The Role of Consultants in Enhancing Safety Standards of Private Building Construction in Nairobi County, Kenya

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Abstract

Nairobi County, Kenya has experienced a boom in the construction of private buildings due to rapid urbanisation. However, the buildings are increasingly collapsing due to poor practice and poor enforcement of regulations. Retaining consultants such as architects, engineers, and project managers to mediate between the rules (regulatory) and application in the field (physical building) is essential to public safety. This study aimed to investigate consultants' role in safeguarding private buildings in Nairobi County, Kenya, which faces challenges of rapid urbanisation and concerns about the quality of construction. Using a sequential exploratory research design, the study explored consultants' roles in designing safety and security features, providing technical advice, quality control, risk management, and impact assessments. Purposive sampling and stratified sampling were used to select 82 consultants. Descriptive statistics analysed the data. The findings showed that 58.6% of respondents were frequently or consistently involved in safety design development and implementation, and 75.8% provided expert advice regularly at project planning stages. Likewise, 86.2% of consultants reported ensuring quality assurance and control. However, there remains room to improve the consistency and thoroughness across all projects. Guided by the Public Interest Theory of Regulation, the research demonstrates how consultants uphold public safety by mediating between regulatory frameworks and construction practices.

Keywords:
Construction safety, Consultants, Building collapses, Private buildings, Urbanization

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Introduction

In Nairobi County, private real estate development has rapidly increased alongside safety concerns, including building collapses, especially in lower-income areas. In 2022, Nairobi completed 20,025 buildings, almost 50 per cent more than the 13,350 completed in 2021. Out of these, 16,910 were residential buildings (KNBS, 2023). In this period of growth, safety in private buildings has been a major concern, reflected in the failure of multi-storey buildings whose construction procedures have not been followed. Data from the Kenya Institute for Public Policy Research and Analysis (KIPPRA, 2023) indicates that 64 private residential buildings collapsed in 2019 alone, with 33 of these accidents noted in Nairobi.

Consultants are instrumental in building safety by overseeing many aspects of the construction process, from ensuring compliance with design to managing risk and quality assurance. However, there are debates about the consistency and effectiveness of their involvement. According to National Construction Authority (NCA) studies, poor workmanship accounts for 35% of building collapses, 28% is related to the use of substandard materials and 9% relates to non-compliance with safety regulations (NCA, 2019). Without the right structures in place, many projects that would otherwise have been successful encounter safety issues; whether because of financial pressures, bureaucratic delays, or a failure to engage with the consultant proactively throughout the project lifecycle.

The factors contributing to building collapses include poor workmanship, inadequate structural design, the use of inferior materials, and weak enforcement of construction standards. Research has shown that consultants are often brought into the process too late, severely limiting their ability to resolve important safety issues (Kamardeen, 2019). Alternatively, other studies suggest that while consultants make knowledgeable recommendations about safety matters, their recommendations frequently go unheeded because cash-strapped developers and contractors are lax in their oversight (Buniya et al., 2020) . Each party in the private building construction process supports the integrity and safety of the final building structure. The roles of property developers, lead consultants, structural consultants, fire safety consultants, and other professionals in preventing building collapses were evaluated in this study.

Property developers acquire land, obtain permits, and engage consultants when they begin the process of developing private buildings. However, a lack of due diligence in the process can lead to unsafety of buildings. In Nigeria, building collapses have been attributed to developers' ignorance and deviating from approved plans (Nwoyiri et al., 2023). Building safety has also been compromised by greed, cost-cutting measures and the employment of unqualified workers (Okah, 2022). Corruption in Kenya has facilitated corrupt developers' construction of unsafe buildings by way of bribing officials to acquire permits (Bah et al., 2018; Smith, 2020).

Lead consultants are responsible for the planning, construction, and management of building projects. They ensure adherence to regulations and safety requirements. Osei-Asibey et al. (2021) found that lead consultants represent developers and bear the responsibility of ensuring quality at construction sites. However, negligence among consultants, including a lack of scrutiny of materials and site approval procrastination, has been linked to poor-quality construction and the eventual collapse of buildings (Khalid et al., 2018). Consultants also have a major role in hiring contractors, and when the hiring process is corrupted, then incompetent contractors are selected, which increases the risk of building collapse (Maqsoom et al., 2018; Dwiaryanti et al., 2021).

Structural consultants (or engineers) are crucial to design and analyse a building's structure to ensure safety and compliance with building codes. Kenya has a shortage of structural engineers and this has been credited as one of the causes of building collapses in Kenya (World Bank Group Report, 2019). Mwenda et al. (2021) indicated that the presence of structural consultants during the construction process influences the quality of projects and contributes to the safety of buildings. According to Kingori et al. (2021), the Kenyan regulatory bodies have stressed the importance of contracting structural engineers to ensure no shortcuts are taken in the construction process and proper protocols are followed.

Fire safety consultants are important in designing fire protection systems and testing fire codes. As outlined by Meacham (2022), early inclusion of the fire engineering aspect in private buildings is critical if potential fire risks are to be effectively addressed, and for compliance with the relevant regulations. In England, Benson & Elsmore (2021) suggest policies to facilitate the presence of fire safety consultants at construction sites to improve safety. Quantity surveyors are involved in cost management, procurement, and the use of materials of the right quality during construction. However, the lack of collaboration with other professionals may stretch out the building process and also result in poor-quality construction (Ejiofor, 2018). Okorie and Omoregie (2018) also mentioned that quantity surveyors contribute to building collapses because they do not ensure that the right materials are used. For instance, service engineers diagnose whether mechanical, electrical, and telecommunications systems are safe and functional. Compliance with installation codes and mitigating safety risks, such as electrical overloads, are critical to preventing building collapses (Li et al., 2018; Adelakun et al., 2022).

The literature emphasizes the importance of different actors in enhancing the safety of private buildings. It, however, leaves gaps in the consistent application of safety protocols and the need for stronger enforcement of standards to prevent building collapses. Such gaps highlight the need for better collaboration between stakeholders and increased oversight by consultants to ensure safety is central to the construction process. The study aimed to explore the contribution of consultants in improving the safety of private buildings in Nairobi County, Kenya, based on their responsibilities to ensure proper design implementation, risk management and quality control. The

objective was to evaluate the potential to increase safety outcomes in a growing real estate market through better interaction with consultants

Theoretical Basis

The study was guided by the Public Interest Theory of Regulation propounded by Arthur Cecil Pigou in 1938. The theory posits that the government should intervene to protect the welfare of the public from exploitation by private companies (Lima & Fonseca, 2021). Government regulation exists, so that industries, like construction, abide by the interests of society, in safety, health, and quality of life.

Consultants also play a critical role in enforcing safety standards and mitigating the risks associated with poor construction practices, particularly in the context of Nairobi's construction sector which has faced its fair share of building collapses in the past — some leading to loss of life and property. According to Pigou's Public Interest Theory, regulations protect the public by ensuring that organisations do not compromise on safety through these measures, together, avoiding market failures brought about by poor materials, non-adherence to building codes, or insufficient supervision during construction (Quach et al., 2020). Given their role in the construction process, consultants serve as an interface between the regulatory bodies and the developers to oversee that these safety standards are implemented.

The Public Interest Theory also highlights the risk of industry players, including developers, attempting to influence regulators to allow them to breach laid protocols for personal gain. In Nairobi, Van Witteloostuijn et al. (2016), demonstrate how unscrupulous developers have gotten around safety standards. Consultants advocate for strict compliance with regulations. Their responsibilities include advising on safety designs, risk assessments, and quality control, actions that ensure the public interest is protected through the avoidance of building collapses.

Methodology

Utilizing a sequential exploratory research design, the study qualitatively and quantitatively examined the extent to which consultants contribute to the safety of private buildings in Nairobi County, Kenya. The study centred on the private building projects in Nairobi County. Nairobi was selected based on its rapid real estate development and the frequency of building collapses, which provided an appropriate target environment for construction safety research. The target population comprised fundamental players in the construction-related sector, specifically property developers, consultants (including lead and structural engineers), and contractors. The study deployed a purposive and stratified random sampling technique; hence, the study respondents share unique perspectives and cognizance of private buildings. A total of 82 participants were included in the final sample. Data was obtained from questionnaires and in-depth interviews. The qualitative data

were thematically analysed to determine common patterns and problems in construction safety. Descriptive statistics were used to analyse quantitative data to assess how frequently safety-related practices were applied and the effectiveness of safety management on separate projects. The study was conducted following strict ethical standards; respondents were assured confidentiality and anonymity.

Results and Analysis

Development and Implementation of Safety Designs in Private Building Projects

Respondents gave responses on their contribution to developing and implementing safety designs in private building projects in Nairobi County. The findings are presented in Table 1 below. The findings indicated that 58.6% of the respondents (37.9% frequently and 20.7% always) contribute actively to developing and implementing safety designs. This indicates that the majority of the consultants surveyed understand the importance of their function in safeguarding buildings and are proactively engaging in the process.

On the other hand, 31% of respondents said they rarely (13.8%) or sometimes (17.2%) contribute to safety designs. This indicates that there is ample room for improvement concerning the consistent and active involvement of all consultants in safety design development and execution. The neutral response of 10.3% of the respondents suggests that the respondents do not have a clear knowledge or commitment to their duty in terms of building safety.

Table 1

Implementation of Safety Designs in Private Buildings

Statement	R (%)	O (%)	N (%)	F (%)	A (%)	Mean	Median	Skewness
Contribution to developing and implementing safety designs in private building projects	13.8	17.2	10.3	37.9	20.7	3.34	4	-0.49

KEY: R (Rarely), O (Occasionally), N (Neutral), F (Frequently), A (Always). *n=82*

Source: Field data, 2024

A mean of 3.34 shows that respondents tend to contribute more than neutral to the safety designs development and implementation process. This interpretation is further supported by the median value of 4 (Frequently). As we can see from the skewness value of -0.49, the dataset distribution

of responses is negatively skewed, with more responses concentrating on "Frequently" and "Always", compared to "Rarely" and "Occasionally". In other words, this means there is still room for improvement, although several consultants are contributing to safety designs.

Key informant interviews were conducted where respondents were asked about their contributions to the design and implementation of safety designs in private buildings. Analysis of the interviews with consultants yielded several themes regarding their role in developing and implementing safety design on private-sector building projects. Numerous consultants stressed their proactive role in reviewing designs and making recommendations for safety improvements.

Consultants noted that collaboration with stakeholders to implement safety designs effectively was critically important. Consultants also discussed their role in conducting ongoing monitoring and inspection to ensure safety designs are followed. They do regular site visits and inspections throughout the construction process to ensure safety measures outlined in the designs are in place, said one consultant. If they see any deviations or deficiencies, they report them quickly to those who can address them. Although 58.6% of survey participants frequently or always participated in developing safety designs for construction and implementing safety design on-site, some studies indicated limited consultant involvement in safety design. For example, Rwamamara et al. (2010) reported that the extent of consultants' involvement in construction safety management was often minimal, and construction safety was only a legal requirement rather than a safety promotion. One potential explanation for this difference is that the studies differ in their context and regulatory environment.

Literature supports the findings from the interviews that a consultant needs to work collaboratively with other stakeholders. Gambatese et al. (2008) highlighted the advantages of collaboration across disciplines towards improving construction safety, where consultants play a vital role in promoting communication and coordination between parties.

Expert Advice for Building Safety

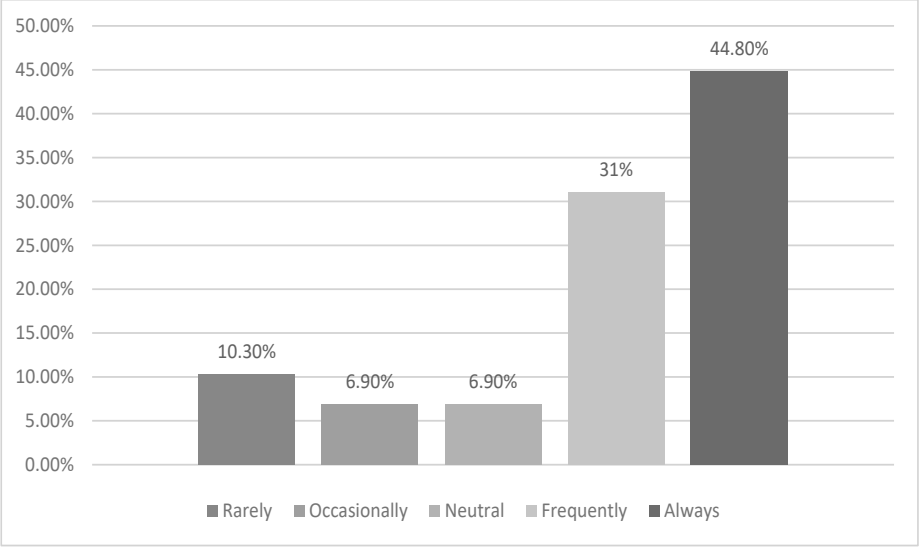
Respondents were asked how frequently they provide expert advice to ensure the safety of private buildings, especially in the early stages of a project. By assessing the frequency with which consultants provide expert advice, particularly during the crucial early stages of a project, this question helps to gauge the level of involvement and proactive contribution of consultants in promoting building safety. The findings are indicated in Figure 1 below.

As detailed in Figure 1, majority of the respondents, 75.8% (31% frequently and 44.8% always), reported that they regularly provide expert advice to ensure safety in the early stages of private building projects. This high percentage indicates that most consultants recognize the significance of their advisory role and actively engage in providing safety recommendations from the outset of

a project. By offering their expertise early on, consultants can help identify and mitigate potential safety risks, influencing the design and planning phases to prioritize safety considerations

Figure 1

Expert Advice for Building Safety



Source: Field data, 2024

It is worth noting that 17.2% of respondents indicated they rarely (10.3%) or only occasionally (6.9%) deliver expert advice for safety early on in the project. This suggests that there is room for improvement in safety of buildings through consistent and proactive consultant input during the early stages of all building projects. The neutral response by 6.9% of the survey participants might denote uncertainty about the work performed by experts in terms of safety or their levels of involvement depending on project conditions.

Mzyece et al. (2019) ascertained that the designer (including consultants) had a vital role on influencing safety through their design decisions at early stages of projects. This resonates with the questionnaire findings which show that consultants in Nairobi are indeed active in providing specialist safety advice, especially in the early stages of projects.

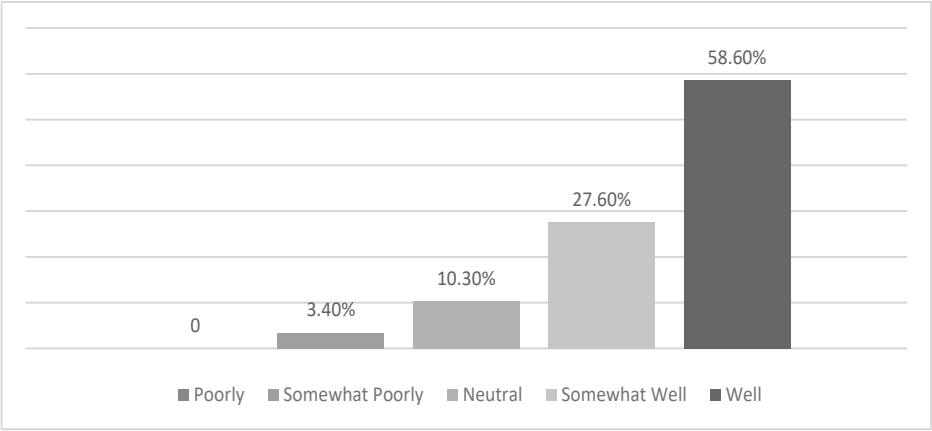
Quality Assurance and Quality Control

Quality assurance and quality control are vital for ensuring the safety of private buildings, as they involve systematically monitoring and evaluating factors that contribute to the overall quality and

safety of a construction project. Consultants are important in implementing quality assurance and quality control measures, which is significant in ensuring the safety of private buildings in Nairobi, Kenya in conformance to National Building Codes. Findings from the respondents are summarised in Figure 2 below.

Figure 2

Ensuring Quality Control and Quality Assurance for Safety



Source: Field data, 2024

Figure 2 indicates a combined 86.2% of respondents reported that they ensure quality assurance and quality control either somewhat well (27.6%) or well (58.6%). This high percentage suggests that most consultants recognize the importance of their role in monitoring and evaluating factors that contribute to the overall quality and safety of construction projects. With proper quality assurance and quality control, safety risks from private buildings in Nairobi can be identified and eliminated by consultants increasing the level of safety in private buildings in Nairobi. 3.4% of respondents indicated that quality assurance and quality control were performed somewhat poorly. Although a small percentage, it makes clear that we must do more to ensure that all the consultants effectively carry out their responsibilities. However, some level of neutrality from 10.3% of the respondents could imply uncertainty in their ability to ensure quality assurance and quality control or that their degree of involvement could be project-dependent. The mean value of 4.41 affirms this trend as respondents ensure quality assurance and quality control to a level between "Somewhat Well" and "Well."

The key informant interviews revealed the approaches used by consultants in Nairobi, Kenya, to provide quality assurance and quality control in construction projects, thereby improving safety. Common themes and strategies emerged from the interviews. The interviewees pointed to regular monitoring and inspection of construction sites as one of the main measures taken. As one key informant noted, site visits were critical, saying,

> *I make it a point to visit the construction site at least once a week, if not more frequently. During these visits, I thoroughly inspect the ongoing work, checking for compliance with the approved designs, specifications, and safety standards. If I identify any deviations or potential safety hazards, I immediately bring them to the attention of the contractor and work with them to implement corrective measures.* (Participant 04, 05/06/2024)

Many consultants emphasized that all quality assurance and quality control activities should be documented and records maintained. In addition, the interviews highlight how consultants helped ensure that high-quality materials were used and standards were met. The interviews with key informants also emphasized consultants' dedication to ongoing education and remaining well-informed about emerging best practices and safety regulations in quality assurance.

Nguyen and Yudina (2019) examined the key factors influencing construction quality management in the Vietnamese construction market. Based on the study, effective communication and collaboration among stakeholders are identified as important factors to enable quality and safety in construction projects.

Managing Potential Risks

Respondents responded on how they identify and manage potential risks to enhance the safety of private buildings during the construction phase. The findings are presented in Table 2 below.

Table 2*:*

Identifying and Managing Potential Risks

Statement	I (%)	SI (%)	N (%)	SE (%)	VE (%)	Mean	Standard Deviation
Effectiveness of identifying and managing potential risks to enhance safety	0	3.4	13.8	48.3	34.5	4.14	0.77

KEY: I (Ineffective), SI (Somewhat Ineffective), N (Neutral), SE (Somewhat Effective), VE (Very Effective). *n=82*

Source: Field data, 2024

The results in Table 2 revealed that 82.8% of the respondents claimed to identify and manage potential risks to enhance safety during the construction phase, either somewhat effectively (48.3%) or very effective (34.5%). Such a high statistic shows that a majority of consultants are

proactive in implementing risk management systems, and understand that their work helps address any potential health and safety risks during the process of a building being constructed.

A small part of respondents, 3.4%, said that they are somewhat poor at identifying and managing potential risks. Although a small percentage, this illustrates that further support and training are needed in these areas to ensure that consultants are skilled and knowledgeable in effectively managing risk and improving safety throughout a build.

13.8% responded neutrally, which suggests a lack of confidence in their risk management ability and that the project has different circumstances regarding risk identification/management. The average score of 4.14 suggests that consultants' ability to identify and manage potential risks to increase safety in the construction phase lies between "Somewhat Effective" and "Very Effective". The standard deviation of 0.77 shows the variation between responses is small, as most consultants responded that the potential risks can be identified and handled to improve safety during the construction phase.

A complementary provider of insight on whether consultants are best placed to identify and assess potential risks concerning the private construction of buildings, to make them as safe as possible, is the key informant interviews conducted with consultants in Nairobi, Kenya. The interviews indicate that consultants use different strategies and techniques to efficiently spot and mitigate possible safety risks during the construction process. Consultants know all are not equal, so they stress the importance of risk assessments early on, identifying potential hazards and preparing a detailed risk management plan. These are several safety measures outlined in the plans to be adopted during construction and safety standards and regulations met.

They continue to emphasize the importance of frequent site inspections and oversight to catch and address any safety issues as they develop. They note that they take the initiative to identify risks, working directly with contractors, site supervisors, and other stakeholders to make sure everyone is working toward common goals and is aware of hazards. The interviews also explored the consultants' role in establishing a culture of safety on construction sites. The consultants tell how they have sought to raise awareness about safety risks and best practices among workers and supervisors through training sessions, toolbox talks and other educational initiatives. Consultants do use injury/incident prevention techniques to provide a safe environment on-site during the construction phase. Additionally, to effectively address recurrent risks, consultants note that streamlined communication and coordination between stakeholders executing a project are key. They emphasize that regular meetings to discuss safety issues and collaborative decision-making ensure that potential risks are addressed during construction.

Chihuri and Pretorius (2010) stress the importance of consultant involvement in risk assessment and management processes to improve project safety and success, which is corroborated by survey findings and key informant interviews conducted in Nairobi County, Kenya. Chileshe and Yirenkyi-Fianko (2012) used the Ghanaian construction industry as a focal point for the analysis

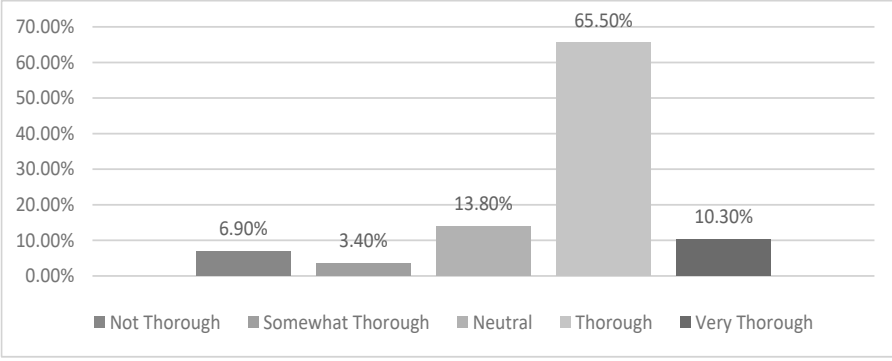
of these aspects in the research. Although risk management is deemed important as recognized in the companies, there were still disconnects with action due to the limitations of knowledge, ability and lack of investment in related training. This implies that although some of the consultants in Nairobi are quite effective in identifying and managing risks, this may not be similar in other contexts that could limit the full benefits of risk management.

Impact Assessment and Managing Projects for Safety

On conducting impact assessments and managing projects to prioritize safety in private building construction, respondents gave their insight on how thorough their approach was to this requirement. The findings are presented in Figure 3 below. According to Figure 3, a substantial majority of consultants, 75.8% (65.5% thorough and 10.3% very thorough), consider their approach to conducting impact assessments and managing projects with a focus on safety to be thorough or very thorough. This high percentage of these consultants in Nairobi gives safety a significant consideration during construction management, from the initial impact assessment to the active management of the project. The detail in the impact assessments done by most consultants shows that they are attempting to identify and quantify potential safety risks and hazards associated with the construction project. Consultants can assess how factors like design, materials choice and construction methods may impact safety, identifying and correcting problems before safety issues arise in the first place, in compliance with Occupational Safety and Health Administration (OSHA) standards.

Figure 3

Impact Assessment and Project Management for Safety



Source: Field data, 2024

In addition, many consultants who completely manage projects consider safety as the main aspect of project management practice. It could include establishing and enforcing safety policies, procedures, and standards across the entire construction project, collaborating with. On the other

hand, a minority of consultants indicated that their approach is not thorough (6.9%) or only somewhat thorough when it comes to impact assessments and more broadly with safety-focused project management (3.4%). Although this number is low, it indicates the need to improve and empower the consultants to have a holistic principle to practice early safety in construction projects to minimize the risk. The 13.8% neutral responses from consultants imply there is an element of vagueness or hesitance in comprehending or having trust in their ways of performing impact assessments and safety-driven project management. Although the percentage is low, it highlights the potential for providing more training to consultants to improve their actions to align with industry best practices.

The key informant interviews reveal the strategies and practices adopted by consultants in Nairobi, Kenya, when conducting impact assessments and managing projects to ensure safety in the construction of private buildings. A range of themes emerges from the interviews, on the diligence of consultants when it comes to these fundamental aspects of securing the safety of buildings. A prominent theme from the interviews is the proactive and holistic nature of consultants' assessments of impact. They state that their approach to conducting impact assessments is a regular exercise with steps dedicated to identifying, evaluating and mitigating potential safety hazards during construction. The consultants place great emphasis on the need for conducting the impact assessment with all relevant stakeholders throughout the process, including clients as well as architects, engineers and contractors, so that they can cover a range of perspectives and a broad understanding of identifying safety worries.

Interviews revealed another theme that may contribute to improving safety practices, the incorporation of safety considerations into project management approaches. The consultants explained the steps taken to ensure safety is a top priority during the entire lifecycle of the project from design and planning, to construction and completion. Regular safety meetings, training sessions and site inspections are also prescribed by the consultants as a way to monitor and enforce safety compliance throughout the project.

According to Olatunde (2021), the involvement of consultants in performing impact assessments and applying safety management practices greatly assisted in ensuring safety throughout the project. This aligns with interview findings indicating that consultants were proactive and holistic in their approach to conducting impact assessments for safety in Nairobi, Kenya. In Zambia, Mwanaumo and Thwala (2012) conducted research on critical success factors for health and safety management in the construction industry. The research highlighted how consultants were considered to be committed/vigilant, leading and knowledgeable in promoting safety performance and facilitating a positive safety culture. This correlates to the interview results, which highlighted how the consultants are perceived to have a role in educating clients and promoting a mind-set of making safety the priority in construction projects.

Kheni et al. (2008) examined the health and safety management practices of Ghanaian Construction SMEs. However, SMEs tend to have limited resources, expertise, and commitment to practice comprehensive management with impact assessment and project safety planning. This is in stark contrast to what the interview findings from Nairobi showed which exposed a high level of thoroughness and proactive behaviour in the consultants prioritizing safety. The discrepancy might be due to the emphasis on SMEs in Ghana, in contrast to the interviews carried out in Nairobi, which probably comprised more sizable and established consulting firms.

Conclusion

The study concludes that consultants are involved in developing and implementing safety designs, providing expert advice, ensuring quality control and assurance, identifying and managing risk, conducting impact assessments and project management. While consultants contribute to the safety of private buildings, there is a need for more consistent involvement across all project phases during construction to enhance the safety of private buildings in Nairobi County, Kenya.

Recommendations of the Study

1. To further enhance the contributions of consultants in ensuring the safety of private buildings, it is recommended that professional bodies and regulatory authorities establish mandatory continuous professional development programs focused on safety.

2. Additionally, consultants should be required to actively participate in safety audits and inspections throughout the project lifecycle, ensuring that safety considerations are consistently prioritized and implemented.

3. Sectorial regulatory measures to be instituted and normalised as obligatory requirements for consultants' involvement throughout construction process from inception of project to issuance of completion certificate upon compliance with safety building codes.

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