

Research Article

Assesment of Quality Management Practice on High-Rise Building, the Case of Banking and Insurance Companies in Addis Ababa

Michael Menberu*

Department of Project Planning and Management, Addis Ababa University, Addis Ababa, Ethiopia

Abstract

This research focuses on the assessment of quality management practices within the context of constructing high-rise buildings, with a particular emphasis on buildings designated as headquarters for banking and insurance companies in Addis Ababa. The objective of this study is to gain a comprehensive understanding of the various factors that contribute to the successful execution of complex construction projects in this domain. Employing a hybrid research approach that combines both qualitative and quantitative methods, the investigation explores a range of aspects related to quality assurance, monitoring, evaluation, and regulatory oversight. The study explores the impact of inadequate quality management on the overall quality, structural integrity, and safety of high-rise buildings. It also identifies barriers and challenges in implementing quality management practices, as well as performance indicators and metrics for assessing the effectiveness of quality control measures. Additionally, the research delves into monitoring construction activities for compliance with quality control measures and ensuring quality standards for materials used in high-rise construction. Furthermore, it discusses quality benchmarks, standards, and the monitoring and evaluation of quality assurance measures implementation within organizations, including policies and procedures specific to high-rise building projects. Through interviews with various stakeholders, this study aims to provide valuable insights into enhancing the quality management processes in high-rise construction projects, ultimately contributing to the advancement of building safety and integrity in urban environments. Building upon these insights, the research concludes by presenting a series of strategic recommendations designed to enhance quality management practices in high-rise building construction projects. These recommendations span multiple dimensions, including strengthening regulatory oversight, implementing integrated quality assurance policies, establishing comprehensive monitoring and evaluation frameworks, defining quality benchmarks and performance metrics, ensuring robust materials quality control.

Keywords

Quality Management, Quality Assurance, Quality Control, High-Rise Building, Project Management

1. Introduction

The construction of high-rise buildings has become a prominent feature of urban development in cities worldwide, meeting the demands of a growing population and fostering economic progress. In rapidly urbanizing cities like Addis

*Corresponding author: zxq@ouc.edu.cn (Xueqing Zhang)

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Ababa, Ethiopia, the construction of high-rise buildings has witnessed a surge in recent years. While these structures offer numerous benefits, ensuring their quality, safety, and structural integrity becomes paramount to safeguard the well-being of occupants and the surrounding environment. Effective quality management practices are essential to achieve these goals and deliver successful high-rise building projects [1].

High-rise buildings are considered symbols of modernization, economic growth, and urban prosperity. However, with their increasing number and complexity, ensuring the quality and safety of these structures has become a critical concern for urban planners, engineers, developers, and policy-makers [2].

Quality management in high-rise building construction involves a systematic approach to control and improve various aspects of the construction process, including design, materials, workmanship, and compliance with building codes and industry standards. The absence of robust quality management practices can lead to construction defects, safety hazards, cost overruns, and project delays [8]. Therefore, a comprehensive assessment of quality management practices in high-rise building construction in Addis Ababa City is essential to identify challenges and areas for improvement.

Quality management practices play a pivotal role in ensuring that high-rise buildings meet stringent safety standards, functional requirements, and aesthetic appeal [7]. In the context of Addis Ababa, a rapidly growing metropolis facing significant urbanization and infrastructure challenges, effective quality management in high-rise construction is paramount to mitigate potential risks and enhance sustainable development [10].

The expansion of tall office buildings intended to serve as headquarters for the banking and insurance sector in Addis Ababa is experiencing strong and impressive development, drawing in significant investments [6]. Nevertheless, the swift rate of growth, combined with the need to satisfy the growing requirements for urban banking and insurance services, accommodations, and business areas, could potentially put the quality and safety of construction at risk. Problems like insufficient planning, lower-quality materials, subpar craftsmanship, and ineffective regulatory oversight might emerge, resulting in structural deficiencies, exceeding of budgeted expenses, and project delays [11].

To address these concerns, a comprehensive assessment of quality management practices in high-rise-building construction is imperative. Such an evaluation will help identify strengths and weaknesses in current approaches and enable stakeholders to implement appropriate strategies to enhance construction quality, safety, and overall project success.

2. Research Methodology

The study was conducted within the boundaries of Addis Ababa City. This urban area presents varied scenery consisting of high rise buildings erected mainly to accommodate banking and insurance firms. These high rise buildings

dedicated to financial services are not concentrated in a sole area but are spread throughout multiple sub-cities [12]. This distribution significantly shapes the city's visual identity and overall urban structure. The specific research location was selected based on a range of factors, such as its geographical positioning, architectural design and construction, safety measures and structural robustness, adherence to urban planning and zoning regulations, integration of technological innovations, and the pace of construction advancement [9].

2.1. Research Approach and Design

Research is the process of delving deeper into a subject of investigation. It involves devising a study plan and strategy to obtain data, along with a methodology for data collection, analysis, and interpretation. This chapter explores the researchers' chosen approach and rationale for this thesis. The research approach for this study involves a mixed-methods approach, combining both qualitative and quantitative methods. This approach was chosen to obtain a comprehensive understanding of quality management practices in high-rise building construction for banking and insurance companies in Addis Ababa City. The use of both qualitative and quantitative data allows for triangulation, enhancing the validity and reliability of the findings.



Figure 1. Research design.

The research design is a case study approach, focusing on multiple high-rise building projects for banking and insurance within Addis Ababa City. The case study design was chosen to provide an in-depth examination of quality management practices in real-world contexts and to gain a detailed understanding of the complexities and nuances of high-rise construction projects. Multiple case study sites were selected to ensure a diverse representation of high-rise building projects for banking and insurance in terms of project types, sizes, and complexities. By examining various cases, the research aimed

to capture a comprehensive picture of quality management practices in different settings, providing more robust and generalizable findings.

2.1.1. Data Type

The research utilized questionnaire surveys, organizational interviews, and direct observations to gain insights into quality management practices in high-rise building construction in Addis Ababa City. Contractors demonstrated a strong emphasis on quality management through collaborative efforts. The survey involved stakeholders such as contractors, construction workers, and municipality professionals. Secondary data from literature reviews and city records complemented primary data, enhancing the comprehensiveness and validity of the research findings.

2.1.2. Sources of Data

The investigation utilized both primary and secondary data sources. Primary data collection involved surveys, questionnaires, and interviews with stakeholders such as contractors, construction workers, and government officials. Direct observations of construction sites provided additional insights. Secondary data sources included a literature review and data from city municipalities and government agencies, providing information on regulations, policies, and statistics related to high-rise building construction and quality management.

2.2. Sampling Techniques

The researcher focused on quality management practices in high-rise building projects for banking and insurance company headquarters in Addis Ababa. Purposive sampling was chosen to ensure accuracy, deliberately selecting participants with expertise relevant to the research topic. Selected participants, such as experienced contractors, architects, and engineers, offer specialized insights. Unlike probabilistic sampling, purposive sampling aims to gather unique perspectives rather than achieving representativeness. This approach enriches the study with in-depth insights into quality management practices in high-rise construction in Addis Ababa.

3. Results and Discussion

The construction of high-rise buildings for banking and insurance headquarters in Addis Ababa city highlights the critical role of quality management, integrating architectural excellence, engineering precision, urban development, and economic value. Quality management ensures structural integrity, adherence to regulations, and the incorporation of advanced technologies for security and efficiency. Economically, it mitigates risks and safeguards investments. Community engagement is essential, contributing to positive perceptions and lasting value. Ultimately, quality management is foundational in elevating these buildings beyond mere structures to symbols of excellence and sustainable development.

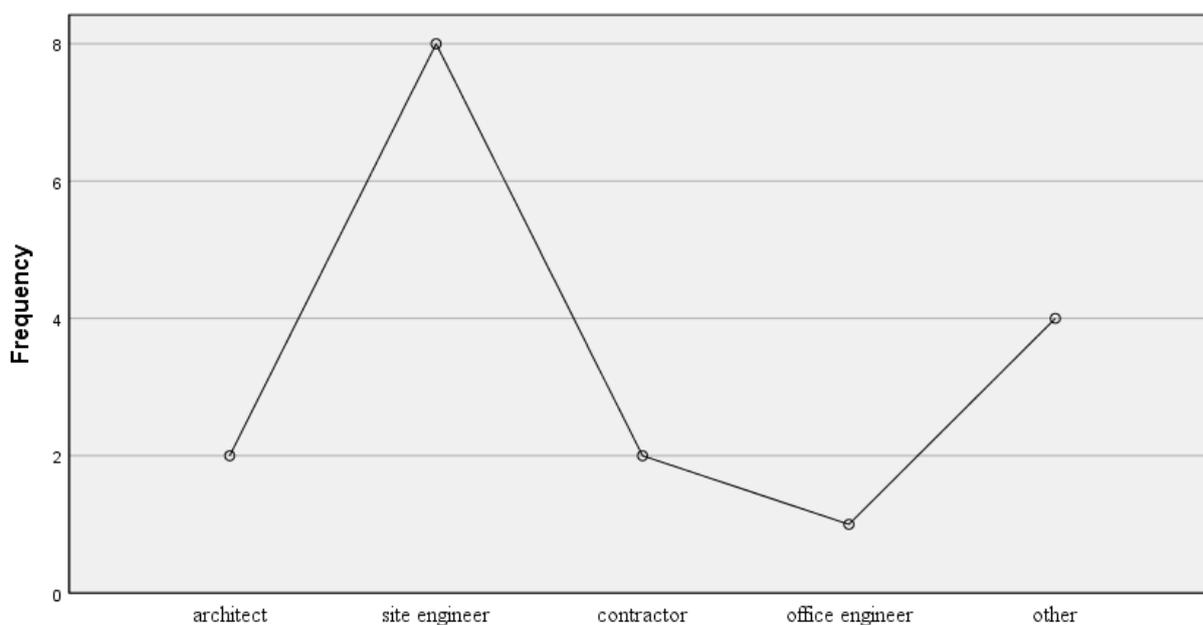


Figure 2. Job position.

3.1. Job Position

High-rise building construction relies on collaboration

among various professionals, each contributing their expertise to ensure effective quality management. Architects provide design vision (11.8%), while site engineers oversee

implementation (47.1%). Contractors coordinate activities (11.8%), and office engineers offer technical support (5.69%). "Others" (23.5%) include resident engineers and project managers. Together, they uphold quality standards, address challenges, and maintain project alignment, enhancing the overall quality of construction through effective communication and interdisciplinary cooperation.

3.2. Quality Assurance Policy and Procedures for High-Rise Building Projects

In the construction of towering structures, maintaining high-quality standards is paramount. The study's examined buildings have implemented meticulous quality assurance policies and procedures, serving as foundational elements for optimal quality management. Quality Assurance, as defined by Arditi and Gunaydin (1997), encompasses various activities to instill quality into work processes, involving policies, training, procedures, standards, guidelines, and systems. Both design and construction professionals share the responsibility of devising tailored QA programs for each project, acting as proactive shields against potential quality challenges. The study buildings display precise standards in concrete quality, work schedules, safety protocols, and in-

vest in labor training initiatives to ensure a skilled workforce capable of delivering uncompromising quality. The focus on robust QA policies and proactive measures underscores contractors' dedication to excellence, contributing to the construction of high-rise buildings of the highest caliber.

3.3. Monitoring and Evaluation of Quality Assurance Measures Implementation in the Organizations

The study observes and assesses the application of quality assurance protocols in the examined buildings, revealing diverse implementation methods. Internal audits are utilized by 23.5%, while an equivalent percentage opts for external third-party audits. Additionally, 35.3% rely on performance reviews, and 11.8% prioritize customer feedback surveys. A minority (5.9%) employ a comprehensive approach, integrating all available options. These methods reflect a commitment to quality, ensuring continuous improvement, objective assessment, process efficiency, and direct user feedback. The multifaceted approach underscores efforts to uphold high standards, ensuring reliable, safe, and impressive high-rise buildings.

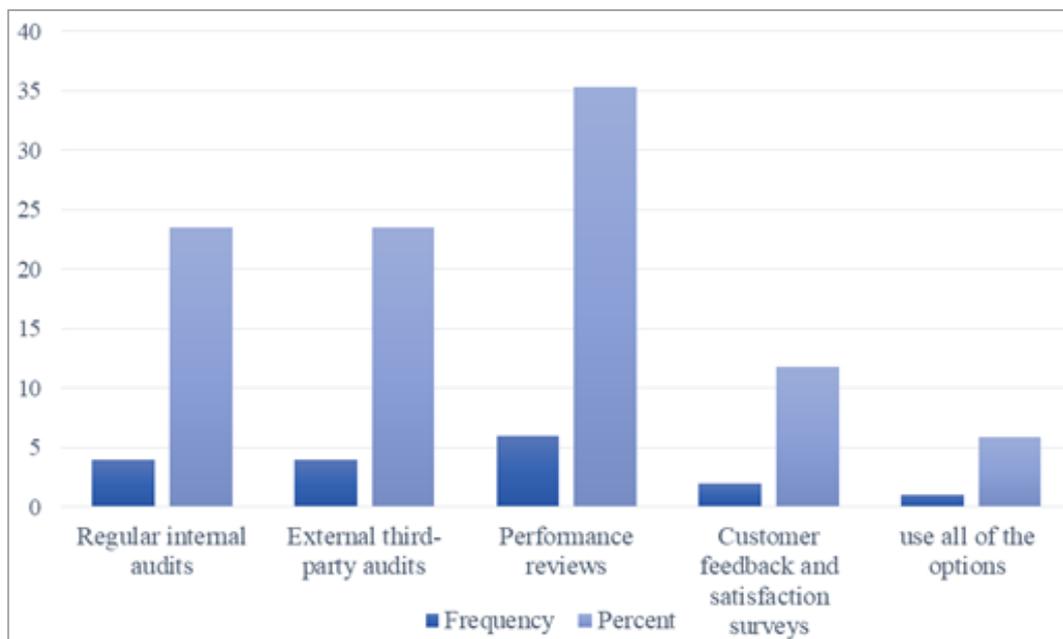


Figure 3. Monitoring and Evaluation of QA Measures Implementation in the Organizations.

3.4. Ensuring Quality Standard for Materials in High-Rise Building Construction

Companies employ various strategies to ensure materials in high-rise building construction meet stringent quality standards. Survey findings reveal diverse approaches: 23.5% rely

on material testing and certification, 17.6% emphasize supplier quality assessments and material inspection upon delivery, while 41.2% adopt a comprehensive approach integrating multiple strategies. This includes supplier assessments, testing, inspection upon delivery, and continuous monitoring during construction. Smaller segments employ combinations of these methods or focus solely on specific steps. Overall, the

study highlights the importance of high-quality materials and the vigilant approach required from initial testing to consistent monitoring, essential for achieving quality management objectives and safeguarding structural integrity in high-rise construction.

3.5. Monitoring Construction Activities for Compliance with Quality Control Measures

Various monitoring approaches are employed to ensure strict adherence to quality control measures in high-rise building projects. Survey data reveals diverse strategies: 11.8% focus on regular site inspections, 17.6% combine inspections with checklists and guidelines, and 17.6% integrate real-time data monitoring systems. A more comprehensive perspective is seen in 23.5% of respondents, who utilize multi-layered approaches including inspections, checklists, real-time monitoring, and independent quality checks. Similarly, 11.8% employ multi-pronged strategies with site inspections, checklists, and independent checks. Other segments prioritize combinations of inspections, independent checks, checklists, or safety incident considerations. These methods underscore a meticulous commitment to quality control, ensuring construction activities align with standards and contribute to safe, high-quality high-rise buildings.

3.6. Performance Indicators and Metrics for Assessing the Effectiveness of Quality Control Measures

The study identifies diverse indicators and metrics used to evaluate quality control measures in high-rise building construction. 11.8% emphasize defect and rework rates, focusing on flaw identification and rectification. 17.6% take a comprehensive approach, including construction schedule adherence and safety incidents. Another 11.8% highlight rework rates, schedule adherence, and safety incidents, emphasizing timely execution and hazard prevention. 5.9% focus on rework rates and safety incidents, aiming to minimize rework and address safety concerns. Notably, 23.5% prioritize construction schedule adherence, emphasizing timely project completion. Additionally, 11.8% consider schedule adherence and safety incidents, emphasizing both timely execution and safety. A holistic approach is seen in 5.9%, incorporating schedule adherence, safety incidents, and customer complaints, reflecting internal quality and external stakeholder perceptions. Overall, these indicators contribute to achieving excellence in high-rise construction while ensuring safety and adherence to timelines.

3.7. Challenges in Implementing QM Practices in High-Rise Building Projects

The study highlights diverse challenges encountered by

respondents in implementing quality management practices in high-rise building projects. These challenges, particularly prevalent in Addis Ababa, include a lack of clear policies, inadequate resource allocation, difficulty in ensuring compliance with standards, and insufficient training on quality practices [5]. Communication issues, time constraints, and resistance to change further complicate the process. Addressing these challenges requires a holistic approach involving policy refinement, resource allocation, stakeholder education, improved communication, and a receptive attitude towards change. Overcoming these hurdles is crucial for achieving quality outcomes and maintaining the construction industry's reputation in the region.

3.8. Barriers to Successful Implementation of Quality Management Practices in High-Rise Building Projects

The effective execution of quality management practices in high-rise building projects faces numerous obstacles, each presenting significant hindrances to achieving optimal outcomes, particularly in banking and insurance headquarters construction. The lack of top management support and commitment to quality is a primary challenge, often leading to a lack of prioritization and resource allocation [4]. Limited access to advanced quality management tools and technologies compounds the issue, hindering progress. Inadequate collaboration and communication among project teams can result in misalignments in quality-focused endeavors. High turnover of skilled labor disrupts knowledge continuity, while financial constraints limit the allocation of necessary funds for quality initiatives [13]. Obtaining timely and accurate quality data poses difficulties, as does integrating quality management into existing processes. Addressing these barriers requires tailored strategies fostering top-level commitment, technological integration, collaboration, workforce stability, financial prudence, streamlined data acquisition, and seamless quality management integration. Overcoming these challenges is crucial for elevating quality standards in high-rise building projects, enhancing the construction industry's reputation.

3.9. Impact of Inadequate Quality Management on High-Rise Building Safety

Inadequate quality management significantly impacts the safety of high-rise building construction, with varied repercussions observed among different contractors. Construction accidents and incidents are heightened, compromising structural stability and resilience. Substandard materials and practices may be utilized, leading to quality and safety concerns. Non-compliance with safety regulations increases risks and potential hazards for building occupants and surrounding areas. These impacts vary across stakeholders, highlighting the dynamic nature of the construction industry. Addressing

these issues requires a holistic approach, including cultivating a robust quality culture, enforcing stringent standards, continuous monitoring, and fostering collaboration among stakeholders. By mitigating the negative effects of inadequate quality management, high-rise building projects, particularly for banking and insurance headquarters, can ensure structural integrity, safety, and the well-being of occupants and surrounding areas [14].

3.10. Impact of Inadequate Quality Management on Structural Integrity of High-Rise Buildings

Insufficient quality management poses direct risks to the stability of high-rise structures, particularly in the construction of headquarters for such buildings. The outcomes include an escalation of structural failures and collapses, endangering lives and disrupting projects. Additionally, compromised quality management undermines building durability, leading to premature deterioration and costly repairs. It also triggers construction defects and errors, compromising functionality and aesthetics. Critical building components may also suffer impairment, affecting overall functionality and occupants' comfort. A comprehensive quality management framework is essential, ensuring adherence to standards, regulations, and best practices through meticulous planning, monitoring, quality checks, and proactive issue resolution. Investing in quality assurance measures can mitigate these risks, enhance structural integrity, and ensure the creation of safe, functional, and enduring high-rise structures [15].

3.11. Regulatory Bodies for High-Rise Construction Projects

Regulatory bodies hold significant sway in shaping quality management practices in high-rise building construction, especially concerning banking and insurance headquarters. Findings from the study reveal varying degrees of regulatory involvement: Comprehensive oversight: A notable 5.9% of respondents report active engagement from all relevant regulatory bodies, including the City Municipality, Construction Authority, Urban Development Authority, and Ministry of Urban and Infrastructure. This collective effort ensures stringent adherence to quality standards. Primary oversight by

Construction Authority: A substantial 17.6% of participants are primarily monitored by the Construction Authority, indicating its pivotal role in ensuring adherence to quality standards. Dual oversight: 5.9% of respondents are supervised by both the Urban Development Authority and the Ministry of Urban and Infrastructure, demonstrating a joint commitment to quality management. Overlapping authority: Another 5.9% of projects are overseen by both the Construction Authority and the Ministry of Urban and Infrastructure, showcasing shared responsibility among regulatory entities. Urban Development Authority's predominant role: 23.5% of projects fall under the purview of the Urban Development Authority, emphasizing its focus on urban planning aspects that influence quality management. Ministry of Urban and Infrastructure's involvement: 11.8% of projects are monitored by the Ministry of Urban and Infrastructure, highlighting its broader infrastructural focus and its impact on quality management initiatives. Overall, regulatory bodies' active involvement ensures adherence to quality standards in high-rise building construction, fostering structures that meet rigorous criteria and contribute positively to urban development and institutional reputation.

3.12. Effectiveness of Regulatory Bodies in Enforcing QS for High-Rise Construction Projects

The study evaluates the effectiveness of regulatory bodies in upholding quality standards during high-rise building construction projects. Responses from participants indicate varying perceptions: 23.5% view regulatory bodies as "effective," signifying confidence in their ability to enforce quality standards. A larger group (35.3%) considers them "moderately effective," acknowledging room for improvement. 23.5% regard regulatory bodies as "ineffective," expressing concern about consistent enforcement. 17.6% are "not sure," indicating uncertainty about regulatory effectiveness. These diverse opinions highlight the complexity of regulatory oversight in construction. They underscore the need for improvements such as transparent communication, stakeholder engagement, monitoring, and timely responses to quality issues. Strengthening these aspects can enhance confidence in regulatory mechanisms, ensuring high-quality, and safe building projects.

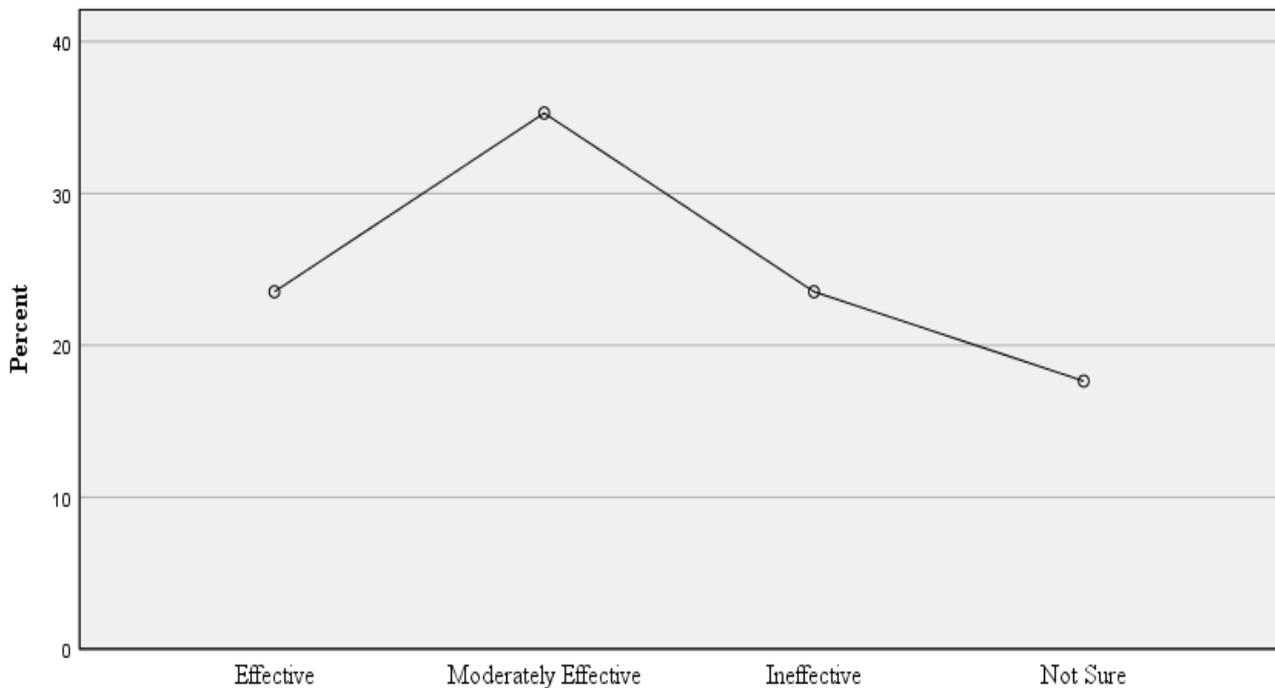


Figure 4. Effectiveness of Regulatory Bodies in Enforcing QS for High-Rise Construction Projects.

4. Results

The research investigated various aspects of quality management in high-rise building construction projects, particularly focusing on the construction of headquarters for banking and insurance companies in Addis Ababa. The findings shed light on the effectiveness of quality management practices, the challenges encountered, and the role of regulatory bodies in upholding quality standards.

Effectiveness of Quality Management Practices

A range of quality management practices were identified, including quality assurance policies, material testing, site inspections, and performance monitoring. Participants reported employing diverse strategies to ensure quality, such as routine audits, performance reviews, and customer feedback mechanisms. Statistical analysis revealed that 41.2% of respondents adopted a comprehensive approach, combining multiple quality management strategies.

Challenges in Quality Management

Common challenges identified included the lack of clear quality management policies, inadequate resource allocation, and difficulties in ensuring compliance with quality standards. Other challenges included communication issues, time constraints, resistance to change, and limited access to advanced quality management tools.

Role of Regulatory Bodies

Regulatory bodies, including the Construction Authority, Urban Development Authority, and Ministry of Urban and Infrastructure, were actively involved in overseeing high-rise building projects. Responses varied regarding the

perceived effectiveness of regulatory bodies, with 23.5% viewing them as effective, 35.3% as moderately effective, and 23.5% as ineffective.

The research highlights the importance of robust quality management practices in high-rise building construction to ensure structural integrity, safety, and sustainability. Challenges identified underscore the need for improved policies, resource allocation, and stakeholder collaboration to overcome barriers to effective quality management. The varying perceptions of regulatory body effectiveness suggest areas for improvement in enforcement and communication. Strengthening regulatory oversight and enhancing quality management practices are essential for achieving high-quality, safe, and sustainable high-rise building projects in Addis Ababa.

5. Discussion

The findings of this research shed light on the effectiveness of quality management practices in high-rise building construction projects, particularly in the context of headquarters for banking and insurance companies in Addis Ababa. The effectiveness of quality management practices, as reported by participants, aligns with existing literature, which emphasizes the importance of comprehensive quality assurance policies and procedures in ensuring high standards of construction. However, the diverse strategies employed by participants highlight the need for tailored approaches to quality management, considering the unique challenges and requirements of each project.

The identified challenges in quality management, such as

the lack of clear policies and inadequate resource allocation, corroborate previous research highlighting similar issues in construction projects. These challenges underscore the importance of addressing organizational and structural barriers to effective quality management, emphasizing the need for improved communication, training, and resource allocation within construction firms. The role of regulatory bodies in overseeing high-rise building projects is crucial for ensuring compliance with quality standards and regulations [3]. While some participants viewed regulatory bodies as effective, others expressed concerns about their efficacy. This variation in perception underscores the complexity of regulatory oversight and suggests potential areas for improvement in enforcement and communication between regulatory bodies and stakeholders.

Future research directions could include exploring innovative quality management approaches, such as the integration of digital technologies and Building Information Modeling (BIM), to enhance construction quality and efficiency. Additionally, further investigation into the specific challenges faced by regulatory bodies and strategies for improving their effectiveness could contribute to advancing quality management practices in high-rise building construction.

6. Conclusions

The assessment of quality management practices in high-rise building projects for banking and insurance companies in Addis Ababa offers a detailed insight into the complexities of executing such projects successfully. The study employs a hybrid research methodology combining qualitative and quantitative methods, providing a comprehensive perspective on quality assurance and control in this specialized construction context. Various aspects of quality management such as assurance, monitoring, evaluation, standards, materials, oversight, and performance metrics were examined. Challenges in implementing quality management practices were highlighted, emphasizing their significant impact on building safety, structural integrity, and overall quality.

Regulatory bodies were found to play a crucial role in upholding standards, but concerns regarding their effectiveness in enforcing quality standards were raised. Inadequate quality management was shown to pose risks to safety, structural integrity, and overall quality of high-rise buildings. The research stresses the importance of stakeholders collaborating to refine and strengthen quality management practices. Addressing challenges, improving regulatory oversight, and fostering a culture of quality commitment were recommended to ensure safer, more durable, and higher quality high-rise buildings.

In conclusion, the research provides a comprehensive understanding of quality management practices in high-rise building projects and advocates for the synergistic use of qualitative and quantitative methods. It aims to empower

stakeholders in making informed decisions and fostering excellence in construction in Addis Ababa.

Abbreviations

List of abbreviations:

HQ: Headquarter

QA: Quality Assurance

QC: Quality Control

QM: Quality Management

QS: Quality Standard

RQ: Research Question

SPSS: Statistical Package for the Social Sciences

TQM: Total Quality Management

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Author Contributions

Michael Menberu is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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Biography



Mr. Michael Menberu serves as a senior lecturer in the Department of Architecture and Urban Planning at Jimma University. He earned his Master of Science degree in Housing and Sustainable Development from Addis Ababa University in 2023. Additionally, he obtained another Master of Science degree in Project Planning and Management from the same institution in 2024. He is also licensed as a Functional Urban Engineer by the Ministry of Urban and Infrastructure Construction Authority in the Federal Republic of Ethiopia.

Research Field

Michael Menberu's research interests are primarily concentrated within the following areas:

Michael Menberu: Housing, sustainability, planning, Architecture, management