received unsatisfactory ratings overall, which made their performance inadequate.

In a survey conducted on projects funded by state departments, it was established that such projects were characterized by time and cost overruns, failure to meet end-user expectations, inefficiency and ineffectiveness, wastage, and poor quality (Ndagi, 2019). Another research by Ongòndo et al. (2019) appraised the performance trends of building projects in Kenya since the country's independence through a review of the literature spanning between 1963 and 2018. This descriptive study drew on existing research from the past. According to the analysis, the project performance is generally subpar and has taken on a chronic course that spans more than 50 years. The results show that, on average, 35–60% of projects started in Kenya experience cost overruns, with time overruns accounting for the majority of severe cases; 35–73% of projects go over budget.

RESEARCH METHODS

Research Design

This study adopts the cross-sectional survey research design described by Bryman (2012) and Creswell and Plano Clark (2017). This design was selected due to its ability to allow for the generalizability of research findings countrywide. Bryman (2012) describes a cross-sectional survey in which multiple cases are measured at a single point in time by measuring quantifiable data with the aim of identifying patterns of association. The aim of studying multiple cases is to enable the detection of variations among the selected cases, while the single-point time perspective provides meaning to the comparisons of the multiple cases. The advantage of data quantification is that it provides a consistent benchmark to the researcher and at the same time makes it is possible to understand relationships between variables (Bryman, 2012).

Sampling Methods and Sample Size

In this study, the population included all construction projects financed through mortgages throughout the country. This study focuses on the 1,063 mortgages initiated during the 2021/2022 financial year, as per the annual banking report by the Central Bank of Kenya (2023).

The sample size was calculated based on the

following formulae from Cochran (1977) and Baartt et al. (2001).

$$n_o = \frac{t^2 \times s^2}{e^2}$$

Where: -

- n_0= required return sample size
- t = alpha level value (0.01 = 2.576 for sample size of 120 or more; the alpha level of .01 indicates the level of risk the researcher is willing to take that true margin of error may exceed the acceptable margin of error.) 2.576 is the z-score for a 99% confidence interval.
- s = estimated standard deviation in population for 7-point scale (1.167; estimate of variance deviation for 7-point scale calculated by using 7 [inclusive range of scale] divided by 6 [number of standard deviations that include almost all (approximately 98%) of the possible values in the range])
- e = acceptable level of error for the mean being estimated (0.21; number of points on primary scale × acceptable margin of error; points on primary scale = 7; acceptable margin of error = .03 [error researcher is willing to except])

Therefore;

$$n_o = \frac{2.576^2 \times 1.167^2}{0.21^2} = 205$$

However, since this sample size exceeds 5% of the population (1,063×5%=53), the following Cochran's (1977) correction formula should be used to estimate the final sample size.

$$n_f = \frac{n_0}{1 + \frac{n_0}{population}} = \frac{205}{1 + \frac{205}{1063}} = 171\ projects$$

Where;

- n_f = final sample size
- n_0 = original sample size
- Population = target population

This study adopts simple random sampling as its choice of selecting the sample size from the population. According to Kothari (2004), this sampling method is also known as chance sampling or probability sampling because each item in the population has an equal chance of being included in the sample and each of the possible samples, in the case of a finite universe, has the same probability of being chosen. An ideal sample is one that meets the requirements of efficiency, representativeness, dependability, and adaptability.

Data Collection

Upon approval of the research proposal by the JKUAT Graduate School, the researcher sought permit from the National Commission for Science and Technology and Innovation (NACOSTI) to collect field data. According to Creswell (2003), structured interviews and questionnaires are the two most common research methods associated with survey research design. The former was adopted in this study as the method of collecting data. The measured indicators were derived from previous literature and refined so that they would be appropriate for the respondents but also generate enough data for hypothesis testing. The questionnaires were self-administered, and the majority of the questions were closed-ended. This made the collected data easily compatible with statistical analysis, which is the preferred method of data analysis in this study.

Data Analysis

The quantitative data was subjected to descriptive analysis using SPSS software. Descriptive statistics were used mostly to describe the distribution of variables. Measures of frequency (percent, count), measures of central tendency (mean), measures of variation/dispersion (range, kurtosis, skewness, standard deviation, variance) were among the descriptive statistics that were performed. While the majority of these metrics were used to examine data obtained for the various variables, kurtosis and skewness were employed to determine whether the data distribution was normal.

Validity and Reliability

To ensure the questionnaire's validity, expert reviews were conducted to establish face and content validity. Five experts, including three from academia (thesis supervisors) and two from the industry, all with a combined experience of 112 years, gave suggestions on how to improve the data collection instrument. Further, a pilot test was performed with a subset of the target audience to identify issues. In addition, factor analysis was used to confirm that the questionnaire measured the intended construct. To ensure questionnaire reliability, clear and unambiguous questions were

used. Additionally, a pilot test was also conducted. Internal consistency (Cronbach's Alpha) was used to test the reliability, whereby all the constructs achieved values exceeding 0.7, as recommended by Creswell (2003). Minor revisions were done following suggestions from the experts and the pilot study participants.

Ethical Considerations

All professions are governed by a code of ethics that has changed over time to reflect the evolving ethos, values, requirements, and expectations of people involved in the professions. The research process is no different. According to Saunders et al. (2007), ethics in research is defined as a researcher's behaviour toward research participants or persons affected by the research. Silverman (2006) on the other hand, feels that ethics should include rules or concepts relevant to effective professional activity. The following ethical issues were observed while carrying out this investigation. At the onset of the questionnaire administration, informed consent was obtained from each respondent. The respondents were also made aware of how long it would take to fill the questionnaire. Further, data collected from the respondents was treated with utmost confidentiality and was used for academic purposes only. The researcher also ensured that no harm befell the respondents during the data collection exercise. Finally, the researcher ensured correct and unbiased reporting of the findings as advised by Kumar (2011). Approval was secured from both the Jomo Kenyatta University of Agriculture and Technology (JKUAT) Graduate School and the National Commission for Science, Technology and Innovation (NACOSTI).

RESULTS

This section presents the empirical findings of the study based on data collected from developers engaged in MFCPs in Kenya. The results are structured into two main categories: background information about the respondents and their project characteristics, and the performance of MFCPs across five key indicators: budget adherence, schedule adherence, quality, safety, and cash flow.

The respondent and project profiles are presented factually across five domains: education level, professional background, type of project, project value, and project duration. Distributions are reported using frequencies, percentages, means, and ranges only, with no interpretation. Visual summaries include a bar chart for education, a word cloud for professions, and bar charts for project type, value bands, and duration bands.

Background Information

Five aspects of background information were considered in the data collection tool. These were: level of education, professional background, type of project, project value, and project duration. Their results have been presented in the following sections.

Level of Education

Results presented in **Figure 1** showed that 52.5% (n=64) of the respondents had a Bachelor's degree while 36.1% (n=44) had a Master's degree. Together, these two categories account for 108 out of 122 respondents (approximately 89%). This suggests that the sector is largely comprised of highly educated professionals. This could be attributed to the fact that most financial institutions prefer to give mortgages to salaried individuals who tend to be educated professionals. 5.7% (n=7) had a Diploma while only 3.3% (n=4) were PhD holders. The low number of Doctorates was expected, given that only a small percentage (probably only those in academia) of professionals advance beyond master's degree. The least represented group was the post-secondary certificate holders, 2.4% (n=3).

Professional Background

Given the expected diverse backgrounds of the respondents (developers), the question on their professional background was framed in an open-ended format. The results have been presented in the form of a word cloud as demonstrated in **Figure 2**. A significant proportion of respondents have backgrounds in construction-related disciplines. These included Construction Management, Civil Engineering, Quantity Surveying, Structural Engineering, Architecture, and Mechanical Engineering, among others. A number of developers come from finance and banking backgrounds. This is expected since bank officials are well exposed to the various mortgage financing options available in the market. As expected, the range of professions was very wide as demonstrated in **Figure 2**.

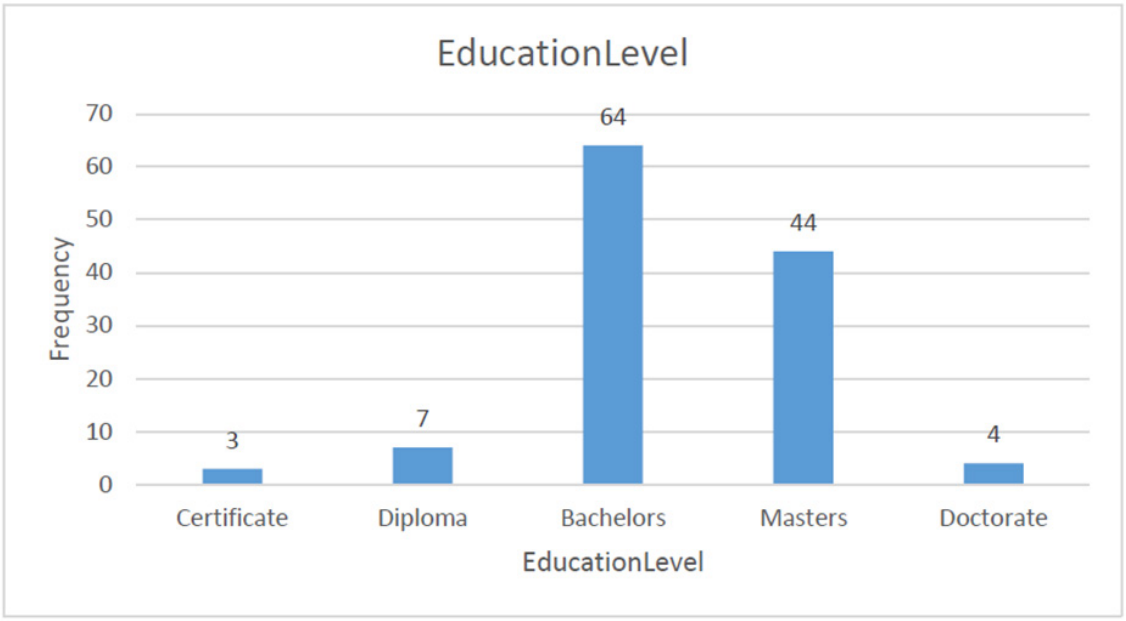

FIGURE 1
Level of education
Source: Author's analysis (2025)

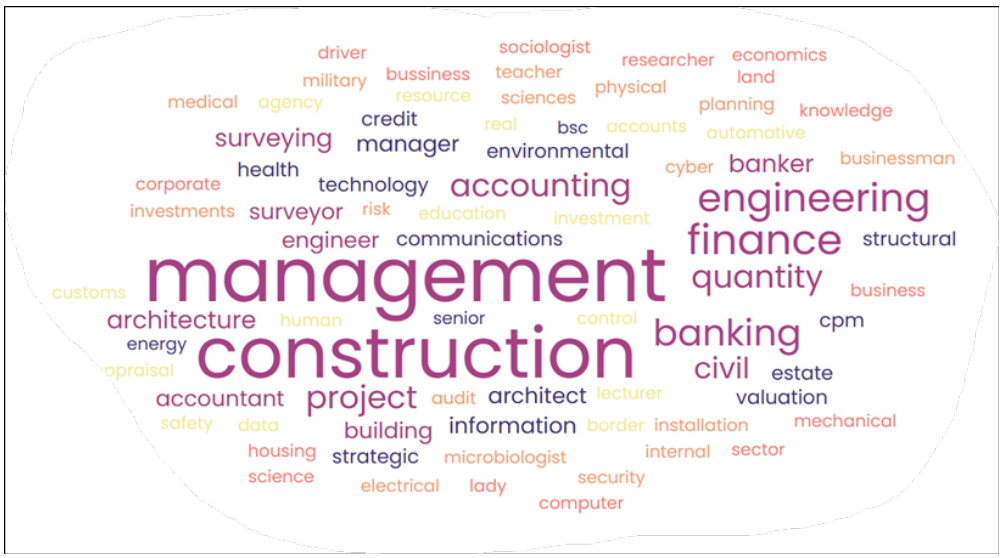

FIGURE 2
Professional background
Source: Author's analysis (2025)

Type of Projects

The respondents were asked to indicate the type of project they were currently undergoing, and which was mortgage-financed. Results presented in **Figure 3** showed that residential houses were the most commonly mortgage-financed with a frequency of 68.3% (n=82). They were followed distantly mixed-use development 13.3% (n=16) and commercial buildings 11.7% (n=14). Office buildings and industrial houses were the least mortgage-financed types of construction projects, each with a frequency of 3.3% (n=4).

Project Value

The respondents were asked to indicate the value of the construction project they were currently

undertaking. **Figure 4** presents interesting results where the extremes recorded the highest frequencies. The results assumed an inverted bell curve. The majority of the construction projects (n=62, 51.2%) undertaken had a value of "up to 20 million" Kenyan shillings, followed by those with a value of "above 120 million" Kenyan shillings (n=32, 26.4%). Projects worth KShs. 81 – 100 million had a frequency of 9.1% (n=11) while those worth KShs. 21 – 40 million had a frequency of 8.3% (n=10). Projects worth KShs. 41 – 60 million and KShs. 61 – 80 both came last with a frequency of 2.5% (n=3).

Project Duration

The project duration was measured in weeks. This

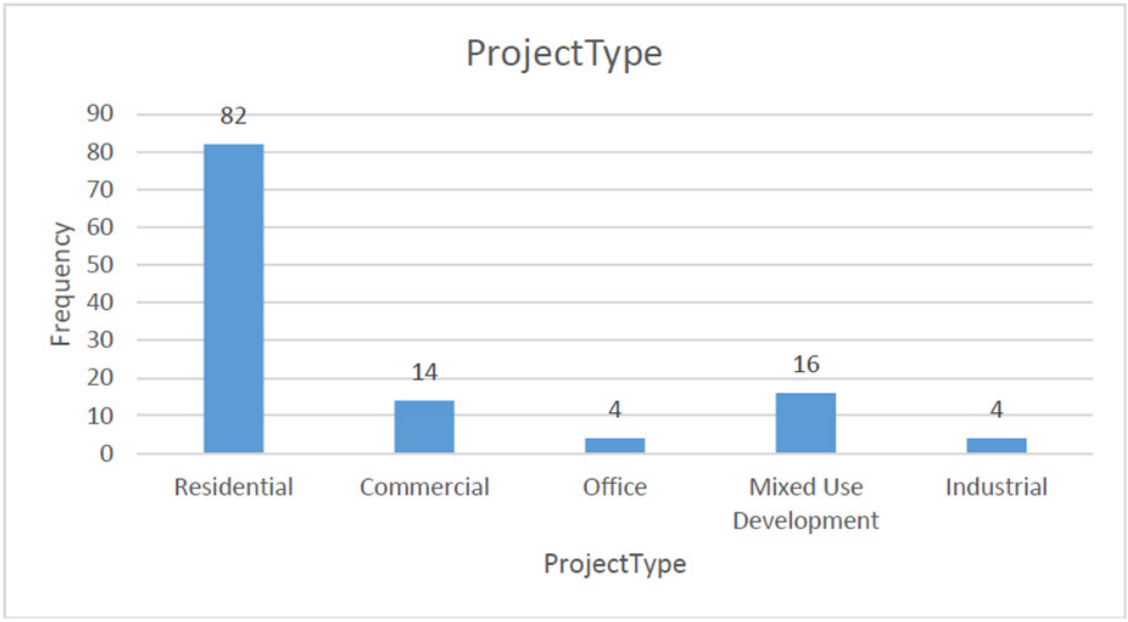

FIGURE 3
Type of project
Source: Author's analysis (2025)

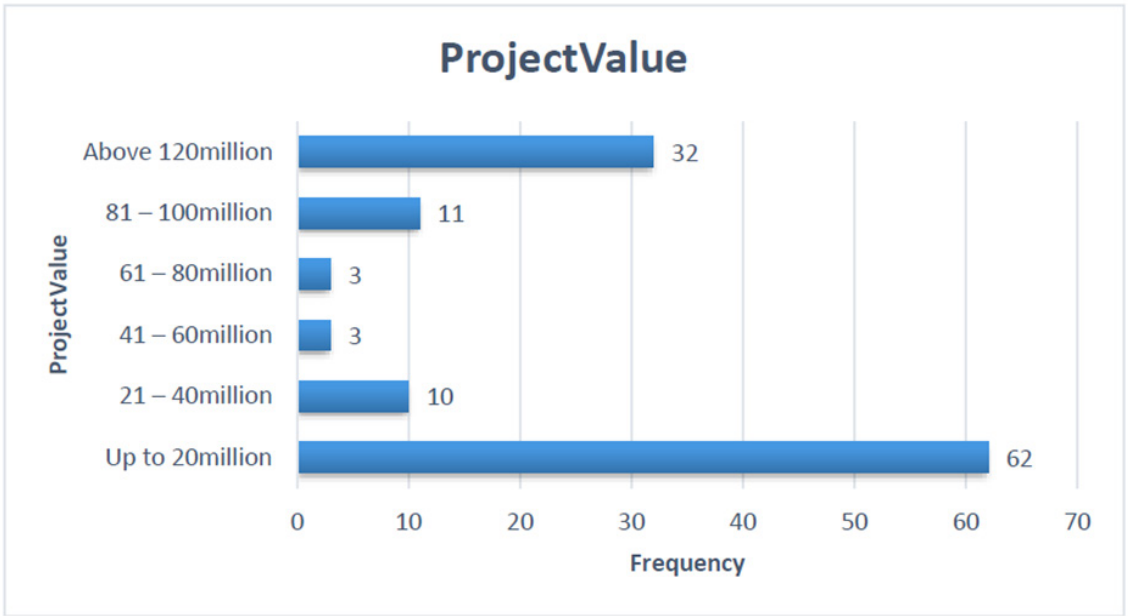

FIGURE 4
Project value
Source: Author's analysis (2025)

was done based on intervals of 12 weeks. Results in **Figure 5** showed a fair distribution across all groups. Projects with a duration of "above 72 weeks" were the most with a frequency of 24.8% (n=30). Projects with a duration of "61-72 weeks" had the least representation with a frequency of 5.0% (n=6). Short-duration projects of "less than 12 weeks" had a frequency of 9.1% (n=11).

Current Performance of MFCPs

Five aspects were used to evaluate the performance of MFCPs. These were: budget adherence, schedule adherence, project quality, safety standards, and project cash flow. The results have been presented in the following sections.

Budget Adherence

Respondents were asked to what extent the project was currently adhering to the set budget. Seven options were presented to them, ranging from "extremely above budget" to "extremely under budget". As presented on **Table 2(a)**, the largest group, 52.8%, reported being slightly above budget. This suggests that while many projects exceed their budgets, the overruns are generally modest. Combining all categories above budget (extremely, moderately, and slightly above) accounts for 67.5% of projects. This indicates that two-thirds of projects experience cost overruns, which can impact financing costs. About 26.8% (n=33) of projects are reported as on budget,

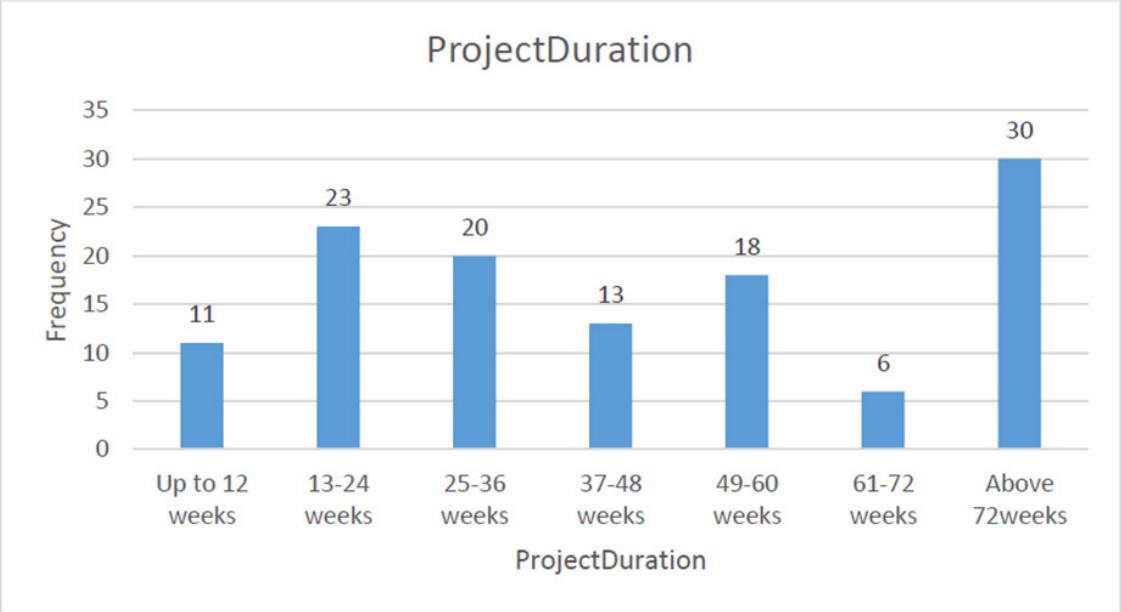

FIGURE 5
Project duration
Source: Author's analysis (2025)

TABLE 2(a)
Budget Adherence (Frequencies)

Budget Adherence	Frequency	Percent	Valid Percent	Cumulative Percent
Extremely above Budget	4	3.3	3.3	3.3
Moderately above budget	14	11.4	11.4	14.6
Slightly above budget	65	52.8	52.8	67.5
On budget	33	26.8	26.8	94.3
Slightly under budget	6	4.9	4.9	99.2
Moderately under budget	1	.8	.8	100.0

Source: Author's analysis (2025)

reflecting effective cost control in a quarter of the cases. A small minority (5.7%, n=7) are under budget, which may indicate efficient management or conservative budgeting.

According to further results presented on **Table 2(b)**, a mean of 3.21 was obtained, indicating that on average, MFCPs are run "slightly above budget." This suggests that while most of these projects aren't severely over budget, they consistently experience minor budget overruns. The coefficient of variation (CV) was calculated as the ratio of the standard deviation to the mean expressed as a percentage. It is a measure of the data's relative variability. A lower CV suggests data points are clustered closer to the mean, while a higher CV indicates greater dispersion. Various authors (Frost, 2025; Lewontin, 1966; Pélabon et al., 2020; Sammarco et al., 2006) have no consensus on the CV thresholds, but argue that it is a tool for comparing the variability of data among variables. A CV of 27% reflects moderate relative variability in budget adherence across projects, suggesting moderate consensus among projects.

Further, the questionnaire sought to quantify the extent of cost overruns being experienced in MFCPs. The purpose of this was to get a relatively more objective measure of the extent of budget adherence. The results are presented in **Figure 6**. 36.6% (n=45) of the projects had a cost overrun of 6-10% while 26.8% (n=33) had a cost overrun of 0-5%. Furthermore, 18.7% (n=23) of the projects had a cost overrun of 11-15% while 7.3% (n=9) had a cost overrun of 16-20%. Additionally, 4.9% (n=6) of the projects had a cost overrun of 21-25% while 4.1% (n=5) had a cost overrun exceeding 30%. Only 2 projects (1.6%) had a cost overrun of 26-30%. The mean cost overrun for MFCPs was established to be 9.9%. This corroborates the findings on budget adherence that most MFCPs in Kenya exceed their budgets slightly, with a significant majority experiencing some level of cost overrun.

Schedule Adherence

Respondents were asked to what extent the project was currently adhering to the initial schedule. Seven options were presented to them, ranging

TABLE 2(b)
Budget Adherence (Mean)

Variable	N	Min	Max	Mean	SD	CV
Budget Adherence	123	1	6	3.21	.861	27%

Source: Author's analysis (2025)

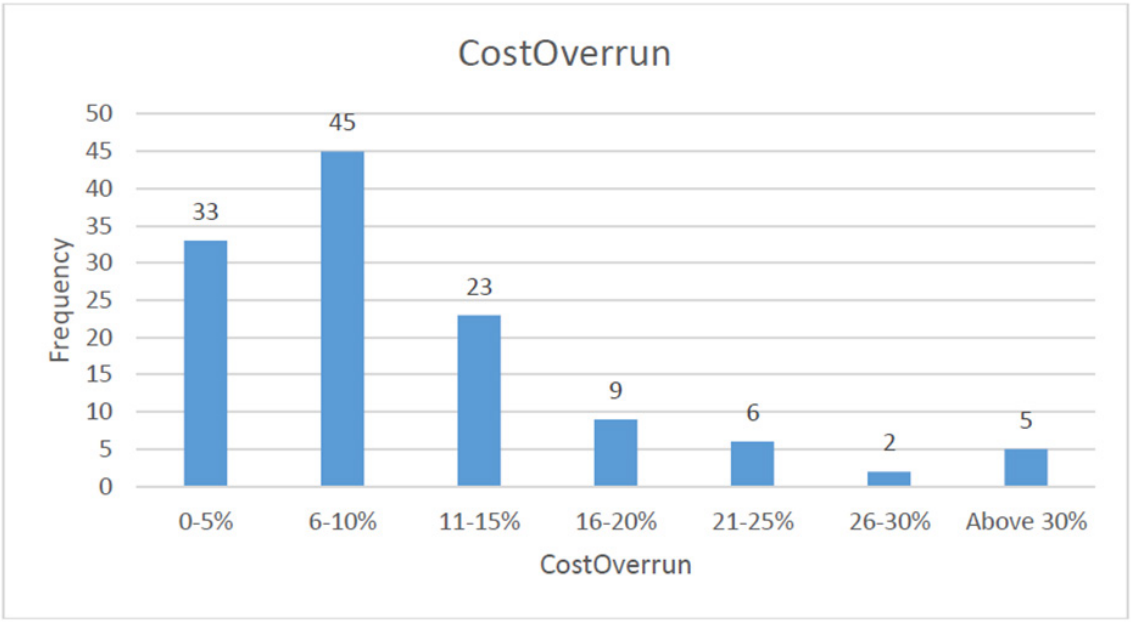

FIGURE 6
Cost Overruns of MFCPs
Source: Author's analysis (2025)

from "extremely behind schedule" to "extremely ahead of schedule". As presented on **Table 2(c)**, 65% of projects (4.9% "extremely" + 14.6% "moderately" + 45.5% "slightly") were behind schedule, with nearly half (45.5%) reporting slight delays. Only 30.1% are on schedule, and a mere 4.9% are slightly ahead. 19.5% of projects (4.9% "extremely" + 14.6% "moderately behind") face significant delays, which can jeopardize stakeholder confidence and financial viability. Slight delays (45.5%) may stem from manageable issues such as weather disruptions or minor administrative bottlenecks. These are often mitigated through contingency planning. Severe delays (19.5%) likely reflect systemic challenges, such as poor contractor performance, design changes, or funding gaps.

According to further results presented on **Table 2(d)**, a mean of 3.15 was obtained, indicating that on average, MFCPs are run "slightly behind schedule." The data indicates that schedule adherence is a significant challenge for mortgage-financed projects in Kenya, with the majority experiencing minor to severe delays. Resolving these difficulties necessitates enhanced planning, risk management, and collaboration to conform to global best practices and local conditions.

A CV value of 29% shows moderate relative variability, suggesting that while many projects hover around on schedule, a notable proportion are either behind or slightly ahead. This variability reflects the inherent uncertainties and challenges in construction scheduling, such as weather, supply chain disruptions, and labour issues (Ikhsan et al., 2025).

Further, the questionnaire sought to quantify the extent of time overruns being experienced in MFCPs. The purpose of this was to get a relatively more objective measure of the extent of schedule adherence. The results are presented in **Figure 7**. 35.5% (n=43) of the projects had a time overrun of 0-5%, while 29.8% (n=36) had a time overrun of 6-10%. This suggests that for the majority, delays are relatively minor and potentially manageable within project contingencies. Furthermore, 17.4% (n=21) of the projects had a time overrun of 11-15% while 8.3% (n=10) had a time overrun of 16-20%. Additionally, 5.0% (n=6) of the projects had a time overrun exceeding 30% while 2.5% (n=3) had a time overrun of 21-25%. Only 2 projects (1.7%) had a time overrun of 26-30%. The mean time overrun for MFCPs in Kenya was established to be 9.4%.

Project Quality

Respondents were asked to rate the extent to which the project was meeting the expected quality. Seven options were presented to them, ranging from "not acceptable" to "exceeded expectations".

TABLE 2(c)
Schedule Adherence (Frequencies)

Schedule Adherence	Frequency	Percent	Valid Percent	Cumulative Percent
Extremely behind schedule	6	4.9	4.9	4.9
Moderately behind schedule	18	14.6	14.6	19.5
Slightly behind schedule	56	45.5	45.5	65.0
On schedule	37	30.1	30.1	95.1
Slightly ahead of schedule	6	4.9	4.9	100.0

Source: Author's analysis (2025)

TABLE 2(d)
Schedule Adherence (Mean)

Variable	N	Min	Max	Mean	SD	CV
Schedule Adherence	123	1	5	3.15	.906	29%

Source: Author's analysis (2025)

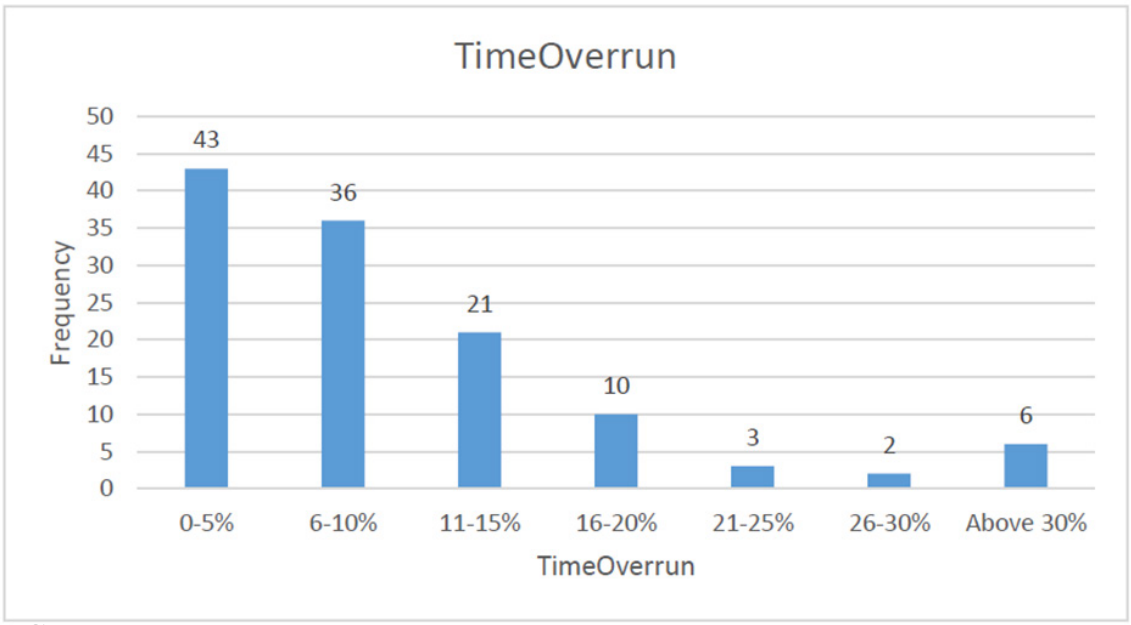

FIGURE 7
Time Overruns of MFCPs
Source: Author's analysis (2025)

As seen on **Table 3(a)**, a significant majority, 59.3%, report that their projects are meeting quality expectations. An additional 16.3% (11.4% "slightly above" + 4.9% "exceeded") indicates that projects are performing above expectations. This suggests a generally positive perception of quality standards in MFCPs in Kenya. Meeting or exceeding quality expectations is critical for client satisfaction, regulatory compliance, and long-term asset value (S. K. Mbatha et al., 2022).

About 24.4% of projects fall below expectations (1.6% "significantly below" + 4.1% "moderately below" + 18.7% "slightly below"). This sizeable minority highlights challenges in maintaining consistent quality across all MFCPs. Causes of quality shortfalls may include inadequate materials, poor workmanship, insufficient supervision, or budget constraints (C. Mongina & Moronge, 2021). Quality deficiencies can lead to costly rework, delays, and reduced market confidence.

Further results presented on **Table 3(b)**, indicate a mean of 4.89 was obtained, indicating that, on average, MFCPs are "slightly below expectations" but tending towards "meeting expectations". The data reveal that although the majority of MFCPs in Kenya meet or exceed quality standards, a notable minority encounter quality deficiencies. This highlights the necessity for improved quality management techniques, more robust regulatory

TABLE 3(a)
Quality Expectations (Frequencies)

Extent of Quality Expectations	Frequency	Percent	Valid Percent	Cumulative Percent
Significantly below expectations	2	1.6	1.6	1.6
Moderately below expectations	5	4.1	4.1	5.7
Slightly below expectations	23	18.7	18.7	24.4
Meeting expectations	73	59.3	59.3	83.7
Slightly above expectations	14	11.4	11.4	95.1
Exceeded expectations	6	4.9	4.9	100.0

Source: Author's analysis (2025)

TABLE 3(b)
Quality Expectations (Mean)

Variable	N	Min	Max	Mean	SD	CV
Quality Expectations	123	2	7	4.89	.895	18%

Source: Author's analysis (2025)

monitoring, and ongoing skills development to guarantee the consistent provision of high-quality building results. A CV value of 18% revealed relatively low variability of the data, suggesting moderate consensus among respondents.

Further, the questionnaire sought to quantify the percentage of the total work completed that had required rework. This was interpreted as the estimated cost increase incurred due to rework on the MFCP as a percentage of the total project cost. The results are shown in **Figure 8**. The data corroborates the findings on quality expectation, that while most mortgage-financed construction projects in Kenya meet or exceed quality expectations, a notable minority experience quality shortfalls. The majority of the projects (n=105, 85.4%) had a rework cost of between 0% and 10%. 64.2% (n=79) of the projects had a rework cost of 0-5%, while 21.1% (n=26) had a rework cost of 6-10%. Furthermore, 5.7% (n=7) of the projects had a time overrun of 16-20% while 4.0% (n=5) had a rework cost of 11-15%. Only 4.8% (n=6) of the projects had a rework cost exceeding 20%. The mean rework cost for MFCPs in Kenya was established to be 6.1%.

Project Safety Standards

Respondents were asked to describe the seriousness of the safety incidents and accidents reported in the project. Seven options were presented to them, ranging from "extremely high" to "extremely low". As seen on **Table 4(a)**, the majority of respondents (61.0%) reported safety incidents as Low, Very Low, or Extremely Low in seriousness (23.6% + 14.6% + 22.8%). About 17.9% reported incidents as High or above seriousness (5.7% extremely high + 5.7% very high + 6.5% high). The remaining 21.1% rated incidents as Moderate in seriousness. The data suggests that while most projects experience safety incidents that are not severe, a notable minority (nearly 18%) face serious safety issues. This distribution is consistent with global construction industry trends, where minor incidents are common, but serious accidents, though less frequent, have significant

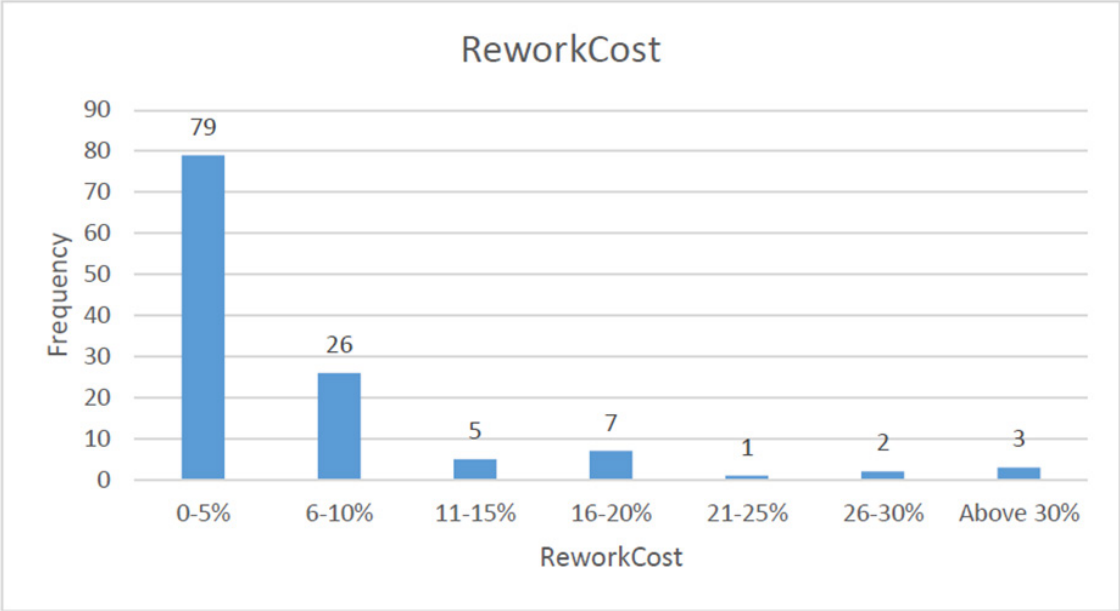

FIGURE 8
Rework Cost of MFCPs
Source: Author's analysis (2025)

TABLE 4(a)
Safety Standards (Frequencies)

	Frequency	Percent	Valid Percent	Cumulative Percent
Extremely High	7	5.7	5.7	5.7
Very High	7	5.7	5.7	11.4
High	8	6.5	6.5	17.9
Moderate	26	21.1	21.1	39.0
Low	29	23.6	23.6	62.6
Very Low	18	14.6	14.6	77.2
Extremely Low	28	22.8	22.8	100.0

Source: Author's analysis (2025)

consequences (Acheampong et al., 2025; Odunlami & Kukoyi, 2025; Purushothaman, Rotimi, et al., 2025). The presence of severe incidents signals the need for improved safety management, training, and enforcement of safety protocols (Kadiri et al., 2024; Oke et al., 2024). Construction sites in Kenya often face challenges such as inadequate safety training, limited use of personal protective equipment (PPE), and enforcement gaps (Omondi & Kinoti, 2020). Economic pressures and informal labour practices may contribute to higher-risk environments, increasing the likelihood of serious incidents (ILO, 2022).

According to further results on **Table 4(b)**, a mean of 4.86 was obtained, indicating that on average, MFCPs experience a "moderate" level of seriousness in the safety incidents and accidents. The data shows that while the majority of mortgage-financed construction projects in Kenya report low severity of safety incidents, a significant minority experience serious accidents that could threaten worker wellbeing and project continuity. Addressing these issues requires a multi-faceted approach involving training, enforcement, resource allocation, and cultural change to foster safer construction environments. A CV value of 35% revealed relatively high variability of the data, which was also supported by the high range (1-7) among the responses. This indicated a relatively low consensus among respondents on the seriousness of safety incidents experienced in their projects.

Further, the researcher sought to quantify the percentage of workers consistently using the required PPEs. The results are shown in **Figure 9**. The data was fairly distributed, indicating that in some cases there was very low compliance where only a handful of workers wore PPEs, and in other cases there was high compliance where almost all workers wore the required PPEs. The data reveals a wide variability in PPE compliance, with a substantial portion of projects at risk due to low PPE usage. This further supports the variability noted in the previous section regarding quality expectations.

Project Cashflow

Respondents were asked to indicate the extent to which they experienced cash flow problems during the project. Seven options were presented to them, ranging from "extremely high" to "extremely low". Results on **Table 5(a)** show that moderate cash flow problems were the most common, reported by 41% (n=50) of respondents. High or greater (High, Very High, Extremely High) cash flow problems affect 23.8% of projects. Low or less (Low, Very Low, Extremely Low) cash flow problems are reported by 35.3% of projects.

TABLE 4(b)
Safety Standards (Mean)

Variable	N	Min	Max	Mean	SD	CV
Quality Expectations	123	1	7	4.86	1.719	35%

Source: Author's analysis (2025)

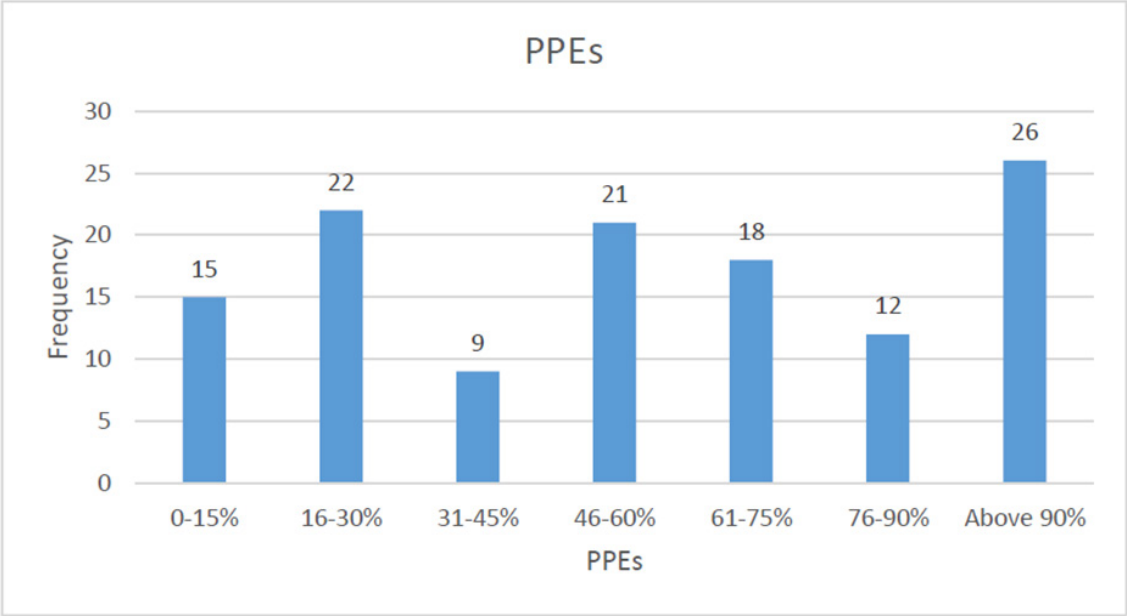

FIGURE 9
Number of Workers with PPEs
Source: Author's analysis (2025)

TABLE 5(a)
Extent of Cash Flow Problems (Frequencies)

Extent of Cash Flow Problems	Frequency	Percent	Valid Percent	Cumulative Percent
Extremely High	5	4.1	4.1	4.1
Very High	5	4.1	4.1	8.2
High	19	15.4	15.6	23.8
Moderate	50	40.7	41.0	64.8
Low	23	18.7	18.9	83.6
Very Low	11	8.9	9.0	92.6
Extremely Low	9	7.3	7.4	100.0

Source: Author's analysis (2025)

This distribution shows that while severe cash flow issues are not the norm, a significant minority of projects face substantial financial stress.

The findings show that cash flow problems are a common challenge in Kenya's MFCPs. While most projects avoid extreme financial distress, nearly a quarter experience high or very high cash flow problems, and only a small minority report very low risk. Cash flow problems are a leading cause of project delays, cost overruns, and even project abandonment in construction (Odongo, 2021). Projects experiencing moderate to high cash flow issues may struggle to pay suppliers, subcontractors, and workers on time, which can disrupt schedules and quality (Ronoh, 2020). The finding that only about 7% report "Extremely Low" cash flow problems suggests that smooth, uninterrupted cash flow is rare in the sector. As seen in **Table 5(b)**, a mean of 4.23 was obtained, indicating that, on average, MFCPs experience a "moderate" level of cash flow problems. A CV value of 32% revealed relatively high variability of the data, which was also supported by the high range (1-7) among the responses.

TABLE 5(b)
Extent of Cash Flow Problems

Variable	N	Min	Max	Mean	SD	CV
Cash Flow Problems	122	1	7	4.23	1.365	32%

Source: Author's analysis (2025)

DISCUSSION

As indicated in the introduction, this study sought to: (i) profile MFCPs and developer/project characteristics; (ii) measure MFCP performance on cost, schedule, quality, safety, and cash flow; and (iii) derive implications for developers, lenders, and regulators to improve delivery under mortgage financing. This section discusses the study's findings in relation to existing literature, theoretical frameworks, and the realities of mortgage-financed construction projects in Kenya. Each performance dimension, budget, schedule, quality, safety, and cash flow, is examined to explain observed patterns, highlight underlying causes, and compare the findings with prior studies. The discussion further explores implications for developers**,** lenders, and regulators, situating the findings within both national and global debates on construction project performance.

Level of Education

The findings reveal that Kenya's mortgage-financed construction sector is dominated by highly educated developers, with Bachelor's and Master's degrees being the norm. This likely enhances professionalism but may also create barriers for those with lower academic qualifications. The financial institutions appear to value highly educated professionals.

Type of Projects

The results revealed that residential projects overwhelmingly dominate the mortgage-financed construction sector in Kenya, with commercial, office, mixed-use developments, and industrial projects making up a much smaller share. The overwhelming dominance of residential projects likely reflects Kenya's ongoing demand for housing, driven by population growth, urbanization, and government initiatives such as affordable housing programs. Mortgage products and incentives may be more accessible or attractive for residential developments compared to other sectors. The lower numbers for commercial, office, and industrial projects may a number of things, (i) mortgage financing is less commonly used or less available for non-residential developments, (ii) these sectors might rely more on alternative financing structures (e.g., corporate loans, equity investment), and (iii) there may be greater perceived risk or longer payback periods for non-residential projects, making them less attractive for mortgage-backed funding. This is because such projects are more capital-intensive compared to residential projects.

The presence of 16 MUD projects (13.3%) suggests a growing trend towards integrated developments that combine living, working, and leisure spaces. This aligns with global urbanization trends and can enhance project viability by diversifying revenue streams and meeting multiple market needs. This is fundamental in ensuring that completed projects are capable of repaying the loan obligations.

Project Value

The majority of projects (51%) fall into the "Up to 20 million" category. This suggests a strong concentration of small- to mid-scale developments, likely targeting affordable housing, which is a significant need in Kenya. This aligns with national priorities like the Affordable Housing Programme, which aims to increase access to affordable housing for low- and middle-income households (World Bank, 2020). The second-largest category (26%) includes high-end or large-scale developments. These could be commercial real estate, mixed-use developments, or luxury residential units aimed at upper-income markets or investors. This may reflect Kenya's growing upper-middle-income earners. The data reveals a "missing middle" in project value (21–100 million), indicating a possible need for more tailored financing instruments for mid-sized developers.

Project Duration

The highest number of projects (24.8%) reported

durations of above 72 weeks, indicating that a significant portion of mortgage-financed developments in Kenya are long-term, complex projects, likely to be large-scale or multi-phase developments. This finding complements the earlier findings on project values, where a substantial number of projects also had high values, suggesting that large investments correlate with extended construction timelines.

The second most common durations are 13–24 weeks (19%) and 25–36 weeks (17%). These reflect short- to medium-term construction projects, likely aligned with small- to mid-sized residential projects, such as single-family homes, low-rise apartments, or smaller gated communities. Only 11 projects (9%) were completed in up to 12 weeks, suggesting that rapid builds are rare, possibly due to challenges such as bureaucratic delays (permits, approvals), shortage of skilled labour or materials, and limited use of prefabricated or modular technologies, among other reasons. Long project durations raise the risk profile for lenders and developers, especially in Kenya, where project delays are common (World Bank, 2021).

Current Performance of MFCPs

Budget Adherence

The proportion of MFCPs reporting cost overruns (67.5%) aligns with prior Kenyan evidence of widespread budget escalation in construction projects (e.g., Musyoka et al., 2017; Lukale, 2018). Whereas earlier studies assessed mixed financing modes, our MFCP-specific profile suggests overruns cluster in the 0–10% band for a plurality of projects, with a mean of ≈9.9%, reinforcing the persistence of moderate, but systemic, budget drift under mortgage-linked disbursement regimes. This points to disbursement-timing frictions, scope creep, and procurement lags as plausible mechanisms to be targeted by lenders' performance-based monitoring and developers' digital cost-control practices.

Cost overruns are a well-documented challenge in construction, often arising from poor cost estimation, design changes, or delays (Alsulamy, 2025). Slight budget overruns are common in construction projects due to unforeseen costs, price fluctuations, or scope changes (Mongina & Moronge, 2021). Under-budget projects are less common but represent best practices in cost management (Getahun et al., 2025).

The cost overruns established among MFCPs could be attributed to scope creep, poor project planning, delays in approvals and permits, increasing holding and labour costs, fluctuating material costs, and exchange rate volatility. Many developers in Kenya still rely on manual budgeting or informal financial controls, which increases the risk of overruns (National Construction Authority, 2020). Cost tracking technologies such as Building Information Modeling (BIM) and construction management software are underutilized, especially among small and mid-sized firms (AfDB, 2024). Budget overruns can compromise loan repayment schedules, reduce profit margins, and strain lender confidence.

Schedule Adherence

No projects reported being "moderately" or "extremely" ahead of schedule which is consistent with the general trend that construction projects rarely finish significantly ahead of schedule (Mongina & Moronge, 2021). Project delays correlate with increased project costs and reputational risks (Diandra, 2025). The findings suggest that while many projects are on track, a significant number experience delays. Several studies highlight that schedule overruns are common globally, with many projects experiencing delays due to optimism bias and unforeseen complexities (Arshad et al., 2025; Diandra, 2025; Kazim et al., 2023). Mulugeta et al. (2025) identify causes of construction delays, including poor planning, resource shortages, and external factors. Project Management Institute (2021) underscores the importance of schedule management for project success, recommending rigorous schedule control mechanisms.

Project Quality

The current study shows that a significant majority (59.3%) of respondents perceive their projects as meeting quality expectations, with an additional 16.3% indicating performance slightly above or exceeding expectations. This reflects a generally positive assessment of quality standards in MFCPs, which aligns with Mbatha et al. (2022), who emphasize the critical importance of meeting or exceeding quality for client satisfaction, regulatory compliance, and asset value. This positive perception corroborates findings by Kinyumu and Mungai (2022) in Nairobi's bank-

financed housing projects, where quality planning and assurance significantly enhanced project performance.

However, the current study also reveals that about 24.4% of projects fall below expected quality, highlighting ongoing challenges. These quality shortfalls are attributed to factors like inadequate materials, poor workmanship, insufficient supervision, and budget constraints, consistent with Mongina and Moronge (2021) and Waswa (2018), who reported quality management deficiencies, lack of professionalism, and weak regulatory frameworks as contributing to poor construction quality in Kenyan projects. Similar concerns about material management and workmanship quality were also noted in Kinyumu and Mungai's (2022) work, emphasizing the need for robust quality control systems.

The mean quality expectation score of 4.89 indicates that on average MFCPs tend toward meeting expectations but with noticeable variability. This moderate consensus among respondents reflects the uneven application of quality management practices documented in earlier studies. For instance, Gacheru et al. (2024) found inconsistent application of quality assurance practices across contractors in Kenya, with gaps in training, audits, and process control that directly impact quality consistency.

In relation to rework costs, the current study finds that most projects have a rework cost between 0% and 10%, with a mean of 6.1%. This supports the finding of quality deficiencies causing costly rework and delays, as identified by Mongina and Moronge (2021). The sizable minority of projects with higher rework percentages underscores the economic impact of quality failures, echoing concerns raised in prior studies on construction project inefficiencies in Kenya.

Project Safety Standards

Only 21.1% of projects report very high PPE compliance (above 90% of workers consistently using required PPE). A further 9.8% fall in the 76–90% compliance range, and 14.6% in the 61–75% range. Nearly half (37.4%) of projects have less than 45% of workers consistently using PPE, with 12.2% reporting extremely low compliance (0–15%). The mean number of workers found to consistently wear PPE in MFCPs in Kenya was established to be 54.7%. Low compliance increases the likelihood and severity of accidents and injuries, which is a persistent issue in construction globally (ILO, 2022). Projects with high compliance (above 90%) are likely to experience fewer and less severe incidents, as PPE is a proven last line of defense against workplace hazards (Tripathi & Mittal, 2024). Barriers to PPE compliance in Kenya may include cost constraints, lack of enforcement, discomfort, limited safety culture, and insufficient training (Nyabioge et al., 2022). Informal labour practices and subcontracting can further reduce accountability for safety standards (Purushothaman, et al., 2025). Studies show that high PPE compliance can reduce accident rates by over 50% (Ibrahim et al., 2024).

Project Cashflow

Cash flow challenges in Kenya's construction sector are often linked to issues such as delayed payments from clients or financiers, cost overruns due to inflation, material shortages, or scope changes, and inefficient financial management or lack of access to bridging finance (Kawera & Datche, 2023). Research outside the country shows that cash flow is a universal challenge in construction, but its impact is often more acute in developing economies due to weaker financial systems and greater payment risk (Mgbeahuru & Olughu, 2022; Ngacho & Das, 2015). The Kenyan data aligns with these findings, highlighting the need for systemic improvements. MFCPs may be particularly vulnerable to cash flow disruptions if disbursements are tied to project milestones or subject to bureaucratic delays.

Finance has an impact on project success since it influences several operations, including the project completion date. According to Gundes et al. (2019), construction contractors' success is heavily reliant on the specific terms and the availability of sufficient finances to carry out planned projects. Further, Abdul-Rahman et al. (2009) posits that inadequate cash flow management, late payment, insufficient financial resources, and financial market instability all have a substantial impact on construction project schedule performance. Okereke et al. (2022) noted that the source of finance has the following impacts on the construction process; improve investment in technology, improve managerial capacity, enable early mobilizations of work on site, better competitive strength, high quality of

the project, promptness in project delivery, work can proceed without undue delays, risk-sharing among all the parties, reduced burden from the sheet of government, does not influence the financial liquidity and debt ratios, helps secure returns on investment, eliminate the risks of project completion delay and abandonment, and enhance the investment in the industry.

Implications for Developers, Lenders, and Regulators

The consistent underperformance in cost and time has direct policy implications for Kenya's Affordable Housing Programme (AHP). Since the majority of MFCPs fall into the affordable housing category (up to KShs. 20M), persistent overruns increase the final cost of housing, making it unaffordable for the target low- and middle-income households. Policy must address not just financing access but also the operational efficiency of the construction sector through regulatory pressure on project delivery performance.

The study also reveals significant risk implications for the financial sector. The finding that over two-thirds of MFCPs face cost overruns and 65% face time overruns carries significant financial risk for mortgage lenders. Cost escalation compromises the borrower's ability to repay the loan, while time overruns increase holding costs and prolong the period before the asset can generate income (or be occupied), straining lender confidence and potentially leading to non-performing loans. This systemic performance issue threatens the stability and growth of the mortgage-backed real estate market in Kenya.

Regarding professional practice implications, the study highlights that poor performance is a systemic issue, despite the sector being largely comprised of highly educated professionals. This implies that better professional management practices are needed, particularly in risk management, resource allocation, and technical oversight, which are currently failing to translate professional knowledge into consistent project success. The prevalence of safety incidents and quality shortfalls also underscores the need for a fundamental shift towards a stronger safety and quality culture across all professional disciplines involved in MFCPs.

For developers and project managers, two key implications arise. First, they need to adopt advanced project management tools. To combat the mean cost overrun of 9.9% and time overrun of 9.4%, developers must move away from manual and informal financial controls. They should implement modern cost-tracking and schedule management technologies, such as Building Information Modeling (BIM) and dedicated construction management software, to enhance planning and control throughout the project lifecycle. Secondly, they ought to prioritize safety and quality training. Given the moderate mean seriousness of safety incidents and the 6.1% mean rework cost, developers must invest in rigorous and regular safety training and quality assurance programs for all site personnel. They must ensure consistent use of personal protective equipment (PPE) and strict adherence to safety protocols to mitigate severe incidents.

In the case of financial institutions and mortgage lenders, two implications arise. First is the integration of performance-based monitoring. Financial institutions should transition from relying solely on traditional valuation milestones to integrating project management performance monitoring (cost and schedule compliance) into their disbursement and risk assessment processes. This early warning system can help mitigate the financial risk posed by a majority of projects running over budget. Second is for them to develop tailored financial products. To foster a more equitable and diversified market, lenders should develop financial instruments specifically designed for the "missing middle" segment (KShs. 21M–100M). This will support mid-sized developers and potentially increase the supply of housing that is neither exclusively high-end nor extremely low-cost.

Finally, for regulatory bodies such as NCA, there is a need to streamline approvals and enforce compliance. Regulatory bodies must streamline the bureaucratic processes for permits and approvals, as administrative delays are a contributing factor to long project durations and time overruns. Furthermore, there must be stricter enforcement and monitoring of safety protocols and quality standards on-site to reduce the percentage of serious incidents and quality shortfalls.

CONCLUSION

Based on the empirical evidence gathered from the evaluation of MFCPs in Kenya, the following conclusions are drawn:

Cost and schedule performance is subpar: The study empirically confirms the anecdotal evidence of dismal performance. MFCPs in Kenya consistently fail to meet budget and schedule targets. A significant majority of projects (67.5%) experience budget overruns, with a mean cost overrun of 9.9%, and 65% of projects are behind schedule, with a mean time overrun of 9.4%. This indicates that minor to moderate overruns are the norm rather than the exception.

Quality standards are inconsistent: While a majority of projects (59.3%) meet quality expectations, a sizeable minority (24.4%) report quality deficiencies, reflected by a mean rework cost of 6.1%. This suggests a gap in maintaining consistent quality management across all MFCPs.

Safety is a significant risk factor: Although the majority of incidents are reported as having low severity, the mean seriousness of safety incidents is rated as "moderate". Critically, nearly 18% of projects face serious safety issues, highlighting a high-risk environment for workers that requires urgent attention.

Market concentration and financing gaps exist: The MFCP sector is overwhelmingly concentrated in residential projects (68.3%). Furthermore, project value distribution shows a "missing middle" (KShs. 21M–100M), indicating that mortgage financing primarily caters to the very small-scale (up to KShs. 20M) and large-scale (above KShs. 120M) developments.

RECOMMENDATIONS

The following recommendations are directed towards key stakeholders to improve the performance of MFCPs in Kenya.

Developers (near-term, high impact):

i. Adopt digital controls (cost/schedule dashboards; earned-value tracking) to curb ~10% mean overruns.
ii. Institutionalise safety & QA training (PPE compliance, supervision checklists) to reduce serious incidents and rework (mean 6.1%).

Lenders (near-term, system-level):

iii. Performance-based disbursement monitoring (cost/schedule compliance triggers) to reduce default risk stemming from overruns and delays.
iv. Tailored products for the "missing middle" (KSh 21–100M) to address financing gaps and smooth cash-flow cadence.

Regulators (medium-term, enabling):

v. Streamline approvals and enforce site compliance (permits, PPE, supervision) to shorten delays and improve safety/quality culture.

Targeted operational controls, performance-linked finance, and focused regulatory streamlining can jointly raise MFCP delivery performance while supporting Kenya's affordable-housing goals.

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