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Conceptualizing the Risk-Performance Nexus in Kenya's Mortgage-Financed Construction Sector

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Abstract

Mortgage-Financed Construction Projects in Kenya (MFCPs) have been associated with dismal performance. These projects have been riddled with cost and schedule overruns, among other challenges. This paper aimed to establish the risk factors affecting the performance of MFCPs, their effects, and possible mitigation measures. A desk review approach was adopted whereby previous research published globally between the years 2004 and 2024 on the subject area was considered in the analysis. In total, 58 studies were reviewed. However, data were collected from a total of 23 studies, representing a response rate of 39.7%. Some of the reasons why 35 studies were not considered were due to duplication of findings, lack of a clear method of data collection and analysis, and limited geographical scope, among other reasons. 12 of the selected studies were from Kenya. Based on the reviewed studies, the research established a total of 31 individual factors. These were categorized into six groups, namely: X_1-Market Risks, X_2-Financial Risks, X_3-Planning Risks, X_4-Construction Risks, X_5-Legal and Regulatory Risks, and X_6-Environmental Risks. The four main effects of risks were found to be cost overruns, project delays, reduced profitability, and increased loan default risk. Some of the risk mitigation measures established included pre-construction due diligence, strict contract management, regular progress monitoring, contingency planning, and adequate insurance coverage. The paper concluded that the investigated risks were detrimental to the success of MFCPs and recommended an empirical study to be conducted in Kenya to evaluate the prevalence and effect on the performance of MFCPs, and the methods being used to mitigate them.

Keywords

Construction Project Performance, Finance, Mortgage, Risk

1. Introduction

Kenya's construction industry significantly contributes to the nation's economic growth, providing infrastructure and housing essential for development. Within this sector, mortgage financing plays a crucial role in enabling individuals and developers to undertake construction projects, thereby stimulating economic activity and addressing the growing demand for housing. However, construction projects, particularly those financed through mortgages, are inherently complex and exposed to numerous risks that can adversely affect their performance, leading to delays, cost overruns, and quality defects [1].

Mortgage-Financed Construction Projects in Kenya (MFCPs) have been associated with dismal performance. These projects have been riddled with cost and schedule overruns, among other challenges. This has been reported in numerous studies [2]-[5]. According to [6], schedule and cost overruns have been the norm rather than the exception. [7] 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. [8] reported schedule overruns of 33.3%. According to [9], on average, 35% - 73% of construction projects in Kenya overrun their schedule. In another study, [10] reported cost overruns of up to 24.92%. There is also further evidence that the time and cost performance of projects is such 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% [8].

Risk management is a critical process that involves identifying, assessing, and mitigating potential threats to a project's objectives [11]. Effective risk management enables project teams to proactively address challenges, minimize negative impacts, and maximize opportunities for success [12]. In the context of construction projects, risk management encompasses a wide range of factors, including financial risks, design risks, construction risks, environmental risks, and regulatory risks [13] [14].

Despite the recognized importance of risk management, its implementation in the Kenyan construction industry, particularly in mortgage-financed projects, remains inadequate. Many construction firms lack the necessary knowledge, tools, and techniques to effectively manage risks, leading to poor project outcomes. This deficiency is further compounded by a lack of standardized risk management frameworks tailored to the specific needs and challenges of the Kenyan construction industry.

Several factors contribute to the inadequate implementation of risk management in Kenyan construction projects. First, there is a lack of awareness and understanding of the benefits of risk management among project stakeholders [15]. Many stakeholders view risk management as a costly and time-consuming exercise, rather than a value-added process that can improve project outcomes. Second, there is a shortage of skilled risk management professionals in the Kenyan construction industry [16]. This scarcity of expertise limits the ability of construction firms to effectively identify, assess, and mitigate risks. Third, there is a lack of data and information on past project performance, making it difficult to accu-

rately assess the likelihood and impact of potential risks [17].

The absence of a comprehensive risk management framework for mortgage-financed construction projects in Kenya has significant implications for the performance of the construction industry and the broader economy. Project delays and cost overruns can lead to financial losses for developers, contractors, and homeowners, as well as increased borrowing costs and reduced investment in the construction sector [18]. Quality defects can result in costly rework, safety hazards, and dissatisfied clients. Ultimately, these negative impacts can undermine the sustainability and competitiveness of the Kenyan construction industry. The objectives of this paper included establishing risks associated with MFCPs, determining the effect of risks on the performance of MFCPs, and finding mitigation strategies for risks associated with MFCPs.

2. Methodology

A desk review approach was adopted whereby previous research published between the years 2004 and 2024 on the subject area was considered in the analysis. The following databases were searched: Scopus, Google Scholar, Directory of Open Access Journals, and Web of Science. These are some of the largest research databases of peer-reviewed research articles, with access to leading journals in the discipline of construction project management. In total, 58 studies were reviewed. However, data were collected from a total of 23 studies, representing a response rate of 39.7%. The selection of studies for this review was guided by clear inclusion and exclusion criteria to ensure relevance, quality, and applicability. The inclusion criteria involved: 1) studies must focus on risk factors impacting construction project performance, preferably mortgage-financed projects, 2) research published in peer-reviewed journals, conference proceedings, or reputable academic sources, 3) studies published between 2004 and 2024 to ensure relevance and currency, 4) English language studies to ensure comprehension and consistency, 5) studies providing clear methodology and data analysis approaches, 6) research including empirical data or conceptual frameworks relevant to construction risk management, 7) studies conducted in Kenya or comparable developing country contexts to ensure applicability, 8) studies available in full text for comprehensive screening and data extraction, and 9) research that explicitly links risk factors to project outcome effects such as cost overruns, delays, profitability, or loan default risk. The exclusion criteria involved: 1) studies not focused on construction project risks or unrelated fields (e.g., IT, general business without construction focus), 2) publications lacking clear methodology or data collection methods, 3) duplicate reports of the same studies or findings, 4) non-peer-reviewed or non-academic sources such as opinion pieces, blog posts, or company brochures, 5) studies limited to geographic areas with very different construction environments without clear transferability, 6) research published before 2000 to avoid outdated data or context, 7) studies that do not provide full text or sufficient information for analysis, 8) conference abstracts, book chapters, or theses not peer-reviewed unless highly relevant, 9) studies only addressing technical construction methods without linking

to risk factors or project performance, and 10) research focusing exclusively on post-construction phases like maintenance or operation unless directly linked to initial construction risks.

Based on the reviewed studies, the research established a total of 31 (thirty-one) risks affecting MFCPs. These were categorized into 6 (six) categories, namely: Market Risks (X_1), Financial Risks (X_2), Planning Risks (X_3), Construction Risks (X_4), Legal and Regulatory Risks (X_5), and Environmental Risks (X_6). This classification draws on established risk management frameworks such as ISO 31000 and PMBOK, which recommend categorizing project risks into broad domains to facilitate systematic analysis and mitigation. Previous studies in construction risk assessment also adopt similar multi-category frameworks to capture the complexity and diversity of risks impacting project performance. These have been discussed in the findings together with their effects and mitigation strategies.

The study acknowledges that while 35 studies were excluded primarily due to duplication, unclear methodologies, or limited geographic scope, this may introduce selection bias. Excluding studies lacking rigorous methods ensures quality but may omit relevant perspectives, especially from non-English sources or less formal research. Consequently, findings should be interpreted cautiously, acknowledging that the selected studies may not fully represent all global or local risks affecting mortgage-financed construction projects, which could affect the generalizability of results.

3. Fındings

3.1. Risks Associated with MFCPs (Borrower's Perspective)

Project risk is a combination of probabilities that cause an event's appearance and the outcomes that the event produces. It has a significant impact on a construction project's performance in terms of cost, time, and quality [19]. Risks and uncertainties appear in various shapes; besides, no construction project is risk-free [20].

3.1.1. Market Risks

This is the potential that market trends and conditions such as low demand, oversupply, or recession (economic decline), could make property development unfeasible or unprofitable. Market risk is the potential for changes in prices or customer expectations associated with property development [12]. Factors like interest rates, demographics, and employment rates can affect prices and attractiveness of properties.

Bank interest rates in Kenya have not been stable in the last few years. For example, the Central Bank of Kenya (CBK) raised the key lending rate from 10.5% to 12.5% in December 2023, before hiking it to 13% in February [21]. Consequently, commercial banks have had to raise their lending rates. For example, KCB raised its base lending rate to 15.6%, while Equity Bank also raised theirs to 18.2% [21]. Since in most cases, the terms and conditions of commercial loans allow the lender to change the lending rates at will, most borrowers end up being affected by such changes.

3.1.2. Financial Risks

Property development projects require major capital outlays long before revenue is generated, thus making cash flow and access to funding a critical element. Financial risk is the potential that the developer either doesn't have access to the funding needed to complete the project, or they do, but the financing cost is prohibitive [22]. Financial risks include costs associated with acquiring and getting the relevant approvals for a site, such as land purchase, taxes, professional fees, etc. Availability and adequacy of project finance, together with its related costs, are also major items of consideration. The use of third parties, such as specialist brokers is sometimes advisable but also comes with its share of risks [23]. Sometimes the cost of finance is too high, such that the project is not profitable or there is no good value for money. Risks related to sales targets and profitability of the project also need to be considered in a construction project, especially those that are for sale. According to [24], cost control is important in the case of overruns or insufficient funding to complete projects.

3.1.3. Planning Risks

Planning risk is the potential for the local authority not to approve the proposed development. This can stop the project dead in its tracks since no planning consent means no building. In the UK, developers often buy a site with planning permission to avoid this type of risk [12]. Gaining planning consent from the local authority and other relevant government regulators is a major cost element associated with planning risks that the developer must be ready to bear. Other costs include: professional fees and expenses, including planning consultants and architects, surveyors, engineers, etc.

3.1.4. Construction Risks

Construction risk includes anything that either disrupts or increases the costs of the physical development process [12]. These include labour disputes, materials shortages, delays, faulty designs, accidents, etc. These result in missed deadlines or exceeded budgets. The following are the specific construction risks associated with MFCPs:

First, there is contractor risk. Too often, inexperienced developers choose a contractor based only on price, with little or no regard for the dozens of other factors that must be considered. Developers tend to engage the wrong contractor especially when the project's financial modelling is shaky [1]. Desperate to get the deal done, they convince themselves that all they have to do is get the project financing approved and everything will be fine. Cost quickly becomes the only criterion for selecting the contractor. Because construction costs represent the vast majority of project costs, when confronted by construction cost estimates that exceed the project's financial modelling, project sponsors often explore lower-cost contractors, which all too often results in engaging the wrong contractor and exposing the project to a myriad of contractor risks [25].

The second risk associated with construction risk is the cost and availability of materials. Though increases in material costs can be handled with a fixed-price

contract, material availability is a common risk, especially during periods of high demand, low resources, supply chain risks, etc. [26]. Third are labour risks. As with materials, an increase in labour costs can be handled with a fixed-price contract, but labour availability is also a common risk, especially when there's high demand and a shortage of readily available labour [26].

Fourth are the below-ground risks. Beneath the construction site lie many unknowns such as cables, drains, rock formations, archaeology, contamination, hidden basements, and waterways. All these can cause havoc with the construction of the substructure [27]. Fifth are extreme weather events; This is a tricky subject because contractors should plan for bad weather. Sometimes, weather events can be very disruptive; for example, rainy weather can stop concrete from being poured [28]. Sixth is the health and safety of the construction site; Construction sites are plagued with many hazards, from trips and slips to working at heights and with hazardous materials [29]. Accidents can and do happen. When they do, they can result in a site closure.

The seventh risk associated with construction risk is contractor skill and liquidity. The question of whether the appointed contractor can deliver the project to a high quality and within the programmed schedule is important [30]. Slippages in time or quality of workmanship can prove to be very costly. Eighth is the failure to complete a project within the construction interim period. When a budget is not appropriately managed, the funds may run out before the project is completed. Funds released to the contractor should equal the percentage of completed work as verified by the project consultants [11].

Ninth is low or no contingency budget; Failure to include a contingency budget in the total construction cost estimation means that any unexpected expenses will increase the overall budget thereby causing delays or even preventing potential project completion [18]. Lastly, there is a lack of progress reporting. Progress reporting allows monitoring of the project to ensure that it's on schedule as per the loan term and the completion date indicated in the construction contract and loan agreement [11]. In addition, progress reporting enables project stakeholders to ensure consistency between construction workmanship and any draw application fund requests.

3.1.5. Legal and Regulatory Risks

Potential changes to building codes, zoning, and environmental regulations can sometimes force costly delays and revisions to development plans to ensure compliance with new rules. According to [31], changes in government legislation could adversely affect property development. Legal action from authorities or other public interest groups concerned over issues such as environmental impact or public access could negatively affect construction projects. Developers face substantial liability risks arising from construction accidents (affecting both workers and the public), design flaws resulting in building defects, and tenant disputes over lease terms, among others [22]. Costly litigation and settlement payouts may occur.

3.1.6. Environmental Risks

Contaminated land that requires remediation, damage to habitats and protected species, excessive noise and air pollution during construction—these issues can bring on fines, lawsuits, delays, and reputational damage if mishandled [29].

3.2. Effect of Risks on the Performance of MFCPs

Risks in MFCPs can significantly impact their performance by causing delays, cost overruns, reduced profitability, and even potential project failure, primarily through factors like design flaws, contractor issues, market fluctuations, and unforeseen site conditions, which can ultimately lead to increased financial burden on the borrower and lender due to higher interest payments and potential default risks. The key impacts of risks on mortgage-financed construction projects include cost overruns, project delays, reduced profitability, and increased loan default risk.

3.2.1. Cost Overruns

Risks in construction projects can lead to cost overruns by causing unexpected delays, changes in scope of work, the need for additional materials or labour, rework due to design errors, and unforeseen site conditions, all of which can significantly increase the project budget beyond the initial estimates. According to [32], unexpected changes in design, material costs, labor rates, or site conditions can lead to significant cost increases, exceeding the initial budget and putting strain on the project's finances. Errors in the design phase can lead to costly modifications during construction, requiring additional materials and labour to correct issues [15]. Lack of skilled workers or unexpected workforce disruptions can cause delays and necessitate hiring more expensive temporary labour to meet deadlines [33]. Unforeseen geological conditions, soil instability, or groundwater issues can require additional excavation, stabilization measures, and specialized equipment, increasing costs. Severe weather events can cause delays in construction activities, leading to extended project timelines and increased costs due to potential rework or protection measures [34]. Frequent changes to the project scope requested by the client can result in additional design work, material procurement, and labour costs. Unpredictable increases in material costs due to market volatility can significantly impact the project budget [25]. Lack of proper planning, inadequate risk assessment, and poor communication can lead to unanticipated problems and cost overruns. Financial difficulties of the contractor can lead to delays in material procurement or workforce issues, impacting project costs. New regulations or permitting delays can necessitate costly design modifications or additional approvals, increasing project expenses [30].

3.2.2. Project Delays

Risks in construction projects can cause project delays by introducing unexpected obstacles or disruptions to the planned workflow, such as unforeseen weather events, labour shortages, material delivery delays, design changes, site conditions issues, equipment failures, permitting complications, and poor communication,

which can all lead to work stoppages, rework, and missed deadlines, ultimately delaying the project completion date. According to [35], construction delays due to weather issues, regulatory hurdles, contractor disputes, or design modifications can result in extended financing periods, increasing interest costs and impacting project completion timelines. Lack of skilled workers, high turnover rates, or unexpected strikes can significantly slow down progress on a project [1]. Delayed deliveries of materials due to supply chain disruptions, incorrect orders, or transportation problems can halt construction activities [36]. Discovering unforeseen geological conditions, like unstable soil or groundwater issues, can require additional mitigation measures, causing delays [37]. Frequent modifications to the project design after construction has started can lead to rework and extended timelines. Severe weather conditions can disrupt outdoor work, forcing temporary suspensions and impacting project schedules. Complex or incomplete permit applications, bureaucratic hurdles, and changes in regulations can hold up construction commencement. Malfunctioning machinery or equipment failures can lead to downtime and delays in construction activities [38]. Lack of clear communication between stakeholders, including contractors, designers, and owners, can lead to misunderstandings, rework, and missed deadlines. Accidents on site can result in work stoppages for investigations and safety improvements, impacting project timelines [39].

3.2.3. Reduced Profitability

When risks materialize, they often lead to lower profit margins for developers and contractors, impacting their financial returns on the project. Risks in construction projects can lead to reduced profits by causing unexpected cost overruns, schedule delays, quality issues, and legal disputes, which all eat into the project's budget and ultimately lower the profit margin. Risks such as labour shortages, adverse weather conditions, material price fluctuations, design changes, and unforeseen site conditions can disrupt project timelines and increase expenses, resulting in a smaller profit or even a loss on the project [26]-[28]. Unexpected labour shortages or strikes can lead to higher labour costs and project delays. Sudden increases in material prices due to market conditions can significantly impact the project budget. Unforeseen site conditions or design changes might necessitate additional work, leading to extra costs. Unexpected equipment failures can cause downtime and require costly repairs. Adverse weather conditions can significantly slow down construction progress, impacting project timelines. Unexpected delays in obtaining necessary permits can hold up construction. Delays caused by subcontractors not meeting deadlines can ripple through the project. Substandard work may require rework, adding to project costs and affecting project quality. Defective materials can lead to costly replacements and rework. Disputes with clients or subcontractors over contract terms can lead to legal fees and delays. Claims filed against the contractor due to project issues can significantly impact profitability.

3.2.4. Increased Loan Default Risk

If cost overruns and delays become too significant, borrowers may struggle to

meet loan repayments, leading to potential loan defaults and legal complications for the lender. When these risks materialize, they can lead to financial distress for the borrower, increasing the likelihood of mortgage loan default [36]. Unexpected site conditions (e.g., poor soil, hidden obstacles), design changes, or material price increases can push project costs beyond the initial budget. If the initial cost estimates are flawed, the borrower may not have secured sufficient funding, leading to a shortfall. Cost overruns can strain the borrower's finances, making it difficult to meet loan repayment obligations. Construction delays due to weather, labor shortages, or permitting issues can lead to increased costs (e.g., extended financing costs, penalties) and lost revenue (e.g., missed deadlines, lost sales). Delays can disrupt cash flow, making it challenging for the borrower to service the loan. Poor workmanship or use of substandard materials can lead to costly repairs or even structural problems, impacting the project's value and the borrower's ability to repay the loan. Disputes with contractors, contractor bankruptcy, or poor contractor performance can cause delays, cost overruns, and quality issues. These issues can diminish the project's value, making it difficult for the lender to recoup their investment in case of default. A recession or a decline in the real estate market can reduce property values, making it difficult for the borrower to sell or refinance the property to repay the loan. New building codes or environmental regulations can necessitate costly changes to the project, impacting the borrower's finances. These external factors can affect the project's financial viability and the borrower's ability to repay the loan. Poor project management, financial mismanagement, or lack of experience can lead to cost overruns, delays, and other problems which in turn cause financial distress to the developer. The borrower's own financial difficulties, unrelated to the project, can also affect their ability to meet loan obligations.

Figure 1 presents the effects of risks on the performance of MFCPs and the interrelationships among the effects.

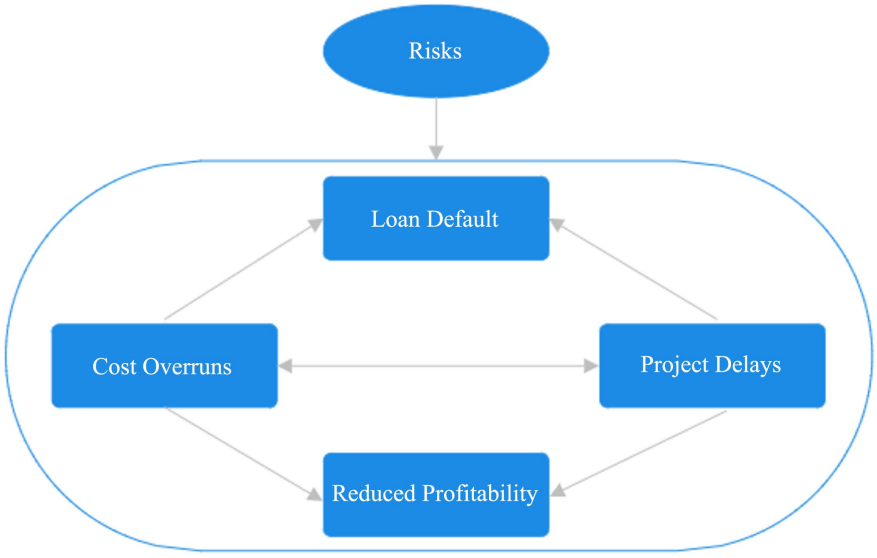

Figure 1. Effects of risks on the performance of MFCPs.

3.3. Management of Risks Associated with MFCPs

Managing risks in MFCPs requires a comprehensive approach that includes thorough pre-construction due diligence, strict contract management, regular progress monitoring, contingency planning, and adequate insurance coverage, all aimed at mitigating potential risks like cost overruns, schedule delays, and construction quality issues, ensuring the project is completed on time and within budget while protecting the lender's investment [1] [26]-[28] [33] [38] [40]. Conducting thorough site assessments helps identify potential geological, environmental, or regulatory challenges. Creating a comprehensive budget with sufficient contingency funds helps account for unexpected costs. Thorough vetting and selection of qualified contractors with a proven track record is a necessity [41]. A thorough review of project designs helps identify potential flaws or areas for improvement [36]. Implementing a system to track project progress against the schedule and budget assists in identifying potential issues early on [15]. Clearly defining responsibilities and obligations in contracts with contractors, including penalty clauses for non-compliance, ensures parties are responsible for their own mistakes [12]. Disbursing funds to contractors based on verified progress milestones helps prevent overspending [1]. Performing regular inspections assists in ensuring construction quality meets project specifications [23]. Careful review and approval of any changes to the project scope prevent cost escalation.

Some of the crucial risk mitigation strategies include contingency planning, insurance coverage, and communication and collaboration [25]. Establishing a dedicated contingency fund helps address unforeseen issues like weather delays, material price increases, or unexpected site conditions. Obtaining comprehensive construction insurance, such as construction insurance, professional liability insurance, and environmental liability insurance, ensures that the risk is transferred to other parties. Maintaining open communication between all project stakeholders including the lender, developer, contractor, and consultants, ensures that issues are promptly addressed [30] [42].

4. Conclusıon

The study identified construction risks as the most prevalent category affecting mortgage-financed construction projects, with significant impacts including cost overruns, project delays, and reduced profitability. These risks primarily stem from contractor selection, material and labor availability, and site conditions. Given these findings, there is an urgent need for empirical research within the Kenyan context to quantitatively assess the prevalence and effects of these risks and evaluate mitigation measures, to enhance the success rates of mortgage-financed construction projects.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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