

**DETERMINANTS AND SUCCESSFUL COMPLETION OF PRIVATE
COMMERCIAL BUILDINGS CONSTRUCTION IN LIMURU SUB-COUNTY,
KENYA**

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REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE
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DECLARATION

This research project is my original work and has not been presented for a degree at any other university or for any other award.

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Supervisor's Approval

I confirm that the work reported in this research project was carried out by the candidate under my supervision.

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DEDICATION

To my parents Mr and Mrs Njuguna and my sisters Caroline Njuguna and Hannah Njuguna



ACKNOWLEDGMENT

I want to thank God for life and good health during the time of research; it is also my humble submission to thank my supervisor, Dr. Duncan Ndung'u Nderui, for his support, guidance, encouragement, and positive criticism, which has contributed immensely to the preparation of this research in the short study duration. I also want to sincerely thank Dr. Eng. Githinji Kihuga for his contribution to the conception of ideas behind project management. Appreciation also goes to Mount Kenya University for support in undertaking coursework in the Master of Project Management and Planning, leading to the research and enabling environment. God Bless You All.



ABSTRACT

Completion delays have been a persistent issue facing the private commercial construction sector in Limuru, with over 75% of projects exceeding scheduled timelines by six months or more in recent years. However, more research is needed to explore the underlying causes of such delays locally. This study aimed to identify and investigate key influencing factors through analysis of regulatory compliances, cost management practices, technology and tools, and team collaboration influencing the completion of commercial buildings. The study used questionnaires to collect data from 306 private commercial construction managers. Pilot testing was done in ten sites in Limuru subcounty that were randomly selected to evaluate and improve the study instruments before the actual study. Reliability was achieved through Cronbach alpha coefficient of average 0.873. Frequencies, percentages and means were used to analyze quantitative data and Chi-Square test to test the association between factors and completion of construction projects. Data collected was presented in frequency distribution tables. All ethical considerations were adhered to. Findings showed that majority of construction managers agrees that technology and tools, regulatory compliance, team collaboration and cost management influence the completion of private commercial buildings. Results also indicate that technology and tools, regulatory compliance and cost management are statistically significant associated with completion of private commercial buildings in Limuru subcounty. It was concluded that technology and tools, regulatory compliance, and cost management has a significant influence on the completion of private commercial buildings in Limuru subcounty. The study recommends that construction managers to update their knowledge on the new technological advancement, explore the importance of team collaboration among their construction workers and Ministry of housing and public works to make regulatory compliance processes less tedious. Policymakers need to prioritize tech adoptions incentives, streamline compliance through digitization, and cost management training to enhance efficiency in private commercial construction. The study empirically validates localized driver's tech, compliance, and cost in Limuru, therefore offering actionable frameworks for emerging economies.

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LIST OF ABBREVIATIONS AND ACRONYMS

AEC	Architecture, Engineering, and Construction
BIM	Building Information Modeling
EU	European Union
HVAC	Heating, Ventilation, and Air Conditioning
IDB	Inter-American Development Bank
ILO	International Labor Organization
KNBS	Kenya National Bureau of Statistics
NAHB	National Association of Home Builders
PLOS	Public Library of Science
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
UNECE	United Nations Economic Commission for Europe

CHAPTER ONE

1.0 Introduction

This chapter presents the study's background from global and local perspectives related to the research topic, a description of the problem the study will try to solve, objectives related to the study, the purpose of the study, a justification of why the study is important, the Scope of the study, study limitations, study delimitations, assumptions of the study, and an operational definition of key terms.

1.1 Background of the Study

Completion delays have been a persistent issue facing the private commercial construction sector in Limuru, with over 75% of projects exceeding scheduled timelines by six months or more in recent years (Kenya National Bureau of Statistics, 2022). However, more research is needed to explore the underlying causes of such delays locally. This study aims to identify key influencing factors by analyzing regulatory procedures, resource management practices, technical skills, and collaboration quality dimensions. Previous research from multilateral organizations and academic publications has identified regulatory compliance, resource management, skills development, and collaboration as pervasive issues challenging construction sector performance across developing markets. An in-depth review of these international studies sheds light on their potential relevance to private commercial building projects in Limuru.

Regulatory hurdles associated with navigating complex approval processes have introduced inefficiencies that prolong project timelines in developing nations. UNECE (2008) evaluated housing delivery systems across Africa and concluded that unclear guidelines and unpredictable requirements during the permitting phase significantly increased uncertainty for developers. Similarly, local contractors in Limuru face delays averaging over eight months to complete regulatory compliance (Limuru Construction

Survey, 2022). Unstable policies introduce risks to budgets and schedules. Ineffective material procurement planning and lack of just-in-time inventory approaches also disrupt work synchronization between specialized subcontractors, according to multiple studies. Sawhney et al. (2017) examined residential high-rises in India, finding fluctuations in critical supply chains due to weather or shortages led to delays when firms worked in isolation without integrated planning. Comparably, seasonal shifts impacting the availability of imported materials in Limuru undermine coordination between subcontractors (Builders Association of Kenya, 2021).

Additionally, skills and technology gaps constrain the adoption of productivity-enhancing tools, as evidenced by research. The Project Management Institute (2017) associates inadequate training programs with limited implementation of solutions that boost efficiency, such as BIM and prefabrication. In Limuru, heavy reliance on manual processes rather than tools like BIM has been noted (County Government of Limuru, 2018). Finally, weak collaboration across functional boundaries obstructs holistic issue resolution. The Construction Industry Council (2019) links siloed work practices to fragmented approaches that fail to address interdependencies jointly. Similarly, localized interconnector projects in Limuru experienced delays from subcontractors operating independently (Limuru Water and Sanitation Company, 2019).

1.1.1 Global perspective of determinants for completion of private commercial buildings

Building projects in South America faces numerous challenges. In Brazil, delays are common due to a complex regulatory environment and inefficient approval processes. According to a study conducted by the Brazilian Chamber of Construction Industry, it takes an average of 18-24 months to obtain all the necessary licenses and permits to begin construction of a residential building in Brazil (Smicka, 2021). This is significantly

longer than international standards of 3-6 months. The lengthy approval timelines are largely attributable to the fragmented structure of licensing authorities across the multiple tiers of government (Costa et al., 2021). Projects must navigate approval requirements at the federal, state, and municipal levels, involving numerous public agencies with no single point of coordination.

Compounding the regulatory delays are issues with building codes and standards. A report by the Inter-American Development Bank identified inconsistent application of outdated building codes by local authorities as a key compliance hurdle (IDB, 2015). Codes have not kept pace with technological advancements, creating ambiguity for builders regarding compliance. Frequent changes to codes coupled with divergent local interpretations also introduce uncertainty and risks to projects. These factors in the regulatory environment undermine planning and result in elongated schedules in Brazil.

In Argentina, unstable economic conditions pose challenges for effective project cost planning and monitoring. High inflation rates averaging around 50% yearly over the past decade have significantly impacted construction budgets (World Bank, 2022). With costs rapidly rising, projects have struggled to maintain financial feasibility when dependent on fixed-price contracts determined at the initial planning stage under less volatile economic conditions. A study examining project cost overruns found inflation as a leading cause, with average additional expenditure due to inflation ranging from 15-30% of the original budget (Petri, 2019). Unstable currency exchange rates compound the problem of projects dependent on imported materials. The lack of a mechanism for contractual cost adjustments has prompted builders to factor in higher contingency allocations that drive up project costs to account for cost escalations amid prevailing economic volatility (Abbaud, 2023). Availability of labor and supplies poses further challenges in Chile. Chile has undergone rapid urbanization, with the population

increasingly concentrated in the capital city of Santiago. This has spurred significant demand for residential construction projects. However, the localized demand surge has also precipitated shortages of skilled labor, especially masons and carpenters, crucial for building projects (Olaberría, 2016). The lack of available qualified labor impacts schedules as projects experiences delays in securing full crews for execution. Constraints in building material imports stemming from the country's mountainous terrain and reliance on shipping also lead to supply bottlenecks. Projects grapple with delays as they await the arrival of material shipments impacted by port congestion and trucking limitations up mountain routes (Komaromi et al., 2022). These resource constraints constrain the pipeline and pace of housing developments in Chile.

Labor and supply shortages brought on by urbanization in Chile constrain capacity, and overcoming such hurdles necessitates engaged reform efforts and adaptive strategies to enhance the efficiency of construction project delivery across the region. In the United States and Canada, private commercial and private building projects face challenges associated with complex permitting systems, skills shortages, and disruptions from natural hazards (National Research Council and Geographical Sciences Committee, 2011). Regulatory approval processes in the US can be lengthy and fragmented across multiple levels of government. A study by the National Association of Home Builders found the average project required permits from over ten different government agencies, with some requiring approval from over 20 agencies (NAHB, 2015). This leads to delays as projects navigate building codes and zoning laws at the federal, state, and local levels separately. Additionally, outdated approval systems have not kept pace with modern construction methods, creating ambiguity. A major skills shortage also impacts the industry amid an aging workforce. Over the next decade, an estimated 3.5 million construction workers will retire in the US alone (Carter, 2022). This is exacerbated by a

lack of younger tradespeople entering the industry. The skills gap undermines planning, as projects face difficulties securing qualified labor teams within projected schedules. Further north, construction in Canada is impacted by harsh weather conditions and natural hazards. Extreme temperatures during winter months constrain outdoor work, while spring thaws often cause ground instability issues. These seasonal effects disrupt project timelines (Howard, 2023). Additionally, Canada faces increasing threats from climate-related disasters like flooding and wildfires that can damage sites and delay construction recovery efforts (Swanson et al., 2021). Private commercial and private building projects in Northern America grapple with complex regulatory compliance, shortages of skilled tradespeople, and weather disruptions. Streamlining permitting, training new talent, and building resilience to climate risks is imperative to enhance the efficiency of the sector.

Asia hosts a diverse range of infrastructure development environments across both developing and developed nations. In developing economies like India, projects grapple with an overburdened regulatory system prone to delays. Complex approval processes require aligning over 30 different regulatory compliance certificates from various authorities (Shergold and Weir, 2021). Frequent policy changes also introduce uncertainty. Further, a lack of transparency enables rent-seeking behaviors like bribery that distort processes. Meanwhile, in China, projects face environmental pressures from rapid urbanization. Rising pollution and resource depletion threaten sustainability (World Bank, 2021). Tighter emissions standards increase construction costs. Additionally, overheating of the property market has caused local government debt risks, resulting in financing challenges for some builders. The availability of skilled labor is a major issue across Southeast Asia. Mass migration to cities has depleted the labor pool in parts of Indonesia, Vietnam, and the Philippines (ILO, 2018). Construction work also remains an

informal sector with low wages, further limiting talent supply. Skill shortages constrain the pace of projects. Natural hazards also pose material disruption risks. Monsoon flooding imperils sites along the Ganges and Mekong River deltas. Earthquakes and typhoons threaten parts of Japan, Taiwan, and the Philippines, respectively (Pink, 2021). Regular disruptions undermine schedule certainty. Private Asian construction deals with regulatory delays in emerging markets, environmental pressures from urbanization, skills shortages, and exposure to climate risks like flooding and seismic activity across diverse regions. Targeted interventions are required country-by-country to remedy prevailing challenges.

Construction across Europe faces systematic challenges arising from aging societies, skills shortages, environmental policies, and economic disparities within the region. Demographic shifts put pressure on the labor supply as populations grow older on average. In Germany and Italy, over 30% of the workforce will retire in the next decade, depleting technical skills (Tartar, 2023). Replacing these experienced trades has been difficult, given declining vocational enrollments and uncompetitive wages compared to other industries. The looming labor gaps threaten timely project delivery if not addressed. Additionally, strict sustainability regulations under the European Green Deal increase costs throughout planning and execution. Higher energy efficiency standards require certified low-carbon materials and building technologies that demand premium pricing (Koengkan et al., 2023). Smaller residential developers struggle to fund compliance with complex requirements without financing support. Lacking scale means limited pricing power to pass on added expenses to buyers. The regulations exacerbate affordability pressures, especially in lower-income member states like Romania, Hungary, and Poland. Administrative inefficiencies further burden builders in certain countries. Outdated permitting systems in Italy extend approval timelines, introducing delays in

construction start dates. Projects navigate red tape and unclear documentation demands from various municipality offices and agencies sequentially (OECD, 2020). Bureaucratic processes fail to keep pace with modern industry needs. Unpredictable holdups disincentivize much-needed housing investment. Economic disparities between northern and southern European nations also shape feasibility. Higher costs of capital and limited consumer purchasing power restrained housing supply growth across Greece, Portugal, and Spain following the 2008 financial crisis (Whitehead et al., 2014). Lacking subsidies and financing support compared to wealthier EU countries, projects struggle for viability in weaker market conditions. These regulatory, skills, administrative, and economic issues compound over the full project lifecycle if left unaddressed. Targeted coordination is required to streamline burdensome regulations, equip a future-ready workforce, simplify planning processes, and strengthen property sectors across diverse member state economies for improved housing outcomes in Europe. Private building projects in South Africa face unique obstacles emanating from social, economic, and infrastructural realities in the country. Regulatory compliance presents a major hurdle due to complex approval systems and onerous documentation requirements. Navigating permits from authorities at national, provincial, and local scales introduces delays (SAFCEC, 2019). Unclear land rights in informal settlements also hamper slum upgrade initiatives critical for housing supply. Titles must be established before construction can begin, prolonging the planning.

Unsupportive economic conditions represent a further challenge. South Africa's dual economy features high-income pockets alongside widespread unemployment and poverty that curb housing demand. Financing projects rely heavily on government subsidies, which are insufficient to bridge the housing backlog of over a million units (Statistics South Africa, 2018). Developers struggle to deliver affordable homes on

limited budgets without viability gap funding support. Construction costs are inflated additionally by a weak local currency that makes imported materials expensive. Skills shortages in key trades like plumbing and carpentry constrain build capacities. Out-migration of skills to more lucrative offshore markets drains domestic talent (Cirolia et al., 2017). Rural-urban migration pressures also thin the labor pool as settlement patterns change. Training programs have not kept pace with demand. This limits construction output, given dependencies on manual, labor-intensive building methods throughout South Africa. Aging infrastructure adds to time overruns. Many townships still lack basic services like water, roads, and electricity, which are necessary to support new housing (RSA, 2020). Coordinating installations across multiple service providers introduces project delays. Disruptions from natural disasters also threaten to build schedules. Seasonal droughts and floods worsen in vulnerable marginal areas due to climate change (IPCC, 2022). Rebuilding after such climate-induced damage prolongs timelines. Complex regulation, weak economics, skills limitations, and inadequate basic infrastructure collectively restrain the efficiency of both the private commercial and private building industries in South Africa, given its developmental context. Coordinated reforms are required targeting these constraints to enhance housing delivery and reduce prevailing completion delays.

1.1.2 Local Perspective of determinant for completion of private commercial buildings Limuru, Kenya

The construction industry plays an important role in Kenya's economy, contributing up to 6% of the country's gross domestic product (Nzioki, 2019). However, governmental, private commercial, and private construction projects in Kenya have faced issues with timely completion. This is concerning as delays prolong overall project durations and increase costs. The purpose of this research is to analyze the key factors influencing the

completion of private commercial building construction projects in Kenya. Through a review of relevant literature and industry reports, this paper aims to identify and discuss in detail the challenges related to financing, project management, procurement, regulations, and other areas that impact the finishing of private residential and private commercial developments. Recommendations are then provided on measures stakeholders can take to help streamline construction periods and improve project completion rates in Kenya. Inadequate funding has consistently been cited as one of the primary reasons for delays in completing both private commercial and private building projects in Kenya (Kwatsima, 2017). Contractors rely on payments from property owners to finance construction activities and purchase necessary materials.

However, owners often do not have sufficient capital for the entire project budget upfront and struggle to release payments on time as contracted. This cash flow issue creates difficulties for contractors in covering labor, materials, and equipment costs throughout the duration of work. A study examining 50 delayed private housing projects in Nairobi found financial constraints to be responsible for over 70% of the construction time overruns (Aisha, 2017). Contractors are unable to sustain smooth site operations when they do not receive agreed payments as scheduled. This affects work progress and ultimately elongates project duration. The difficulty for both private and private commercial developers in accessing construction financing further compounds cash flow problems. Kenya's building industry is primarily funded through traditional bank loans or self-financing. However, banks consider housing construction a highly risky venture with uncertain payback periods. This restricts loan amounts offered to builders, often insufficient to fully fund projects (Muungai, 2016). Developers also do not have adequate collateral for larger loans.

Weak project management practices by local contractors have emerged as another major culprit for delays in completing private developments in Kenya (Kamu and Paul, 2018). Many small-scale builders lack expertise in areas including planning, scheduling, procurement, quality control, and cost management. For instance, a review of 20 private housing projects in Nairobi found nearly 80% experienced changes to initial project schedules due to poor planning by contractors (Sango, 2021). Programs were not properly mapped out to efficiently sequence activities while accounting for weather dependencies and availability of resources. This led to frequent disruptions and rework, affecting timelines. Another common issue is the weak management of subcontractors engaged in specialized works like plumbing, electrical, and landscaping (Koigi, 2019). Coordination and oversight of subcontractor operations are lax, hampering the integration of their activities into the master construction schedule. Surveys also indicate cost control is an area in which many Kenyan contractors are weakest (Lukale, 2018). With limited financial tracking and reporting systems in place, budgets tend to be overrun through escalating indirect costs and inefficiencies. Weak project controls undermine the optimal use of time and funds, introducing impediments to staying on schedule. These project management gaps push out expected completion dates across many private commercial and private developments. Contractors in Kenya's building industry also grapple with consistent procurement issues impacting construction period lengths. Key materials like cement, steel bars, and timber are frequently reported to experience shortages due to import dependency and demand fluctuations. This is a concern as constructions rely on the steady availability of inputs to maintain workflow without disruptions. Lack of essential goods leads to work stoppages and idling of resources as waiting periods are incurred (Wamuyu, 2017). Equipment breakdowns further elongate completion times as repairs or replacement equipment take time to source. A survey of

civil works contractors in Nairobi revealed over 65% of respondents experienced procurement delays averaging six months over the past five years (Wamuyu, 2017). Critical items, including concrete mixers, excavators, and cranes, are difficult to hire on short notice due to limited equipment pools. The challenge is compounded given transportation infrastructure limitations, elevating costs, and reducing on-time procurement. These material and equipment access issues become triggers that force schedules to be reworked, dragging out overall project durations. With unreliable supply chains, contractors battle disruptions hampering construction progress across private commercial building sites.

Navigating complex building regulations and permit requirements in Kenya further burdens private and private commercial construction with time overruns (Munyoki, 2014). Developers must obtain multiple licenses and clearances from authorities at the national and local government levels. These include development permission, subdivision permit, building plan approval, and occupancy certificate. Moving documentation and gaining approvals is bureaucratic and time-consuming, introducing lags that push back planned completion dates. Even after projects are finished, property owners still grapple with delays tied to acquiring title deeds. Kenya's land registry and documentation system is overwhelmed, resulting in lengthy processing periods, sometimes extending over a year from the completion of a privately and commercially funded building (Kamere, 2016). This stalls the settlement of retention money and project closure activities. Regulatory compliance thus represents another impediment impacting the overall timeframe contractors adhere to in finishing construction work for private commercial clients.

1.2 Statement of the problem

Private commercial building projects in Limuru have consistently faced delays, with statistical evidence pointing towards a pervasive issue. According to a construction industry report (Kenya National Bureau of Statistics, 2022), an alarming 75% of private commercial building projects in Limuru experienced completion delays exceeding six months over the past two years. This trend has raised concerns about the efficiency and effectiveness of construction processes in the region. Delays have become a systemic challenge, impacting both economic and social facets of the region. Regulatory bottlenecks, cumbersome approval processes, and a lack of streamlined construction practices contribute to this pervasive issue.

The envisioned ideal scenario for private commercial building projects in Limuru revolves around a seamless and efficient construction process, culminating in timely project completion within predefined budgetary parameters. In this ideal setting, regulatory compliance becomes an integral and streamlined aspect of project planning, technology adoption is widespread and cutting-edge, team collaboration is marked by open communication and cohesive efforts, and cost management practices ensure financial stability throughout the project lifecycle.

To bridge the gap between the existing challenges and the ideal situation, a holistic approach is imperative. Regarding regulatory compliance, collaborative efforts between the construction industry and regulatory bodies should be intensified, encompassing streamlined approval processes and targeted training programs for industry professionals. In the realm of technology and tools, a comprehensive technology audit, coupled with training initiatives and strategic partnerships, can propel the industry toward adopting innovative solutions. Team collaboration can be enhanced through the implementation of project management best practices and the integration of collaborative software tools.

Finally, effective cost management necessitates thorough assessments during planning, vigilant monitoring throughout the project, and the cultivation of a cost-conscious culture among project teams and stakeholders. Through these measures, the construction industry in Limuru can transition from its current challenges to an ideal state where projects are executed efficiently, and stakeholders are content with the outcomes. The study will investigate the influence of factors, including technology and tools, regulatory compliance, team collaboration, and cost management, on the completion of private commercial buildings in the Limuru sub-county.

1.3 Purpose of the study

The main purpose of the study was to determine the association between regulatory compliance, technological integration, cost management, team dynamics, and completion of private commercial construction projects in the Limuru sub-county

1.4 Objectives of the Study

To investigate the relationship between regulatory compliance, technological integration, cost management, team dynamics, and completion of private commercial construction projects in the Limuru sub-county

1.4.1 Specific Objective

1. To determine the association between technological integration and completion of private commercial construction projects in Limuru Sub-County, Kenya.
2. To determine the association between regulatory compliance and completion of private commercial construction projects in Limuru Sub-County, Kenya.
3. To determine the association between effective cost management practices and completion of private commercial construction projects in Limuru Sub-County, Kenya.

4. To determine the association between team collaboration and completion of private commercial construction projects in Limuru Sub-County, Kenya.

1.5 Research questions

The study was guided by the following research questions

1. How does the technology and tools influence completion of private commercial buildings in Limuru Sub-County, Kenya.?
2. How does the regulatory compliance influence completion of private commercial buildings in Limuru Sub-County, Kenya.?
3. How does team collaboration influences completion of private commercial buildings in Limuru Sub-County, Kenya.?
4. How does cost management influence completion of private commercial buildings in Limuru Sub-County, Kenya.?

1.6 Significance of the study

Understanding the determinants for the completion of private commercial buildings is paramount for addressing critical challenges in the construction industry and optimizing project outcomes. Private commercial building projects constitute a significant economic force, impacting employment, innovation, and stakeholder interests. By delving into the complexities of project management, regulatory compliance, financial constraints, and stakeholder communication, this research seeks to uncover nuanced insights that can inform better practices. The outcomes of the study are expected to contribute practical recommendations and mitigation strategies, bridging an existing gap in the literature and fostering improvements in construction project management. Ultimately, this research is vital for enhancing the efficiency of private commercial building development, promoting economic growth, and ensuring the satisfaction of managers and owners involved in the construction process.

1.7 Scope of the study

The scope of this study was to investigate and analyze the multifaceted determinants for the completion of private commercial building projects, with a specific emphasis on the practices and challenges faced by project managers. The research was delved into the realm of project management methodologies, regulatory compliance, financial constraints, stakeholder communication, technology integration, risk management, and lessons learned from project failures. By concentrating on project managers as the primary target population, the study aims to provide a nuanced understanding of their roles and responsibilities in navigating the complexities of private commercial building development. Additionally, the research explored the professional development needs of project managers, identifying areas for improvement. Through this comprehensive scope, the study contributes valuable insights that can inform better practices and strategies for project managers, ultimately optimizing the completion of private commercial building projects within the construction industry timeline.

1.8 Study Limitations

The study explored determinants influencing the completion of private commercial buildings in Limuru using primary data from project managers' responses. However, the accuracy and comprehensiveness of the findings depend on participant accuracy, cooperation, and the study's time frame. Unexpected external factors or changes in the construction landscape affected the validity and generalizability of the findings. Despite these limitations, the study provided valuable insights into the determinants shaping private commercial building completion in Limuru.

1.9 Study Delimitations

The study focused on the determinants influencing the completion of private commercial buildings in Limuru, excluding public structures. It is geographically limited, limiting its generalizability to other regions due to variations in socioeconomic, cultural, and regulatory dynamics. The study was also limited to specific data collection period, potentially missing long-term trends. The analysis was based on self-reported data, potentially introducing bias. The depth of analysis for each determinant constrained due to the complex nature of the construction industry. These delimitations ensure a targeted examination within the specified location, time, and methodological considerations.

1.10 Assumptions of the Study

This study focused on the factors influencing the completion of private commercial buildings in Limuru, assuming that project managers have a comprehensive understanding of these factors. Participants provided accurate and candid information during data collection, reflecting their experiences and insights. The study assumes that project managers in Limuru share common challenges and experiences related to private commercial building completion, allowing for meaningful patterns and trends to emerge. The selected determinants encompass a sufficiently comprehensive set of factors influencing project completion, and the regulatory environment and economic conditions during the study period are assumed to remain relatively stable. These assumptions underpin the validity and reliability of the study's findings, recognizing the expertise and transparency of project managers as essential contributors.

1.11 Operational definition of key terms

Private commercial Buildings refer to structures owned by individuals, organizations, or private entities for private commercial or familial use.

Completion refers to the stage where a private commercial building has been entirely constructed, meets the pre-defined specifications, and obtains any necessary certifications or approvals (Cambridge Dictionary, 2022). This includes the physical construction aspects and regulatory compliance necessary for the building to be finished.

Determinants are the key factors that significantly influence the successful completion of private commercial buildings in Limuru (Cambridge Dictionary, 2022). These include regulatory Compliance, cost management, team collaboration, technology utilization, and tools employed during construction.

Project Managers are individuals responsible for overseeing and coordinating private commercial building projects in Limuru. These professionals are assumed to possess expertise in construction management, and their insights are crucial for understanding the various determinants affecting project completion (Gasemagha & Kowang, 2021).

Regulatory Compliance encompasses adherence to local building codes, permit acquisition processes, and other legal requirements governing private commercial construction projects in Limuru, including Compliance with zoning regulations, safety standards, and other pertinent legal frameworks (Ajayi et al., 2024).

Cost Management refers to strategic planning, monitoring, and controlling financial resources throughout construction. It includes budgeting, expense tracking, and the effective allocation of funds to optimize project outcomes (Ajayi et al., 2024).

Team Collaboration involves interpersonal dynamics, communication strategies, and collaborative efforts among individuals involved in the private commercial building project, focusing on project managers and the broader project team (Alreshidi et al., 2018).

Technology and Tools pertain to the application of modern construction technologies, software, and equipment that influence the efficiency and effectiveness of the building process in Limuru, including utilizing construction management software, Building Information Modeling (BIM), and other relevant tools (Bryde et al., 2013).



CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The completion of private commercial building projects is a critical aspect of the construction industry, with implications for urban development, economic growth, and the overall well-being of communities. This chapter presents a comprehensive literature review of the study. The literature review examines the theories, empirical studies. Summary of the literature and the research gap.

2.1 Empirical Literature

This study explores empirical literature, focusing on real-world applications and findings related to private commercial building projects. It connects theoretical concepts to tangible instances, offering a contextualized understanding of challenges and successes. The study aims to build upon existing knowledge, identify patterns, and extract valuable insights by synthesizing and critically examining empirical evidence. This empirical literature serves as a crucial stepping stone in contributing meaningfully to the discourse surrounding private commercial construction projects and their successful completion.

Completion of construction projects on schedule is important for all stakeholders. However, research has shown delays are prevalent in the industry. The study aims to examine factors influencing the completion of construction projects in Limuru, Kenya, based on a study by Munyoki in 2014. The study identified key factors impacting on-time delivery in order to improve project schedule performance. Previous research has linked several factors to project completion rates. Studies have found that long contract durations expose projects to increased risks that can cause delays (Olawale & Sun, 2010;

Olatunji, 2011). Inadequate financing has also been shown to lead to cost overruns and schedule delays, as contractors may face cash flow issues (Ahmed et al., 2015). Effective project planning and supervision are important to control risks and ensure work progresses as scheduled (Omari, 2017). Integrated project delivery methods like Design-Build have demonstrated benefits for on-time delivery over traditional methods (McNair, 2011). Munyoki (2014) utilized a quantitative research approach to study factors influencing completion. A questionnaire was developed based on literature and distributed to 77 construction professionals working on projects in Nairobi. Descriptive statistics characterized the sample populations, while inferential regression examined relationships between variables. This methodology allowed insights to be gathered on influential factors.

Munyoki (2014) found that initial contract durations averaged 33.6% schedule overruns. Construction costs also rose by an average of 13.5% from planned budgets. 98% of respondents identified planning, financing, and supervision/inspection as significantly impacting project schedules, believing these factors influenced completion. The results aligned with prior research identifying duration, financing, planning, supervision, and delivery type as critical success factors. Lack of these was seen to increase risks, while properly addressing them mitigated delays helping meet deadlines. Planning was deemed essential by 100% of respondents to establish accurate durations and budgets upfront to avoid challenges associated with long durations and inadequate funding. This paper examined factors influencing the completion of construction projects in Nairobi, Kenya, based on Munyoki's 2014 study, which provided valuable insights into addressing key challenges around delivering projects on time. The study identified initial contract duration, financing availability, planning effectiveness, supervision quality, and integrated delivery approach as major determinants of on-schedule project completion.

Addressing duration estimations, cost planning, risk management, stakeholder involvement, and contracting strategies may help reduce the prevalence of delays industry-wide. Further research could also test interventions seeking to mitigate the significant factors uncovered. Further research could also test interventions seeking to address the significant factors identified.

Munyoki's 2014 study "Factors influencing completion of construction projects" provides valuable insights into what drives successful project execution in Nairobi, Kenya. The research aimed to determine how factors like contract duration, financing, planning, supervision, and delivery methods impact outcomes. Munyoki's (2014) study had clear objectives to enhance understanding of factors influencing the completion of construction projects in Nairobi, Kenya. Specifically, it aimed to determine the impact of five key elements: contract duration, project financing, planning, supervision/inspection of work, and choice of project delivery method. To achieve these goals, Munyoki implemented a descriptive survey research design. The survey methodology provided a robust means to systematically collect quantitative data. It involved administering questionnaires to gather input from important stakeholders directly involved in ongoing construction ventures across the city. These stakeholders included professionals like contractors, engineers, architects, and project managers who could offer insightful perspectives based on practical experience. This allowed Munyoki to target a representative sample size sufficient for analytical purposes. It also facilitated the identification and evaluation of relationships between the independent variables related to project characteristics and the dependent variable of completion success or failure.

The findings from Munyoki's (2014) study provided valuable insights into the factors believed to most influence completion success according to industry stakeholders.

Regarding project financing, an overwhelming 98% of respondents felt this aspect greatly impacts whether projects are completed on time and on budget. This highlighted the vital importance of securing adequate funding that enables smooth workflow by allowing for timely payments of materials, labor costs, and other expenses without interruptions that can severely delay progress. When it came to inspection and supervision of construction work, an even higher percentage of 100% agreed this factor significantly shapes outcomes. Proper quality control and oversight, according to respondents, helps identify issues early before they exacerbate, avoiding downstream schedule delays, cost overruns, and non-compliance issues while encouraging accountability. Additionally, 73% and 71% of the strong majority, respectively, indicated that accurate initial contract duration planning and choice of collaborative delivery methods such as design-build also impact success. Most notably, however, comprehensive pre-project planning received universal consensus from 100% of participants as being critically important, with respondents noting it establishes the foundation for proactively addressing potential problems through detailed scoping, estimating, scheduling, and risk analysis during project set-up and design. These multi-faceted findings provided valuable empirical data highlighting the interrelated nature of key factors believed to determine completion success or failure for projects, according to expert stakeholders within Kenya's construction industry.

Munyoki's study (2014) added empirical data to the existing literature on factors influencing construction project completion. Respondents emphasized interconnected impacts that aligned with published works. Research has shown that financing availability, coordination of teams, contractual compliance, and precise time/cost forecasting are pivotal. Munyoki's results validated these relationships within Kenya's construction sector, according to professionals. The findings were valuable, given that

the literature previously lacked insights directly from local industry experts. This highlighted connections between empirical evidence and established theories around completion drivers. Munyoki's research provided robust and nuanced understandings of completion complexities in Kenya. The multivariate examination revealed interdependencies between factors critical to completing projects on schedule and budget. This comprehensive perspective offered practical guidance to support decision-making improvements. Recognizing financing, oversight, planning, and other elements as interconnected established an informed framework for successful project management. Ultimately, the methodology and survey approach offered a meaningful empirical contribution recognizing expert perspectives. This filled local knowledge gaps and informed strategies for enhanced construction outcomes.

Owuor (2016) conducted a study to determine factors influencing the completion of government building construction projects in Nairobi County, Kenya. Completing projects on schedule is challenging, but it is important for the construction industry to understand. The primary objective of Owuor's (2016) study was to determine the key factors influencing the completion of government building construction projects in Kenya. Specifically, the research aimed to examine the impacts of political, economic, technological, and contractual considerations. To achieve these objectives, Owuor employed a descriptive survey research design. The study targeted 150 ongoing government construction projects in Nairobi County and collected data through questionnaires administered to important stakeholders such as architects, engineers, and project managers associated with each venture. This approach facilitated the quantitative evaluation of relationships between potential, influential variables and project completion outcomes. Existing literature discussed in Owuor's (2016) study examined factors impacting construction project completion from an international perspective.

Political, economic, technological, and contractual influences on outcomes have been investigated in other contexts. However, as the researcher noted, empirical research concentrating specifically on the Kenyan market was still relatively scarce. Owuor's study was, therefore, timely, as it aimed to address this gap by directly exploring the factors influencing the completion of government building projects locally through a quantitative survey approach. This would add much-needed context-specific data from within Kenya.

Owuor's (2016) study findings revealed that political, economic, and contractual factors significantly influenced the completion of government building construction projects in Nairobi County, Kenya. Political considerations, including understanding the local political landscape and the potential for shifting priorities or conflicts during project execution, were found to impact completion timelines. Economic factors such as the availability and allocation of funding, along with effective stakeholder coordination, also played a crucial role in determining whether projects were completed on budget and schedule. Moreover, the timeliness of payment for work contracts emerged as a critical success factor, as delayed reimbursements risked work stoppages from unpaid suppliers, contractors, and workers that could disrupt project momentum. These findings highlighted the importance of prudent management of political relationships, economic planning, and contract payment administration for mitigating delays and ensuring construction projects are completed successfully and on time. The study comprehensively explored influences through its robust methodology. Findings offered practical guidance and aligned with literature while complementing past work. They highlighted addressing political, economic, and contractual considerations for timely project delivery.

Studies have contributed to understanding the factors influencing the timely completion of construction projects in Sri Lanka. As project delays can significantly impact success, identifying the most influential delay drivers is critical. This research aimed to fill gaps in comprehending regional challenges to delivering construction works on schedule. An extensive literature review and expert consultations were conducted to determine 39 potential delay factors. These incorporated internal and external influences previously cited domestically and abroad. To collect primary data, 163 civil engineers representing a range of expertise and locations were surveyed using a randomized sampling method. This facilitated a comprehensive assessment beyond the limitations of earlier research. Respondents provided insight into their experiences confronting schedule challenges. Responses were systematically evaluated using the Relative Importance Index, quantifying each factor's level of impact according to feedback. This allowed for an objective ranking of top delay drivers. Findings revealed a lack of change orders to contract documentation, contractor financing problems, insufficient material management abilities, escalating supplies expenses due to external inflation, and inadequate contractor experience as most delays. Other categories, like consultant design modifications and resource availability constraints, were additionally prioritized.

Breaking down results into contractor, consultant, resource, and general external elements provided a detailed understanding of multi-faceted internal and external hurdles. For example, financial stability emerged as a prominent contractor issue, suggesting industry support is needed. While design alterations notably stemmed from consultant responsibilities. Resource dependencies correlated to material sourcing complications and price inflation vulnerabilities outside industry control. By addressing gaps through an all-encompassing lens, the study offered comprehensive insights previously unavailable to stakeholders. A nuanced view of interrelated schedule

performance barriers specific to local environmental complexities was presented. Findings can guide focused efforts to proactively manage emerging risks and support enhanced on-time delivery. The robust research design and statistical analysis further reinforced confidence in results and made a meaningful contribution to addressing an important gap. In summary, this important work yielded practical knowledge supporting improved construction success in Sri Lanka.

The report "Study of Factors Affecting the Performance of Construction Projects in the AEC Industry" presented a detailed examination of the enabling elements influencing the performance of construction projects in the Architecture, Engineering, and Construction (AEC) sector, notably in India. The study's goal was to examine the elements that influenced the success of building projects while also understanding the complexity and problems that the Indian construction sector faced. The study's approach included employing structured questionnaire surveys to acquire primary data from the Indian construction sector. The information gathered was subsequently examined utilizing reliability and factor analyses. The study's results demonstrated the importance of dependability, with a Cronbach's alpha score of 0.86 for data acquired using a questionnaire survey. Furthermore, exploratory factor analysis produced five main significant factors based on covariance between the attributes, grouped into factors such as site management and coordination, leadership and financial management, planning, commitment, and coordination, with variances of 17.65%, 11.8%, 9.1%, 8.5%, and 7.5%, respectively.

The construction business was similar to a living creature in that it necessitated the interconnection and coordination of several stakeholders, each with their own set of goals, which may occasionally lead to conflicts of interest between and within teams. Any project's success was repeatable, and a set of qualities for construction project

success may have been established, requiring discipline and hard effort. The construction industry was a nation's development engine, supplying services and commodities to other sectors. Understanding the variables impacting the success of construction projects was thus critical for the industry's and the larger economy's long-term growth. The study's emphasis on the Indian building industry helped to address the complexity and fragmentation of the Indian construction sector, providing insights into the difficulties and potential for enhancing project performance. The study's results had practical implications for improving project performance and resolving the challenges involved with Indian building projects. Finally, the research "Study of factors affecting the performance of construction projects in the AEC industry" gave useful insights into the enabling elements influencing the performance of construction projects in the Indian environment. The study added to the current literature on construction project performance by identifying and assessing the key elements influencing project performance, giving useful insights for practitioners, policymakers, and scholars in the construction sector.

2.2 Theoretical Framework

This study provides a theoretical framework for understanding the factors influencing the completion of private commercial building projects. Drawing on established theories in construction management, project governance, and urban development, it aims to frame research questions and guide analysis. This section introduces critical theoretical perspectives informing our study and interpreting variables affecting private commercial building completion. This structured approach ensures a systematic understanding of the subject matter, contributing to empirical understanding and broader theoretical discourse. Grounding the research in a theoretical framework ensures a systematic understanding

of private commercial construction projects. Theories described in this section include project management theory, resource dependency theory, and institutional theory.

2.2.1 Project Management Theory

Project management theory has been advanced by the seminal work of several thinkers since the early 20th century (Lewis, 2007). Henri Fayol laid the important groundwork by establishing 14 general principles of management in his influential 1949 work (Fayol, 1949). Luther Gulick also made early contributions with his 1937 publication, noting the key functions of managers (Gulick, 1937). Lyndall Urwick built upon these foundations by recognizing in his 1943 book the temporary nature of projects and the need for coordinated teams (Urwick, 1943). However, it was individuals like Harold Kerzner (Kerzner, 2013), David I. Cleland (Cleland & Ireland, 2002), and Russell Archibald (Archibald, 1976) in the mid-20th century who truly helped establish project management as a formal discipline through their scholarly efforts. Kerzner authored many influential books codifying best practices (Kerzner, 2013), while Cleland and Archibald played pivotal roles in Project Management Institute (Cleland & Ireland, 2002) the leading professional organization. Their theoretical publications and work developing standardized processes, tools, and language helped project management gain recognition as a unique body of knowledge for planning and controlling complex endeavors (PMI, 2020), laying the groundwork for ongoing refinement of project management theory.

Project management theory asserts that applying standardized processes, tools, and knowledge can help complete unique endeavors successfully (PMI, 2020). The theory postulates that defining project requirements, breaking work into phases, establishing teams, setting baselines, monitoring progress, controlling changes, and closing projects can aid in addressing challenges and delivering outputs as planned (Kerzner, 2018). Key aspects of the theory include: clearly defining a project's scope, schedule, and budget at

the outset of planning (Kerzner, 2013); developing a work breakdown structure to decompose work into manageable components (PMI, 2020); establishing clear roles and responsibility through a responsibility assignment matrix (PMI, 2020); developing a project schedule using tools like Gantt charts to coordinate tasks and resources over time (Kerzner, 2013); applying earned value management to track budget and schedule performance against a performance measurement baseline (ANSI/EIA-748-B, 2011); highlighting risks and having contingencies to address likely and unlikely events (PMI, 2020); and following a standardized project closing process to formally end a project or phase (PMI, 2020). The overall goal of project management theory is to complete projects within constraints by coordinating people and other resources (PMI, 2020).

Project management theory has continued evolving thanks to contributions from practicing project managers. One of the most notable developments was the publication of the Project Management Body of Knowledge (PMBOK) by the Project Management Institute (PMI) in 1987, which helped codify and disseminate standard practices (PMI, 2020). Agile project management methods also emerged in the early 2000s to emphasize adaptability, building projects iteratively through short development cycles, daily collaboration, and responding to change (Beck et al., 2001). This is built upon the recognition that some project environments require incremental versus purely linear approaches (Sommerville et al., 2009). Hybrid "heavy-agile" frameworks now combine traditional and agile techniques for large, complex initiatives (Gomes et al., 2013). Advancing technological solutions has further supported Remote and Global Project Management (Du et al., 2021). Newer areas of focus within project management theory also include emotional intelligence (Müller & Turner, 2007), stakeholder management (Bourne & Walker, 2005), and leadership skills (Turner & Müller, 2005; Winter et al., 2006) to complement technical project skills. These ongoing developments have

strengthened the theory's applicability across diverse application domains and industries (Söderlund, 2004).

Thomas et al. (2021) applied key aspects of project management theory to examine critical success factors for sustainable social infrastructure projects in Australia. Through a review of the literature and 12 expert interviews, they analyzed how defining clear objectives, establishing governance structures, cost planning, scheduling, risk management, stakeholder engagement, and post-project reviews correlated with delivery outcomes. The study helped validate project management principles for promoting social objectives. Lee et al. (2015) used project management theory to frame their empirical investigation of schedule control practices adopted on large building construction projects in Korea. The researchers employed regression modeling to test relationships between elements of the theory, such as work breakdown schedules, schedule monitoring, and control mechanisms, with variance in project duration. Their findings reinforced the value of schedule management tools proposed by project management. Ika (2009) adopted a project management theoretical lens to study what factors most influence the success of international development projects based in Colombia, Ecuador, and Peru. A survey of project managers and document review assessed how the application of principles for planning, defining roles, tracking budgets/schedules, stakeholder engagement, and closeout impacted overall project performance. The research highlighted some cultural adjustments needed in exporting traditional project management theory.

While project management theory provides a useful framework, it has some limitations. The theory assumes projects unfold in a mostly linear, sequential manner, but reality sees many projects as chaotic and emergent in nature (Söderlund, 2004). An over-emphasis on strict adherence to detailed plans and controls hinders the ability to adapt to changes

and be flexible as needs dictate (Pinto & Winch, 2016). Standard project management also overlooks the contextual uniqueness of individual initiatives (Winter et al., 2006). Additionally, soft skills involving leadership, culture, and emotions are underexplored aspects that impact outcomes significantly, according to some scholars, despite gaining recognition in recent decades (Turner & Müller, 2005; Müller & Turner, 2007). The theory also centers on completion over other potential goals that initiatives may have, like ongoing research and development (Cleland & Ireland, 2002). Quantifying benefits and measuring project success can likewise be challenging areas (Baccarini, 1999). These limitations, if unchecked, can reduce the practicality and generalizability of the theoretical prescriptions provided. However, ongoing refinements are helping address more of the social and human factors involved.

Project management theory supports this goal by providing guidance on defining technical specifications and requirements early, assessing suitable technology/tools options, breaking work into manageable components leveraging such options, tracking schedule and budget variances enabled by tools, and employing change control processes that tools may assist with over the course of a project (Kerzner, 2013). The theory helps here by advocating for incorporating regulatory requirements into baseline plans, establishing approval/review procedures that address compliance checkpoints, implementing quality control/assurance to satisfy regulations, and documenting agreements to demonstrate adherence was achieved upon handover (PMI, 2020). Key aspects of the theory applicable involve clarifying team roles and ground rules formalized in a charter, instituting routine collaboration activities such as status meetings, co-locating personnel where possible, motivating joint effort via intermediate goals, and resolving conflicts as a united team under overall leadership (Bourne & Walker, 2005). The theory provides guidance for cost planning via validated estimates, budget

development factoring contingencies, tracking expenditures using Earned Value Management for variances, implementing spending controls with governance, and learning from spending deviations to refine future estimates (Lewis, 2007). Following these constructs can help complete private commercial building initiatives on time and on budget.

2.2.2 Resource Dependency Theory

Resource Dependency Theory was originally developed in the late 1970s by Jeffrey Pfeffer and Gerald Salancik. In their foundational work "The External Control of Organizations: A Resource Dependence Perspective," Pfeffer and Salancik proposed that organizations depend on the environment to obtain scarce and critical resources necessary for their survival and functioning. Due to this dependence on external factors, organizations cannot be understood independently of their surroundings. Pfeffer went on to become one of the most influential scholars who applied and advanced insights from resource-dependence thinking. Some key contributions include his publications on organizational design and on the management of external dependencies. In subsequent decades, many other prominent scholars built upon and extended the basic ideas put forth by Pfeffer and Salancik. Charles Perrow emphasized that organizations' technical activities require resources from other entities in the environment. Aldrich and Pfeffer emphasized that the availability of critical resources influences organizational structures and behaviors. William Stern and Stewart Clegg further elaborated on how technical and institutional factors shape dependence relationships. Donald Hickson and colleagues applied resource dependence arguments to examine determinants of power in organizational fields. More recently, scholars like Jeffrey Harrison and Cristina Z. Qiu

have continued contributing new empirical tests and theoretical refinements related to concepts like agency theory, social exchange, and network dynamics.

The central assertion of Resource Dependency Theory is that organizations depend on external environmental factors to obtain essential resources and fulfill their objectives. Pfeffer and Salancik argued that organizations are constrained and influenced by their reliance on external entities that control vital resources like capital, information, labor, customers, suppliers, and legitimacy. An organization cannot produce or obtain all necessary resources internally on its own, so it must interact and engage with the external facets of the environment that govern these important resources. According to the theory, organizational behavior and decision-making are significantly shaped by this context of resource dependence. Managers are compelled to consider external demands, needs, and interests when structuring their activities and operations so that the continued flow of critical resources from the environment is secured. The ability of external stakeholders to withhold or withdraw essential resources gives them power and influence over the organization. This power dynamics stemming from environmental dependence forms the core theoretical driver for how and why organizations undertake certain actions. Organizations seek to reduce uncertainties surrounding resource availability and manage the dependencies created by relying on externals for survival-critical enablers.

One noteworthy development was Oliver's (1990) identification of strategic responses that organizations can employ to actively manage external dependencies. Oliver proposed five potential strategies: acquiescence, where organizations comply with external demands; compromise, where organizations attempt to balance internal and external demands; avoidance, where organizations attempt to prevent the application of external demands; defiance, where organizations reject external demands; and manipulation, where organizations attempt to influence the source of the demands. This

nanced Oliver's typology of strategic responses to external dependencies beyond just compliance or defiance. It demonstrated organizations have agency despite environmental constraints. Additional refinements have broadened the conceptualization of dependencies. Where the early theory focused primarily on material resources, scholars have explored how organizations also face financial, social, and political dependencies on external stakeholders (Frooman, 1999). These non-material dependencies similarly influence organizational actions and decision-making. The theory was also enhanced by considering the interplay between different types of dependencies rather than treating them as isolated influences (Casciaro & Piskorski, 2005). Examining reciprocal and multilayered dependency relationships provided a more sophisticated and realistic view of complex inter-organizational interactions than solely unilateral dependence. Researchers have further demonstrated how dependencies shape network governance structures between organizations in collaborative partnerships and policy domains (Provan & Kenis, 2008).

Several notable scholars have conducted large-sample empirical tests that have validated core Resource Dependency Theory predictions. Hillman et al. (2009) examined survey data on thousands of firms to analyze how social alliance networks influence resource dependencies. They found network ties help diversify dependencies and reduce reliance on sole sources. Casciaro and Piskorski (2005) also used an extensive sample to apply the theory to strategic alliances. Their results supported expectations that factors like physical proximity and prior relations alleviate power asymmetries created by uneven dependencies between alliance partners. A number of prominent researchers have also leveraged qualitative, case-based analyses to apply the theory. Provan and Kenis (2008) conducted in-depth studies of network governance structures in community mental health delivery systems. They observed configurations like shared administrative roles emerge

in response to mitigating uncertainties from environmental dependence. Oliver (1990) interviewed managers at nonprofit organizations to evaluate strategic response patterns regarding dependencies on funders. Tactics like collaboration were found to correlate with factors like the urgency of external demands. Pfeffer and Salancik themselves empirically validated core hypotheses regarding hospital board structures and environmental constraints. Across diverse domains, these scholars have helped further corroborate the Resource Dependency Theory's utility.

One major limitation of Resource Dependency Theory is that it assumes organizations will primarily behave in a logical, strategic manner focused on managing environmental dependencies and uncertainties. However, in practice, cognitive biases, institutional norms, and non-rational decision processes also influence organizational actions. As a result, the theory's predictive ability may falter when irrational behaviors come into play. Additionally, while the theory portrays the environment as an external factor imposing constraints, the environment is actually dynamic and unpredictable. Changes occurring rapidly in external conditions challenge the stability assumption. Other limitations arise from oversimplifications within the theoretical framework. The theory risks overstating environmental power differentials in situations where one organization wields vastly disproportionate influence. This can obscure nuances between interdependence and unilateral dependency. The theory also faces challenges clearly demonstrating direct causality, as dependencies may correlate with—rather than definitively cause—observed strategies. Internal factors are also somewhat overlooked despite undoubtedly shaping decision-making to varying degrees alongside external controls. Finally, not all resources are equally critical for organizational survival, so the explanatory power weakens when dependencies are less strategically consequential. These limitations suggest considering complementary theoretical lenses.

According to Resource Dependency Theory, building projects rely heavily on external contractors and equipment suppliers for specialized technologies needed for tasks like plumbing, electrical work, and HVAC installation (Pfeffer and Salancik, 1978). Any delays in obtaining critical technologies from these partners could directly impact completion schedules due to environmental dependencies beyond managers' control (Oliver, 1990). Project dependencies on external entities for specialized tools and equipment may constrain autonomy and introduce uncertainties influencing timelines (Casciaro and Piskorski, 2005). Carefully managing these dependencies through coordinated planning and partner relationship management can help mitigate risks of delays from supply chain issues or support problems (Provan and Kenis, 2008). Private commercial construction projects depend on timely approvals from regulatory authorities like building departments to legally proceed with work (Loosemore and Hsin, 2001). From the perspective of Resource Dependency Theory, gaining necessary permits in a rational timeframe is imperative to avoiding delays stemming from non-compliance with outside requirements. Effective dependency management involves collaborative coordination between project teams and regulatory bodies to streamline approval processes and help ensure compliance requirements do not unduly constrain timelines (Hillman et al., 2009). Resource Dependency Theory posits that unforeseen cost fluctuations introduce environmental uncertainties influencing project schedules (Pfeffer and Salancik, 1978). Accurately budgeting and responding to unpredictable expense changes pose challenges, introducing interdependencies that can extend timelines (Frooman, 1999). Strategic dependency management tactics like innovative joint investment models or leveraging long-term supplier partnerships may help alleviate the negative impacts of potential cost overruns on project deadlines (Provan and Kenis, 2008). According to Resource Dependency Theory, coordinating work between multiple

internal project teams and external subcontractors introduces complex interdependencies that can influence schedules if not managed effectively (Provan and Kenis, 2008). Suboptimal collaboration and integration between groups performing interrelated tasks increases the risk of delays stemming from environmental constraints (Hillman et al., 2009). Minimizing fragmentations requires fostering cooperative relationships that streamline handoffs between partners (Casciaro and Piskorski, 2005). Strategies like co-locating project staff, integrating communication systems, and holding joint planning sessions can help promote optimal coordination and buffer projects from potential delays caused by issues within overlapping workstreams (Oliver, 1990). Examining indicators of collaboration effectiveness through a dependency management lens may offer insights into timeline performance outcomes.

2.2.3 Institutional theory

Institutional theory was prominently developed by sociologist John W. Meyer and economist Brian Rowan in the 1970s. Other notable proponents include Dick Scott, Walter W. Powell, Paul J. DiMaggio, and John W. Meyer. According to institutional theory, organizations are influenced by the social, political, economic, or cultural environments in which they operate. The theory looks at the processes by which organizations progressively come to resemble other organizations in the same field or within the same environment. This is done through the exploitation of resources and relationships with key stakeholders that are available in the wider institution (Scott, 2008). Institutional theory asserts that, over time, organizations working in the same domain or field will come to resemble one another as they align their structures and processes with prevailing norms, rules, and beliefs that define that particular institution (DiMaggio & Powell, 1983). This phenomenon is known as isomorphism. There are three distinct mechanisms that drive isomorphism according to institutional theory -

coercive, mimetic, and normative. Coercive isomorphism stems from political influence and legitimacy pressures exerted on organizations through regulations, standards, and contractual relationships with key partners. Mimetic isomorphism occurs when organizations model themselves after other similar, successful peers during times of uncertainty to legitimize their own structures and practices. Normative isomorphism arises through professionalization as a result of practitioners being trained and socialized in common ways through universities and occupational networks, which shapes how they perceive modern "good" management (Scott, 2008). Over time, institutional forces perpetuate diffusion and homogenization across organizations as they habitually emulate organizations that they deem as leading in their field to garner acceptance and increase chances of survival.

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organizations that they deem as leading in their field to garner acceptance and increase chances of survival.

Institutional theory has evolved over the decades as researchers have built upon and refined its key concepts. Early conceptualizations focused on macro aspects of regulative and normative institutions and their top-down influences. New institutionalism emerged to emphasize that institutions also encompass cognitive dimensions like shared logics, meanings and certitudes (Fuerstein, 2002). This spurred interest in micro-level dynamics within fields and how the agency shapes responses to institutional pressures over time. Hybrid perspectives integrate multiple logics to recognize that organizations often function across different sectors, each with distinct social norms (Pache & Santos, 2013). Recent developments also incorporate insights from related theoretical lenses. For example, combining practice theory illuminated how routines, habits, and taken-for-granted behaviors recreate institutions unconsciously on a daily basis (Lounsbury & Boxenbaum, 2013). New institutionalism also moved beyond a strict determinism to acknowledge that actors retain the capacity for change, even if their actions are bounded and facilitated by prevailing institutions (Lawrence et al., 2009). These theoretical advancements have bolstered institutional theory's explanatory power regarding organizational evolution, institutional development, and change over the long term. Caroline de la Porte and Bruno Palier (2002) employed institutional theory to analyze welfare state reforms in European countries. They examined how path dependencies and complementarities between institutions shape the possibilities for reforming welfare systems. Their study provided insight into how institutions are resilient to change due to taken-for-granted practices and compromised enduring policies. Neil Fligstein and Doug McAdam (2012) utilized neo-institutional theory in their research on strategic action fields. Through case studies of the antislavery movement and 1980s Takeover Battles,

they explored how social skills, organization, and ideologies interact to sustain or disrupt existing institutional arrangements. The research demonstrated institutional theory's usefulness for understanding political dynamics and conflicts inherent in institutional change. Christopher Marquis and András Tilcsik (2016) applied neo-institutional arguments in their analysis of corporate social and environmental reform movements. They interviewed activists and firm leaders to investigate how movements mobilize public discourse and target corporations to incite institutional change and progressive outcomes. The study provided insights into external pressures that empower actors to challenge prevailing norms and shift institutions over the long term. Institutional theory faces several notable limitations that have been highlighted by various scholars over time. Chiefly, the theory does not fully account for the important role of organizational heterogeneity and strategic agency, which can undermine its assertions of passive conformity to institutional pressures. While isomorphism is emphasized as a driver of similarities between organizations in a field, institutional theory fails to adequately recognize how unique contextual factors within each organization, such as resources, history, leadership, and internal politics, shape distinct responses to the social environment. The influence of individual actors working strategically to positively or negatively impact prevailing institutions is also underestimated. This downplays the entrepreneurial capacity of change agents to provoke disruption from within a system. Additionally, institutional theory struggles to disentangle the independent and interacting effects of technical factors versus institutional factors on organizational behaviors. Without means to clearly separate these technical and social realms, the theory remains open to criticism regarding its analytical clarity and testability. Related to this is the challenge of directly operationalizing and validating the theory's abstract concepts like isomorphism and practice diffusion using empirical research designs. While institutional

theory excels at explaining stability and persistence over time, it provides limited guidance for researchers seeking to objectively evaluate or assess the actual performance and functions of institutions as dynamic entities susceptible to incremental change. These limitations nonetheless continue to spur further theoretical advancements within the institutional tradition.

Institutional theory is relevant here because it recognizes that factors beyond technical performance can shape the adoption and use of tools and technologies in the building industry. Government policies and regulations, industry best practices and standards, and social norms influence the types of technologies and tools used in the construction of private commercial buildings. For example, organizations may adopt certain technologies like BIM (Building Information Modeling) not just because of technical functions but because it has gained widespread legitimacy and use in the industry. The social pressures to conform leads organizations to prioritize technologies that are familiar and endorsed within the institution. Institutional theory directly links to this objective as it emphasizes how pressures to conform to rules, regulations, and standards influence organizational behaviors and practices. The building industry operates within a strong regulative environment imposed by governing bodies through mechanisms like codes, acts, ordinances, and permitting processes. To gain acceptance and legitimacy, organizations prioritize compliance with these formal regulations, even if it increases costs or reduces efficiencies. Non-compliance could threaten permits, approvals, or organizational reputation. Regulative pillars described in institutional theory help explain the focus on compliance among building firms. Collaboration among teams within and outside organizations is shaped by cognitive and normative mechanisms in institutional theory. Teams adopt collaborative work practices like co-locating personnel or integrating trades through alliances because these have become standard norms or taken-

for-granted practices in construction. These socially accepted ways of working gain legitimacy and are perceived as modern or progressive, motivating organizations to conform (Friedland & Alford, 1991). In addition, shared definitions of quality project delivery and mutual understanding of roles influence expectations for team behaviors. Institutional theory offers insights into how normative and cognitive pressures from institutions influence cost management practices in the building industry. There are widespread beliefs and understanding within the construction field about appropriate strategies for controlling costs and minimizing overruns on projects. Common cost control mechanisms like standardized pricing systems, pre-qualified subcontractor lists, and cost performance metrics have become institutionalized as socially acceptable norms. Even if an organization has identified alternative methods that are more efficient, it may be reluctant to deviate significantly for fear of appearing unprofessional or unrealistic in its approach (Scott, 2001). Industry associations that promote best practices also shape norms about cost management through published materials and training programs. This leads organizations to model their cost control processes after familiar templates endorsed within the institutional environment rather than experiment with novel, untested methods. The institutional forces for standardization and conformity impact the adoption of certain cost management techniques over others in the industry.

2.2.4 Socio-Technical Systems Theory

Socio-Technical Systems Theory (STS) emerged in the mid-20th century through pioneering work by Eric Trist and Ken Bamforth at the Tavistock Institute in London. Their studies of coal mining operations revealed that organizational productivity hinges not solely on technological tools but on the harmonious integration of social and technical subsystems. Trist and Bamforth observed that mechanized tools, while technically advanced, often disrupted traditional teamwork practices, leading to inefficiencies. This

insight laid the foundation for the theory, which posits that optimal system performance requires the joint optimization of human, technical, and organizational elements (Trist & Emery, 2015).

The theory challenges reductionist approaches that prioritize technical efficiency over social dynamics. Its central tenet is joint optimization, which asserts that tools and workflows must align with the skills, communication patterns, and cultural norms of the workforce. For instance, advanced project management software may streamline scheduling, but its success depends on site managers' willingness to adapt their decision-making processes. Similarly, interdependencies between tools and practices mean that disruptions in one subsystem such as a malfunctioning BIM platform can cascade into communication breakdowns or delays. Theory also stresses human-centric design, arguing that technology should augment human capabilities rather than enforce rigid automation. In construction, this might involve using drones for site surveys while retaining skilled operators to interpret data contextually. Finally, the theory underscores adaptive flexibility, urging organizations to evolve tools and practices in tandem with technological advancements and workforce dynamics (Dwyer, 2011).

Empirical applications of the theory in construction highlight its relevance to private commercial projects. The technical potential of BIM was undermined by social resistance, illustrating the need for joint optimization. The theory illuminated the interplay between technical data collection and social knowledge-sharing. Lean construction practices, such as the Last Planner System, further exemplify STS principles by merging technical scheduling tools with collaborative social rituals like daily huddles, fostering accountability and adaptability (Wang et al., 2022). These cases underscore that cutting-edge tools only enhance completion rates when paired with complementary social practices.

Despite STS emphasis on equilibrium, it overlooks rapid technological disruptions, such as AI-driven tools outpacing workforce upskilling. Cultural resistance in hierarchical industries like construction also complicates joint optimization. For instance, senior engineers accustomed to traditional blueprints may resist AI-generated 3D models, prioritizing legacy workflows over innovation. Additionally, the theory lacks prescriptive guidelines for balancing trade-offs, leaving practitioners to navigate social-technical tensions contextually (Trist & Emery, 2015).

On private commercial building projects, the theory offers critical insights into how technology and tools influence completion outcomes. It explains why tools like BIM or ERP systems often underperform: when implemented without addressing skill gaps or communication silos, they create friction rather than efficiency. Conversely, STS-guided strategies such as pairing 3D laser scanners with operator training programs ensure technical investments yield returns. The theory also highlights ethical considerations, such as automation's impact on labor dynamics. Robotic bricklayers may reduce costs, but the theory urges developers to evaluate effects on worker livelihoods and community relations, aligning tools with broader social values.

2.3 Conceptual Framework

To address the challenges of private commercial building project completion in Limuru, the conceptual framework focuses on understanding the interactions of technology, tools, regulatory compliance, team collaboration, and cost management in influencing the completion of private commercial buildings. The research objectives aim to create a structured lens for analyzing and interpreting complex dynamics. The framework organizes and synthesizes the diverse elements shaping private commercial construction projects, contributing to a holistic understanding of the subject matter. It will help

navigate the empirical and theoretical landscape, untangling the intricate web of influences on private commercial building completion in Limuru.

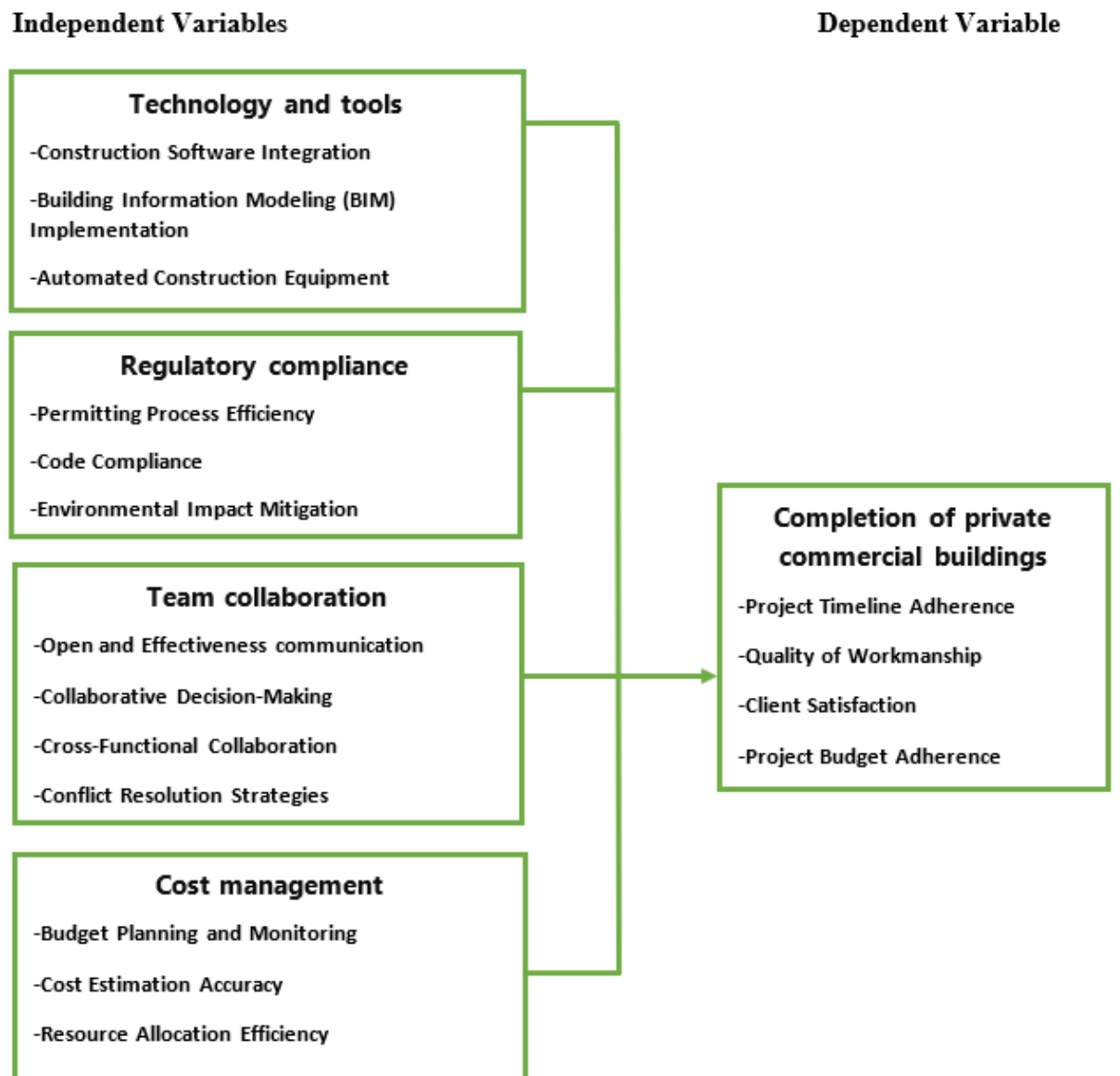


Figure 1: Conceptual Framework (Source: Researcher 2024)

2.4 Recap of Literature Review

The literature review on private commercial building project completion reveals a complex landscape influenced by various factors. Key aspects include project management practices, regulatory compliance, financing mechanisms, and technological integration. This study emphasizes the need for a holistic understanding of private

commercial construction projects. The synthesized knowledge serves as a foundation for exploring technology, tools, regulatory compliance, team collaboration, and cost management, which significantly impact the successful completion of private commercial buildings. The research objectives are relevant and significant within existing scholarship, providing a roadmap for empirical investigation.

2.5 Research Gap

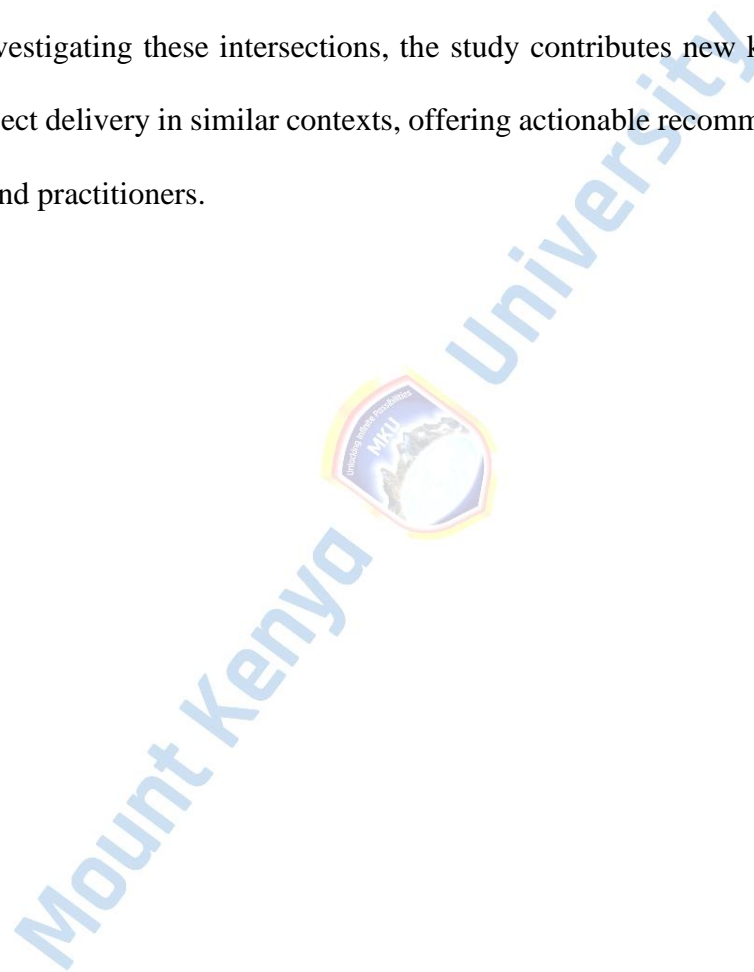
Theoretically, studies have predominantly relied on singular theoretical lenses, such as project management theory or resource dependency theory, to explain delays. However, few studies integrate complementary theories like institutional theory to account for regulatory, social, and cultural pressures shaping organizational practices. By synthesizing project management, resource dependency, and institutional theories, this study advances a multi-theoretical perspective to unravel how technical, environmental, and institutional forces jointly affect completion outcomes.

While studies by Munyoki (2014) and Owuor (2016) provide insights into delays in Nairobi and government projects, there is a paucity of data on private commercial projects in emerging urban centers like Limuru, Kenya. Additionally, the role of modern tools such as BIM and localized regulatory dynamics remains underexplored in existing empirical work. The study fills the gap by collecting context-specific data on Limuru's private sector, testing the interaction between technological adoption, compliance challenges, and collaborative practices.

Studies have focused on large cities or government-led projects, overlooking the unique challenges of smaller, rapidly urbanizing areas. Limuru's distinct socio-economic landscape marked by resource constraints, informal governance structures, and community-driven stakeholder dynamics presents a critical yet understudied context.

This study addresses this gap by situating its analysis within Limuru's specific institutional and environmental realities.

Knowledge gap persists in understanding how localized regulatory compliance, cost management innovations, and team collaboration dynamics interact to influence completion. Existing literature lacks granular insights into adaptive strategies for balancing technical efficiency with institutional legitimacy in resource-constrained settings. By investigating these intersections, the study contributes new knowledge on optimizing project delivery in similar contexts, offering actionable recommendations for policymakers and practitioners.



CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This research employed a systematic methodology to achieve its objectives and address research questions. Rigorous and well-defined research methods were applied to ensure the validity and reliability of findings, especially in investigating determinants for private commercial building completion. The research design incorporated qualitative and quantitative methods to comprehensively understand the completion of private commercial building projects. The research aims to contribute methodological rigor to existing literature and generate insights that inform theory and practice in private commercial construction projects.

3.1 Research Methodology

The research design for this study is cross-sectional design, allowing for data collection at a specific point in time (Pandis, 2014; Wang & Cheng, 2020). This design is suitable for investigating the determinants for the completion of private commercial buildings in the Limuru sub-county; the study provides significant insight into the relationships between variables related to the completion of private commercial buildings in the Limuru sub-county. The study used a cross-sectional survey design to collect data to analyze patterns, relationships of the determinants associated with completion of private construction buildings.

3.2 Location of the Study

The study was conducted in Limuru, Kenya, a rapidly developing region known for its diverse construction activities. The region's economic growth and urbanization make it an ideal location to investigate factors influencing construction completion. Limuru's

topography, including rolling hills and fertile plains, presents unique challenges. The study focused on neighborhoods and construction sites within Limuru, including key ongoing and completed projects, to provide a holistic view of the construction process and identify factors influencing timely completion. Construction projects include private commercial and residential areas.

3.3 Target Population

The study's target group consists of construction managers actively managing building projects in the Limuru region of Kenya, the managers were identified since the managers are directly involved the management of the constructions in Limuru. The effective management of construction projects is crucial to their success. Hence, construction managers are important sources of information about the factors affecting project completion schedules.

3.3.1 Inclusion and Exclusion Criteria

Inclusion Criteria

The study included individuals currently holding construction manager positions in Limuru. They include professionals managing various private commercial construction projects, such as residential and private commercial.

Exclusion Criteria

The study excluded individuals who do not hold the construction manager position, as their perspectives may differ significantly from those directly responsible for project management decisions. Individuals with roles such as site supervisors or laborers were excluded to maintain a focused investigation on the managerial aspect of private commercial construction projects.

3.4 Sampling Procedure and Technique

The study used simple random sampling to obtain a representative sample of construction managers in Limuru (Kothari, 2004). Each manager had an equal chance of being included, ensuring their insights and experiences mirror the region's broader population. This approach enhances the external validity and applicability of the research outcomes to the broader context of construction management in Limuru, ensuring the findings are generalizable to the entire population (Clark et al., 2021).

3.5 Sample Size

This study focuses on construction managers in Limuru, Kenya, who are crucial in executing construction projects. They bring experience and insights into challenges and strategies. The study aims to understand factors influencing the timely and effective completion of construction projects in Limuru. By including construction managers in the sample, the research outcomes are grounded in the practical realities of project management within the local construction industry, providing valuable insights into the existing knowledge.

According to the National Construction Authority, approximately 1500 registered private commercial buildings are being built in Limuru. However, a significant number of these buildings are experiencing delays in completion. The study adopted this approximate number to determine the sample size that will be used in data collection. (Kothari, 2004) propose a sample size determination given by

$$n = \frac{Z^2 \cdot P \cdot Q \cdot N}{e^2(N - 1) + Z^2 \cdot P \cdot Q}$$

, Where e is the margin of error, N is the population size, P is the estimation proportion and $Q = 1 - P$. The population size is $N = 1500$, $P = 0.5$, $Z = 1.96$, $e = 0.05$, then

$$n = \frac{1.96^2 \cdot 0.5 \cdot 0.5 \cdot 1500}{0.05^2(1500 - 1) + 1.96^2 \cdot 0.5 \cdot 0.5}$$

$$n = 306$$

Therefore, the sample size for the study was 306 construction managers.

3.6 Data Collection Instruments

Questionnaires were designed to collect data (Appendix). In qualitative studies, it is common for questionnaire surveys (Clark et al., 2021). The questionnaire instrument was selected due to its robustness and its ability to gather significantly wide range of information from the respondents (Clark et al., 2021). The questionnaire consisted of seventeen questions, where the first section of the questionnaire described information on how it should be completed, and eight Socio-demographic and economic characteristics questions (Appendix). Background questions are designed to clarify demographic and work information in the survey. The next section of the survey includes four questions about determinants for the completion of private commercial buildings in Limuru. The questions have five responses: strongly disagree, disagree, neutral, agree, and strongly agree, where the respondent is required to select one choice for each question.

3.7 Pilot Test

A pilot study was conducted in Limuru sub-county, the pilot study involved construction managers to provide an insight into the questions' clarity, relevance, and comprehensibility (Kothari, 2004). where construction managers of the private construction buildings who possess characteristics that are similar to the ones for target population. 31 respondents were selected for the pilot study which is 10% of the sample projected for the actual study (Connelly, 2008). The questionnaires were checked for ambiguity to ensure reliability of the instrument.

3.8 Validity and reliability

The study aims to ensure the trustworthiness of a questionnaire designed for construction project completion in Limuru. Validity was assessed to ensure the questionnaire effectively captures the intended constructs related to challenges, strategies, and contextual nuances. A pilot test involving a subset of construction managers provided insights into the questions' clarity, relevance, and comprehensibility (Kothari, 2004). Reliability checks established the consistency and stability of the questionnaire's measurements. Test-retest reliability was assessed by administering the questionnaire to a subgroup of construction managers at different time points. At the same time, internal consistency was evaluated using Cronbach's alpha technique. These assessments were aimed at demonstrating whether the questionnaire yields stable and internally consistent results, enhancing the dependability and replicability of the data collected (Kothari, 2004). By addressing validity and reliability concerns, the research instrument was designed to produce trustworthy data that accurately reflects the nuances surrounding construction project completion in Limuru.

3.9 Data Collection and Procedure

Data were collected through a survey designed specifically for this study. Questionnaires were printed in paper form and distributed to construction managers included in the study. A total of 306 questionnaires were distributed to construction managers in Limuru Sub-County, Kenya. In the questionnaire document, participants were provided with clear and simple instructions on how to complete the questionnaire and a specified timeframe for participants to finish their responses. For clarity on the purpose of the survey, the questionnaire highlights the purpose of the study. After one week of questionnaire distribution, the filled questionnaires were collected and organized for data entry and processing using SPSS.

3.10 Data processing and analysis

Data analysis was conducted using IBM SPSS Statistics® version 27.0. The software provides a comprehensive set of tools for data analysis and is widely used in research studies. The collected surveys were coded in SPSS with ID numbers (1–306), and the questions and answer options were coded. The completed questionnaires were manually entered into SPSS, and frequency tables will be designed to verify that the material input was correct in SPSS.

The frequency tables in SPSS were used to analyze omissions in the survey, and the tables used to analyze the background questions in the survey to examine the characteristics of construction managers who participated in the survey and gender distribution among respondents. Survey questions 11a to 11f were analyzed to answer the four research questions about the association between the identified factors and the completion of the projects. The chi-square test was performed to assess the association between the study variables and completion of private construction building projects. A *chi-square test* is an analysis method that examines differences between groups and examines the level of significance between two categorical variables. A test with p-value less than 0.05 was considered to be statistically significant that the two variables are associated (McHugh, 2013; Rana et al., 2015). The multinomial logistic model was used to estimate the effect of determinants on the completion of private commercial building construction in Limuru. The model estimates the effects of determinants (financing, regulatory compliance, technology adoption) on completion of private commercial building projects. It evaluates probability of completion relative to determinants. Coefficients quantify how each determinant influences the likelihood of completion, while odds ratios reveal the relative risk of determinants compared to timely completion. (Christensen, 2006).

3.11 Ethical Consideration

Ethics principles in this survey were considered, mainly relating to data collection using questionnaires. The ethical principles are informed consent, confidentiality, utilization, and information requirements (Clark et al., 2021). The respondents were informed about the purpose of the survey, voluntary participation, and consent upon agreeing to participate, which meets the ethical criteria where research needs to explain the information requirement (Clark et al., 2021). However, in this survey, it was not impossible to guarantee that all respondents read the information provided. Confidentiality requirements were followed by storing the questionnaires securely in the author's home, which makes the questionnaires inaccessible to unauthorized persons. The collected materials were used for this investigation to ensure the utilization requirement has been followed and achieved.



CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.0 Introduction

This chapter presents findings of the study for the investigation of the association between technology and tools, regulatory compliance, team collaboration, and cost management with the completion of private commercial construction projects in Limuru sub-county. The chapter has the following sections: questionnaire return rate, background information of the study participants, influence of the study variables on completion of private commercial construction projects, and the findings on the association between technology and tools, regulatory compliance, team collaboration, and cost management with the completion of private commercial construction projects in Limuru sub-county. Data analysis was carried out using Statistical Package for Social Sciences (SPSS V25), and results presented in tables.

4.1 Instrument Return Rate

The instrument return rate is numerical value describing the number of people who received and responded to the survey questions divided by the number of participants included in the survey, it is expressed in percentages (Lohr et al., 2021). The questions were distributed to 306 construction managers in Limuru sub-county, Kiambu County, Kenya.

Table 1: Questionnaire return rate

Respondent (%)	Sample Size	Number Collected	Return rate
Construction managers	306	306	100%

Source: Field Data, 2024

Table 1 presents the instrument return rate; the table indicates that the questionnaires distributed to 306 construction managers were filled and collected, thus constituting a 100% return rate. A 100% return rate was considered appropriate in this study, allowing the data analysis to proceed.

4.2 Validity of the Instrument

The study content validity was established through a pilot study involving 31 construction managers on clarity, relevance, and comprehensiveness of each questionnaire items. The feedback led to refinements on any ambiguity therefore enhancing the instrument's alignment with Limuru's construction. Expert validation by three industry professionals affirmed the study's questionnaire's capacity to capture critical constructs such as regulatory hurdles, cost constraints, and technological tools.

4.3 Reliability of the Instrument

Reliability tests demonstrated strong consistency in the instrument's measurements. Test-retest reliability, assessed by administering the questionnaire to 31 participants yielded a high Pearson correlation coefficient of 0.86, this indicates stable responses over time. Internal consistency evaluated through Cronbach's alpha, produced coefficients ranging from 0.781 to 0.981 across all questionnaires exceeding the threshold of 0.70 (Kothari, 2004). These results confirm questionnaire's capacity to generate dependable and replicable data.

Table 2. Reliability of the Instrument

Questionnaires	Number of questions	Cronbach's Alpha
Technology and Tools	4	0.981
Cost Management	4	0.877

Team Collaboration	4	0.852
Regulatory compliance	4	0.781

4.4 Background information of the study participants

The study collected the background information for the study participants: construction managers where questions about their education level, occupation, whether the respondent can write, income per month, number of buildings overseen to completion, number of buildings overseen but not complete completion and whether the construction is complete or not. The results were presented in the table.

Table 3: Background information of construction managers (n = 306)

Variable	Categories	Frequency	Percentage	Mean (SD)
Education Level	None	-	-	
	Primary	3	1.0	
	Secondary	16	5.2	
	Tertiary	271	88.6	
	Post-Tertiary	16	5.2	
Occupation	Architect	92	30.1	
	Artisan	68	22.2	
	Civil Engineer	104	34.0	
	Business Person	33	10.8	
	Others	9	2.9	
Can write?	Yes	305	99.7	
	No	1	0.3	
Income Per Month (Ksh)	Less than 10000	5	1.6	
	10001 – 20000	8	2.6	
	20001 – 30000	12	3.9	
	30001 – 40000	73	23.9	

	40001 – 50000	89	29.1
	Above 50000	119	38.9
Buildings overseen to completion			8(4.5)
Buildings overseen but not complete			2(2.2)
Construction project completed?	Yes	124	40.5
	No	182	59.5

Source: Field Data, 2024

Studies have determined that there is still favoritism in educating and assigning work responsibilities to male child over female child in construction industry (French & Strachan, 2015). From table 2, construction managers across various education level groups reveals that 3(1%) possessed primary education, 16(5.2%) had secondary education, 271(88.6%) had tertiary education, and 16(5.2%) had past-tertiary education. These results indicate many construction managers hold a tertiary education.

A significant number of construction managers 104(34%) indicated that they were civil engineers, 92(30.1%) indicated that they were architect, 68(22.2%) were artisans, 33(10.8%) were business persons, and 9(2.9%) indicate that they have other professions, the findings concur with (Mccaffer, 2020) who indicated in the modern construction management construction industry, civil engineers have significantly taken the roles of management to ensure that there is quality work done in the construction projects.

The construction managers were asked on whether they can write in swahili, english, or any other language, and 305(99.7%) indicated that they are able to write while 1(0.3%) indicated that he is not able to write in any of the language, these large percentage of construction managers being able to write is in concurrence with the findings on education level which indicate that all the construction managers attended school.

Respondents were asked about their monthly income and their responses indicate that 5(1.6%) earn less than Ksh 10,000, 8(2.6%) earn between Ksh 10,001 and 20,000, 12(3.9%) earn monthly salary between Ksh 20,001 to Ksh 30,000, 73(23.9%) earn between Ksh 30,001 to 40,000, 89(29.1%) earn between Ksh 40,001 to 50,000, and majority 119(38.9%) earn above Ksh 50,000, the findings indicate that majority of the construction managers in Limuru subcounty earns salaries more than 50,000. The average number of buildings that the construction managers have overseen and finish it are eight and the average number of incompletes are two. The data also shows less than half 124(40.5%) of the construction managers indicated that they have managed and completed the construction project while more than half 182(59.5%) of the construction managers indicated that they have managed construction projects but not many are complete.

4.5 The influence of the selected factors on completion of private construction projects

This section provides an interpretation and discussion of the results for the influence of each study variable on completion of private construction projects, including how do technology and tools influence the completion of private commercial buildings, how does regulatory compliance influence the completion of private commercial buildings, how does team collaboration influence the completion of private commercial buildings, and how does cost management influence the completion of private commercial buildings in Limuru subcounty. Responses from the participants were categorized as "Strongly agree," "Agree," "Neutral," "Disagree," and "Strongly disagree." Statistical analysis was conducted on the replies of each participant, and the frequencies and percentages were shown in tables.

4.5.1 Technology and Tools on Private Commercial Building Completion

The first research question sought to find out how technology and tools influence completion of private commercial buildings in Limuru subcounty. The table presents construction managers responses on how technology and tools influence completion of private commercial buildings.

Table 4: Construction managers responses on technology and tools influence on completion of private commercial buildings

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Stad Dev
Advanced construction technology and tools positively impact the efficiency of private commercial building completion.	4(1.3%)	12(3.9%)	1(0.3%)	130(42.5%)	159(52%)	4.40	0.80
Current tools and technology are available for private commercial building construction projects.	7(2.3%)	9(2.9%)	2(0.7%)	134(43.8%)	154(50.3%)	4.37	0.84
Modern construction tools contribute to the quality of private	4(1.3%)	2(0.7%)	2(0.7%)	121(39.5%)	177(57.8%)	4.52	0.68

commercial buildings. Adopting technology in the construction process has improved the speed of private commercial building completion.	1(0.3%)	6(2.0%)	1(0.3%)	139(45.4%)	159(52%)	4.47	0.64
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Source: Field Data, 2024

Majority of construction managers 289(94.5%) agreed that advanced construction technology and tools positively impact the efficiency of private commercial building completion, 16(5.2%) disagreed and 1(0.3%) construction manager was undecided on whether advanced construction technology and tools positively impact the efficiency of private commercial building completion, this findings indicate that majority of construction managers have a strong view that advanced construction technology and tools has positively impacted the efficiency of their work in completing construction of private commercial building, the finding concur with (Insight DIY, The Impact of Technology on the Construction Industry) findings which determine that Building Information Modelling (BIM), use of drones and robotics, 3D printing, and virtual reality have significantly improve construction efficiency and increase the rate of construction completion. Majority of construction managers 288(94.1%) indicated that the current tools and technology are available for private commercial building construction projects, 16(5.2%) of construction managers disagree that the current tools and technology are available for private commercial building construction projects, while 2(0.7%) indicated that they were undecided to whether the current tools and technology are available for private commercial building construction projects.

A significant number of construction managers 298(97.3%) agreed that modern construction tools contribute to the quality of private commercial buildings, 6(2%) construction managers disagree with the statement, and 2(0.7%) construction managers were undecided on modern construction tools contributing to the quality of private commercial buildings, the findings indicate large number of construction managers agree that current technology in building and construction is available to facilitate faster completion of construction, this finding concurs with (Jia et al., 2019) who determine that technology and internet of things have facilitated faster completion of smart buildings. Lastly, 298(97.3%) agreed that adopting technology in the construction process has improved the speed of private commercial building completion, 7(2.3%) disagreed with statement, and 1(0.3%) construction manager was undecided on whether adoption of the technology in the construction process has improved the speed of private commercial building completion. this indicate that majority of the construction agree that adoption of technology in the construction process improves the speed of private commercial building completion, the finding is consistent with the research finding by (Vyas and Patil, 2016) who determine that using technologies such as 3D printing, Building Information Modelling (BIM), drones and robotics, artificial intelligence, advanced construction materials, artificial intelligence and Internet of Things (IoT) has revolutionize construction and hasten completion of construction projects. Mao & Ye (2015) also determined that technological innovations are one of the factors the is affecting construction industry.

4.5.1.1 Association between technological integration and tools and completion of private commercial construction projects

To determine the association between technological integration and tools and completion of private commercial construction projects, the study used chi-square test to determine the association between the variables. The table presents the test results.

Table 5: Chi-Square test for the association between technological integration and tools and completion of private commercial construction projects

Metrics	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	0.014 ^a	1	0.010	0.053
Likelihood Ratio	0.014	1	0.010	0.053
Fisher's Exact Test				0.053

Source; Field Data (2024)

The findings from the table show that Pearson Chi-Square = 0.014 with p-value = 0.010, since p-value is less than 0.05, this implies that there is evidence of statistically significant association between technological integration and tools and completion of private commercial construction projects. The finding indicates that technological integration and tools significantly influence completion of private commercial construction projects. Findings concur with Aithor (2024) research which determine that technological advancement have significant impact on improvement of efficiency, completion and sustainability of construction projects.

4.5.2 Regulatory Compliance on Private Commercial Building Completion

The second research question sought to find out how regulatory compliance influence completion of private commercial buildings in Limuru subcounty. The tables present the

construction managers responses on how regulatory compliance influence completion of private commercial buildings.

Table 6: Construction managers responses on regulatory compliance influence on completion of private commercial buildings

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Strict adherence to regulatory compliance positively contributes to the timely completion of private commercial building projects.	3(1.0%)	11(3.6%)	1(0.3%)	115(37.6%)	176(57.5%)	4.47	0.77
Lack of compliance with building regulations leads to delays in completing private commercial construction buildings.	1(0.3%)	7(2.3%)	1(0.3%)	118(38.6%)	179(58.5%)	4.53	0.66
A comprehensive understanding	4(1.3%)	10(3.3%)	1(0.3%)	112(36.6%)	179(58.5%)	0.48	0.78

of local							
building codes							
and							
regulations is							
crucial for							
completing							
private							
commercial							
buildings.							
Regulatory							
hurdles and							
compliance							
challenges							
affect the							
overall cost of	5(1.6%)	11(3.6%)	2(0.7%)	121(39.5%)	167(54.6%)	4.42	0.82
completing							
private							
commercial							
buildings.							

Source: Field Data, 2024

Majority of construction managers 291(95.1%) agreed that strict adherence to regulatory compliance positively contributes to the timely completion of private commercial building projects, 14(4.6%) disagreed and 1(0.3%) construction manager was undecided that strict adherence to regulatory compliance positively contributes to the timely completion of private commercial building projects. Majority of construction managers 297(97.1%) indicated that lack of compliance with building regulations leads to delays in completing private commercial construction buildings, 8(2.6%) of construction managers disagree that the lack of compliance with building regulations leads to delays in completing private commercial construction buildings, while 1(0.3%) construction manager was undecided on lack of compliance with building regulations leading to

delays in completing private commercial construction buildings, The findings shows that large number of construction managers agree with the statement that adherence to regulatory compliance has positively contributes to their timely completion of their building projects and on contrary, the lack of compliance with building regulations can only lead to delays in completing private commercial construction buildings, (Janaky, 2024) determined that adhering to construction compliance not only led to development of safe and durable structures but also facilitate timely completion of the projects with less bureaucracies from the construction authorities.

More than half, 291(95.1%) construction managers agreed that comprehensive understanding of local building codes and regulations is crucial for completing private commercial buildings, 14(4.6%) construction managers disagree with the statement, and 1(0.3%) construction manager was undecided on whether comprehensive understanding of local building codes and regulations is crucial for completing private commercial buildings, this finding shows most of the construction managers believe that understanding of local building codes and regulations are crucial for completion of their construction projects, this finding concurs with (NATIONAL CONSTRUCTION AUTHORITY, 2022) which indicate that for safe and conclusive implementation construction projects, the stakeholders must understand and adhere to building codes and regulations. Lastly, 288(94.1%) agreed that regulatory hurdles and compliance challenges affect the overall cost of completing private commercial buildings, 16(5.2%) disagreed with statement, and 2(0.7%) construction managers were undecided on whether regulatory hurdles and compliance challenges affect the overall cost of completing private commercial buildings, the finding indicate that majority of the construction managers believe that regulatory hurdles and compliance challenges are hindering the overall cost of completing their construction project, this finding is

consistent with (Mao & Ye, 2015) study which determined that government regulation policies hinder construction process in China.

4.5.2.1 Association between regulatory compliance and completion of private commercial construction projects

To determine the association between regulatory compliance and completion of private commercial construction projects, the study used chi-square test to determine the association between the variables.

Table 7: Chi-Square test for the association between regulatory compliance and completion of private commercial construction projects

Metrics	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	0.883 ^a	1	0.0347	0.0373
Likelihood Ratio	0.869	1	0.0351	0.0373
Fisher's Exact Test				0.0373

Source; Field Data (2024)

The findings from the table shows that Pearson Chi-Square = 0.883 with p-value = 0.0347, since p-value is less than 0.05, this implies that there is evidence of statistically significant association between regulatory compliance and completion of private commercial construction projects. The finding indicates that regulatory compliance significantly influences completion of private commercial construction projects.

4.5.3 Team Collaboration on Private Commercial Building Completion

The third research question sought to find out how team collaboration influence completion of private commercial buildings in Limuru subcounty. The tables present the

construction managers responses on how team collaboration influence completion of private commercial buildings.

Table 8: Construction managers responses on team collaboration influence on completion of private commercial buildings

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Effective collaboration among construction team members positively impacts the efficiency of completing private commercial buildings.	3(1.0%)	9(2.9%)	2(0.7%)	118(38.6%)	174(56.9%)	4.47	0.75
Open communication and collaboration within the project team contribute to the successful and timely completion of private commercial	5(1.6%)	15(4.9%)	2(0.7%)	111(36.3%)	173(56.5%)	4.41	0.87

construction buildings. A high level of trust and cooperation among construction team members is crucial for completing private commercial buildings. Effective team collaboration minimizes conflicts and eases the resolution of issues during private commercial building construction.	3(1.0%)	6(2.0%)	1(0.3%)	131(42.8%)	165(53.9%)	4.47	0.70
Effective team collaboration minimizes conflicts and eases the resolution of issues during private commercial building construction.	6(2.0%)	16(5.2%)	1(0.3%)	106(34.6%)	177(57.8%)	4.41	0.90

Source: Field Data, 2024

Majority of construction managers 292(95.5%) agreed that effective collaboration among construction team members positively impacts the efficiency of completing private commercial buildings, 12(3.9%) disagreed and 2(0.7%) construction managers were undecided on whether effective collaboration among construction team members positively impacts the efficiency of completing private commercial buildings, the finding shows a significant number of construction of managers agree that effective collaboration

among construction team members has positively impacted their efficiency in completing their building construction projects, the finding is consistent with the finding by (Hardin & McCool, 2015). Majority of construction managers 284(92.8%) indicated that open communication and collaboration within the project team contribute to the successful and timely completion of private commercial construction buildings, 20(6.5%) of construction managers disagree that open communication and collaboration within the project team contribute to the successful and timely completion of private commercial construction buildings, while 2(0.7%) construction managers were undecided on whether open communication and collaboration within the project team contribute to the successful and timely completion of private commercial construction buildings, the finding shows that construction managers agree that having open communication and collaboration within the project team significantly contribute to the successful and timely completion of their construction project, this finding is consistent with Rahman et al., (2014) research findings which determined that excellent communication between team members significantly facilitate faster delivery and success of the building projects, Wu et al.,(2017) also determined that excellent communication and formal communication among teams is positively associated with construction projects success.

More than half of construction 296(96.7%) agreed that high level of trust and cooperation among construction team members is crucial for completing private commercial buildings, 9(3.0%) construction managers disagree with the statement, and 1(0.3%) construction manager was undecided on whether high level of trust and cooperation among construction team members is crucial for completing private commercial buildings, the finding shows that majority of the construction managers agree that high level of trust and cooperation among construction team members is crucial in facilitating completion of their private commercial buildings constructions, this findings concurs

with the Driskell & Driskell (2018) who found that teamwork significantly facilitate faster realization of outputs. Lastly, 283(92.4%) agreed that effective team collaboration minimizes conflicts and eases the resolution of issues during private commercial building construction, 22(7.2%) disagreed with statement, and 1(0.3%) construction manager was undecided on whether effective team collaboration minimizes conflicts and eases the resolution of issues during private commercial building construction, the finding demonstrate that majority of construction managers believe that effective team collaboration minimize conflicts and eases the resolution of issues during building construction, this finding is consistent with the research finding by Wu et al., (2017) which determine that conflicts among teams in construction projects negatively affect projects success.

4.5.3.1 Association between team collaboration and completion of private commercial construction projects

To determine the association between team collaboration and completion of private commercial construction projects, the study used chi-square test to determine the association between the variables.

Table 9: Chi-Square test for the association between team collaboration and completion of private commercial construction projects

Metrics	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	0.02 ^a	1	0.089	1.000
Likelihood Ratio	0.02	1	0.089	1.000
Fisher's Exact Test				1.000

Source; Field Data (2024)

The findings from the table show that Pearson Chi-Square = 0.02 with p-value = 0.089, since p-value is more than 0.05, this indicate that there is weak association between team collaboration and completion of private commercial construction projects, however there is no enough evidence of statistically significant association between team collaboration and completion of private commercial construction projects. The finding indicates that team collaboration is not significantly associated to completion of private commercial construction projects.

4.5.4 Cost management on Private Commercial Building Completion

The fourth research question sought to find out how cost management influence completion of private commercial buildings in Limuru subcounty. The Tables present the construction managers responses on how cost management influence completion of private commercial buildings.

Table 10: Construction managers responses on cost management influence on completion of private commercial buildings

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Cost management practices positively contribute to the overall success and timely completion of private commercial	3(1.0%)	5(1.6%)	-	132(43.1%)	166(54.2%)	4.48	0.68

building projects.							
Adherence to a set budget significantly influences the completion of private commercial building construction.	1(0.3%)	8(2.6%)	1(0.3%)	126(41.2%)	170(55.6%)	4.49	0.67
Accurate cost estimation and forecasting are crucial for ensuring financial success in completing private commercial building construction.	5(1.6%)	11(3.6%)	2(0.7%)	124(40.5%)	164(53.6%)	4.41	0.82
Effective cost management prevents budget	2(0.7%)	4(1.3%)	3(1.0%)	118(38.6%)	179(58.5%)	4.53	0.65

overruns and
financial
setbacks
during
private
commercial
building
construction.

Source: Field Data, 2024

More than half of the construction managers 298(97.3%) agreed that cost management practices positively contribute to the overall success and timely completion of private commercial building projects and 8(2.6%) disagreed on cost management practices positively contributing to the overall success and timely completion of private commercial building projects, this results shows that a significantly large number of construction managers have believe that cost management practices have positively contributed to the overall success and timely completion of their building projects, the finding is consistent with the finding that cost management has a significant role in the success of construction projects Al-Nady et al., (2016). Majority of construction managers 296(96.8%) agreed that adherence to a set budget significantly influences the completion of private commercial building construction, 9(2.9%) of construction managers disagree that adherence to a set budget significantly influences the completion of private commercial building construction, and 1(0.3%) construction manager was undecided on whether adherence to a set budget significantly influence the completion of private commercial building construction. This result shows that construction managers agree that adherence to the set budget significantly affect their ability to complete their project but a very small number of them don not believe that adherence to the set budget has influence on the completion of their construction project.

A significant number of construction managers 288(94.1%) agreed that accurate cost estimation and forecasting are crucial for ensuring financial success in completing private commercial building construction, 16(5.2%) construction managers disagree with the statement, and 2(0.7%) construction managers were undecided on whether accurate cost estimation and forecasting are crucial for ensuring financial success in completing private commercial building construction. Lastly, 297(97.1%) agreed that effective cost management prevents budget overruns and financial setbacks during private commercial building construction, 6(2.0%) disagreed with statement, and 3(1.0%) construction managers were undecided on whether effective cost management prevents budget overruns and financial setbacks during private commercial building construction, results shows that majority of the construction managers believe that the effective cost management helps in preventing the budget overruns and financial setbacks as they implement their private commercial building construction projects, however there is a small number of construction managers who do not agree that effective cost management prevents budget overruns and financial setbacks on their private commercial building construction projects. This finding concurs with research finding by Taye (2016) research which determine that effective cost management helps in reducing the cost overrun during construction project implementation.

4.5.4.1 Association between cost management and completion of private commercial construction projects

To determine the association between cost management and completion of private commercial construction projects, the study used chi-square test to determine the association between the variables.

Table 11: Chi-Square test for the association between cost management and completion of private commercial construction projects

Metrics	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	0.484 ^a	1	0.049	0.050
Likelihood Ratio	0.494	1	0.048	0.050
Fisher's Exact Test				0.065

Source; Field Data (2024)

The findings from the table show that Pearson Chi-Square = 0.484 with p-value = 0.049, since p-value is less than 0.05, this implies that there is evidence of statistically significant association between cost management and completion of private commercial construction projects. The finding indicates that cost management significantly influence completion of private commercial construction projects.

4.5.5 Multinomial regression model for the association determinant factors and the completion of private commercial construction buildings

From the chi-square test we determine that technology and tools, regulatory compliance and cost management were significantly associated with completion of private commercial construction buildings. This section presents the results for the linear association between the factors and completion of private commercial construction buildings.

Table 12: Model results for the linear association of the variables

Variable	Estimates	P-value	Exp (Estimates)
Intercept	1.760	0.049	5.801
Technology and tools	-0.192	0.055	0.825

Regulatory compliance	-0.334	0.030	0.716
Cost management	0.045	0.089	1.046

The findings from the table shows that the coefficients of the variable regulatory compliance and the coefficient are statistically significant while the coefficients for the variable's technology and tools and cost management are not statistically significant. This indicate after fitting the model we observe that cost management is the major factor that influence the completion of private commercial construction projects. The model equation that describes the final results is given by

$$\mathbf{Completion = 1.760 - 0.334 * Regulatory\ compliance} \dots \dots \dots (1)$$

From equation (1), a unit change in cost management contribute to 0.716-unit change in completion rate of private commercial construction projects in Limuru subcounty.

4.6 Construction Managers open Responses

From table 13, construction managers indicated that additional strategies for enhancing project completion should include efficient procurement management, risk assessment and mitigation where 21.9% highlights the critical role of supply chain coordination and proactive risk planning, 18% of construction managers indicated that accurate budget estimation, regular cost tracking and reporting were also crucial in faster implementation of the projects, 13.4% indicated that risk assessment and 9.8% indicated cost tracking and reporting” (9.8%). These findings align with Limuru's current context, where fluctuating material costs, informal subcontractor networks, and regulatory ambiguities has significantly amplified the risks.

Table 13. Construction Managers open Responses

Interventions/Suggestions	Frequency	Percentage
Accurate budget estimation	23	7.5

Accurate budget estimation, regular cost tracking and reporting	55	18.0
Accurate budget estimation, regular cost tracking and reporting, efficient procurement management	1	.3
Accurate budget estimation, regular cost tracking and Reporting, efficient procurement management, risk Assessment and mitigation	1	.3
Cost tracking and reporting	30	9.8
Efficient procurement management	2	.7
Efficient procurement management, risk assessment	1	.3
Efficient procurement management, risk assessment and mitigation	67	21.9
Regular cost tracking and reporting, efficient procurement Management, risk assessment and mitigation	39	12.7
Risk assessment	41	13.4
Risk assessment and mitigation	1	.3

4.7 Findings and Discussion

The study examined four critical factors influencing the completion of private commercial construction projects in Limuru subcounty: technology and tools, regulatory compliance, team collaboration, and cost management. Technology and Tools emerged as a pivotal factor, with 94.5% of construction managers affirming that advanced technologies enhance efficiency. High agreement was observed on the availability of modern tools (94.1%), their contribution to quality (97.3%), and their role in accelerating project timelines (97.3%). Statistical analysis confirmed a strong association ($p=0.010$) between technological integration and project completion. These results align with Jia et al. (2019) and Vyas and Patil (2016), who emphasize innovations like BIM, IoT, and 3D printing in streamlining workflows and reducing delays. The consensus underscores technology's transformative role in mitigating traditional bottlenecks, reinforcing its necessity in contemporary construction practices. Regulatory Compliance was identified

as another critical determinant, with 95.1% of respondents linking strict adherence to timely completion. Non-compliance was perceived to cause delays (97.1%), while understanding local codes (95.1%) and managing regulatory challenges (94.1%) were deemed vital. A statistically significant association ($p=0.0347$) validated compliance's impact, corroborating Janaky (2024) and the NATIONAL CONSTRUCTION AUTHORITY (2022), who posit that compliance minimizes bureaucratic hurdles and ensures structural integrity. However, the recognition of compliance-related cost implications (94.1%) echoes Mao and Ye's (2015) findings on regulatory pressures, highlighting a dual role: compliance as both a facilitator and a financial burden.

Contrastingly, Team Collaboration, while strongly endorsed by managers (95.5% agreement on its efficiency benefits), showed no statistically significant association with project completion ($p=0.089$). This paradox suggests that, despite respondents valuing communication, trust, and conflict resolution supported by Rahman et al. (2014) and Driskell and Driskell (2018) its impact may be mediated by external variables like project complexity or leadership dynamics. The discrepancy invites further exploration into contextual factors that may dilute collaboration's direct influence in Limuru's setting. Cost Management was the most robust predictor, with 97.3% linking it to project success and a significant statistical association ($p=0.049$). Practices like budget adherence (96.8%), accurate estimation (94.1%), and preventing overruns (97.1%) were emphasized, aligning with Al-Nady et al. (2016) and Taye (2016), who stress financial oversight as a cornerstone of project viability. The regression model further prioritized cost management, highlighting its centrality in navigating Limuru's challenges, such as material cost volatility and subcontractor inefficiencies. Open responses reinforced these themes, advocating for procurement efficiency (21.9%), risk mitigation (13.4%), and cost tracking (9.8%), reflecting localized struggles with supply chains and regulatory

ambiguities. These practical insights complement the quantitative findings, emphasizing holistic strategies that integrate financial, technological, and compliance frameworks.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

The chapter presents the summary of the research results, the conclusions from the study findings, recommendations and suggestions for further study.

5.1 Summary of the findings

The study results showed that majority of construction managers agrees that advanced construction technology and tools positively impact the efficiency of private commercial building completion, indicated that the current tools and technology are available for private commercial building construction projects. A significant number of construction managers agrees that modern construction tools contribute to the quality of private commercial buildings and agrees that adopting technology in the construction process has improved the speed of private commercial building completion. There is evidence of statistically significant association between technological integration and tools and completion of private commercial construction projects.

Majority of construction managers agrees that strict adherence to regulatory compliance positively contributes to the timely completion of private commercial building projects indicated that lack of compliance with building regulations leads to delays in completing private commercial construction buildings. More than half construction managers agreed that comprehensive understanding of local building codes and regulations is crucial for completing private commercial buildings, and agrees that regulatory hurdles and compliance challenges affect the overall cost of completing private commercial buildings. There is statistically significant association between regulatory compliance and completion of private commercial construction projects.

Majority of construction managers agreed that effective collaboration among construction team members positively impacts the efficiency of completing private commercial buildings construction managers indicated that open communication and collaboration within the project team contribute to the successful and timely completion of private commercial construction buildings. More than half of construction agrees that high level of trust and cooperation among construction team members is crucial for completing private commercial buildings, and construction managers agrees that effective team collaboration minimizes conflicts and eases the resolution of issues during private commercial building construction. The findings also showed that there no enough evidence of statistically significant association between team collaboration and completion of private commercial construction projects.

More than half of the construction managers agreed that cost management practices positively contribute to the overall success and timely completion of private commercial building projects construction managers agreed that adherence to a set budget significantly influences the completion of private commercial building construction managers agrees that accurate cost estimation and forecasting are crucial for ensuring financial success in completing private commercial building construction, and construction managers agrees that effective cost management prevents budget overruns and financial setbacks during private commercial building construction. There is enough evidence of statistically significant association between cost management and completion of private commercial construction projects

5.2 Conclusion

This study explored the influence of technological integration, regulatory compliance, cost management, and team collaboration on the timely completion of private commercial construction projects in Limuru Sub-County, Kenya. Findings confirmed

that technological integration, regulatory compliance, and cost management are strongly associated with project completion. Construction managers significantly recognized these factors as critical drivers of efficiency, quality, and adherence to timelines. For instance, advanced tools like autonomous machinery, 3D printing, and IoT were emphasized as accelerators of construction speed, aligning with global trends in smart construction practices. Similarly, streamlined regulatory processes, particularly in environmental compliance and permitting, were deemed essential to minimize delays.

While team collaboration was perceived as beneficial by managers, its statistical association with project completion was inconclusive, suggesting its impact may depend on contextual factors like leadership or subcontractor dynamics. To enhance project outcomes, the study advocates for prioritization of technology adoption, simplifying regulatory frameworks, and institutionalizing rigorous cost management practices, such as real-time budget tracking and risk mitigation. These strategies address Limuru's unique challenges, including material cost volatility and regulatory ambiguities, while fostering alignment with evidence-based construction practices observed in broader research. By focusing on these actionable areas, stakeholders can improve on timely and quality private commercial construction projects in Limuru.

5.3 Recommendations

Based on the findings of the study, the study makes the following recommendations.

First, the project managers need to; prioritize technology adoption such as BIM, IoT given its strong perceived efficiency benefits but align it with cost and compliance strategies, Implement structured communication tools and conflict-resolution frameworks to optimize its impact. Third, streamline regulatory compliance processes. While compliance significantly influenced completion highlighted cost burdens. Policymakers such as digitize approvals and offer compliance subsidies to reduce delays

and financial strain. Balancing these strategies, stakeholders can address Limuru's unique challenges informal subcontractor networks, regulatory ambiguities and foster timely completion of the projects.

5.4 Suggestions for Further Research

The study investigated the relationship between regulatory compliance, technological integration and tools, cost management, team collaboration with completion of private commercial construction projects in the Limuru subcounty. Further studies could consider:

1. A similar study in public commercial construction projects to determine if technology and tools, regulatory compliance, team collaboration and cost management factors also have a significant influence in completion of private commercial buildings projects in Limuru subcounty.
2. A study on the influence of specific technological tools on completion of private commercial buildings projects.

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APPENDICES

Appendix 1: Informed Consent Form

Title of Study: Determinants and Successful Completion of Private Commercial Buildings Construction in Limuru Sub- County, Kenya

Principal Investigator: Lucy Wairimu Njuguna

Introduction

You are being invited to participate in a research study aimed at understanding the major determinants influencing the successful completion of private commercial buildings construction projects. Before you decide whether to participate, it is essential to understand the purpose of the study and what your involvement will entail. Please carefully review the following information and feel free to ask any questions before making your decision.

Purpose of the Study

The purpose of this study is to investigate the relationship between regulatory compliance, technological integration, cost management, team dynamics and completion of private commercial construction projects in Limuru Sub County, Kenya. By gaining insights into these determinants, the research aims to contribute to improved project management practices and better outcomes in the construction industry.

Procedures

If you agree to participate, you will be asked to provide information through questionnaires depending on your role and expertise in the construction industry. The data collected will be used solely for research purposes and will be kept confidential.

Risks and Benefits

Participation in this study involves minimal risks, such as potential discomfort associated with discussing your experiences in the construction industry. However, every effort will be made to ensure your comfort and confidentiality throughout the research process.

The potential benefits of participating include contributing to the advancement of knowledge in the field of construction management and potentially improving project outcomes for future commercial building projects.

Confidentiality

Your privacy and confidentiality will be strictly protected throughout the study. Any information you provide will be anonymized and aggregated with other participants' data to ensure confidentiality. Your identity will not be disclosed in any research reports or publications.

Voluntary Participation

Participation in this study is entirely voluntary. You have the right to withdraw from the study at any time, for any reason, without any penalty or loss of benefits. Your decision to participate or not will not affect your current or future relationship with the researcher or any affiliated institutions.

Contact Information

If you have any questions or concerns about the study, you may contact the principal investigator, Lucy Wairimu Njuguna, at mobile phone number, 0702263211.

Consent

By signing this form, you indicate that you have read and understood the information provided above, that any questions you have about the study have been answered satisfactorily, and that you freely consent to participate in this research study.

Participant Signature: _____ Date: _____

Investigator Signature: _____ Date: _____

Appendix 2: Questionnaires

This questionnaire is meant to help the researcher gather data on her Master's (MSc) project titled “**Determinants and Successful Completion of Private Commercial Buildings Construction in Limuru Sub- County, Kenya.**” Please complete the following sections by **ticking (✓)** or **circling (o)** the appropriate opinion or writing down the answer appropriately.

Part A: Socio-Demographic and Economic Characteristics

1. What is your gender? Male [] Female []

2. How old are you? _____years.

3. Marital status?

Never Married Married Divorced/Separated Widowed

Cohabiting Other (Specify) _____

4. What is the highest level of education you attained?

None Primary Secondary Tertiary post-tertiary

5. What is your occupation?

Architect Artisan Civil Engineer Business person Other (Specify)

.....

6. Can you write in (Swahili, English, or any other language)? []Yes []No

7. What is your total income per month?

Less than KES 10,000 per month []

KES 10001 - 20000 per month []

KES 20001 – 30000 per month []

KES 30001 – 40000 per month []

KES 40001 – 50000 per month []

Above KES 50000 per month []

Part B: Study Variables

8. How many buildings have you overseen to completion? _____

9. How many buildings have you overseen but not completed? _____

10. Have you completed your construction project? Yes [] No []

11a) The following are some statements related to **technology and tools**. Please indicate the extent to which you agree with the statements by ticking (✓) the appropriate opinion on the corresponding box based on the following attributes:

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Advanced construction technology and tools positively impact the efficiency of private commercial building completion.					
Current tools and technology are available for private commercial building construction projects.					
Modern construction tools contribute to the quality of private commercial buildings.					
Adopting technology in the construction process has improved the speed of private commercial building completion.					

11b) Based on your answers in (11a) above, what technology can be enhanced to speed up the completion of private commercial building construction? (List your suggestions)

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11c) The following are some statements related to **regulatory compliance**. Please indicate the extent to which you agree with the statements by ticking (✓) the appropriate opinion on the corresponding box based on the following attributes:

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Strict adherence to regulatory compliance positively contributes to the timely completion of private commercial building projects.					
Lack of compliance with building regulations leads to delays in completing private commercial construction buildings.					
A comprehensive understanding of local building codes and regulations is crucial					

for completing private commercial buildings.					
Regulatory hurdles and compliance challenges affect the overall cost of completing private commercial buildings.					

11d) Based on your answers in (11c) above, which **regulatory compliance** rules should be addressed in order to speed up the completion of private commercial building construction? (List all your suggestions)

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11e) The following are some statements related to **team collaboration**. Please indicate the extent to which you agree with the statements by ticking (✓) the appropriate opinion on the corresponding box based on the following attributes:

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Effective collaboration among construction team members positively impacts the					

efficiency of completing private commercial buildings.					
Open communication and collaboration within the project team contribute to the successful and timely completion of private commercial construction buildings.					
A high level of trust and cooperation among construction team members is crucial for completing private commercial buildings.					
Effective team collaboration minimizes conflicts and eases the resolution of issues during private commercial building construction.					

11f) The following are some statements related to **cost management**. Please indicate the extent to which you agree with the statements by ticking (✓) the appropriate opinion on the corresponding box based on the following attributes:

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Cost management practices positively contribute to the overall success and timely completion of private commercial building projects.					
Adherence to a set budget significantly influences the completion of private commercial building construction.					
Accurate cost estimation and forecasting are crucial for ensuring financial success in completing private commercial building construction.					
Effective cost management prevents budget overruns and financial setbacks during private commercial building construction.					

11g) Based on your answers in (11f) above, which **cost management** have you adopted to ensure that the private commercial buildings are completed on time? (List all your initiatives)

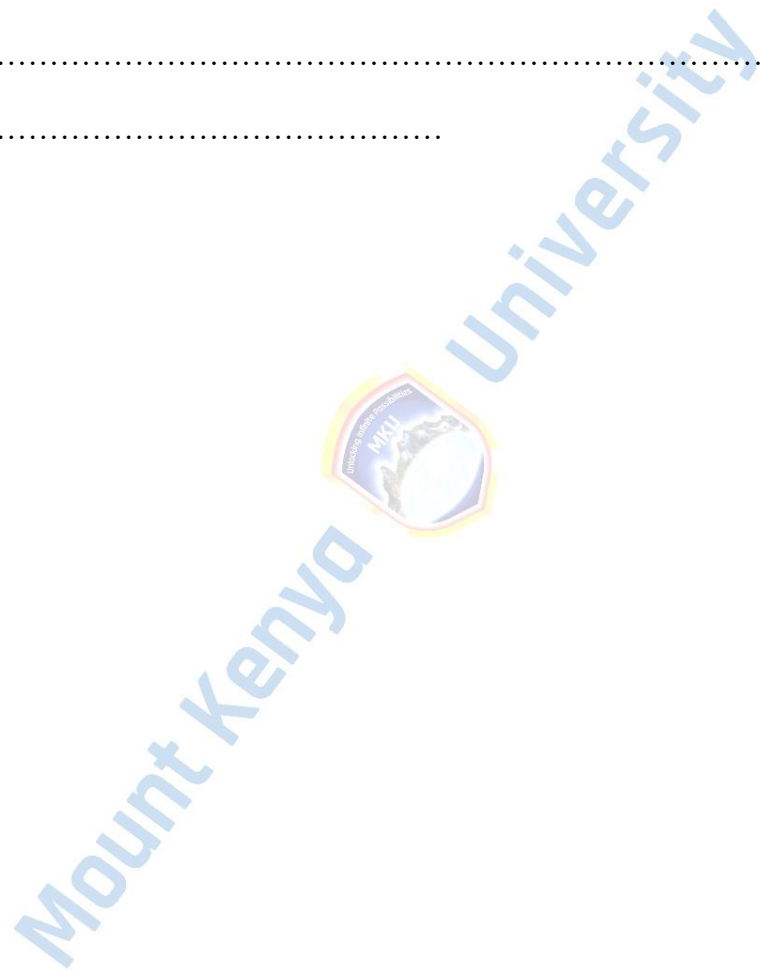
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Appendix 3: ERC Certificate

Mount Kenya University



REF: MKU/ISERC/4334
TO: LUCY WAIRIMU NJUGUNA

Date: 30 August 2024

REG: MSCPM/2022/54079

Dear Sir/Madam,

RE: MAJOR DETERMINANTS AND SUCCESSFUL COMPLETION OF PRIVATE COMMERCIAL BUILDINGS CONSTRUCTION IN LIMURU SUB-COUNTY, KENYA

This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **3054**. The approval period is **30/08/2024 - 29/08/2025**.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including informed consents, study instruments, MTA will be used
- ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
- vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,

Dr. Alfred Owino, PhD
Chairman, Mount Kenya University ISERC



Appendix 4: Introduction Letter

Lucy Wairimu Njuguna,

P.O Box, 24785-00502,

Karen, Nairobi.

Dear Sir/Madam,

RE: PERMISSION TO COLLECT DATA


I am a student at the Mount Kenya University pursuing Master's degree in master of science degree in project management and planning and I am in the process of conducting research on **“Determinants and Successful Completion of Private Commercial Buildings Construction in Limuru Sub-County, Kenya.”** Your site has been selected to be part in this study. Kindly allow me to distribute the research tools to you. I assure you that the information you will provide will only be used for academic purposes and your identity will be treated with strict confidentiality.

Yours Faithfully,




Lucy Wairimu Njuguna.

Appendix 5: NACOSTI Permit



REPUBLIC OF KENYA




NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 904278

Date of Issue: 24/September/2024

RESEARCH LICENSE




This is to Certify that Miss. LUCY WAIRIMU NJUGUNA of Mount Kenya University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kiambu on the topic: MAJOR DETERMINANTS AND SUCCESSFUL COMPLETION OF PRIVATE COMMERCIAL BUILDINGS CONSTRUCTION IN LIMURU SUB - COUNTY, KENYA for the period ending : 24/September/2025.

License No: NACOSTI/P/24/40309

904278


Applicant Identification Number



Director General

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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See overleaf for conditions

Appendix 6: Similarity Index Check

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Appendix 7: Research Site Map

